

REPORT BY THE THIRD ENABLING MASTERPLAN WORKGROUP ON

Promoting Independent Living of Persons with Disabilities through Technology and Design





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SECTION 1: **Foreword by Co-Chairs**

We have come a long way in building an inclusive society and enabling persons with disabilities to live their lives to the fullest within the community. Under the Third Enabling Master Plan (EMP3), significant progress has been made in various aspects of accessibility. Public transport is almost completely barrier-free. Strides have been made in improving informational accessibility, and in growing inclusive spaces and opportunities for meaningful interactions through all stages of life. We have also strengthened the ecosystem of support for caregivers and made information available and accessible for them.

But there is still more that we can do together.

This Workgroup was set up to look at how design and technology can help persons with disabilities in Singapore to live independently in the community. Specifically, the Workgroup would:

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- a) Propose design-related solutions that enable persons with disabilities to live and work independently within the home, community and workplace. This includes both technological and non-technological enablers that can be implemented on a wide scale.
 - b) Promote wider adoption of assistive, technological or digital devices among persons with disabilities, and in the design of homes, workplaces and common spaces in the community among planners, employers and builders.
 - c) Improve persons with disabilities and caregivers' ability to access information and advice relating to design modifications and assistive technology or solutions that are suitable for their needs.
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Members from our Workgroup were drawn from across the people, private and public (3P) sectors, providing a range of different perspectives and ideas that have led to the recommendations in this report. Members have also worked with the various agencies to co-solution and provide input to the specific initiatives that will be implemented in response to these recommendations. We would like to express our appreciation to the Workgroup members for their contributions.

Foreword by Co-Chairs

The COVID-19 pandemic has disrupted our way of life and amplified hurdles for many persons with disabilities. At the same time, it has accelerated the adoption of technology and substantially expanded digital services across all sectors. This shift toward digitalisation presents new opportunities to use technology to overcome barriers and improve independent living for persons with disabilities. It also reminds us all that an increasingly digitalised world comes with a diverse audience, whether they are consumers, fellow digital citizens, collaborators or participants in various initiatives. We will need the concerted effort of all stakeholders within the community to make our communications, outreach and service delivery inclusive.

When we co-create, co-develop and co-implement solutions together, we amplify the sum of our efforts.



Mr Masagos Zulkifli

Minister for Social and Family Development,
Second Minister for Health &
Minister-in-charge of Muslim Affairs



Ms Chia Yong Yong

Board Advisory Panel Member, SPD
Advocate and solicitor,
Chia Yong Yong Law Corporation

SECTION 2: Executive Summary

In March 2019, former-Minister of State for Social and Family Development, Sam Tan, announced in Parliament the formation of a workgroup to improve the ability of persons with disabilities to live independently, by leveraging technology and design. This Workgroup on Promoting Independent Living of Persons with Disabilities through Technology and Design comprised 19 members from the people, private and public sectors, including persons with disabilities. Their work builds on the Enabling Masterplans to empower and enable persons with disabilities to engage meaningfully with others in the community, and to fulfil their potential.

The Workgroup has drawn up 11 recommendations in four key areas, and has worked with key partners, such as disability social service agencies (SSAs), and public sector agencies like the Building and Construction Authority, and the Smart Nation and Digital Government Group (SNDGG), to jointly develop initiatives in these areas:

Improving accessibility in built environment and transportation

Ensuring access to information and services

Adopting assistive technology to support self-care at home and connecting to community

Raising awareness of disability and promoting inclusion

The recommendations, and the initiatives that are being undertaken to realise them, are summarised in the following pages.

The Workgroup calls for the support and active participation of the community at large in fostering inclusion, in the way organisations, businesses and individuals share information and ideas, provide products, services and programmes, and interact with each other, so that we can realise the vision for building a caring and truly inclusive society where persons with disabilities can participate fully and realise their potential.



Source: Ministry of Social and Family Development

Focus group discussions in 2019 with persons with disabilities, caregivers and staff from disability SSAs

KEY THEME 1: Improving accessibility in built environment and transportation

RECOMMENDATION 1
Systematically improve barrier-free access and wayfinding

DETAILS

Two community partnership groups to be set up by 1H 2021 as a start, one looking at the accessibility gaps in the Central Business District, and another looking at the accessibility gaps in a Housing & Development Board (HDB) town.

RECOMMENDATION 2
Develop barrier-free navigation feature in map applications

OneMap will be progressively enhanced from 2022 onwards, to include barrier-free point-to-point navigation, starting with six specific locales: Ang Mo Kio, Bukit Merah, Punggol, River Valley, Singapore River and Tanglin.

RECOMMENDATION 3
Enhance commuter experience in the public transport system for persons with disabilities

The Government will continue to build a more caring and inclusive land transport system through ongoing efforts under the Land Transport Master Plan 2040 and Caring SG Commuters Movement. Public Transport Council will conduct a survey later this year, to seek feedback on travel experience from persons with special needs/disabilities and their caregivers.

KEY THEME 2: Ensuring access to information and services

RECOMMENDATION 4

Build capability needed to enhance accessibility of websites and applications

DETAILS

More Government websites to be compliant with Web Content Accessible Guidelines (WCAG), an internationally adopted standard which ensures digital accessibility for persons with disabilities. SNDGG has started automated testing of websites this year.

A new programme, Consumer Inclusiveness workshop for e-accessibility, was introduced by SG Enable in November 2020 to educate resource personnel on web content accessibility guidelines.

RECOMMENDATION 5

Expand the range of courses available to persons with disabilities to pick up digital skills

Infocomm Media Development Authority (IMDA) has started working with Special Education (SPED) schools to organise train-the-trainer sessions for SPED teachers, to teach basic digital skills to their students, and to develop digital tools to aid learning.

