Master class: The 4th pillar under gerontechnology

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J.E.M.H. van Bronswijk. Master class: The 4th pillar under gerontechnology. Gerontechnology 2014;12(2):63-67; doi:10.4017/gt.2014.12.2.003.00 Master classes originate from the musical domain, but may also be applied to other domains with a high level of complexity. Since 2006 two-days master classes take place under patronage of the International Society for Gerontechnology (ISG). Teaching is meant for young researchers and designers, typically PhD students, who prepare their project for the master class. Master teachers are experienced in working at the crossroad of technology and gerontology. Project focussing, clarity and embedding in the academic literature of both technology and gerontology are the main teaching aims. The master class became the 4th pillar in the mission of the ISG, after biannual conferences, the journal Gerontechnology, and cultural chapters.

Keywords: trans-generational communication, knowledge transfer, gerontechnology

The International Society for Gerontechnology (ISG) organizes master classes in which young academics are taught by masters who, by age, could be their grandparents[1-7]. Having been present at almost all ISG master classes, it has struck me that in the discussions a strong transgenerational flow of knowledge developed with masters being approached by students as grandparents are by adult grandchildren. Knowledge exchange typically continued at collective lunches and coffee breaks, and intensified during the two days of the master class.

When viewing chatting between adult grandchild and grandparent in general, their outlook may differ but trans-generational communication can be intense (*Figure 1*). Grandparents reported that the most common type of support they provided is advice, although grandchildren do not view their grandparents as advisors[8]. Academically speaking this might be an example of a happy marriage between a lifelong growth in skills, knowledge and experience (crystallized intelligence) and the well-developed health-related ability to analyze novel problems (fluid intelligence)[9,10].

Figure 1. Clothing differs but communication goes deep! Photo from the Nationale Beeldbank, Netherlands

The questions arise; "Why a gerontechnology master class? How does it work?"

Master classes

Knowledge and skill transfer from old and experienced to young and coming is obvious in the musical domain, when master classes are given. Wikipedia defines a master class as follows: "The difference between a normal class and a master class is typically the setup. In a master class, all the students (and often spectators) watch and listen as the master takes one student at a time. The student (….) usually performs a single piece which they have prepared,….."[11]. The student is expected to have complete control of the basic elements, but has not yet command over the full complexity of required skills for perfection. Inventor of this way of teaching is considered to be the composer, pianist, conductor, teacher and Third Order Franciscan, Franz Liszt (1811-1886, *Figure 2*), who gave these classes for free[11].

Why an ISG master class?

Just as in case of the musical domain, with its complexity of description (notation, dynamics and expression) and of execution (mastery of the instrument, projection of meaning), complexity is the driving force for ISG master classes, as was loosely defined earlier[1].

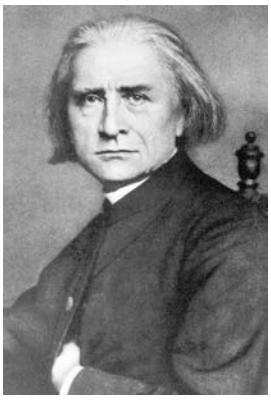

Figure 2. Franz Liszt (1811-1886), inventor of the Master Class on an engraving from 1908 by an unknown artist[12]

Being able to succeed in good gerontechnology research or designing successful products for an aging society asks for managing a multitude of complexities. To start with, the 'Income & Health' and 'Gerontechnology efficacy' situation in the home countries of the researchers differ greatly, as was recently shown on a global scale in the 'Global Age-Watch Index' project of Helpage International[13,14]. European, Asian and American countries may be found in both the best half and the poorer half of the quartiles (*Table 1*).

More influential is striving towards a human centered basis for technology development, with knowledge of aging as related to calendar age as well as birth cohort (gerontology), and with straight technology knowledge. Aging well is strongly connected to lifestyle and culture, hampering generalisation of results. But that is not all, with age, the diversity among cohort members increases, depending on differences in genetics, environmental exposures, life events, gender, technology exposure, technology generation, life phase, aging speed, and differences in aging among the organs of an individual. This diversity interacts with a multitude of changing natural, built and social environments[15,16].

