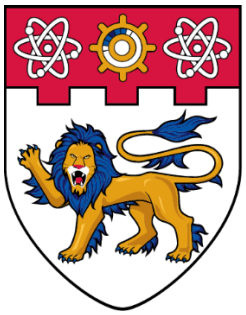

NANYANG TECHNOLOGICAL UNIVERSITY
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School of Social Sciences

The Future of Gerontology Education, Training, and Research

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1. INTRODUCTION

1.1 COUNTRY PROFILE AND AGEING DEMOGRAPHIC

Singapore is a multi-ethnic society. In 2020, 71.1% of its 5.6 million population were residents, of which comprises 3 major ethnic groups: Chinese (75.4%), Malays (15.0%), and Indians (7.4%) (Department of Statistics Singapore, 2021b). The mean years of schooling increased from 9.7 years in 2009 to 11.2 years in 2019 (Department of Statistics Singapore, 2021b). The unemployment rate among residents was 3.8% in 2020 (Department of Statistics Singapore, 2021a).

Despite the difference in profile, like many countries, Singapore is ageing rapidly. The median age increased by 3.6 years to 42.2 years in 2020 (Department of Statistics Singapore, 2021b). Moreover, the proportion of residents aged 65 years old and above grew from 9.0% in 2010 to 15.2% in 2020 (Department of Statistics Singapore, 2021b). In 2015, 1 in 8 Singaporeans were aged 65 and older. The ratio is expected to double by 2030 when it is estimated to have over 900,000 older adults.

A decline in the old-age-support ratio was observed throughout the years (i.e. 10.5, 7.4, and 4.3 working adults per resident aged 65 years and above in 1990, 2010, and 2020) (Department of Statistics Singapore, 2021b). This is can be attributed mainly to: (i) the increase in life expectancy at birth (81.7 years and 83.9 years) and at age 65 (19.8 years and 21.5 years) respectively (Department of Statistics Singapore, 2021b), and (ii) the total fertility rate remained below the replacement value. Given these trends, it is no surprise that Singapore will be ranked the top 5 oldest countries globally and the oldest in South-East Asia by 2030.

1.2. AIM AND RATIONALE OF STUDY

The changing demographic will intensify the demands for healthcare, the needs for age-friendly environments, and a larger and better-trained workforce. It is paramount to focus on public health, behavioural, social, and biological concerns relating to the needs of our older adult. On the contrary, these investments can also bring about opportunities by enabling them to contribute to their family, community, and society.

Therefore, the study aims to explore the future of gerontology in Singapore and to align knowledge with the needs of current and future generations of older adults. In this report, the parameters and scope of gerontology include gerontological education, training, and research.

2. BACKGROUND

2.1. DEFINITION OF GERONTOLOGY

Gerontology is an ancient subject but a recent science. In the earliest recorded histories, there is evidence that humankind speculated about ageing and the association of infirmities and death with advanced age. The processes of ageing are complex, and combined with the uncertainties about death, a fertile ground for myth, fantasy, and wishful thinking has always existed. These speculations have given rise to myths about the prolongation of life and the nature of death. Some elements of these myths have been displaced by information provided by scientific research but many remain as part of our cultural inheritance (Birren, 2007).

The word gerontology was first introduced in the 1900s by Noel Laureate, Elie Metchnikof, a professor at the Pasteur Institute of Paris. The word is derived from the Greek words *geron*, meaning old man, and *ology*, a suffix that refers to a branch of knowledge or science. Gerontology refers to the comprehensive study of ageing processes and individuals across later adulthood and

old age. The field of gerontology has a multidisciplinary focus and it includes: First, the physical, mental, and social changes in people as they age. Next, the investigation of changes in society resulting from our ageing population. Lastly, the application of this knowledge to policies and programs (The Gerontological Society of America).

2.2. STATE OF GERONTOLOGY IN SINGAPORE

2.2.1. GERONTOLOGICAL EDUCATION AND TRAINING

FORMAL EDUCATION

In the early 20s, there is almost no Undergraduate, Master's or PhD level programmes that specialised in gerontology in Singapore. With Singapore Institute of Management (SIM) pioneering the Master's in Health Science (Gerontology) and Nanyang Polytechnic offering Diploma course in Gerontological Nursing. These courses were provided with a strong health emphasis.

As a result of the increased attention to the needs of the growing population of older adults, there has been a considerable growth in gerontology education within the Singapore education system. A summary of programmes offered within the education system is presented in table 1.

There are currently no programme or curriculum specifically designed for gerontology at the primary and secondary level. Instead, ageing related topics can be found systematically incorporated into humanities subjects such as social studies or civic and moral education (Ministry of Education, 2000). The packed curriculum and the lack of appropriate training for teachers may be reasons to develop gerontology as an independent subject.

Table 1: List of programmes offered within the educational system

No.	Course Name	Institution	Course Duration	Reference
1	Certificate in Health Care (Home Care) (Traineeship)	Institute of Technical Education	1 year	(Institute of Technical Education, 2019)
2	Higher Nitec in Elder Care (Traineeship)	Institute of Technical Education	1 year	(Institute of Technical Education, 2021)
3	Diploma in Social Sciences in Gerontology	Temasek Polytechnic	3 years	(Temasek Polytechnic, 2021a)
4	Specialist Diploma in Integrated Care Management	Republic Polytechnic	1 year	(Replblic Polytechnic, 2021b)
5	Specialist Diploma in Healthy Ageing & community Care for Seniors	Republic Polytechnic	1 year	(Replblic Polytechnic, 2021a)
6	Specialist Diploma in Community Gerontology Nursing	Ngee Ann CET Academy	1 year	(Ngee Aann CET Acedemy, 2021)
7	Specialist Diploma in Nursing (Gerontology)	Nanyang Polytechnic	52 weeks	(Nanyang Polytechnic, 2019)
8	Specialist Diploma in Gerontology (Optimal Ageing Practice)	Temasek Polytechnic	1 year (part-time)	(Temasek Polytechnic, 2021c)
9	Specialist Diploma in Gerontology (Nutrition for Ageing Well)	Temasek Polytechnic	1 year (part-time)	(Temasek Polytechnic, 2021b)
10	Graduate Diploma in Geriatric Medicine	National University of Singapore	1 year	(National University of Singapore)
11	Graduate Certificate in Gerontology	Singapore University of Social Science	1 year	(Singapore University of Social Science, 2021a)
12	Master of Gerontology	Singapore University of Social Science	2 years	(Singapore University of Social Science, 2021a)
13	Master of Science in Applied Gerontology	Nanyang Technological University	1 year (Full time) 1.5 years (Part-time)	(Nanyang Technological University, 2021)
14	PhD in Gerontology	Singapore University of Social Science	3 years	(Singapore University of Social Science, 2021b)

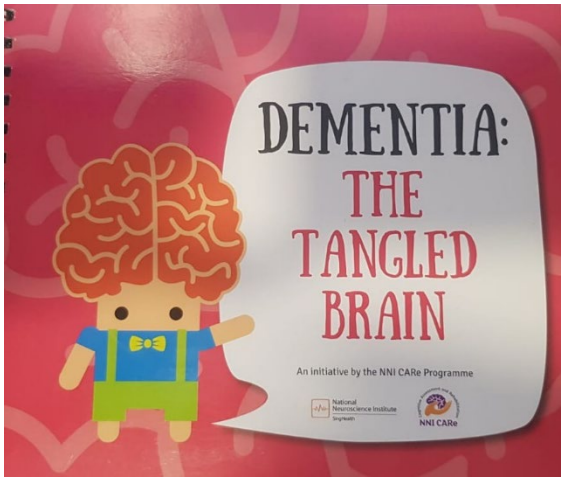
However, despite the lack of gerontological programme incorporated into the primary and secondary curriculum, institutions are developing innovative ways to meet the educational needs of professionals. These efforts can educate the younger population about ageing, promote understanding between generations, and combat ageism (Burnes et al., 2019).

The Intergenerational Learning Programme (ILP), which started in 2011 with 6000 students and seniors, by the Council for Third Age (C3A) (Ministry of Health, 2016). The ILP provides students with unique intergenerational experience through teaching older adults skills such as technology and photography. With the success of the programme, C3A aims to engage more partners and schools to expand the programme (Teo, 2015).

In 2017, St Joseph's Home was one of the first institutions to collocate both eldercare and childcare within the same premise (S. Tan, 2017). Not only does this offer opportunities for both the children and the older adults to interact daily, but it also creates a tight-knit community across generations. The government also shares their vision of promoting more of such intergenerational facilities and planning such development in 10 other HDB community (S. Tan, 2017).

Education materials with positive content can help stimulate interesting discussion about ageing, and help children and teenagers learn more about the ageing process. One such example is *Dementia: The Tangled Brain* book (Figure 1) developed by the CARe Team from the Singapore National Neuroscience Institute. The book targets teenagers and young adults by providing knowledge on dementia simply and interactively.

Figure 1: Education materials by the CARe Team from National Neuroscience Institute (NNI CARe Programme, 2015)



LEARNING FOR OLDER ADULTS

The Council for Third Age, C3A, was established in 2007 to promote active ageing in Singapore through public education, outreach and partnership. The National Silver Academy (NSA), which was launched in 2016, is one such initiative under C3A. To help older adults in their learning journey, the NSA offers older adults a wide range of learning opportunities through their networks of post-secondary education institutions and community-based organisations. Most courses offered under are subsidised for older adults aged 50 and above and can be paid through their SkillsFuture Credit.