KEY THEME 3: Adopting assistive technology to support self-care at home and connecting to community

RECOMMENDATION 6

Enhance Tech Able to raise awareness of the range and applications of assistive technology available, serve the assessment and prescription needs of persons with disabilities and caregivers, and deepen partnerships to facilitate sharing of knowledge and innovation to better support needs of persons with disabilities

DETAILS

Assessment services by Tech Able for assistive technology needs, co-managed by SG Enable and SPD, will be expanded to cover assessment and training of persons with disabilities in their natural environment e.g. home, workplace or place of learning/training.

RECOMMENDATION 7

Showcase accessible design and technology through various platforms to drive adoption of assistive technology

HDB's My Nice Home Gallery showcases a range of smart items, such as voice-activated smart controls, lighting controls, etc. HDB has incorporated additional items suggested by the Workgroup into a recent revamp of the Gallery and will consider other suggested items for display in future.

RECOMMENDATION 8

Enhance affordability of assistive technology

Ministry of Social and Family Development (MSF) will review the existing Assistive Technology Fund (ATF) to make it more client-centric and to enhance the affordability of assistive devices.

KEY THEME 4: Raising awareness of disability and promoting inclusion

RECOMMENDATION 9

Strengthen public education efforts to empower members of the community to include and support persons with disabilities in day-to-day settings

DETAILS

SG Enable will continue to collaborate with social media partners, schools and Institutes of Higher Learning (IHLs), employers, and persons with disabilities themselves, to strengthen inclusion and public awareness on how to support persons with disabilities.

RECOMMENDATION 10

Develop Communications and Engagement guide for public sector agencies

MSF and partnering agencies such as Ministry of Culture, Community and Youth (MCCY) and SG Enable will put together guides on inclusive engagement and inclusive public communications. Both guides will be circulated to all public agencies later this year.

RECOMMENDATION 11

Train frontline officers to be able to serve and address needs of persons with disabilities sensitively

SG Enable has worked with the Civil Service College to extend SG Enable's Consumer Inclusiveness workshop for customer service to public officers. The workshop helps public officers communicate effectively with persons with disabilities.

Promoting Independent Living of Persons with Disabilities

1 Improving accessibility in built environment and transportation



Systematically improve barrier-free access and wayfinding



Develop barrier-free navigation feature in map applications



Enhance commuter experience in the public transport system for persons with disabilities

2 Ensuring access to information and services



Build capability needed to enhance accessibility of websites and applications



Expand the range of courses available to persons with disabilities to pick up digital skills

3 Adopting assistive technology to support self-care at home and connecting to community

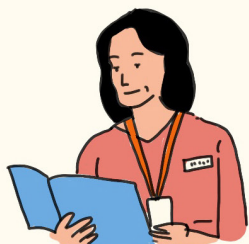


Enhance Tech Able to raise awareness of the range and applications of assistive technology devices available, serve the assessment and prescription needs of persons with disabilities and their caregivers, and deepen partnerships to facilitate sharing of knowledge and innovation to better support needs of persons with disabilities

4 Raising awareness of disability and promoting inclusion



Strengthen public education efforts to empower members of the community to include and support persons with disabilities in day-to-day settings



Develop Communications and Engagement guide for public sector agencies



Train frontline officers to be able to serve and address needs of persons with disabilities sensitively



Showcase accessible design and technology through various platforms to drive adoption of assistive technology



Enhance affordability of assistive technology

SECTION 3: Overview



Source: Cerebral Palsy Alliance Singapore

Person with disability using an iPad app and BIGmack device for communication

Persons with disabilities should be enabled to live their lives to the fullest within the community, and to be able to participate in society as far as they desire to. In doing so, we:

- Support the desire of persons with disabilities for independence and autonomy over their own lives, and recognise their abilities;
- Support family members/caregivers by enabling persons with disabilities to carry out tasks for themselves;
- Support ageing-in-place and enable persons with disabilities to be part of and supported by their network and community as far as possible.

Support for independent living does not necessarily mean supporting persons with disabilities to live alone. It is about enabling persons with disabilities to perform day-to-day activities more independently, and covers the following domains in both the home and community environment:

- **Personal mobility** – getting around in the built environment and using the transport system for the purposes of education, training, work, leisure and recreation;
- **Access to information and services** – to be able to navigate and access information and services independently;
- **Access to assistive technology to support self-care at home and connecting to the community** – in terms of knowledge about what options are available, how to get them, and affordability;
- **General public understanding and support** – to foster a more inclusive and caring society.

SECTION 4: Insights from the Public and Agencies

The Workgroup consulted extensively with persons with disabilities, caregivers and staff from disability social service agencies (SSAs). There were two phases of public engagement on independent living – in 4Q 2019 the Workgroup obtained feedback on areas for improvement, which shaped the EMP recommendations, and in 4Q 2020, the Workgroup presented the findings and preliminary recommendations to these persons with disabilities, caregivers and staff, to seek their inputs on the recommendations. Close to 300 participants took part in 15 engagement sessions over 2019 and 2020.

During these engagement sessions, participants were asked to share their views on the key challenges faced by persons with disabilities and caregivers in going about their daily activities in the home and community, how technology and design could help to mitigate these challenges, and the support they hoped to see from other stakeholders such as employers, government agencies, etc. The feedback and ideas received through these sessions have helped to shape the recommendations of the Workgroup and are discussed further in the following sections. A summary of the findings can be found at Annex A.



Source: Ministry of Social and Family Development

Focus group discussions in 2019 with persons with disabilities, caregivers and staff from disability SSAs

SECTION 5: **Workgroup Recommendations and Co-Solutioned Next Steps**

Based on input gathered through the engagement sessions, the Workgroup agreed on the following areas of focus when developing solutions using technology and design to support independent living.