These complexities are not covered in regular university education of the first cycle (BSc/BA level) or second cycle (MSc/MA level) that both focus on one discipline[1,17]. Of course, neither one student nor any one teacher will have all knowledge and skills to tackle the complexities mentioned above. Therefore, gerontechnology master class teaching

Table 1. Distribution of 91 countries over the four quartiles of gerontechnology efficacy (geometric mean of the normalized values for two domains: 'Employment & education' and 'Enabling environment') and of the Income & health situation (geometric mean of the normalized values from 'Income security' and 'Health status') as taken from the Global Age-Watch Index[14]*; calculated after Zaidi*[13]*; the poorest quarter is grey*

		Gerontechnology efficacy quartile			
		1	**2**	**3**	**4**
Income & Health quartile	**1**	16: Australia, Austria, Canada, Denmark, Finland, Germany, Iceland, Ireland, Israel, Japan, Netherlands, New Zealand, Norway, Sweden, Switzerland, USA	10: Argentina, Belgium, Chile, Czech Republic, France, Luxembourg, Panama, Slovenia, Spain, Uruguay	7: Belarus, Brazil, Greece, Italy, Malta, Portugal, Ukraine	
	2	1: UK	14: Albania, Armenia, Bolivia, China, Costa Rica, Ecuador, Estonia, Georgia, Mauritius, Nicaragua, Peru, South Korea, Sri Lanka, Thailand	14: Bulgaria, Colombia, Croatia, El Salvador, Hungary, Latvia, Lithuania, Mexico, Romania, Serbia, Slovakia, Turkey, Venezuela, Vietnam	2: Jordan, Montenegro
	3	1: Philippines	6: Cyprus, Ghana, Indonesia, Kyrgyzstan, Poland, Tajikistan,	11: Dominican Republic, Guatemala, India, Lao People's Democratic Republic, Moldova, Mongolia, Nepal, Paraguay, Russia, South-Africa, West Bank & Gaza	2: Morocco, Pakistan
	4			3: Cambodia, Honduras, Nigeria	4: Afghanistan, Malawi, Rwanda, Tanzania

focusses on knowledge and skills needed for the specific project of the participating student, and masters from different origins perform the teaching.

Structuring and limiting

Matrices became commonly used tools in ISG master classes (*Figures 3*)[18] to guide students in (i) structuring, limiting and focussing their project, and (ii) embedding it in gerontechnology's state-of-the-art. A student may choose only one cell in each matrix. By using sticky notes students can change their mind at any moment as long as they explain the reasons for changing. Let's take a hypothetical gerontechnology project to explain the use of the tools: the development of 'An app for travel in the Netherlands' (An app).

In the engineering matrix of showing the possible impact of the product on the application domain (*Figure 3a*) 'An app' fits in the cell combining mobility (domain) & enrichment (goal), meaning that the project should be based on the state-of-the art of this combination.

In the outlook matrix of user perspective (*Figure 3b*) 'An app' fits in the cell of active retirement (3rd age) of older adults who in their young age became acquainted with electrical tools without menus (electro-mechanical generation). The focus group in the development of 'An app' should be filled with these older adults.

In the science matrix (*Figure 3c*), showing the cross-fertilization[19] of the relevant technology and gerontology disciplines, 'An app' falls in the cell communication science & psychology. This is important for the choice of methods to test or develop the product. Although with the matrices mentioned above, focussing may succeed the problem of generalization of results remains. To support the embedding in existing knowledge, theories, concepts or paradigms are available to support generalization (*Figure 3d*). For 'An app' this could be the gerontology theory of 'Situated learning'[19] (from psychology, relevant from architecture to design as shown in a horizontal baton), and the technology concept of 'Plug & Play'[20] (from ICT, relevant from medicine to nutrition as shown in a vertical baton)[21].

ISG master classes

In 2006 the 'master class model' was applied for the first time to gerontechnology. Seven 3rd cycle students (PhD candidates) from France, Italy and the Netherlands were accepted by the masters. James L. Fozard (USA, 1930), Herman Bouma (Netherlands, 1934), Alain A. Franco (France, 1944) and Jan A.M. Graafmans (Netherlands, 1951) taught for free and took the students along the complexity of goals, domains and disciplines, method selection and interpretation of results, while the author governed program and discussion. Students and masters joined in applying the acquired knowledge to the specific research project of the individual student[3]. It became the start of a series of gerontechnology master classes and special classes in Canada, France, and Taiwan, as well as the Netherlands[4-7]. Some students followed more than one master class, and a number of them are currently proud bearers of the academic degree 'PhD'.

