Roots, trunk and branches

James L. Fozard PhD[a]
William D. Kearns PhD[b]

[a]School of Aging Studies, College of Behavioral and Community Sciences, University of South Florida, Tampa, FL 33612, USA, E: james.fozard@verizon.net;[b]Department of Child and Family Studies, College of Behavioral and Community Sciences, University of South Florida, Tampa, FL 33612, USA, E: kearns.william@gmail.com

J.L. Fozard, W.D. Kearns. Roots, trunk and branches. Gerontechnology 2015;14(1):1-3; doi:10.4017/gt.2015.14.1.002.00 Gerontechnology, unlike the goddess Venus, did not arrive in the world fully formed. Rather, its origins over the past 50 years may be traced to small beginnings in disparate locations that collectively gave rise to the vibrant organization whose mission falls squarely in the ongoing health policy debates of nations struggling to meet the demands of their aging citizenries. In this editorial we describe the growth of gerontechnology from its humble beginnings to a significant force for changing our conceptualizations of aging and aged persons.

Keywords: gerontechnology, technology and aging, aging and health, gerontology

Gerontechnology as a formal field of applied research and development began at the Technical University of Eindhoven (TU/e) about 1989, with roots in human factors, ergonomics, industrial design of consumer products and environments, and the study of physiological and psychological changes related to aging.

Roots

In 1985, Dr. Arnold Small, cofounder of the Human Factors and Ergonomics Society (HFES) of America created the Technical Group on Aging (TGA) the first to focus on a class of people rather than systems issues. Subsequent interest groups focused on persons with disabilities, and on individual personality differences. Another HFES founder, Dr. Alphonse Chapanis, published a seminal paper on engineering for the elderly[1] and Human Factors published the first of two special issues on aging in 1981[2]. The Gerontological Society of America created its own technology interest group convened by Geri Lesnoff-Caravaglia, who was the first and only editor of the 'Journal of Technology and Aging'.

Industrial designers and architects were the second root of gerontechnology. Robert Blaich pronounced, 'design as a connector between technology and aging' at the First International Conference on Gerontechnology[3]. Architects Victor Rengier[4] and Paul Grayson[5] were pioneers in a continuing stream of gerontechnology contributors in housing for the elderly. The union of human factors and design reflects human factors' historical focus on military applications, assigning system functions to human and machine components, and designers' focus on usefulness and aesthetic appeal of consumer products. The shared ground was a dynamic system view of person-environment interactions changing as a person aged in an ever-changing technical and built environment.

The third root united aging's functional changes with effects of lifestyle differences, 'normal' aging, disease, and environmental factors. These led to articulation of gerontechnology's major goals -prevention, compensation and care-paralleling public health's primary, secondary, and tertiary prevention[6].

Trunk

Over the 1990s gerontechnology's trunk grew strong at TU/e and other mostly European settings. TU/e's Center of Biomedical and Health Care Technology and the newly created Center for Gerontechnology, were both managed by Jan Graafmans under the direction of Prof. Bouma, director of the Institute for Perception Research. James Fozard in his year as a visiting professor of gerontechnology at TU/e worked with an enthusiastic and diverse group of engineers and scientists to develop the theoretical core and developmental programs of gerontechnology. To facilitate growth, all written reports and conference speeches were deemed community property and used without reservation. The decade's major events included (i) the second and third international conferences in Helsinki[7] and Munich[8]; (ii) the creation of the International Society for Gerontechnology (ISG) under Jan Graafmans; (iii) planning and initiation of two international educational activities by Drs. Jan Rietsema and Andrew Sixsmith; (iv) an EU focus on gerontechnology by its research funding organization, 'Cost A-5' headed by Dr. Vappu Taipale and Jan Graafmans; (v) the publication of an edited work 'Gerontechnology: How and Why'[9]; and (vi) the creation of a demonstration

house to showcase technology in homes of elderly persons, as headed up by Dr. Ad van Berlo.

With the retirement of Dr. Bouma TU/e closed the Institute for Gerontechnology, but activities continued in TU/e's Departments of Technology Management (Dr. Bouwhuis) and Building Technology (Dr. van Bronswijk). Delft University of Technology (NL) founded an active applied research program[10]. Roger Coleman, a British industrial designer at London's Royal College of Art authored his influential work, 'Designing for our future selves'[11] echoing strong British traditions continued by designers Newell and Lim. In Germany, Hans-Werner Wahl, and Heidrun Mollenkopf[12], amassed knowledge on household technology, housing, transportation and mobility to support aging in place. Dr. R. Sackmann and colleagues began research defining birth cohorts by the types of technology used when they matured, 'technology generations'[13], which was later extended to the millennial generation[14.] (See related work by Docampo et al.[15]). In the US, CREATE[16] initiated a research program on aging and technology that continues to churn out books, young scientists, and a steady flow of research reports. Perusing the second[7] and third[8] international conference abstracts and chapter titles gives a clear overview of the broadening scope of activities.

Branches

The first 15 years of the 21st century have seen the proliferation and interconnection of gerontechnology activities. Six more ISG World Conferences have occurred[17-22], with the 10th scheduled for Nice, France in 2016 and the 11th scheduled for 2018 in St. Petersburg, FL, USA. The single most important initiative is the Society's peer-reviewed journal, Gerontechnology; under founding editor-in-chief, Dr. van Bronswijk, the journal aggregates a wide range of research and reviews by international scholars. The proceedings document international conferences, the minutes and reports of its working committees, and special issues are devoted to areas of particular concern to older people - transportation by automobile, vision, and leisure activities.