Improving accessibility in built environment and transportation

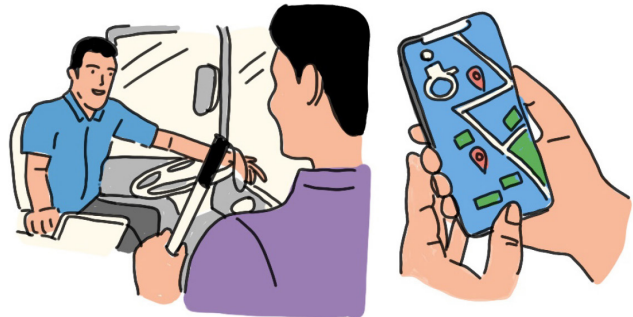
Ensuring access to information and services

Adopting assistive technology to support self-care at home and connecting to community

Raising awareness of disability and promoting inclusion

The Workgroup developed 11 recommendations and has worked with agencies to co-solution and provide input to specific initiatives across these four areas of focus in response to the recommendations.

Agencies have started to implement some of these initiatives, while others will be progressively implemented over the coming years.



KEY THEME 1:

Improving accessibility in built environment and transportation

CURRENT STATE & ISSUES

There are continual efforts to enhance accessibility in the built environment and the transportation system. At the land use planning level, Urban Redevelopment Authority's (URA) Master Plan 2019 focuses on planning for inclusive, sustainable and green neighbourhoods with community spaces and amenities for all to enjoy. Key themes to enhance connectivity and mobility in the Master Plan include creating 'liveable and inclusive communities' and 'convenient and sustainable mobility'.

At the individual development level, Building and Construction Authority's (BCA) Code on Accessibility in the Built Environment (a comprehensive set of requirements that building owners and professionals have to follow for buildings and public spaces to meet a minimum standard of accessibility) was reviewed in 2019 by a tripartite committee, which included disability organisations. Provisions of the Code apply to new buildings and existing buildings undergoing addition and alteration works. BCA's Accessibility Fund also provides grants to private building owners to upgrade their existing pre-1990 buildings with essential accessibility features.

Within many Housing & Development Board (HDB) public housing estates, there are barrier-free accessibility features such as ramps, railings, sheltered walkways and drop-off points. All new HDB estates are built with barrier-free access features. Barrier-free accessibility within existing HDB estates are also improved upon when they undergo upgrading programmes such as Lift Upgrading Programme, Neighbourhood Renewal Programme and Remaking Our Heartland programme. Hospitals, polyclinics, markets, hawker centres have wheelchair-accessible lifts and toilets.

However, as highlighted through the feedback, there are still areas that can be made more accessible. These include existing built-up areas in the city centre with large number of older developments.

In terms of transport, one of the key goals of Ministry of Transport's (MOT) Land Transport Master Plan 2040 is to develop a more inclusive land transport system, supported by a caring and gracious commuting culture. It also aims to achieve 20-minute towns and 45-minute city¹ for all by 2040.

For key public transport nodes such as MRT/LRT stations and bus interchanges, Land Transport Authority (LTA) has ensured that at least one access route is barrier-free. All buses are wheelchair accessible. Since 2013, LTA has installed lifts at 51 pedestrian overhead bridges, and around 50 more will be upgraded to provide barrier-free crossings for the less ambulant. LTA is working towards making all bus stops accessible to persons in wheelchair by 2023.

But more can be done to improve barrier-free accessibility from all start to end points. Persons with disabilities have shared in our engagements with them that they face challenges in route-planning, navigating and travelling from one point to another. The challenges faced and needs of persons with disabilities also differ, depending on their disability. Hence, solutions to enhance wayfinding would need to take the varied needs of persons with disabilities into account.

1. The Land Transport Master Plan 2040 envisions a land transport system in which commuters can take no more than 20 minutes to get from home to the nearest neighbourhood centre, and take 45 minutes or less in most cases to reach their workplace during peak periods.



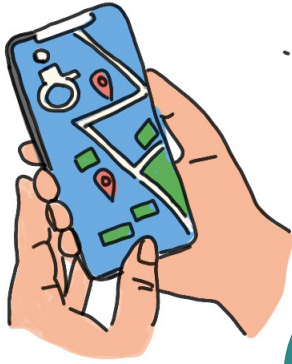
RECOMMENDATION 1

Systematically improve barrier-free access and wayfinding

The Workgroup recommends that the public agencies work more closely with the disability community to identify areas for accessibility improvements. This includes continuing to engage the building management of private and older developments to ensure that Barrier-Free Accessibility (BFA) features are considered and incorporated during upgrading, and to consider including BFA features that are above and beyond BCA's Code on Accessibility in the Built Environment.

BCA will be working with URA, LTA, Real Estate Developers' Association of Singapore and SSA partners, to form community partnership groups to co-create solutions for enhancing accessibility and inter-connectivity in specific localities. These community partnership groups will take a community-driven approach to identify and address key BFA gaps, for example accessibility to transport nodes. The partnership will also work with private building owners to upgrade the accessibility of their buildings, and put in place better wayfinding signage, among other initiatives.

Two such community partnership groups will be set up by 1H 2021 as a start, one looking at the accessibility gaps in the Central Business District, and another looking at the accessibility gaps in a HDB town.



RECOMMENDATION 2

Develop barrier-free navigation feature in map applications

The Workgroup recommends that a platform be developed so that persons with disabilities and caregivers can easily search for and find barrier-free routes to the places that they need to get to and from. This platform could be customised for the needs of specific disability types, especially persons with physical disability or visual impairment.

Singapore Land Authority (SLA) is working with HDB, GovTech, LTA and SG Enable to enhance OneMap to include barrier-free point-to-point navigation, starting with six specific locales: Ang Mo Kio, Bukit Merah, Punggol, River Valley, Singapore River and Tanglin. Over the next two years, the project team will engage various disability groups for input and testing, including groups representing persons with physical disability and visual impairment. Thereafter, SLA will explore scaling up the effort island-wide.