Although with feedback from students[6] and teachers the master class concept developed, the original set-up remained[3,7]. Typically, in an informal setting and spread over two full days, four 20min lectures (that unfortunately commonly took longer..) are given on methodology, theory and interdisciplinarity, intermingled with 4x4 hours of discussion with posters serving as focal points. At the end students and masters independently judge the student projects and select the best one for innovation, clarity (focussed, terms well defined), theoretical embedding, applicability (including user involvement), and poster organization, readability and legibility at 2-3 m distance. Afterwards, as a last assignment and wrap-up, the three best of both juries are compared and discussed. Usually students and masters partly agree. The winning student receives a prize, lately from the Herman Bouma Foundation[7,22], and each student is given a certificate signed by all masters.

In some master classes slightly different set-ups were tried and evaluated. The final aim of applying the complexity of gerontechnology to individual projects was not fully reached in master classes with the following characteristics: (i) a duration of less than two full days, (ii) devoted to a sub-section of gerontechnology, (iii) with students still in their 2nd academic cycle, (iv) with more than four students/master or spread over more class rooms, or (v) when translation to and from English was needed. Apparently there exists an additional need for more general classes for 2nd cycle teaching[17], which could be an effective initiative of ISG's cultural chapters.

Requirements

Master class students typically are 3rd cycle students (PhD candidates), but other researchers or designers with less than 10 years of experience are also welcome. Requirements to participate include: (i) being independent users of English in listening, reading, writing and speech, (ii) having prepared a poster of his/her project, and (iii) having provided an abstract of their project[2,Table 1] and a short biography as a basis for admission by the masters (*Table 2*).

Table 2. Master class requirements for students and masters

Item	Student	Master
Academic skills	≥MSc / MA level (2^{nd} cycle)[9]	Doctor degree level (3^{rd} cycle)[9] Interdisciplinary publications At least bilingual Effective teacher
Experience	<10 years	>15 years
Language Passport[23]	English ≥B1 (independent user)	English C1/C2 (proficient user)
Acceptance	By the masters	By the ISG

Experienced, interdisciplinary, bilingual or multilingual teachers served in the master classes. Since teaching is done in English, the official language of the ISG, teachers were all proficient English users and had command of at least one other language to experience multiculturalism.

In 2010 the ISG decided to bestow the honorary title 'ISG-Grandmaster' on those effective master class teachers known to have authored a long list of publications touching both technology and gerontology. The first grandmasters originated from psychology (Jim L. Fozard),

ENGINEERING - Goal & application cell

Goal = Enjoyment in:	Application domain: Health Self-esteem	Housing Daily living	Mobility Transport	Communication Governance	Work Leisure
Enrichment Satisfaction			An App		
Prevention Engagement					
Compensation Substitution					
Care support Care organization					

OUTLOOK - Age & generation cell

Technology generation	Target population: 1st age - Formative years	2nd age - Main working phase	3rd age - Active retirement	4th age - Frailty & Dependence
Mechanical products, hierarchical organization				
Electro-mechanical products, hierarchical organization			An App	
Menu driven products, layered software ('Microsoft generation')				
Gaming with proficiency levels, relational organization at each level				

SCIENCE - Cross-fertilization cell

Gerontology	Technology: (Bio)Physics (Bio)chemistry	Architecture Construction	Computer science ICT	Mechatronics Robotics	Ergonomics Design	Business management Economics
Physiology Nutrition						
Psychology Social psychology			An App			
Sociology Demographics						
Medicine Nursing Rehabilitation						

EMBEDDING – in existing knowledge

Gerontology	Technology: (Bio)Physics (Bio)chemistry	Architecture Construction	Computer science ICT	Mechatronics Robotics	Ergonomics Design	Business management Economics
Physiology Nutrition			Play			
Psychology Social psychology		Situated learning				
Sociology Demographics			Plug &			
Medicine Nursing Rehabilitation						

Figure 3. Four matrices[17-19,21] as a tool to limit, focus and place a student project as to aspects of engineering (a), of outlook to the user (b) of science (c), and of embedding in existing knowledge (d); It has been completed for one hypothetical project "An app for travel support in the Netherlands" (=An App)

physics (Herman Bouma) and medicine (Vappu T. Taipale). It became a habit to appoint a new grandmaster at each of the biannual world conferences.

To conclude

The ISG master class (already mentioned as specific training and educational program in the original articles of association[24]) became the 4th pillar under the gerontechnology mission of the ISG, next to biannual conferences, journal and cultural chapters. The class is needed to teach the complexity of gerontechnology to young academics. Currently its general set-up and requirements have stabilized. A system of quality control may be needed in the future to ascertain further development.

