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J. E.M.H. Bronswijk
Eindhoven University of Technology

James L. Fozard
University of South Florida

William D. Kearns
University of South Florida, kearns@usf.edu

Gerald C. Davison
University of Southern California Los Angeles

Pan-Chio Tuan
Nai Kai University of Technology

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Implementing gerontechnology

Johanna E.M.H. van Bronswijk PhD
Department of Architecture, Building and Planning
Eindhoven University of Technology, Eindhoven, the Netherlands
E: j.e.m.h.v.bronswijk@tue.nl

James L. Fozard PhD
School of Aging Studies, University of South Florida,
Tampa, Florida 33260, USA
E: Fozard@tampabay.rr.com

William D. Kearns PhD
Department of Aging and Mental Health,
Louis de la Parte Florida Mental Health Institute,
University of South Florida, Tampa, Florida 33612, USA
E: kearns@fmhi.usf.edu

Gerald C. Davison PhD
Leonard Davis School of Gerontology,
Ethel Percy Andrus Gerontology Center
University of Southern California Los Angeles,
California 90089-0191, USA
E: gdaviso@usc.edu

Pan-Chio Tuan PhD
Graduate School of Gerontic Technology and Service Management
Nai Kai University of Technology, Nantou, Taiwan
E: tuan@nkc.edu.tw

J.E.M.H. van Bronswijk, J.L. Fozard, W.D. Kearns, G.C. Davison, P-C. Tuan. Implementing gerontechnology. Gerontechnology 2008; 7(3):325-327. Master classes for PhD students in gerontechnology showed the need for a short guideline to help young researchers. To enable the gerontechnology enterprise to be implemented in design, engineering and research, some of the teachers in the master classes in Eindhoven (the Netherlands) and Nantou (Taiwan) developed together a step-by-step framework for gerontechnology projects to assist young researchers.

Keywords: gerontechnology, design, engineering, research, framework

No matter how we define gerontechnology, we always emphasize its interdisciplinarity and complexity[1]. During master classes in both Taiwan and the Netherlands the authors observed the difficulties of young scientists with the design of their experiments and projects due to the complexity of the gerontechnology endeavor. Although principles for research in gerontechnology are already published[2] a more concrete guideline is needed to lead the young professional through the phases of his/her research, engineering or design project. In this short communication we present such a guideline as discussed during the master classes (*Table 1*).

Table 1. A framework for gerontechnology research, engineering and design projects aiming at health and happiness up to the highest possible age

Step	Question	Possible answers	
1	What is the main ***goal*** of the project? (Choose one item)	□ Enrichment □ Satisfaction □ Prevention of later restrictions □ Engagement	□ Compensation □ Substitution □ Care support □ Care organisation
2	Identify one ***target*** and one ***target population*** of the project	*Target:* □ Physical functioning □ Mental functioning □ Emotional functioning □ Social functioning □ A combination, namely ……	*Target population:* □ 1st age: formative period □ 2nd age: main working phase □ 3rd age: active retirement □ 4th age: frailty & dependence
3	What is the ***application domain***? (Choose one main item)	□ Health □ Self-esteem □ Housing □ Daily living □ Mobility	□ Transport □ Communication □ Governance □ Work □ Leisure
4	What is the ***setting*** of the project aim? (Choose one item)	□ The technical environment □ The social environment □ The person □ The person-environment interface □ A combination, namely …..	
5	What is the ***timing*** of the project?	□ Before decline of the function addressed is measurable □ After function decline	
6	Who will be invited in the ***interdisciplinary team***?	In addition to *members of the target population*:	
		A gerontologist from: ■ Ethics □ Aesthetics □ Physiology □ Nutrition □ Psychology □ Social psychology □ Sociology □ Demographics □ Medicine □ Rehabilitation □ Other, namely ……	*And an engineer from:* □ Chemistry □ Biochemistry □ Architecture or building □ Information □ Communication □ Mechatronics □ Robotics □ Ergonomics □ Design □ Business management □ Other, namely …
7	Which are the ***theories*** addressed?	*From gerontology:* □ Compressing morbidity □ Maslow's motivation hierarchy □ Situated learning □ Technology Acceptance Model □ Other, namely ……	*From engineering:* □ Aging-in-place □ Inclusive design □ Management innovation □ Targeted marketing □ Other, namely ……
8 Design only	In which ***evaluation phase*** is the product under scrutiny?	□ Computer simulation □ Laboratory testing □ Field pilot □ Full scale field study	□ Business plan completion □ Marketing plan completion □ Post-introduction surveillance □ Other, namely …….

Seven or eight steps

It all starts with formulating the main goal of the project (Step 1), followed by identifying its objective or target, and the target population (Step 2), as well as its application domain (Step 3). At this stage the setting of the project is not yet clear. To address this, a principal investigator, designer or engineer will choose a setting such as the technical environment, the person, or the user-system interface (Step 4), and a timetable (Step 5).

After the choices of steps 1 to 5 have been made, the principal investigator forms an interdisciplinary team to realize the project (Step 6). Such a gerontechnology team always includes members of the target population, as identified in step 2, in addition to experts from specific technology and gerontology disciplines. In step number 7 the interdisciplinary team may choose a theory from both gerontology and technology that is most applicable to the project. Such a selection will not only enhance generalisation of results, it will also hint at the specific methodologies that are best suited to obtain them.

In the case of a design project, the interdisciplinary team must take an additional step: evaluation of the technical system, service, product or environment (Step 8). In the first stages of design this will be limited to a computer simulation of one or more scenarios of intended use, followed by laboratory and field testing, and business calculations, until a full-scale post-introduction surveillance can be performed.

Interdisciplinarity and complexity

In the steps described above interdisciplinarity is clearly visible. Step 6 reminds the investigator to not only include delegates of the target population in the project team, but also members of both the gerontology and technology domain. Note that 'Ethics' must be considered in all gerontechnology projects.

The complexity of gerontechnology projects is classified in the steps 1 to 5. After a closer look, goal, target, target population, application domain, setting and timing concern human-machine interactions that are relevant in a number of technology and gerontology domains. This again points at the large array of disciplines incorporated in gerontechnology.

The authors hope that this simple guideline (*Table 1*) will support novice professionals in gerontechnology projects, helping them to assure success.

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