RECOMMENDATION 3

Enhance commuter experience in the public transport system for persons with disabilities

The Workgroup recognises that more can be done to enhance the commuting experience of commuters with disabilities in the public transport system. The Workgroup recommends that the Government ensures access to first and last mile transport connectivity, and to explore deeper upstream engagement with commuters with disabilities to incorporate their feedback on an ongoing basis.

Workgroup Recommendations

The Government will continue to build a more caring and inclusive land transport system through ongoing efforts under the Land Transport Master Plan 2040 and Caring SG Commuters Movement, which aims to build a caring and inclusive commuting culture. One of the Caring SG Commuters Committee's areas of focus is on raising awareness of the challenges faced by persons with disabilities when taking public transport, and guiding members of public to assist persons with disabilities sensitively. The Committee will release its recommendations in a report in mid-2021.

As part of the Caring SG Commuters Committee's engagement efforts, the Public Transport Council is also working with Ministry of Social and Family Development (MSF), SG Enable and SSAs on a survey to seek feedback on travel experience from persons with special needs/disabilities and their caregivers. This survey is targeted to be rolled out later this year.

Partners in the community are also playing a part, such as Tower Transit's effort to launch a free course at the relocated Jurong East bus interchange. The Public Bus Confidence Course is designed to assist people with mobility challenges to regain confidence to travel on public buses. Facilitated by Tower Transit's Customer Experience & Inclusivity Officer who himself is a wheelchair user, the course will involve familiarisation of the bus interchange and bus layout, on-board coaching and practice runs. The course was launched on 25 March 2021. Another course for members of the public – the Public Bus Inclusivity Course – will equip participants with the awareness of the needs of vulnerable commuters and knowledge of how to assist such commuters on public buses. Details are being worked out and the inaugural course is slated to take place in 1H 2021.



Source: APSN

To help persons with visual impairment navigate our pedestrian crossings with greater ease, MOT/LTA will also be studying the possibility of implementing audible signals at more pedestrian crossings, and the possibility of increasing the number of pedestrian crossings with audible signals that operate past 9pm.

Students from APSN Chaoyang School on the Independent Travel Training Programme

KEY THEME 2:

Ensuring access to information and services**CURRENT STATE & ISSUES**

Digital technologies are becoming increasingly prevalent in our daily lives and workplaces. For example, more information and services (both government and private) are being moved online and broadcast digitally via websites and apps. Persons with disabilities can tap on several existing schemes to be connected digitally and to obtain digital devices for work or personal use. The NEU PC Plus Programme supports low-income persons with disabilities with subsidised PCs and broadband, while the Open Door Programme provides subsidies for employers to purchase equipment that their employees with disabilities might need for work.

Beyond access to personal IT devices, the content and design of online information and services also need to be accessible for the individual user. A good example is the Enabling Guide launched by SG Enable in July 2019. The website serves as a first-stop online portal that provides information on disability schemes and services in Singapore. Some features of the Enabling Guide include:

- Easy access to personalised content under upcoming function ‘My Guide’ among other features
- A new blog section written by persons with disabilities to share their personal stories, daily achievements and struggles
- An e-book section curated by National Library Board and SG Enable where users can borrow e-books using their library accounts

Within Government, all public-facing government digital services are required to comply with the Digital Service Standards (DSS), which also includes the Web Content Accessibility Guidelines (WCAG), an internationally adopted standard which ensures digital accessibility for persons with disabilities. However, there are still challenges to making government websites and apps accessible as the gaps in accessibility faced by users with disabilities may not be well understood nor prioritised during the development of these websites and apps. Some web developers may not have the capabilities or training to code websites accessibly, making it challenging to implement the DSS.

The issue of accessibility of online information is particularly pertinent for the Visually Impaired (VI) community. We have heard during our public engagements that websites and mobile apps may occasionally be incompatible with the screen readers that they use. This makes it difficult for persons with visual impairment to navigate and transact with government websites and apps.

Some also face challenges navigating websites entirely with their keyboards due to the design of fields/forms, and new updates can sometimes introduce errors that reduce the ease of use.

Some persons with disabilities may also lack the skills and experience to access and utilise digital technology in an everyday setting. There is scope to explore how adult persons with disabilities can be supported in the learning of digital skills, the use of hardware, and how to access websites and applications.



RECOMMENDATION 4

Build capability needed to enhance accessibility of websites and applications

The Workgroup recommends that all Government websites and apps be made accessible, so that persons with disabilities are able to access information on digital platforms and carry out transactions on all Government websites and apps.

Today, Government digital services are required to comply to a set of Digital Service Standards, which include the WCAG, an internationally adopted standard which ensures digital accessibility for persons with disabilities.

The Smart Nation and Digital Government Group (SNDGG) has put in place measures to ensure compliance with WCAG, such as providing website designers with standardised components and layouts that incorporate accessibility design considerations.

This year, SNDGG has started automated testing and expect an increasing number of websites to be more compliant with WCAG over the year. However, as the content of websites change frequently, compliance with WCAG will not be a one-off effort, and will require continuous identifying and fixing of issues.

The Government has also started to involve the disability community in doing user testing on government digital services to provide feedback on accessibility issues. Testing of these services with persons with disabilities will also help to ensure that international accessibility standards such as the WCAG are implemented in the localised context.

SG Enable will complement these efforts by running a Consumer Inclusiveness workshop for e-accessibility which will help educate resource personnel (such as website owners, copywriters, and graphic designers) on web content accessibility guidelines and ways to apply the guidelines.



RECOMMENDATION 5

Expand the range of courses available to persons with disabilities to pick up digital skills

The Workgroup recommends that effort be made to expand the range of courses available to persons with disabilities to pick up digital skills, so as to empower them to use technology, adopt digital tools and participate in a more digitalised society.



