Will lifelong learning be matched by continuous education?

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H.Bouma. Will lifelong learning be matched by continuous education? Gerontechnology 2014;12(4):194-200; doi:10.4017/gt.2014.12.4.002.00 Due to rapid changes in society driven by developments in technology, the concept of lifelong learning has replaced the youth and adolescence as the paramount period of learning, in preparation for a whole life integrated in society. People are able to internalize new information and acquire new skills at any age up to the end of life, except in case of specific memory- or movement debilitating diseases. Quite a few normal life skills are based on memory. Education is defined here as organized opportunities for learning with well-defined students, goals, and methods. So, in a dynamic society, lifelong learning has to be matched by sufficient opportunities for continuous, lifelong education. However, society as a whole has only partly embraced lifelong learning and seems to still predominantly focused on education as preparation and training for a continuing professional career, i.e. education for jobs. **Purpose** Working out the concept of lifelong learning and continuous education for ageing people in present society. **Method** Analysis of the structural lag of older people to participate in a society characterised by fast innovations, and deriving suggestions for solutions. **Results and discussion** A flood of innovations and scientific findings has deeply changed society and is continuing doing so. It follows that the validity over time of what is learned has shrunk and there is now a need for continuous education and skills training right up to the end of life. Some options will be outlined for continuous education, thus supporting lifelong learning. Open learning environments via the Internet combined with the training of digital competences appear to be the basic skill set. It is presently unclear who will take on a position as primary stakeholder to make this happen. As for scientific support, disciplines of gerontology and technology necessary for developing digital competence, education software, user interfaces, social organization, and massive introduction are indicated.

Keywords: lifelong learning, continuous education, learning by practising

Lifelong learning is the concept that learning is a human faculty that remains active from birth until the very end of life. The learning is from everything people experience and try out, and includes information from news media and books, new names and faces, changes and happenings in one's physical and human environment, and also new daily skills. 'No limits to learning' may be somewhat too general for ageing people, but it is not far from the truth. General phenomena related to ageing such as a general slowing and diminishing muscular strength[1,2] may put limits on the type and speed of learning, but this does not diminish the notion that learning is a lifelong faculty as has long been recognized[3,4].

Education is defined here as organized opportunities for learning with well-defined students, goals, and methods. Education is made to serve students in the first place, but in a wider sense the interests of society as a whole, or of specific sectors including interests groups, as indicated by the responsible organizations and financing. Therefore, lifelong learning could be matched by educational opportunities in all phases of life. However, society as a whole still seems to hold on to the earlier notion of education as preparation for and continuation of professional life, i.e. education for jobs. Since a stream of technological innovations and scientific findings has changed and continues to change society, the validity over time of someone's education has shrunk and the need has arisen of continuous education and training. Here the position of older people will be considered with respect to continuous education.

The view will be from a European perspective, in which responsibilities are recognizably divided between recipients themselves, government agencies, non-profit organizations, professionals and their organizations, and private companies. Due to financial pressures, divisions between the different players have become more fluent, thus contributing both to opportunities and uncertainties of all concerned. The general response in public institutes to the widely ranging effects of population aging has been slow to evolve[5,6].

Older people are different

It is seductive to consider older people as a rather homogeneous group. However, the only common aspect is their age. Because of their long and highly different life experiences, they are far more heterogeneous than younger people. Their rich spectrum of experienced contexts may serve them to embed new information more eas-

ily. Ageing people will also have life experiences in common in as far as their environments have been similar, in particular during their formative period before the age of 30 years[7]. This relates to aspects such as cultural environment, general wealth or poverty, educational opportunities, gender considerations, and life events such as economic depression or war. It specifically relates to the environment of technology-based products and services relevant for gerontechnology.

Therefore, the general sociological notion of 'cohorts' of people born in a certain year, and successive cohorts taken together as 'a generation' of people, has been widened to include 'technology generations'[8-11]. Because of the changes of technology products, services and infrastructure during their lives, older people are different from younger people who have experienced only later technological environments. Older people are running behind; they have to endure a certain lag, both from personal factors and from socio-economic factors[12,13]. This has already been the case for at least a century and is characteristic for the situation in which technological innovation runs at a higher pace than the attainment of adequate skills by the prospective users of such innovative products and services. Also, earlier existing skills and habits may slowly fade out by non-use, but cannot be actively forgotten.