Despite the wide outreach to residents, it was notable that the participatory rate was low. This was reflected in the NSA 3rd Anniversary Celebration & Roadshow which garnered 16,000 visitors. However, only 1,181 older adults took part in the courses (Council for Third Age, 2019). The low participatory is also supported by the quantitative analysis discussed in section 5.3.

To address the current gaps in older adult learning, C3A has launched the Geragogy Guidelines to enhance the training methodologies of adults learning in Singapore. Developed in collaboration with the Singapore University of Social Science (SUSS), the guidelines which provide recommendations on the effective adoption of teaching methodologies to enhance the learning experience of older adults, was launched in 2021. Three key areas are covered in the guidelines: (i) Understanding seniors and their challenges, (ii) Teaching Methodologies, and (iii) Traits of effective trainers (National Sliver Academy, 2021). As the geragogy is newly introduced, there are currently no professionals that are trained on the new guidelines.

2.2.2. GERONTOLOGICAL RESEARCH

RESEARCH INSTITUTES

Over the past decade, 7 key government ageing institute has been established in Singapore (table 2). Each institute has its area strength and complements the work of other institutes. Collaborations between institutes can help build informational networks and stimulate thinking (Green & Johnson, 2015), potentially challenges current thinking and leading to innovations.

Table 2: Key governmental ageing institutes/centers in Singapore

Center/ Institute	Organisation	Year Established	Website
Ageing Research Institute for Society and Education (ARISE)	NTU	Unknown	https://www.ntu.edu.sg/arise
Centre for Ageing Research & Education (CARE)	Duke NUS	Unknown	https://www.duke-nus.edu.sg/care/about
Centre for Healthy Longevity	NUHS	Unknown	https://www.nuhs.edu.sg/research/NUHS-Centres-of-Excellence/Pages/Centre-for-Healthy-Longevity.aspx

Joint NTU-UBC Research Centre of Excellence in Active Living for the Elderly (LILY)	NTU	2012	www.ntulily.org
Institute of Geriatrics and Active Ageing (IGA)	TTSH	2013	http://www.iga.com.sg/
Geriatric Education and Research Institute (GERI)	MOH	2015	www.geri.com.sg
Research on successful ageing (ROSA)	SMU	2014	www.rosa.smu.edu.sg

AGEING RESEARCH

The steady presence of ageing research institutes/centres has kept Singapore abreast with and contribute to the latest development within the gerontological field. Extensive ageing research has been found in Singapore, and can be organised into 5 key themes:

Sociocultural and economic aspect of ageing. Relevant ageing research under this theme includes intergenerational influence (Williams, Mehta, & Lin, 1999); ageism (Ward, 1988); housing and built environment (T. P. Ng et al., 2018); and impact of cultural factors and religious practice on social integration (K. Mehta, 1997; K. K. Mehta, 1997). Other studies which explore the socioeconomic aspect of ageing include the implication of the ageing labour force (Kalirajan & Shantakumar, 1998), work-related challenges of older nurses (Ang et al., 2017), and income security (Lee, 1999).

Health, wellbeing, and quality of life. The prevalence and risk factors of geriatrics conditions among older adults in Singapore is well studied. Studies delved into conditions such as neurocognitive disorders and dementia (L. Feng, Chong, et al., 2013; M. Y. Z. Wong et al., 2019), frailty (Cheong et al., 2020; Reshma A Merchant et al., 2017) and sarcopenia (Pang et al., 2021; Tay et al., 2015). Research studies on chronic conditions (Malhotra, Chan, Malhotra, & Østbye, 2010; C. C. L. Tan et al., 2018) and mental health (Li, Theng, & Foo, 2015) of older adults were also performed. Other works examined overall life satisfaction (G. K. M. Wong, 2003) and disease-specific quality of life (L. Feng, Yap, & Ng, 2013).

Caregivers of older Singaporeans. The increased number of publications on the health and well-being of both formal and informal carers in Singapore reflecting the importance of

caregivers in our society. Some area of focus in caregiver studies includes quality of life of caregiver of older adults with long-term care needs (Eom, Penkunas, & Chan, 2017); the role of foreign domestic workers in supporting older adults and their caregivers (Østbye, Malhotra, Malhotra, Arambepola, & Chan, 2013); cost of informal dementia care (Chong et al., 2013); health impact of caregiving (Lim et al., 2014); and needs of caregivers (Towle et al., 2019).

Successful and active ageing. The investigation of the health and well-being of older adults has also led to various research on successful and active ageing. Such research includes the perceptions of successful ageing among Singaporean older adults (Q. Feng & Straughan, 2017), understanding determinants of successful and active ageing (Tze Pin Ng, Broekman, Niti, Gwee, & Kua, 2009), and the role of psychological, lifestyle, and social factors in successful ageing (Chong et al., 2018).

Health care services and long-term care. The recent increase in the emergency department and hospitalization admission among older adults prompted studies to identify predictors of frequent healthcare utilization (Low et al., 2016; Paul, Heng, Seow, Molina, & Tay, 2010). The change in focus from communicable diseases management to chronic diseases management has contributed to strong research focus on the long term care services, which include enhancing community care services and healthcare financing (Sitoh, 2003); perceived affordability of community-based services; determinants of long-term care services utilization; and quality and convenience of long-term care services (Liu, Eom, Matchar, Chong, & Chan, 2016; Wee et al., 2015).

2.2.3. GERONTOLOGICAL PRACTICE

CLINICAL GUIDELINES

The notion of frailty and sarcopenia has evolved greatly over the past 20 years. Although there is a lack of consensus, these syndromes were recognised to increase vulnerability to adverse health outcomes for older adults. This has prompted actions, including alignment of identification, measurements and evidence-based interventions, which been observed in recent years.

In light of the Asia-Pacific Clinical Practice Guidelines which were released in 2017, it was imperative to discuss how the science of frailty can be translated to foster alignment in local policy, practice and research in contextualising the clinical practice guidelines. Hence, in 2018, the Chapter of Geriatricians, Society of Geriatric Medicine Singapore (SGMS), Geriatrics Education & Research Institute (GERI), and Institute of Geriatrics & Active Ageing (IGA) convened the National Frailty Consensus Discussion (Lim, Wong, Ding, Rockwood, & Lien, 2019). This discussion was attended by multiple stakeholders including the Ministry of Health, practitioners, and community partners.

The International Classification of Disease-10 code for sarcopenia represents a major step forward in translating sarcopenia into clinical practice. The update of the Asian Working Group for Sarcopenia 2019 consensus has guided the identification and diagnosis of older adults at-risk or with sarcopenia in both community and hospital settings. While it is important to identify older adults with sarcopenia within the community, older adults often need to be referred back to the hospital for diagnosis confirmation due to the lack of diagnostic equipment within the community settings.

REDESIGNING CARE

To meet the challenges of a fast-ageing population, the World Health Organization has advocates healthy ageing as a goal, with an emphasis on maintaining the intrinsic capacity of the

older adults. This requires the transformation of healthcare in Singapore. Two identifiable trends underpin the ongoing transformation of the healthcare system and practice in Singapore:

From a one dimensional to holistic definition of health. The shift of care from a disease-specific approach to a holistic approach involves a proactive and management of one's health, including the physical and psychosocial wellbeing.

Disease centric to community-based, preventive person-centred care. Healthcare professional prioritise both the individual's and community's ownership of health, knowledge, and self-efficacy over stand medical agenda or diagnosis.

In 2015, the local government introduced a $3 billion 'Action Plan for Successful Ageing', which aims to transform Singapore into an enabling city for seniors to live and commute independently within the community. In recent years, there has been a surge in programmes, activities and campaigns by Health Promotion Board and other government agencies to promote physical and mental wellbeing amongst community-dwelling older adults.

The above-mentioned efforts are completed by initiatives from private and non-profit organisations through the delivery of physical activities and nutrition. Initiatives such as the Share-a-Pot programme (Share a pot), Happy Ageing Promotion Program for You (HAPPY) (R. A. Merchant, 2021) and Gym Tonic has garnered interest among older adults. However, it is notable that the current initiatives are unorganised and ad-hoc, which tends to benefits a specific group of older adults.

3. LITERATURE REVIEW: GERONTOLOGY STATES OF OTHER COUNTRIES

This section examines the development of gerontology in two other countries, i.e., the United States of America, and Japan. Although the needs vary from one country to another, we

have much to learn from one another including how a country approach gerontology education, training and research, the outcomes and the lesson learnt.

3.1 UNITED STATES OF AMERICA

3.1.1 DEMOGRAPHY OF AGEING

The number of people age 65 and older in the United States is expected to increase steadily. It is projected to more than double from 46 million (14.5%) in 2015 to more than 98 million (23.5%) by 2060. The number of centenarians is also expected to increase drastically from 53,000 in 2010 to 600,000 in 2060 (Mather, Jacobsen, & Pollard, 2015).

Previously, higher fertility and international migration have helped to keep the ageing population at bay. But the trends are changing. With the decrease in fertility rate and an increase in life expectancy, the number of older adults is expected to outnumber the number of kids (Mather et al., 2015).