Source: APSN

The Infocomm Media Development Authority (IMDA) is working with Special Education School (SPED) schools to organise train-the-trainer sessions for SPED teachers, to teach basic digital skills to their students, and to develop digital tools to aid learning, e.g. cyber-wellness virtual reality game. IMDA will also work with MSF to reach out to disability SSAs and support them with train-the-trainer sessions on digital skills, so that persons with disabilities outside the school environment can also pick up these skills.



Source: SPD/Infocomm Media Development Authority

Persons with disabilities using mobile tablets

KEY THEME 3:

Adopting assistive technology to support self-care at home and connecting to community

CURRENT STATE & ISSUES

Today, there are various agencies and organisations involved in the assistive technology space. However, not all the agencies and organisations may be familiar with the available assistive technology solutions or have them on hand for their clients to try and assess the suitability of such solutions. The provision of assistive technology services and support schemes also depends on the functional expertise of existing agencies in assessing and prescribing assistive technology for the specific client groups they serve. These have resulted in gaps on the ground and the level of assistive technology adoption remains low.

At the engagement sessions, we learned that persons with disabilities and caregivers would appreciate more ways to learn about assistive technology solutions and how to incorporate these solutions in their daily life. Some shared that they were unsure of where they could go to find information about these products and what would suit them. There can also be more options and ways to improve service delivery when it comes to assessing the assistive technology needs of users with disabilities that would take into account their individual needs and the environment that they will need to use the devices. In addition, the Workgroup has heard feedback that assistive technology products may require maintenance, and need to be regularly replaced. Those that require more customisation can also be very costly. Persons with disabilities highlighted that more could be done to make these devices more affordable to own, use, and maintain.

Another challenge that was highlighted related to how innovative ideas or solutions may not be developed further or make its way into production due to difficulties finding collaborators to develop the products further or to commercialise it. There is scope for more partnership to link innovators up with other stakeholders who can take part in the process of deployment (i.e. testing, refining, ensuring safety and rolling out of the products or solutions). Institutes of Higher Learning (IHLs), SSAs and industry players can play a more defining role. There can also be more opportunities for therapists to learn about new innovations from professionals and peers, so that they can better inform their clients on products or solutions that suit the needs and capabilities of different persons with disabilities.



RECOMMENDATION 6

Enhance Tech Able to raise awareness of the range and applications of assistive technology devices available, serve the assessment and prescription needs of persons with disabilities and their caregivers, and deepen partnerships to facilitate sharing of knowledge and innovation to better support needs of persons with disabilities

The Workgroup recommends working with disability SSAs to enhance the service delivery for assistive technology assessment and raise the awareness of assistive devices for persons with disabilities.



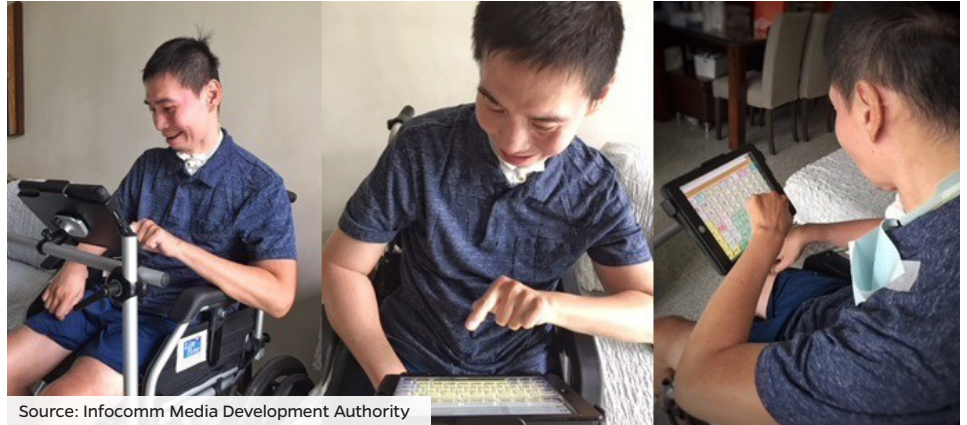
Source: SG Enable

Tech Able at Enabling Village is an integrated assistive technology space

Tech Able will expand its assessment services for assistive technology needs. It will start by expanding its services to conduct assessment and training of assistive devices in the natural environment of persons with disabilities including their home, workplace or place of learning/training. At the same time, Tech Able will continue to explore the use of technology to enable remote assessment of persons with disabilities and training for caregivers.

As a way to improve accessibility and reach, Tech Able will also offer a virtual showroom. In addition, Tech Able will raise awareness by developing content to help persons with disabilities and caregivers select commonly purchased assistive devices, and providing listing on assistive technology events, distributors and resources.

Workgroup Recommendations



Source: Infocomm Media Development Authority

Person with disability using an Augmentative and Alternative Communication (AAC) application with an iPad and keyguard

As a priority, the Workgroup recommends deepening the sector know-how on the use of assistive technology within the social/disability sector. In the longer term, the Workgroup also recommends building inroads with innovators to support the development and localisation of assistive technology.

Tech Able will deepen sectoral know-how by starting a Community of Practice to facilitate the sharing of knowledge among therapists and professionals in uses of assistive technology. In addition, it will also study how it can develop initiatives to deepen the knowledge of these professionals (such as engineers and designers, in addition to social service and healthcare professionals) in assistive technology. This includes organising regular meetings, events or publications to discuss and raise awareness of issues in relation to assistive technology, and working with IHLs to train and equip them with the skills and knowledge on the use of assistive technology.

Tech Able will continue to build inroads in connecting innovators and producers of assistive technology with persons with disabilities. SG Enable has worked closely with Google to assess how smart home technology can be adopted to benefit persons with disabilities. It has also launched a smart home guide to equip persons with disabilities with knowledge on smart home devices and understand how these devices could benefit them. This is available from the Enabling Guide website. SG Enable and Google have also developed a train-the-trainer programme on smart homes for SSAs to develop the competencies to assist their clients in the selection and setting up of smart home devices.