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References

1. Bronswijk JEMH van. On education. Gerontechnology 2008;7(1):1-2; doi:10.4017/gt.2008.07.01.001.00
2. Bronswijk JEMH van, Fozard JL, Kearns WD, Davison GC, Tuan PC. Implementing gerontechnology. Gerontechnology 2008;7(3):325-327; doi:10.4017/gt.2008.07.03.007.00
3. Derksen T, Hoof J van. 1st ISG master class for PhD students. Gerontechnology 2006;5(3):183; doi:10.4017/gt.2006.05.03.013.00
4. Kort HSM de. Fun Technology Master Class. Gerontechnology 2009;8(2):124; doi:10.4017/gt.2009.08.02.025.00
5. Roche NM de. The 5th ISG Gerontechnology Master Class. Gerontechnology 2011;10(1):60; doi:10.4017/gt.2011.10.01.008.00
6. Kort HSM de. Student comments on the 6th Master class. Gerontechnology 2011;10(2):124; doi:10.4017/gt.2011.10.2.008.00
7. Kort HSM. ISG Master Class of June 25-26, 2012. Gerontechnology 2014;12(2):123-124; doi:10.4017/gt.2013.12.2.005.00
8. Sheehan NW, Petrovic K. Grandparents and Their Adult Grandchildren: Recurring Themes From the Literature. Marriage & Family Review 2008;44(1):99-124; doi:10.1080/01494920802185520
9. Christensen H, Batterham PJ, Mackinnon AJ. The Getting of Wisdom: Fluid Intelligence Does Not Drive Knowledge Acquisition. Journal of Cognition and Development 2013;14(2):321-331; doi:10.1080/15248372.2012.664590
10. Bergman I, Almkvist O. The effect of age on fluid intelligence is fully mediated by physical health. Archives of Gerontology and Geriatrics 2013;57(1):100–109; doi: 10.1016/j.archger.2013.02.010
11. Master class; http://en.wikipedia.org/wiki/Master_class; retrieved July 2, 2014
12. Kendrick Johnson H. The world's best music, famous compositions for the piano. Volume 2. New York: The University Society;1908; www.dreamstime.com/royalty-free-stock-image-franz-liszt-image27255166; retrieved July 3, 2014
13. Zaidi A. Global Age Watch Index 2013. Purpose, Methodology and Results. London; Helpage International; 2013; www.helpage.org/download/52949b561453d; retrieved July 9, 2014
14. Taipale VT. The global age-watch index, GAWI, 2013. Gerontechnology 2014 (in press)
15. Kuh D, Karunananthan S, Bergman H, Cooper R. A life-course approach to healthy ageing: Maintaining physical capability. Proceedings of the Nutrition Society 2014;73(2):237-248; doi:10.1017/S0029665113003923
16. Fozard JL, Wahl HW. Age and cohort effects in gerontechnology: A reconsideration. Gerontechnology 2012;11(1):10-21 doi:10.4017/gt.2012.11.01.003.00
17. The framework of qualifications for the European Higher Education Area, adopted by Ministers at the Bergen Conference of European Ministers Responsible for Higher Education 19-20 May, 2005; http://www.ehea.info/Uploads/Documents/QF-EHEA-May2005.pdf; retrieved May 2014
18. Bronswijk JEMH van, Bouma H, Fozard JL, Kearns WD, Davison GC, Tuan PC. Defining gerontechnology for R&D purposes. Gerontechnology 2009;8(1):3-10; doi:10.4017/gt.2009.08.01.002.00
19. Bouma H, Fozard JL, Bouwhuis DG, Taipale VT. Gerontechnology in perspective. Gerontechnology 2007;6(4):190-216; doi:10.4017/gt.2007.06.04.003.00
20. http://en.wikipedia.org/wiki/Plug_and_play; retrieved July 11, 2014
21. Bronswijk JEMH van. Gerontechnology starts at birth and even earlier. Gerontechnology 2014;13(2):173; doi:10.4017/gt.2014.13.02.021.00
22. The Herman Bouma Fund for Gerontechnology Foundation; http://gerontechnologie.nl/; retrieved July 8, 2014
23. Europass language passport; http://europass.cedefop.europa.eu/en/documents/european-skills-passport/language-passport; retrieved May 2014
24. Dongen PMNM van. Oprichting vereniging 9710168/MS (International Society for Gerontechnology). Eindhoven: Marks Wachters Notarissen; 1997; Articles of Association (in Dutch) available from www.kvk.nl, under KvK40241035