Interestingly, the older population in the United States is becoming more racial and ethnic diversity. Between 2018 and 2060, the percentage of non-Hispanic white is projected to drop from 77% to 55%. The change in the composition of the population will create a diversity gap between generations. This generation divide might increase intergenerational conflict over resources such as social security, and medical benefits.

3.1.2 GERONTOLOGY EDUCATION AND TRAINING

The University of South Florida and the University of North Texas both created the first Master's programme specialises in gerontology in 1967 (Jester, 2020). In 1972, the Administration on Aging (AoA) established a grant programme to fund gerontology training programme in colleges and universities. The federal funding led to a dramatic increase in gerontological training

in colleges and universities across the States (Schneider, 1992). Since then, gerontology has gain traction as a formal discipline, with undergraduate, masters, doctoral, and post-doctoral education available around the country.

The Academy for Gerontology in Higher Education (AGHE) was established in 1974 to help foster the development of gerontology education and assist university-based ageing centres to secure training grants by AoA. Despite the advancement in gerontology education, the incorporation of gerontology to children's and youth's education has far lagged (Davis, 2015). To bridge the gap, AGHE has set up a K-12 Gerontology Education committee which facilities inclusion of ageing content into k-12 school curricula and develop a network of professionals interested in teaching children about ageing (McGuire, 2017).

3.1.3 GERONTOLOGY RESEARCH

In the 1940s, Gerontology has become a recognised and well-organised speciality in the United States of America. The Gerontological Society of America (GSA) was founded in 1945 to "promote the scientific study of ageing". The establishment of GSA was the main driving force behind advancing innovation in ageing both domestically and internationally. Within a span of few years, GSA published the first issue of The Journal of Gerontology and organised its first Annual Scientific Meeting. These milestones reflect the main thrust of the organisation's work at the forefront in advancing practise and policies through interdisciplinary ageing research.

Society was a key and influential player in the United States. GSA supported legislation for the creation of the National Institute on Ageing (NIA) under the National Institute of Health. Since the establishment in 1974, NIA has conducted and supported many ageing researches, and

maintains an active communication and outreach program to share ageing-related knowledge and information with the community.

In 1983, the John A. Hartford Foundation projected a 4-year budget of $7 million to address the accelerated growth in health and ageing cost, lack of depth in geriatrics leadership, limited resources available for ageing-related research, and improve services for older patients (Jenllinek, 2019). To date, the foundation has awarded 577 grants for various causes such as training healthcare workers, research, and developing new models of care.

3.1.4. CONCLUSION

The United States of America is one of the most rapidly growing countries. However, this unprecedented demographic change is observed across the world. The various education, training and research initiatives have contributed greatly to the development of the gerontology field. Despite the challenges of the ageing demographic, the United States has the upper hand of being one of the few nations that have a good head start in the field of gerontology. Singapore can observe and take the United States of America, both the federal and private industry, as a reference on their gerontological and research programme.

3.2 JAPAN

3.2.1 DEMOGRAPHY OF AGEING

Japan is ageing fast. According to the government statistic released in 2020, 28.4% of the total population are 65 years old or over. This statistic exceeds the U.S.A (16.5%), Italy (23.0%) and Singapore (14.4%)(Department of Statistics Singapore, 2021a; European Parliment, 2020; United States Census Bureau, 2019), indicating that the ageing society in Japan is progressing more rapidly compared to the rest of the globe.

The change in Japan's demographic was accelerated after World War II and can be attributed to a combination of two elements:

A high life expectancy. The current healthcare service delivery system was established right after World War II, which was parallel with the universal health insurance system. With health services in place, the age-specific age mortality rates have declined markedly over since the war. Between 1964 and 2011, life expectancy at age 65 increase substantially, from 12.2 to 18.7 years and from 14.8 to 23.7 years for men and women respectively (Naohiro & Matsukura, 2007; OECD, 2013). In 2015, the country is also home to 61 763 centenarians and 146 supercentenarians (Saito, Ishii, & Robine, 2021).

A low fertility rates. Japan had a relatively brief baby boom right after World War II in 1947 and ended in 1949 when the government loosened abortion law, encouraged family planning and birth control to prevent overpopulation. A second baby boom followed from 1971 to 1974. However, the fertility rate remained consistently low. This was due to an increased female labour force participation, the poor societal support for working women to have children, and the increased financial burdens of raising children.

3.2.2 HISTORY OF GERONTOLOGY IN JAPAN

The history of gerontology societies in Japan date back to as early as 1953 and is summarised in table 3.

Table 3: Foot Steps of Gerontological Societies in Japan from the 1950s to 2000s (Takahashi, 2019)

Period	Gerontological Societies
Before 1970	1953: Geriatric Institute, Study Group of Geriatric 1953: Japan life Science Association

	1954: Life Science Research Group sponsored by Japan Gerontology Society 1956: The first Japan Gerontology Society 1957: The Second Japan Gerontology 1958: The Third Japan Gerontology Society 1959: The Japan Geriatrics Society 1959: Japan Socio-Gerontological Society
The 1970s	1972: Tokyo Metropolitan Institute of Gerontology
The 1980s	1981: Japan Society for Biomedical Gerontology 1986: Japanese Psychogeriatric Society
The 1990s	1990: The Japanese Society of Gerontology 1993: The Dia Foundation for Research on Ageing Societies 1995: Japan Academy of Gerontological Nursing 1995: National Center for Geriatrics and Gerontology
The 2000s	2001: Japan Society of Care Management 2002: J. F. Oberlin University Graduate School of Gerontology 2006: The Institute of Gerontology of The University of Tokyo 2006: Society for Applied Gerontology Japan

3.2.3. GERONTOLOGY EDUCATION AND TRAINING

As observed in table 3, the first educational institute was established in the 2000s. Oberlin University Graduate School of Gerontology, was the first institute that offers Master's degree and doctoral program in gerontology. The modules from the gerontology program focus on narrow areas of speciality involving older adults and ageing issues rather than the interdisciplinary study of ageing.

As of 2016, no other universities were offering gerontological courses after the establishment of the first gerontology program by Oberlin University. Despite several universities expressing their interests in starting a gerontology program, their application was not approved by the Japanese Ministry of Education, Culture, Sports and Technology (MEXT) (Ikeuchi et al., 2017).

Compared to gerontology education, geriatrics education was more well established in Japan. With the first academic geriatrics department established in 1962, the undergraduate educational program includes both lectures and bedside teaching. The teachings incorporate the biology of ageing, clinical geriatrics and socio-economical aspects of the ageing society (Maeda, 1992).

3.2.4. GERONTOLOGY RESEARCH

As phenomenal was recognised as a critical societal issue, ageing is a major research theme in almost all academic disciplines and industries. The topic ranges from biomedical (including mechanism of ageing, and the genomics of longevity) to phycology and social science. One prominent topic since the early stage of gerontology is gerontechnology, where technology and robotics contribute to the development of assistive technology and ageing-friendly environments.

These researches are usually conducted in various private and public institutions. Institutions specialised in research includes the Tokyo Metropolitan Institute of Gerontology and the National Center for Geriatrics and Gerontology. Another research institute is the Japan Socio-Gerontological Society, which focuses on interdisciplinary sociological and behavioural science relating to ageing and welfare of the older adults.

Understanding the importance of longitudinal, internationally comparable data in advancing knowledge on global ageing. Supported by the U.S National Institute of Aging, data collected from the national governmental survey, for example, the National Survey of the Japanese Elderly, was made publicly available for research purpose in 2009 (Muramatsu & Akiyama, 2011).

The government has also sought greater collaborations between academia, research institutes, and private companies. To increase the collaborations between university and firms, the

government focus on incentivising universities and reforming policies. The gradual growth in the research contract and joint research project has reflected the success in strengthening collaboration between organizations (Organisation for Economic Co-operation and Development, 2018).

In addition, the Japanese have implemented a range of measures to foster greater internationalisation of research. This has allowed Japan to diversify its international research networks beyond its traditional partners (Organisation for Economic Co-operation and Development, 2018).

3.2.5 CONCLUSION

Japan has the highest proportion of older adults in the world. Despite the long history of gerontology in Japan, very little focus has been placed on gerontology education throughout the years. However, the Japanese are strong in ageing research and has published the second largest number of papers on ageing research (von Zglinicki, 2000). Ageing research in Japan is not restricted to ageing institutes and has been extended to all disciplines both nationally and internationally. Singapore should do well to learn from Japan in this aspect.

3.4 LEARNING POINTS FROM OTHER COUNTRIES

The progress of gerontology in both the United States of America and Japan are commendable. There are a few points to note when examining the development of both countries. First, the United States have developed gerontological education and training support and programme that meet the needs of their older adults. Despite having a long history, the federal government played a major role in supporting and backing the gerontology movement. Similarly, the success of the gerontology effort can be observed by the gerontology education and research field in Japan.

With the K-12 Gerontology Education committee establishment in the States and the intergenerational research studies, the growing trend in gerontological education in children and teenagers is notable.

Last, as seen in both countries, private institutions also a major role in propelling the gerontology field. Individuals in their capacity, also play an important role in advocating and spearheading gerontological education and research initiatives, which can be funded federally or privately or a combination of both.

4. RESEARCH METHODS

The research methods are divided into two broad categories; quantitative, and qualitative.