Tech Able will continue to look for opportunities to support the development of assistive technology-related innovation by connecting the innovators and producers with the relevant end-users and procurers. This includes using physical and virtual showcases to raise awareness of these innovations and gather ideas on how products can be used to benefit disability groups, and supporting IHLs to develop assistive technology-related innovations and services.

**RECOMMENDATION 7****Showcase accessible design and technology through various platforms to drive adoption of assistive technology**

The Workgroup recommends looking for more opportunities and platforms to showcase both accessible and assistive technology where possible. The Workgroup also urges private companies who are interested in showcasing such technology reach out to the Government.

The Government agrees with the Workgroup's recommendation, and has worked to showcase both accessible and assistive technology where possible.

A wide range of smart items has been on display at the showflats at HDB's My Nice Home Gallery since 2017, such as voice-activated smart controls, lighting controls, smart switches, panic alert buttons, etc. Building on this, HDB has incorporated additional items suggested by the Workgroup into a recent revamp of the Gallery, and will consider other suggested items for display that are also suitable to the general public. Homebuyers can view or try them out to see how such smart items could fit in their home environment. At the showflats, visitors can also view Universal Design (UD) features which have been introduced by HDB since 2006, such as rocker switches mounted at lower height, ramps, wider internal corridors and doorways to cater to the varied needs of homebuyers.

The Government will continue to find opportunities to work with other public agencies to do so and work with Tech Able to expand the showcase of assistive technologies. The Government will also continue to find opportunities to work with private sector companies that are interested to showcase assistive technology and accessible ideas. Private companies interested in showcasing such technology can reach out to the Government.



RECOMMENDATION 8

Enhance affordability of assistive technology

The Workgroup recommends the Government continue to ensure that assistive technology remain accessible and affordable for persons with disabilities.

The Government regularly reviews the Assistive Technology Fund (ATF), administered by SG Enable, which helps support persons with disabilities to purchase assistive devices, which can be used to help them at school, at work and to live independently. To ensure that the needs of persons with disabilities continue to be met across their lifetime, MSF will be reviewing the ATF to make it more client-centric and to make assistive technology adoption more affordable.



Person with visual impairment use assistive technology such as a Braille notetaker

Source: Singapore Association of the Visually Handicapped

KEY THEME 4:

Raising awareness of disability and promoting inclusion**CURRENT STATE & ISSUES**

There have been concerted efforts to raise awareness on disability issues and educate the public on the right attitudes when interacting with persons with disabilities. In 2016, National Council of Social Service (NCSS) launched the See The True Me campaign, with the aim of shifting public attitudes of persons with disabilities from acceptance to inclusion. Over the years, the movement has comprised awareness campaigns on outdoor media, digital and social media advertisements, resources on understanding persons with disabilities. To celebrate the strengths and abilities of persons with disabilities and encourage the inclusion of persons with disabilities in society, NCSS also worked with corporate and community partners to provide platforms and touchpoints to showcase talents and increase interaction opportunities through festivals and carnivals. One example is the fully inclusive music video released in 2019, that featured a 100-man strong inclusive choir and dancers from the local deaf hip-hop group Redeafinition.

A 2019 survey on public attitudes by NCSS found that about 75% of Singapore residents who were surveyed had positive attitudes toward persons with disabilities.² Respondents who had seen the See The True Me campaign had better attitudes towards persons with disabilities (77.5% had positive attitudes), than those who had not seen the campaign (73.2% had positive attitudes). While broader societal attitudes remain positive, there is room to deepen understanding of disability issues and provide practical advice on how to engage persons with disabilities in everyday scenarios. At focus group discussions (FGDs) with members of the public, participants shared instances where members of the public wanted to help them, but were unsure what to do. Such a sentiment was also echoed in FGDs with persons with disabilities, who shared their encounters with ungracious and unempathetic members of public.

Today, more agencies see the value and understand the need to communicate with and engage persons with disabilities in public consultations. During the FGDs, the Workgroup heard feedback that underscored the need for frontline staff in various public service agencies, such as hospitals, police and other customer-facing touchpoints, to be equipped to communicate with customers with disabilities more effectively, and to be more sensitive to their needs. There is also a need to ensure Government communications and public messages take on an inclusive angle, so as to ensure that different groups of persons with disabilities are able to access information in a manner that is accessible to them.

2. NCSS' survey covered 1,981 Singapore residents aged 18 and above, and was conducted in July to September 2019.



RECOMMENDATION 9

Strengthen public education efforts to empower members of the community to include and support persons with disabilities in day-to-day settings

The Workgroup recommends that raising public awareness on how the community can support and include persons with disabilities be continued.

The Government remains committed to working with partners to further public education efforts, through public campaigns and other ground-up initiatives, to strengthen inclusion and public awareness on how to support persons with disabilities.

This will be done through a range of collaborations with social media partners, schools and IHLs, employers, and persons with disabilities themselves. Going beyond raising awareness, the public education initiative, now driven by SG Enable, will seek to bring about greater inclusion for persons with disabilities in schools, at work and within the community; and sustain the positive shift in the general public's attitudes toward disability. SG Enable will work with relevant stakeholders in the respective settings, focusing on highlighting the abilities of persons with disabilities, and generating an understanding of the needs of persons with disabilities and how they can be supported.



Source: Ministry of Transport



Members of public can do their part to assist fellow commuters with disabilities board and alight from public transportation



RECOMMENDATION 10

Develop Communications and Engagement guide for public sector agencies

The Workgroup recommends that guidelines be developed so that public engagements and public communications can be designed in an inclusive manner accessible to citizens with disabilities.