As gerontechnology has grown, its topics in education and training have diversified. Annual master-classes in gerontechnology originated in 2006 in TU/e with a format duplicating a musician's masterclass; instead of playing for the virtuoso, doctoral students from multiple disciplines present their research project in a poster format and are queried and advised by masters and fellow students. The presentations are interspersed with lectures by masters, and the master with peer students' consensus gives an award for best project. Master-classes provide no academic credits but demonstrate the importance of interdisciplinary approaches to design and implement technologies to benefit older adults. A number of master-class teaching aids have been published in Gerontechnology.

The Nan Kai University of Technology in Taiwan has created full graduate and undergraduate curricula in gerontechnology and service management with the assistance of Professors Don G. Bouwhuis and James L. Fozard. Several other universities have initiated educational and research programs based on gerontechnology concepts - the most recent example being the University of South Carolina in the USA. A textbook, Gerontechnology, was published in 2007[23].

Regional chapters of the ISG have proliferated in Europe, Asia and North America. A summary of the diverse activities in the North American chapter was published in the ISG2014 conference proceedings[24]. Perhaps most important is the society's partnering with the International Association of Gerontology and Geriatrics (IAGG); IAGG past-President Gloria Gutman and former IAGG Secretary-General Alain Franco (ISG's 3rd president) facilitated the arrangement. The union provides an important platform for tele-health and technology services information in geriatrics.

Concluding

Gerontechnology's trunk and roots have nourished its flourishing branches. We happily nurture gerontechnology's continuing growth and evolution.

References

1. Chapanis A. Human engineering environments for the aged. The Gerontologist 1974;14(3):228-235; doi: 10.1093/geront/14.3.228
2. Fozard JL, editor, Special issue on aging. Human Factors, 1981;23(1); doi:10.1177/001872088102300101.
3. Bouma H, Graafmans JAM, editors. Gerontechnology. Amsterdam: IOS Press; 1992
4. Rengier V. Design for assisted living: Guidelines for housing physically and mentally frail. New York: Wiley; 2002.
5. Grayson JP. Technology and home adaptations. In: Lanspery S, Hyde J editors, Staying put: Adapting the places rather than the people. Amityville NY: Baywood Publishing; 1997.
6. Bronswijk JEMH van, Bouma H, Fozard JL. Technology for quality of life: An enriched taxonomy. Gerontechnology 2002;2(2):169-172; doi:10.4017/gt.2002.02.02.001.00
7. Graafmans JAM, Taipale V, Charness N, editors. Gerontechnology: A Sustainable Investment in the future. Amsterdam: IOS Press; 1998
8. Pieper R, Vaarama M, Fozard JL, editors. Geron-

technology: Technology and aging - Starting into the Third Millennium. Aachen: Shaker; 2002
9. Harrington TL, Harrington MK, editors. Gerontechnology: why and how. Maastricht: Shaker; 2000
10. Steenbeckers LPA, Beijsterveldt CEM van, editors. Design-relevant characteristics of ageing users. Delft, NL: Delft University Press; 1998
11. Coleman R. Designing for our future selves. London: Royal College of Art; 1993
12. Wahl HW, Mollenkopf H. Impact of everyday technology in the home environment on older adults' quality of life. In: Charness NE, Schaie KW, editors, Impact of technology on successful aging. New York: Springer; 2003; pp 215-241
13. Weymann A, Sackmann R. Modernization and the generational structure. Technological innovation and technology-generations in East and West Germany. In: Becker HA, Hermkens PL, editors, Solidarity of generations: Demographic, economic and social change, and its consequences. Amsterdam: Thesis Publishers; 1993; pp 721-744
14. Sackmann R, Winkler O. The concept of technologies revisited: New insights from sociology. Gerontechnology 2012;11(2).106-107. doi:10.4017/gt.2012.11.02.508.00
15. Docampo Rama M, Ridder H de, Bouma H. Technology generation and age in using layered user interfaces. Gerontechnology 2001;1(1):25-40; doi:10.4017/gt.2001.01.01.003.00
16. Czaja SJ, Sharit J, Charness N, Fisk AD, Rogers W. The Center for Research and Education on Aging and Technology Enhancement (CREATE): A program to enhance technology for older adults. Gerontechnology 2001;1(1): 50-59; doi:10.4017/gt.2001.01.01.005.00
17. Charness N, Czaja S, Fisk, A. Gerontechnology 2002: Creative use of technology for better aging. (Abstracts of the 4th International Conference of Gerontechnology) Gerontechnology 2002;2(1):1-166; doi:10.4017/gt.2002.02.01.000.00
18. 5th International Conference on Gerontechnology. Gerontechnology 2005;3(4); doi:10.4017/gt.2005.03.04.000.00
19. Bouma H, Dario P. Welcome to ISG08: Smart technology for active longevity. Gerontechnology 2008;7(2):63-64; doi:10.4017/gt.2008.07.02.000.00
20. Sixsmith AJ, Gutman G. ISG2010 – 7th World Gerontechnology Conference. Gerontechnology 2009;8(1):61-62; doi:10.4017/gt.2009.08.01.019.00
21. ISG*ISARC2012 World Gerontechnology Conference. Gerontechnology 2012;11(2); doi:10.4017/gt.2012.11.02.000.00
22. Hsu, Y.L. Welcome to ISG 2014 on Taiwan. Gerontechnology 2014;13(2):63; doi:10.4017/gt.2014.13.02.430.00
23. Lesnoff-Caravaglia G, editor. Gerontechnology: Growing old in a technological society. Springfield: Charles C. Thomas; 2007
24. Woolrych, R (convener). Inter-university and interdisciplinary collaboration in gerontechnology. Gerontechnology 2014;13(2):154; doi:10.4017/gt.2014.13.02.097.00