4.1. ONLINE SURVEY FOR OLDER ADULTS RESIDING IN SINGAPORE

Public views on gerontology in Singapore was gathered from 3 May 2021 to 23 May 2021. The questionnaire was disseminated through word of mouth and responses was collected using Google Form. Participants were included if they were (i) adults aged 50 years and older, and (ii) residing in Singapore. 50 responses were collected during this period. The following topics were examined for this study:

1) Knowledge and awareness of gerontological courses, seminars, and workshops

2) Views and experience of ageing

3) Health and life satisfaction

Statistical analyses were performed using Excel version 2016. All statistics are presented in n (%) or Mean ± SD unless otherwise stated.

4.2. EXPERT INTERVIEW

The expert interview was conducted between 5 May 2021 to 21 May 2021. Invites were emailed to various experts in the gerontology field. Three experts reverted, expressing interest in the interview. A one-to-one focused semi-structured interview was conducted remotely via zoom and the following topics were discussed with the field experts:

1) Trajectory of gerontology in Singapore

2) Challenges and evident gaps in the current state of gerontology

3) Current and future needs of older adults and how to meet bridge them

The audiotaped interviews were then transcribed verbatim. The transcribed data were then analysed using thematic analysis. Codes were generated, analysed independently, and matched for common themes to identify the needs, gaps and barriers of the local gerontological landscape.

5. RESULTS: FUTURE OF GERONTOLOGY

5.1. NEEDS OF OLDER ADULTS

5.1.1. CHANGING SOCIAL NEEDS

The number of older adults living alone in Singapore is increasing. It is estimated that 83,000 older adults aged 65 and above will be living alone by 2030 compared to 47,000 in 2016 (Department of Statistics Singapore, 2021b). The statistics can be attributed to the increased prevalence of smaller, nuclear families and the trend of more people remaining single. Many older adults who live alone lose the comprehensive support from their family. Factors such as loss of spouse and friends, retirement, disability and illness, and weak family ties are contributing factors to social isolation. Social isolation is associated with poor health in older adults who are isolated

(Coyle & Dugan, 2012). The issue is crucial in Singapore as there is no comprehensive safety net for older adults without family care.

Particularly, during the course of the COVID-19 pandemic, measures are put in place to help curb the transmission of COVID-19. Singapore has set in place strict restrictions on social gathers and physical interactions. This resulted in limited services and community services catered to older adults, especially for those with poor social support. While the younger population leverage digital platform to overcome physical interaction during this period, many older adults experienced difficulty in overcoming the technological barriers. These factors exacerbated the risk of social isolation in older adults. A local expert shared more about social isolation:

> "*but that prolonged time at home especially if it is in lockdown measures have its secondary consequences. both in terms of physical inactivity and also the social isolation. and many of the older adults not being as savvy with technology which can let them get connected and which can enable them to continue access services like shopping and banking*"

5.1.2. CHANGING HEALTHCARE NEEDS

The ageing population in Singapore has resulted in a fast, epidemiological shift from acute to chronic disease. As life expectancy becomes longer, more Singaporeans live with multiple chronic conditions, and they experience higher rates of disability that creates dependency and may require help from others. As health and social care needs ate usually intertwined, clinicians will also need to ensure the older adults social and psychological well-being, which increases the complexity of their care needs.

"They do not come with a single need pattern of disease. they don't come just with diabetes. It is not that straightforward. more importantly, in older adults, we have to deal with a whole suite of comprehensive issue which also includes the functional, and the psychosocial as well."

The increased risk of disability in old age also would render the demand for intermediate and long-term care. Long-term care services can also be used by older adults who may be frail and need supervision or assistant in their activities of daily living.

5.2. GAPS AND BARRIERS

This section identifies potential gaps and barriers in the current field of ageing. Quotes from the expert interview are used to support the claims.

Trained professionals in the field of ageing. As mentioned in the previous section, there is a lack of geragogy trained professional to improve training for older adults.

This notion was supported by a local expert:

"*We need more trainers that are trained in geragogy and even though we teach in a diploma in gerontology. We do and are more aware of what gerontology is and require champions in this area to be clinical supervisors or to come in as academic mentors. But even our academic mentors are not trained in geragogy*."

Collaborations. Lack of collaborations observed between ageing institutes or centers in Singapore. This could be attributed to various reasons including manpower and other resources.

"Currently in Singapore, we are doing our work. we may not have time to do collaboration but I think this is something that we need to promote. but from what I see, this might be because of the shortage of manpower and limited funding. so,

they can just focus on their own plate. they cannot look at the bigger picture. we need people to work together."

Integrated care. Care needs to more integrated and to ensure more holistic care within the care system. Integration between the health and social care sector is needed and it can be designed from the older adults' point of view.

"I think the care needs to be more integrated for older adults. and needs to be designed from the older person point of view and not from the organization point of view. I think a lot of improvement has been made. … But definitely can be even more integrated. community care organisations working more together with more closely such that the older person does not go to different organisation for different things."

Technology. Many older adults are struggling with the use of technology. Increase the uptake of technologies and ensure that older adults are familiar with basic technologies, whilst the frequent update of technologies.

"It is quite disorienting for them (older adults) having to go for classes online. A lot of the daycare have to pivot their programs online. some seniors don't know how to connect, they left halfway or totally don't want to join."

Health education. Frailty and sarcopenia are new and complex concepts. identify ways to frame and communicate for public education.

"*A multi prog strategy where they still use traditional means like TV. So if you go to the traditional channels like channel 8 for example. Lots of health message through that. They also use actor and actresses who have lots of social capital with older adults to convey the health messages as well. Health messages are often done*

in a way that people can relate to through images through stories that people can relate to. So those are important. the talk shows on the radio are also important as older adults still tune in to those sources and they still use the traditional way."

5.3. VIEWS OF OLDER ADULTS AS OBTAINED FROM ONLINE SURVEY

5.3.1. DEMOGRAPHICS

50 participants with a mean age of 61.37± 5.37 years, of which 41 (82%) were females, Chinese 43 (86%), married 35 (70%), and with undergraduate and above education 24 (48%). 27 (54%) of the participants are currently employed and are working an average of 36.8 ± 13.49 hours per week. 16 (32%) of the participants are retired with a mean age of 60.13 ± 5.00 years.

Table 4: Demographics of the sample population (n=50)

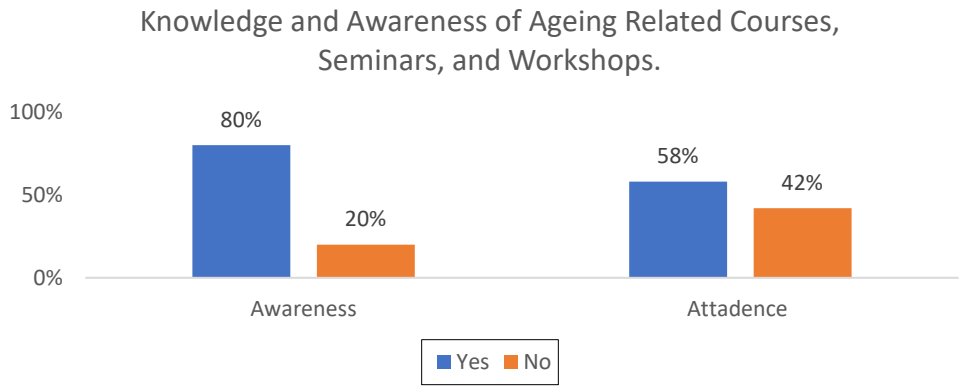
	Number (%)
Age (years)*	61.37 ± 5.37
Gender	
Male	9 (18%)
Female	41 (82%)
Ethnicity	
Chinese	43 (86%)
Malay	3 (6%)
Indian	2 (4%)
Others	2 (4%)
Highest Education Level	
Primary and below	3 (6%)
Secondary	12 (24%)
Post-secondary	9 (18%)
Degree or Post Graduate	24 (48%)
Others	2 (4%)
Martial Status	
Single	7 (14%)
Married	35 (50%)
Divorced	7 (14%)
Widowed	1 (2%)
Others	0 (0%)
Monthly household income	
<$1,000	4 (8%)

$1,000-$2,999	12 (24%)
$3,000-$4,999	16 (32%)
$5,000-$6,999	7 (14%)
$7,000-$9,999	3 (6%)
>$10,000	8 (16%)
Employment Status	
Working	27 (54%)
Homemaker	5 (10%)
Retired	16 (32%)
Others	2 (4%)

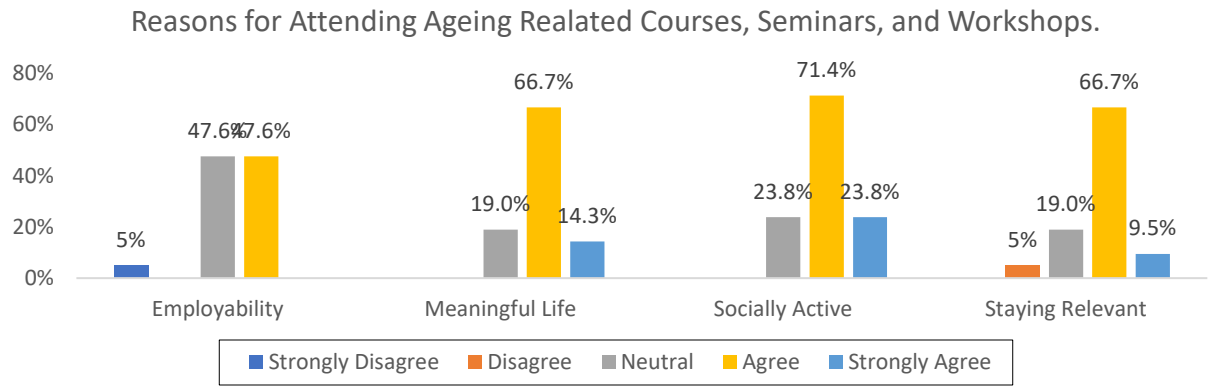
n(%) unless otherwise stated; *mean ± SD