In consultation with disability SSAs and other government agencies, MSF has developed a guide on inclusive public communications. The guide provides tips and best practices for ensuring that public communications, whether online or offline, are inclusive and take into consideration the accessibility needs of persons with different types of disabilities. It also provides guidelines on using respectful language when referring to disabilities, and addressing persons with disabilities.

In addition, following the multiple engagement sessions held with participants with disabilities, caregivers and staff from disability SSAs, MSF and partnering agencies such as the Ministry of Culture, Community and Youth and SG Enable have put together a guide on inclusive engagement. The guide will address design considerations, facilitation etiquette and preparation required in conducting public engagements with persons from different disability types.

Both guides will be circulated to all public agencies later this year, and will be made available on a Government intranet site for public agencies' reference.



Source: Ministry of Social and Family Development



Focus group discussions in 2019 with persons with disabilities, caregivers and staff from disability SSAs



RECOMMENDATION 11

Train frontline officers to be able to serve and address needs of persons with disabilities sensitively

The Workgroup recommends that frontline service officers be provided with the necessary training to serve and address the needs of persons with disabilities.

The Government will take the lead by introducing suitable training courses for all public facing frontline officers to understand how to serve and address the needs of persons with disabilities. SG Enable has worked with the Civil Service College to allow public officers to attend its Consumer Inclusiveness workshop which is aimed at helping public officers communicate effectively with persons with disabilities, understand the challenges encountered by persons with disabilities in accessing services, and to incorporate accessibility considerations into their service delivery.



Source: SG Enable



Source: Building Construction Authority

Emerging trends to consider



Source: Ministry of Social and Family Development

Focus group discussions in 2019 with persons with disabilities, caregivers and staff from disability SSAs

The Workgroup sees an opportunity to ride on emerging trends to build a more inclusive society, for example:

- Ageing population means there is an increasing need to address mobility and sensory needs of the elderly, which overlap with that of some persons with disabilities.
- COVID-19 has pushed us towards new ways of doing things (e.g. using technology to support working from home, purchasing of goods), and can also bring about new forms of community support and/or service delivery.
- It is an opportune time to put in place UD. Widening aisles/pavements/walkways and putting in place automatic doors would not only enhance accessibility but also support social distancing measures.

As such, apart from the recommendations above, the Workgroup also recommends for the Government to study other suggestions to support independent living and facilitate opportunities for engagement/interaction in the community, in the next iteration of the Enabling Masterplan. For example:

- Broader range of housing options and supported living service models;
- Enhancing services/support in the community – case management for those who have complex needs; more regional touchpoints for services and support;
- Explore potential models for life coaches/independent living assistants;
- Inclusive infrastructure and community activities – build more inclusive infrastructure e.g. playgrounds in residential estates, quiet/sensory rooms in more locations, and foster more opportunities for inclusive community activities.

SECTION 6: **Walking the Next Steps Together**



Focus group discussions in 2019 with persons with disabilities, caregivers and staff from disability SSAs

Source: Ministry of Social and Family Development

The Workgroup recognises that the recommendations cannot be achieved solely through efforts by the Government.

In order to succeed in building an inclusive society, the Workgroup seeks to generate a national movement, a call to action and the active participation of everyone from all walks of life.

The Workgroup hopes this report will inspire greater public consciousness and shared ownership of the role each of us plays in fostering inclusion, not only when planning for infrastructure, transport and Government services, but also the way in which organisations, businesses and individuals share information and ideas, provide products, services and programmes, and interact with each other.

The Workgroup also hopes that the consultative and co-creative approach established through the workgroup process will be viewed as a positive example of how we should collaborate across sectors to achieve solutions for the betterment of all and to build a more caring society. An inclusive Singapore starts with working together.

ANNEX A

Feedback on Independent Living from EMP3 Engagement Sessions

Close to 300 participants (persons with disabilities, caregivers and other members of the disability community) took part in 15 engagement sessions over 2019 and 2020. Key findings from these sessions can be categorised into the following domains:

PERSONAL MOBILITY

Wayfinding/Navigating the built environment:

- Need for more barrier-free pathways, need to address inadequate infrastructure e.g. narrow and uneven pavements, sharp drop from curbs for those with physical and visual disabilities.
- Need more at-grade crossings or lifts at overhead bridges, more covered walkways/ underground options for seamless travel especially during rainy weather for those with physical and visual disabilities.
- Non-slip railings to enhance grip, especially for areas that would be wet in rainy weather for those with physical and visual disabilities.
- Hands-free solutions (eg. for entryways, gantries, traffic lights) would be useful for those with physical and visual disabilities.
- High contrast, large, coloured signages and buttons (for steps, lift buttons, even public toilets) would be helpful for those with physical and visual disabilities, and those with intellectual disability and autism.
- Need for more traffic poles to be enabled with locating tones and audible signals to facilitate safe crossing of persons with visual impairment, who navigate by sound.

Travelling on public transport:

- Information on point-to-point barrier-free commuting would be useful to those with physical or visual disabilities, to help to plan travel ahead of time.
- Need for audio announcements on buses and at bus stops especially for those who are visually impaired, and would be useful for those with intellectual disability and autism also.
- Need for both visual and audio information on buses and trains, as well as accessible forms of assistance especially during emergencies and disruptions.

- Challenges boarding and exiting buses during heavy rain.
- Challenging for wheelchair users to get on and off trains during peak hours; front wheels get stuck in platform gap.
- Add-value machines not accessible for persons with visual impairment.
- Need for more intuitive placing of tactiles in train stations and/or ways for persons with visually impairment to give feedback on the placement of tactiles to the authorities.
- Challenges communicating with staff at stations or interchanges.
- Need for alternative options/protocols for persons with disabilities to exit stations when lifts breaks down.

Private transport:

- Affordability and availability of wheelchair accessible taxis is an issue.
- Drivers may not know how to identify and assist persons with disabilities.