In considering present and future generations of older people, such insights have to be taken into account. As to the present, people deciding on or introducing new technologies cannot easily imagine the difficulties that people from an earlier generation experience. Also, extrapolating the present will not do if only because, apart from their general heterogeneity, future older people will belong to a different generation, including a different technology generation. Neither will assuming that the present problems will disappear because future older people will have familiarized with present technology based products and services such as a multitude of apps on smartphones. Technology may be expected to keep on changing faster than people can muster. Projections for the future may be uncertain anyway, but application of current insights about generations must be part of any credible scenario.

So, professional projections of future older people have to be based on their education and their technology environments in earlier life, including before the age of 30. As to technology, subsequent new products and services can be mastered, but only after maintained repetitive use. In the present, restrictions in digital competence may turn out to be a limiting factor, also for achieving educational results. In this, the supporting role of many a grandchild is gratefully acknowledged and helps to diminish individual lag.

Approaching end-of-life

In medical aspects of older people, the distance in time to their end-of-life will obviously be taken into account, particularly if the end seems near. Discussions are about the balance between quality of life and burden of treatment. However, the aspect of end-of-life is much more general on the mind of older people, either consciously or subconsciously[14-16]. In relation to innovative products and services, it may take the motivationally evasive form of: 'it will last my remaining time'. Just as in the medical aspect, the balance between increased quality of life and required efforts and costs for attaining such quality is a necessary consideration. However, since one's end-of-life will often be hidden in the future, it can also serve as too easy an excuse for inaction.

Continuous education

Continuous or lifelong education is defined here as education from the beginning till the end of life. In a complex and fast-changing society, this should be a truism, but often the concept happens to be restricted to mainly education of young people up till readiness for taking up paid jobs, and in addition to training and updating of professional people up to some time before the end of their paid jobs. Surprisingly, this may even be the focus of the concept of lifelong learning[17]. Such restriction would leave many people out of opportunities for education and also for opportunities of being fully competent citizens in their society. We will briefly touch on educating the young and educating professionals, but our main goal is to consider the educational environment of older people. This will enable us to consider adults in general as well, and in particular the many adults who are out of paid jobs, and ask the question how in our dynamic society general educational opportunities may continue after people have left initial education such as high school. It turns out that the international situation is quite diverse[6] and no effort will be made here to provide an overview. However, what seems most needed are for any country listings of up-to-date content of subject matter that older people might wish to master and an infrastructure for overview and access to actual and digital courses and reliable websites with clear content and restricted fees. Representative groups of older people are needed for helping work this out in the various countries and environments.

Educating the young

All governments have a department of education. This usually covers the education of all children and many adolescents. Schools and institutes are

provided in which professional teachers introduce and train the pupils in knowledge and skills needed as citizens in the culture of their environment and for their future profession. Supervising and advisory committees are many. However, as innovative products and services are concerned, young people tend to train themselves by just trying out and following their peers. This may already happen at a very young age. The role of teachers in primary and particularly secondary school is developing into teaching young people to focus on specific subject matter and providing them with an integrating framework of knowledge, insight and tools, in which relevant data can be found and understood. General education in a broad number of subjects tends to end at high school level. At tertiary level, education becomes focused and deepened into becoming expert in a certain professional discipline or combination of disciplines.

Educating people in mid-life

During the phase of life with paid work, education is mainly covered by employers and professional training organizations, sometimes supported by government programmes. All along the continuum of low to high level professions, the actual work is in constant change because of the spread of new technology-based products and services and because of new professional knowledge, insights, methods, and tools. This requires almost continuous refresher courses or other opportunities for studying and training. For professions in certain fields, such as of medicine, of public safety, and in some countries of teaching, such training is a constant and obligatory activity, as a condition for keeping one's professional permit. This lends itself to broadening to other professions, if only for making optimal use of reliable new digital tools. In general, present vocational education does not end with a certain initial certificate, but has become embedded in professional life permanently.