5.3.2 KNOWLEDGE AND AWARENESS

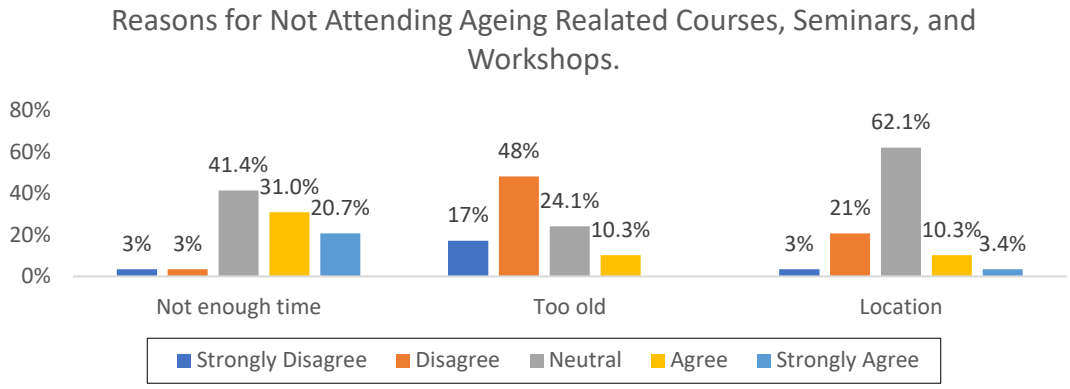
40 (80%) of the participants are aware of ageing specific courses, seminars, and workshops. However, only 29 (58%) have attended these courses, seminars, and workshop.



Out of the 29 participants who attended, majority of them agreed or strongly agreed that the courses, seminars, and workshops help has helped them improve employability (47.6%), lead a meaningful life (81%), socially active (95.2%), and staying relevant (76.2%).

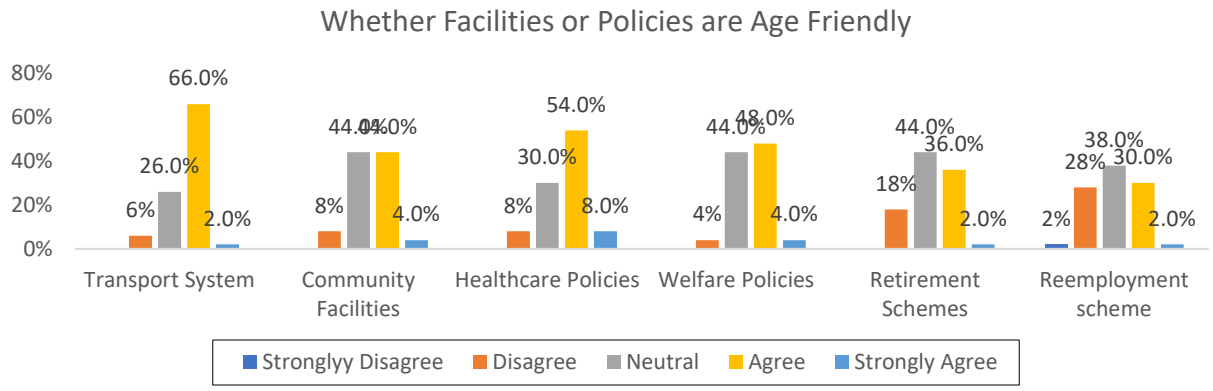


Out of the 21 participants who did not attend, 51.7% indicated that they do not have time to attend, 34.4% indicated that they are too old to learn new things, and 13.7% indicated that the location was not accessible to them.

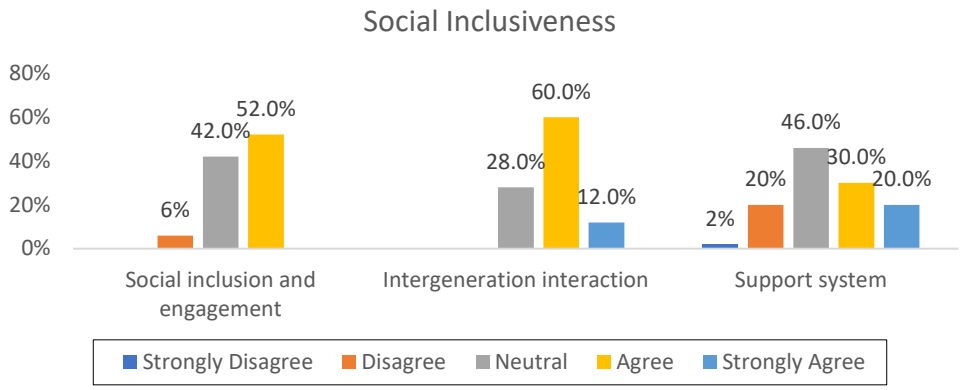


5.3.3 VIEWS AND EXPERIENCE OF AGEING

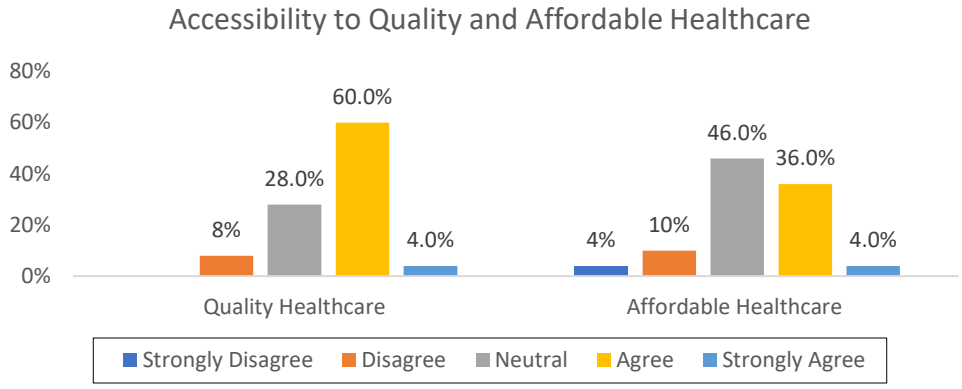
Most of the participants agree or strong agreed that the facilities and policies are age friendly. This ranged from 68% for transport system, 48% for community services, 62% for healthcare policies, and 52% for welfare policies. However, a substantial number of participants disagree that the retirement and reemployment schemes in Singapore are age-friendly.



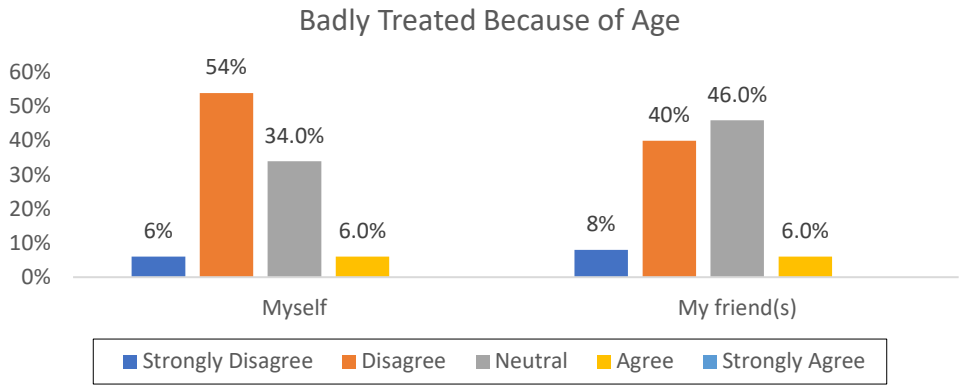
When ask on social incluciveness, approximately half of the participants agreed or strongly agreed that older adults are well supported, and are socially included and engaged within the community. 72% of them agreed or strongly agreed that there should be more interaction between generations within the community.



64% of the participants agreed or strongly agreed that quality healthcare is assessable. But only 40% of them agreed or strongly agreed that they can easily access affordable healthcare.

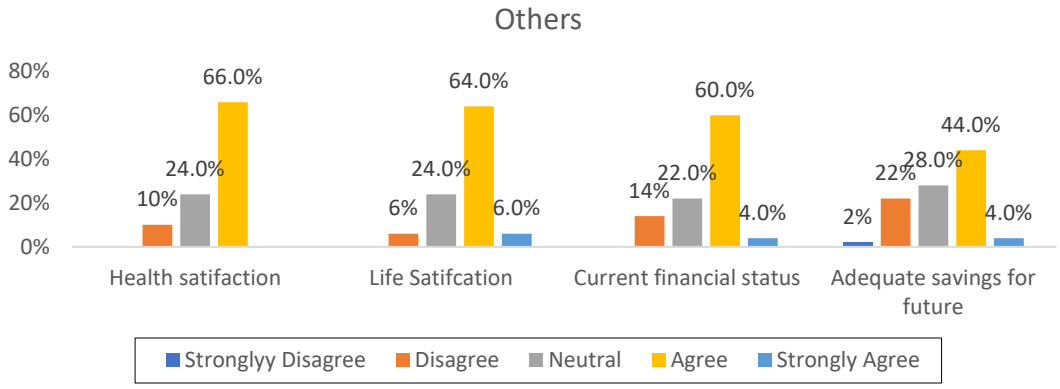


Six percent of the participants and/or their peers have been treated badly because of age.