ACCESS TO INFORMATION AND SERVICES

- For persons with visual impairment, many websites and digital platforms are not accessible (e.g. not screen-reader friendly) or difficult to use; challenging to use Two-Factor Authentication (2FA) and touch-screen devices.
- Persons who are deaf or hard-of-hearing may need alternative modes of communication (e.g. sign interpreter, video relay, speech-to-text).
- Persons who are deaf or hard-of-hearing face challenges in making and receiving phone calls and require alternative modes to access hotline services.
- Need for greater training of frontline staff to be sensitive to needs of different disability groups and understand how to address these needs.
- Accessible features to put in place could include Braille signage, hearing assisted systems, large fonts (big, bold and bright).
- Information not presented in simple and clear enough language is convoluted and confusing especially for some persons with intellectual disability and/or autism.
- For over-the-counter services, need for lowered counters so that wheelchairs can access and see staff over the counter, preferably at eye-level.
- If there is a queue system, audio cues should be provided in addition to visual cues.
- Many services are delivered online now, so access to enabling IT hardware is important — some persons with disabilities (especially those in the lower-income groups) may not have access to IT equipment (computer/laptop), stable broadband and support/training with regard to going online/using digital services.

ACCESS TO ASSISTIVE TECHNOLOGY TO SUPPORT SELF-CARE AT HOME AND CONNECTING TO THE COMMUNITY

In the home environment, different groups shared that they require different design/ aids to would meet their needs whilst also ensuring their safety:

- **Physical disabilities:** Need for physical aids (e.g. grab bars, ramps) to be built into homes, adjustable counter tops/cupboards. Voice-activated functions to control gadgets/devices would be useful.
- **Visual impairment:** Voice or sound-activated design/tech to support independence e.g. induction cooker, talking microwave.
- **Deaf/hard-of-hearing:** Visual indicators for equipment that usually notify via sound eg. fire alarm, door bell.
- **Autism and/or intellectual disability:** Some would benefit from support for managing relationships/behaviour, finances, health and daily schedules.

In general:

- Smart home devices have strong potential to facilitate independence.
- Persons with disabilities and caregivers need information about various assistive technology solutions, and for these to be affordable.
- Many are open and willing to use assistive technology but face issues with regard to:
 - **Awareness:**
When it comes to finding out more information about assistive technology, it is uneven across persons with disabilities and their caregivers. Hospitals tend to be the most the common touchpoints for learning about assistive technology. persons with disabilities generally rely on word-of-mouth to find out about assistive technology products and those associated with SSAs may check in with their SSAs to get more information.
 - **Affordability:**
Cost of buying a specific assistive technology product may be higher if it is more specialised and the demand is not high. Participants highlighted the need to bring the costs down and/or for Government to provide more subsidies.
 - **Lack of knowledge on how to use specific assistive technology devices** – some persons with disabilities may require training and support.
 - **Also require convenience in terms of getting assistive technology replaced/ repaired,** as losing access to this would hinder ability to do daily activities independently.

GENERAL AWARENESS AND SUPPORT FROM PUBLIC

- Participants said that members of public generally want to help persons with disabilities, but do not know how to.
- Some shared encounters with members of public who were not empathetic and gracious.
- Some people focus on the disability rather than ability, which affects the ability of persons with disabilities to contribute, e.g. as volunteers, or to participate in activities.
- Need for more activities (especially community activities) to be more inclusive (i.e. offer alternative ways of communication/ participation).

Participants also highlighted the need for:

- More customisable housing options/residential models.
- Better connection to support services; support in the community.

ANNEX B

Workgroup Members

1	Mr Masagos Zulkifli	Minister, Ministry of Social and Family Development (MSF) [Co-Chair]
2	Ms Chia Yong Yong	Board Advisory Panel member, SPD [Co-Chair]
3	Ms Tan Li San	Chief Executive Officer (CEO), National Council of Social Service (NCSS)
4	Ms Ku Geok Boon	CEO, SG Enable
5	Mr Karthikeyan JR	CEO, AWWA
6	Mr Bernard Chew	CEO, St Andrew's Autism Centre (SAAC)
7	Mr Ardi S Hardjoe	CEO, Thye Hua Kwan Nursing Home
8	A/Prof Kevin Lim	Chairman, Cerebral Palsy Alliance Singapore
9	Ms Koh Gee May	Deputy CEO, Movement for the Intellectually Disabled of Singapore (MINDS)
10	Ms Judy Lim	Executive Director, Singapore Association for the Deaf (SADeaf)
11	Mr Chong Kwek Bin	Head, Advocacy, Communications, Employment and Training, Singapore Association of the Visually Handicapped (SAVH)
12	Mr Augustine Tan	Immediate Past President, Real Estate Developers' Association of Singapore/Executive Director, Property Services Division, Far East Organisation

13	Dr Winnie Goh	Senior Consultant, Department of Child Development, KK Women's and Children's Hospital
14	A/Prof Ang Wei Tech	Executive Director, Rehabilitation Research Institute, Nanyang Technological University
15	A/Prof Lim Hua Beng	Associate Professor, Health & Social Science Cluster, Singapore Institute of Technology
16	Ms Koh Li-Na	Assistant Chief Executive, Infocomm Media Development Authority
17	Ms Geraldine Low	Director, Land Division, Ministry of Transport
18	Ms Er Teh Poh Suan	Director, Centre of Excellence for Engineering Design, Housing & Development Board
19	Ms Ng Teng Teng	Director, Smart Nation Technology Office, Smart Nation and Digital Government Office

Past Members

1	Mr Sam Tan (Jul 2019 – Jun 2020)	Former Minister of State, MSF
2	Mr Sim Gim Guan (Jul 2019 – May 2020)	Former CEO, NCSS
3	Mr Dennis Ang (Jul 2019 – May 2020)	Former CEO, SAAC