5.3.4. OTHERS

A large proportion, 66%, and 70% are satisfied or strongly satisfied with their health and life respectively. 32 participants indicated that they are comfortable with their current financial status but only 24 of them have adequate savings for the future.

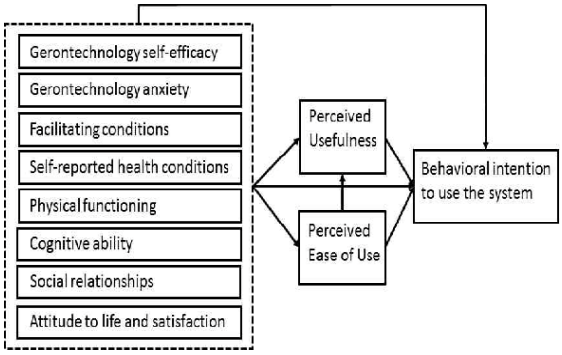


5.3.5 IMPLICATIONS TO STATE OF GERONTOLOGY

Much has changed in the gerontology field over the past 20 years. While it is still difficult to visualise the future trajectory, however, the main trends are currently clear.

Technologies. The COVID-19 pandemic has deepened the digital divide amongst Singaporeans. The main group affected by the digital divide are the older adults. Their resistance to technology can be due to various reasons such as medical barriers including poor eyesight; reduction of sensation of fingers; illiterate; mismatch of technology with older adult's needs; or fear of technology. The use of technology can be explained using the Senior Technology Acceptance Model and there are various factors that the community can work on to encourage and support older adults during their digital journey. It is imperious for our older adults to learn the basic know-how to ensure that they are not deterred from essential services such as healthcare and financial services when Singapore becomes a Smart Nation.

Figure 2: Senior Technology Acceptance Model (Shin, Yoon, Kim, & Kim, 2020)



***Professional training*.** Singapore Professional can be from the public sector or individuals who are trained in gerontology, geriatrics or geragogy. However, due to the niche market, there are very limited trained professionals in Singapore. But the knowledge and skills to care for and educate the older adults can potentially create opportunities for older adults to grow and contribute back to the community in later life. Although professionalising is important in the gerontological field, governmental, funding and resources are needed to ensure its success.

Community care. To meet the evolving care needs of our population, a paradigm shift in healthcare delivery is observed. This includes the shift from disease-centric to community-based, preventive person-centred care, where older adults are empowered to live well. This is will be conducted through preventive programmes or interventions to prevent or delay the onset of diseases. Leveraging on the strength of different research institute, collaborative efforts are needed to: (i) identify the needs of community-dwelling older adults, and (ii) to develop and implement management and preventive tools.

6. CONCLUSION

6.1. STUDY LIMITATIONS

Due to the COVID-19 restriction measures, the questionnaire was disseminated and conducted using google form. Online surveys can be a relatively new idea and require a certain level of familiarity with technology. Hence, we are expecting older adults who are more technologically proficient and of higher education to take part in this online questionnaire.

6.2. CONCLUSION

The report identified gaps in gerontology education, training, and research in Singapore. Through analysing the current trajectory, drawing on the strengths from other countries, interview with our local experts and understanding the view of our older adults, 3 main trends are observed: technology, professional training, and community care.

In conclusion, gerontology has come a long way over the past 20 years in developing various education and training programmes, and research base on the needs of our older adults. With the everchanging needs of older adults, it is thus impetus for us to relook the trajectory and identify the best way forward.

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7. REFERENCES

Ang, S. Y., Ayoob, S. B. M., Hussain, N. B. S., Uthaman, T., Adenan, H., Chiang, P., . . . Ostbye, T. (2017). Challenges faced by older nurses in Singapore: a mixed methods study. *Int Nurs Rev, 64*(4), 502-510. doi:10.1111/inr.12348

Birren, J. E. (2007). History of Gerontology. In J. E. Birren (Ed.), *Encyclopedia of Gerontology (Second Edition)* (pp. 686-695). New York: Elsevier.

Burnes, D., Sheppard, C., Jr, C. R. H., Wassel, M., Cope, R., Barber, C., & Pillemer, K. (2019). Interventions to Reduce Ageism Against Older Adults: A Systematic Review and Meta-Analysis. *American Journal of Public Health, 109*(8), e1-e9. doi:10.2105/ajph.2019.305123

Cheong, C., Nyunt, M., Gao, Q., Gwee, X., Choo, R., Yap, K., . . . Ng, T.-P. (2020). Risk factors of progression to frailty: findings from the Singapore Longitudinal Ageing Study. *The journal of nutrition, health & aging, 24*(1), 98-106.

Chong, M. S., Tan, C. N., Yew, S., Lim, J. P., Lim, W. S., & Lieu, P. K. (2018). Successful Ageing in Nonagenarians: Bio-psychosocial Factors Determining Successful Ageing in Long-Lived Older Adults. *J Am Med Dir Assoc, 19*(1), 90-92. doi:10.1016/j.jamda.2017.10.015

Chong, M. S., Tan, W. S., Chan, M., Lim, W. S., Ali, N., Ang, Y. Y., & Chua, K. C. (2013). Cost of informal care for community-dwelling mild-moderate dementia patients in a developed Southeast Asian country. *Int Psychogeriatr, 25*(9), 1475-1483. doi:10.1017/s1041610213000707

Council for Third Age. (2019). C3A FY 2019 Review. Retrieved from https://www.c3a.org.sg/FY19review/

Coyle, C. E., & Dugan, E. (2012). Social Isolation, Loneliness and Health Among Older Adults. *J Aging Health, 24*(8), 1346-1363. doi:10.1177/0898264312460275

Davis, T. (2015). The importance of gerontological education starting early: framing the educational needs of the future. *The Gerontologist, 55*(Suppl_2), 798-798. doi:10.1093/geront/gnv432.01

Department of Statistics Singapore. (2021a). Labour, Employment, Wages and Productivity. Retrieved from https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=14821

Department of Statistics Singapore. (2021b). Singapore Population Retrieved from https://www.singstat.gov.sg/modules/infographics/population

Eom, K., Penkunas, M. J., & Chan, A. W. M. (2017). Effect of caregiving relationship and formal long-term care service use on caregiver well-being. *Geriatr Gerontol Int, 17*(10), 1714-1721. doi:10.1111/ggi.12958

European Parliment. (2020). Japan's ageing society. Retrieved from https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659419/EPRS_BRI(2020)659419_EN.pdf

Feng, L., Chong, M. S., Lim, W. S., Lee, T. S., Collinson, S. L., Yap, P., & Ng, T. P. (2013). Metabolic syndrome and amnestic mild cognitive impairment: Singapore Longitudinal Ageing Study-2 findings. *J Alzheimers Dis, 34*(3), 649-657. doi:10.3233/jad-121885

Feng, L., Yap, K. B., & Ng, T. P. (2013). Depressive symptoms in older adults with chronic kidney disease: mortality, quality of life outcomes, and correlates. *Am J Geriatr Psychiatry, 21*(6), 570-579. doi:10.1016/j.jagp.2012.12.020

Feng, Q., & Straughan, P. T. (2017). What Does Successful Aging Mean? Lay Perception of Successful Aging Among Elderly Singaporeans. *J Gerontol B Psychol Sci Soc Sci, 72*(2), 204-213. doi:10.1093/geronb/gbw151

Green, B. N., & Johnson, C. D. (2015). Interprofessional collaboration in research, education, and clinical practice: working together for a better future. *The Journal of chiropractic education, 29*(1), 1-10. doi:10.7899/JCE-14-36

Ikeuchi, T., Lu, F. H., Holdsworth, J. K., Arun, Ö., Wang, S. T., Murakami, I., & Osada, H. (2017). Higher education in gerontology: A comparison of master's programs in Japan, Taiwan, and Turkey. *Gerontol Geriatr Educ, 38*(1), 61-75. doi:10.1080/02701960.2016.1232593

Institute of Technical Education. (2019). ITE Skills Certificate in Health Care (Home Care) (Traineeship). Retrieved from https://www.ite.edu.sg/courses/course-finder/course/ite-skills-certificate-in-health-care-home-care-trn

Institute of Technical Education. (2021). Higher Nitec in Elder Care (Traineeship). Retrieved from https://www.ite.edu.sg/courses/course-finder/course/higher-nitec-in-elder-care-trn

Jenllinek, I. (2019). Assessment of the accomplishments and impact of the John A. Hartford foundation's grantmaking in aging and health. Retrieved from https://www.johnahartford.org/images/uploads/reports/JAHF_Accomplishments_Impact_Report_FINAL_1.7.2019.pdf

Jester, D. (2020). *Doctoral and Masters-Level Educational Programs in Gerontology and Aging Studies in the United States*.

Kalirajan, K. P., & Shantakumar, G. (1998). Ageing labour force in a labour shortage economy: the case of Singapore. *International Journal of Social Economics, 25*(2/3/4), 486-503. doi:10.1108/03068299810193704

Lee, W. K. (1999). Economic and social implications of aging in Singapore. *J Aging Soc Policy, 10*(4), 73-92. doi:10.1300/J031v10n04_05

Li, J., Theng, Y. L., & Foo, S. (2015). Depression and Psychosocial Risk Factors among Community-Dwelling Older Adults in Singapore. *J Cross Cult Gerontol, 30*(4), 409-422. doi:10.1007/s10823-015-9272-y

Lim, W. S., Cheah, W. K., Ali, N., Han, H. C., Anthony, P. V., Chan, M., & Chong, M. S. (2014). Worry about performance: a unique dimension of caregiver burden. *Int Psychogeriatr, 26*(4), 677-686. doi:10.1017/s1041610213002445

Lim, W. S., Wong, C. H., Ding, Y. Y., Rockwood, K., & Lien, C. (2019). Translating the Science of Frailty in Singapore: Results from the National Frailty Consensus Discussion. *Ann Acad Med Singap, 48*(1), 25-31.

Liu, C., Eom, K., Matchar, D. B., Chong, W. F., & Chan, A. W. (2016). Community-Based Long-Term Care Services: If We Build It, Will They Come? *J Aging Health, 28*(2), 307-323. doi:10.1177/0898264315590229

Low, L. L., Liu, N., Wang, S., Thumboo, J., Ong, M. E. H., & Lee, K. H. (2016). Predicting frequent hospital admission risk in Singapore: a retrospective cohort study to investigate the impact of comorbidities, acute illness burden and social determinants of health. *BMJ Open, 6*(10), e012705. doi:10.1136/bmjopen-2016-012705

Maeda, D. (1992). Gerontological education in Japan--in training of social welfare personnel and nurses. *Nihon Ronen Igakkai Zasshi, 29*(5), 365-367. doi:10.3143/geriatrics.29.365
Malhotra, R., Chan, A., Malhotra, C., & Østbye, T. (2010). Prevalence, awareness, treatment and control of hypertension in the elderly population of Singapore. *Hypertens Res, 33*(12), 1223-1231. doi:10.1038/hr.2010.177
Mather, M., Jacobsen, L., & Pollard, K. (2015). Population Bulletin. Ageing in the United States. Retrieved from https://www.prb.org/wp-content/uploads/2019/07/population-bulletin-2015-70-2-aging-us.pdf
McGuire, S. (2017). Aging Education: A Worldwide Imperative. *Creative Education, 8*, 1878-1891.
Mehta, K. (1997). Cultural scripts and the social integration of older people. In.
Mehta, K. K. (1997). The impact of religious beliefs and practices on aging: A cross-cultural comparison. *Journal of Aging Studies, 11*(2), 101-114. doi:https://doi.org/10.1016/S0890-4065(97)90015-3
Merchant, R. A. (2021). Healthy Ageing Promotion Program for You (HAPPY) to Meet Ageing Population Needs. Retrieved from https://www.ifa-abstracts.com/healthy-ageing-promotion-program-for-you-happy-to-meet-ageing-population-needs/
Merchant, R. A., Chen, M. Z., Tan, L. W. L., Lim, M. Y., Ho, H. K., & van Dam, R. M. (2017). Singapore healthy older people everyday (HOPE) study: prevalence of frailty and associated factors in older adults. *J Am Med Dir Assoc, 18*(8), 734. e739-734. e714.
Ministry of Education. (2000). Civics and Moral Education Syllabus Primary School. Retrieved from https://libris.nie.edu.sg/sites/default/files/cme2000a.pdf
Ministry of Health. (2016). *I feel young in my Singapore! Action Plan for Successful Ageing*. Online: Ministry of Health Retrieved from https://www.moh.gov.sg/docs/librariesprovider3/action-plan/action-plan.pdf
Muramatsu, N., & Akiyama, H. (2011). Japan: Super-Aging Society Preparing for the Future. *The Gerontologist, 51*(4), 425-432. doi:10.1093/geront/gnr067
Nanyang Polytechnic. (2019). Specialist Diploma in Nursing (Gerontology) Retrieved from https://eservices.nyp.edu.sg/alls/course/cseDetails.jsp?id=HSEP01
Nanyang Technological University. (2021). Master of Science in Applied Gerontology. Retrieved from https://www.ntu.edu.sg/education/graduate-programme/master-of-science-in-applied-gerontology#programme
Naohiro, O., & Matsukura, R. (2007). Ageing in Japan: The health and wealth of older persons. *United Nations Expert Group Meeting on Social and Economic Implications of Changing Population Age Structures, 31*, 199-220.
National Sliver Academy. (2021). An Essential Tool forEngaging Senior LearnerS. Retrieved from https://dev.nsa.org.sg/geragogy-guidelines
National University of Singapore. Graduate Diploma in Geriatric Medicine. Retrieved from https://medicine.nus.edu.sg/dgms/docs/graduate-diploma/gdgrm_announcement.pdf
Ng, T. P., Broekman, B. F., Niti, M., Gwee, X., & Kua, E. H. (2009). Determinants of successful aging using a multidimensional definition among Chinese elderly in Singapore. *The American Journal of Geriatric Psychiatry, 17*(5), 407-416.
Ng, T. P., Nyunt, M. S. Z., Shuvo, F. K., Eng, J. Y., Yap, K. B., Hee, L. M., . . . Scherer, S. (2018). The Neighborhood Built Environment and Cognitive Function of Older Persons: Results from the Singapore Longitudinal Ageing Study. *Gerontology, 64*(2), 149-156. doi:10.1159/000480080

Ngee Aann CET Acedemy. (2021). Specialist Diploma in Community Gerontology Nursing. Retrieved from https://www.cet.np.edu.sg/courses/specialist-diploma-in-community-gerontology-nursing/

NNI CARe Programme. (2015). *Dementia: the tangled Brain*. Singapore.

OECD. (2013). *Life expectancy and healthy life expectancy at age 65*.

Organisation for Economic Co-operation and Development. (2018). Japan: Promoting Inclusive Growth for an Aageing Society Retrieved from https://www.oecd.org/about/secretary-general/BPS-Japan-EN-April-2018.pdf

Østbye, T., Malhotra, R., Malhotra, C., Arambepola, C., & Chan, A. (2013). Does Support From Foreign Domestic Workers Decrease the Negative Impact of Informal Caregiving? Results From Singapore Survey on Informal Caregiving. *The Journals of Gerontology: Series B, 68*(4), 609-621. doi:10.1093/geronb/gbt042

Pang, B. W. J., Wee, S.-L., Lau, L. K., Jabbar, K. A., Seah, W. T., Ng, D. H. M., . . . Ng, T. P. (2021). Prevalence and associated factors of Sarcopenia in Singaporean adults—the Yishun Study. *J Am Med Dir Assoc, 22*(4), 885. e881-885. e810.

Paul, P., Heng, B. H., Seow, E., Molina, J., & Tay, S. Y. (2010). Predictors of frequent attenders of emergency department at an acute general hospital in Singapore. *Emerg Med J, 27*(11), 843-848. doi:10.1136/emj.2009.079160

Replblic Polytechnic. (2021a). Specialist Diploma in Healthy Ageing & Community Care for Seniors. Retrieved from https://www.rp.edu.sg/ace/course-summary/Detail/specialist-diploma-in-healthy-ageing-and-community-care-for-seniors

Replblic Polytechnic. (2021b). Specialist Diploma in Integrated Care Management. Retrieved from https://www.rp.edu.sg/ace/course-summary/Detail/specialist-diploma-in-integrated-care-management

Saito, Y., Ishii, F., & Robine, J.-M. (2021). Centenarians and Supercentenarians in Japan. In H. Maier, B. Jeune, & J. W. Vaupel (Eds.), *Exceptional Lifespans* (pp. 125-145). Cham: Springer International Publishing.

Schneider, E. L. (1992). The growth of gerontology & geriatrics in the United States. *Nihon Ronen Igakkai Zasshi, 29*(5), 381-384. doi:10.3143/geriatrics.29.381

Share a pot. Our Stories.

Shin, H., Yoon, H.-j., Kim, S., & Kim, Y. S. (2020). Comprehensive Senior Technology Acceptance Model for Digital Health Devices. *Journal of Digital Convergence, 18*, 201-215.

Singapore University of Social Science. (2021a). Master of Gerontology. Retrieved from https://www.suss.edu.sg/programmes/detail/master-of-gerontology-mger-maj

Singapore University of Social Science. (2021b). PhD in Gerontology. Retrieved from https://www.suss.edu.sg/programmes/detail/phd-in-gerontology-phger

Sitoh, Y. Y. (2003). Aged care services in Singapore--an overview. *Ann Acad Med Singap, 32*(6), 717-722.

Takahashi, R. (2019). The Historical Philosophy of Gerontology in the Context of Our Future. *Gerontology and Geriatric Medicine, 5*, 1-13. doi:10.24966/GGM-8662/100026

Tan, C. C. L., Cheng, K. K. F., Sum, C. F., Shew, J. S. H., Holydard, E., & Wang, W. (2018). Perceptions of Diabetes Self-Care Management Among Older Singaporeans With Type 2 Diabetes: A Qualitative Study. *J Nurs Res, 26*(4), 242-249. doi:10.1097/jnr.0000000000000226

Tan, S. (2017). Singapore's first inter-generational playground, childcare centre in a nursing home launched

1 of 5. *The Straits Times*. Retrieved from https://www.straitstimes.com/singapore/health/singapores-first-inter-generational-playground-childcare-centre-in-a-nursing-home

Tay, L., Ding, Y., Leung, B., Ismail, N., Yeo, A., Yew, S., . . . Chong, M. (2015). Sex-specific differences in risk factors for sarcopenia amongst community-dwelling older adults. *Age, 37*(6), 1-12.

Temasek Polytechnic. (2021a). Diploma in Social Sciences in Gerontology (T53). Retrieved from https://www.tp.edu.sg/schools/hss/social-sciences-in-gerontology

Temasek Polytechnic. (2021b). Specialist Diploma in Gerontology (Nutrition for Ageing Well). Retrieved from https://www.tp.edu.sg/schools-and-courses/adult-learners/all-courses/part-time-diploma-post-diploma-courses/specialist-diploma-in-gerontology-nutrition-for-ageing-well.html

Temasek Polytechnic. (2021c). Specialist Diploma in Gerontology (Optimal Ageing Practice).

Teo, J. (2015). Ageing well with help from the young. Retrieved from https://www.straitstimes.com/singapore/ageing-well-with-help-from-the-young

The Gerontological Society of America. What is Gerontology? Retrieved from https://www.geron.org/about-us/our-vision-mission-and-values/what-is-gerontology

Towle, R. M., Tan, C. G., Saptu, K., Ong, L. J., Yap, M. M., Kheng, J. H., & Low, L. L. (2019). What do caregivers value and is there agreement in perception of met needs between nurses and caregivers? *Singapore medical journal, 60*(11), 575-582. doi:10.11622/smedj.2019040

United States Census Bureau. (2019). Population 65 years and over in the united states. Retrieved from https://data.census.gov/cedsci/table?q=s0103&tid=ACSST1Y2019.S0103

von Zglinicki, T. (2000). Research on ageing in Germany. *Exp Gerontol, 35*(3), 259-270. doi:10.1016/s0531-5565(00)00087-5

Ward, C. (1988). Stereotypes of old persons in Singapore. *J Cross Cult Gerontol, 3*(2), 95-103. doi:10.1007/bf00116753

Wee, S. L., Hu, A. J., Yong, J., Chong, W. F., Raman, P., & Chan, A. (2015). Singaporeans' perceptions of and attitudes toward long-term care services. *Qual Health Res, 25*(2), 218-227. doi:10.1177/1049732314549812

Williams, L., Mehta, K., & Lin, H.-S. (1999). Intergenerational influence in Singapore and Taiwan: The role of the elderly in family decisions. *Journal of Cross-Cultural Gerontology, 14*(4), 291-322. doi:10.1023/A:1006630800469

Wong, G. K. M. (2003). Quality of life of the elderly in Singapore's multi-racial society. *International Journal of Social Economics, 30*(3), 302-319. doi:10.1108/03068290310460170

Wong, M. Y. Z., Tan, C. S., Venketasubramanian, N., Chen, C., Ikram, M. K., Cheng, C. Y., & Hilal, S. (2019). Prevalence and Risk Factors for Cognitive Impairment and Dementia in Indians: A Multiethnic Perspective from a Singaporean Study. *J Alzheimers Dis, 71*(1), 341-351. doi:10.3233/jad-190610

8. ANNEX

8.1 ONLINE QUESTIONNAIRE

INTRODUCTION 简介

I am a student from the Nanyang Technological University conducting a survey on the future of Gerontological research, education and training. This survey seeks to understand the needs and the experience of our older adults in this rapid ageing society. This survey comprises of 30 questions and will take approximately 10 minutes of your time. Please read each item carefully, and select the most appropriate answer for each question. All information will be used for research purposes and is strictly confidential.

我是南洋大学的学生,正在调查老年研究，言教与训练。 此调查将探讨本地老年人在快速老龄化大的所需与体验。此调查表由 30 个问题组成， 并将占用您大约 10 分钟的时间。请仔细阅读每道题目， 并为每道题选择最合适的答案。所有的资讯只限于本研究所用而且绝对保密。

Demographics

1. Age 年龄 _____

2. Gender 性别
   - ☐ Female 女
   - ☐ Male 男

3. Ethnicity 种族
   - ☐ Chinese 华族
   - ☐ Malay 马来族
   - ☐ Indian 印度族
   - ☐ Others 其他

4. Highest Education Level 最高学历
   - ☐ Primary and below 小学及以下
   - ☐ Secondary 中学
   - ☐ Post-Secondary 高中
   - ☐ Degree or post graduate 大学及以上
   - ☐ Others 其他

5. Marital status 婚姻状况
   - ☐ Single 未婚
   - ☐ Married 已婚
   - ☐ Divorced 离婚
   - ☐ Widowed 寡妇/鳏夫
   - ☐ Others 其他

6. Monthly household income 家庭月收入
   - ☐ <$1,000
   - ☐ $1,000-$2,999
   - ☐ $3,000-$4,999
   - ☐ $5,000-$6,999
   - ☐ $7,000-$9,999
   - ☐ >$10,000

7. Employment Status 就业状况
   - ☐ Working 在职
   - ☐ Homemaker 家庭主妇
   - ☐ Retired 离退休
   - ☐ Others 其他

8. If you answered “working” in question 7, 如果您在问题 7 回答“在职”,

a. Current job 职业 _____

b. Hours of work per week 每周工拙时间 _____

9. If you answered “retired” in question 7，如果您在问题 7 回答”离退休”,

a. Age of Retirement 退休年龄 _____

KNOWLEDGE AND AWARENESS 知识与意识

10. I am aware of courses, seminars, and workshops on ageing. 我知道关于为乐龄所举办的课程，研讨会与讲座。
- ☐ Yes 是
- ☐ No 否

11. I have attended courses, seminars, and workshops on ageing. 我曾参加为乐龄所举办的课程，研讨会与讲座。
- ☐ Yes 是
- ☐ No 否

12. If you answered “yes” in question 11，如果您在问题 11 回答” 是”

a. The courses, seminars, and workshops has help me improve employability. 课程，研讨会与讲座提高了我的就业能力。
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

b. The course seminars, and workshops has help me lead a meaningful life. 课程，研讨会与讲座有助我过上有意义的生活。
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

c. The course seminars, and workshops has help me stay socially active. 课程，研讨会与讲座帮助我保持社交活跃。
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

d. The courses, seminars, and workshops has help me stay relevant in my everyday life. 课程，研讨会与讲座助于我
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意

☐ Strongly Agree 非常同意

13. If you answered “no” in question 11, what are the reasons for not attending?, 如果您在问题 11 回答” 否”， 那是什么原因呢？

a. I do not have enough time 我不够时间
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

b. I am too old to learn new things 因年纪的关系，我无法学新事物
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

c. The location of the courses, seminars, and workshops are not easily accessible. 课程，研讨会与讲座的地点
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

<u>VIEWS AND EXPERIENCE OF AGEING</u>

14. The public transportation system is age-friendly. 本地的公共交通系统亲乐龄
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

15. The facilities within the community are age friendly. 社区的设施亲乐龄
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

16. The healthcare policies in place are age friendly. 本地的医疗政策亲乐龄
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立

- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

17. The social welfare policies in place are age friendly. 社会福利政策亲乐龄
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

18. The retirement schemes in place are age friendly. 本地的退休计划亲乐龄
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

19. The reemployment schemes in place are age friendly. 本地的再就业计划亲乐龄
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

20. There is social inclusion and engagement of seniors within the community. 社区中具有社会包容与和乐龄人士之间的互动。
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

21. There should be more intergenerational interaction within the community. 社区内应该有更多的代际互动。
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

22. The older adults in Singapore are well supported. 新加坡的年长者得到了良好的支助。
- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

23. I can easily access quality healthcare. 我能轻易寻求品质的医疗服务。

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

24. I can easily access affordable healthcare. 我能轻易寻求便宜的医疗服务。

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

25. I have been treated badly because of age. 我曾因年龄而受到恶劣的对待。

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

26. My friend(s) have been treated badly because of age. 我的朋友曾因年龄而受到恶劣的对待。

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

<u>OTHERS 其他</u>

27. I am satisfied with my health 我对我的健康感到满意

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

28. I am satisfied with my life 我对我的生活感到满意

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

29. I am comfortable with my current financial status 我对我目前的财务状况感到满意

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

30. I have adequate savings for the future 我将来有足够的积蓄

- ☐ Strongly disagree 非常不同意
- ☐ Disagree 不同意
- ☐ Neutral 中立
- ☐ Agree 同意
- ☐ Strongly Agree 非常同意

8.2. Expert Interview

1) What does your current field of work encompass and why is it important within the gerontology field?

2) How has the trajectory of gerontological research, education and practice change over the past 20 years?

3) What are some emerging challenges due to the changing trajectory of gerontological research, education and practice? How these challenges overcome?

4) What are some emerging opportunities resulting from the changing trajectory of gerontological research, education and practice? How can one harness these opportunities?

5) Do you envision any change in the future regarding:
   a) the needs of older adults
   b) services for older adults? If yes, kindly elaborate.

6) What are your overall experiences working older adults (or working in the field of gerontology) in Singapore? Is there one experience that was particularly memorable? What have you learnt from this experience that can inform your work with older adults in the future?

7) As a country, how can we ensure that the needs of our older adults are constantly met?

8) As an expert in your field, what are some of the evident gaps you see?