For people outside the vocational world, educational opportunities are diffuse. There are many types of such people: housewives and housemen, people outside jobs, people with physical or mental restrictions. If people wish to keep up-to-date with their initial education or acquire new knowledge or skills, they are left free to find, and pay for, suitable courses such as from community colleges, open university, commercial parties, or the Internet. There is little general support and restricted infrastructure. There will be some exceptions such as language courses for immigrants and job-to-job training. As opposed to professional education, general education is rather treated as a once-and-for-all issue and not readily available for adults, as if the surrounding world were static. Of course, the new options are via the Internet, where the main issue seems to be to match individual needs with the excess of options. Sufficient digital competence is a condition, which is also anything but static.

Educating older people

The goal of general education will be to enable students of taking up full positions in their society. This will hold for students at any age. Although this paper is focusing on education for people after retirement, it is an issue for all people who are not in a position for receiving permanent general education among whom all adult people without paid jobs. From the point of view of present society, it is an open environment, in a sense nobody's land, and left to individuals themselves, to their organizations, to NGO's, to schools, universities and institutes, and to commercial parties. Notably absent are departments of education. Options for continuous education will increase the value of people in taking up volunteer or paid activities and for themselves increased self-esteem and independence, and a sense of being active part of their society including the social connections that come with such commitments. Ever more people are active in paid and voluntary work after official retirement age and would profit from up-to-date general education.

There are spots of order in the rather chaotic educational situation. A system of community colleges offers opportunities for specific courses and lectures with low fees. In the cultural and scientific sector, there is a wide offering of courses and cultural travel with rather higher fees. There are courses for learning to use computers, mostly run by volunteers. And there are extensive Internet opportunities, which will be considered separately.

For children and adolescents, it is considered necessary to have some general understanding of a number of subjects, such as in high school: physics, chemistry, biology, earth sciences, history, literature, the national language and a few foreign languages. In most of these, there have been frequent fundamental developments such as nuclear fission and dark matter in physics, genetics and immunology in biology and medicine, raw materials and relations between countries in the earth sciences, robotics in mechatronics, politics and the making of the present in history, communication means in languages and the explosion of Internet access in computer science. It is not only new concepts and insights that have to be mastered, but also methods of keeping track of developments. People with a high level of initial education may be able themselves to find their way, but this may be less so for people

with lower initial education. The main issue is if we will provide people with the educational opportunities to keep track of relevant changes in subject matter that earlier was considered useful or even necessary for their role in society.

Internet opportunities

Here the advantages of keeping informed and up-to-date are advocated. There are several means to keep oneself informed such as by reading books, periodicals, and newspapers or actively attending courses on the Internet. Indeed, the Internet is developing as a most important medium for teaching older people. For example, there are the free Massive Open Online Courses (MOOC). However, in many countries there seems to be little guidance, few explicit goals, few proven methods, little oversight. Most of the extended infrastructure for educating the young appears absent for educating the old.

Within the European Union there is a programme 'Grundtvig' directed at open educational environments for adults including older people. Among other things, it has analyzed an implementation gap between technical options and actual opportunities. It also includes a register of best practices[18,19]. From an economic perspective, the OECD follows the topic of lifelong learning and open learning environments[20,21].

If only lists of certified websites were made, updated, and communicated, including tested user interfaces for different types of user, this would already provide the interested older people with some means to educate themselves. Obviously, this would count only as a first step in providing everybody with the opportunities to remain fully educated at one's own level. And the problem of education in digital competence has to be attacked.

Digital competence

In the technology domain, older people have difficulty in handling new products and services. The effective way for older people to learn to use new products or services is not studying books or instructions for use, neither attending classes, but simply repetitive use of the application, with direct instruction in case of difficulties. Instruction videos may help if these follow closely the successive steps to be taken and include what can go wrong. The role of classes may be to create a fruitful social environment and keeping up learning discipline, and selected games may keep up motivation. Any system for teaching older people use new skills has to be evaluated in practice and optimized accordingly. But there seems to be lack of an infrastructure of professional teachers and evaluators of skills of older persons, necessary for developing goals, methods and tools for continuous education, including choosing and handling new useful technology products and services. Open educational environments may hold solutions, but difficulties in access and navigation may stand in the way[22].

Products and services that may enrich the lives and enhance opportunities of older people have hurdles that require specific actions to overcome[23]. The present generations of older people have experienced such hurdles in using computers, tablets, apps on smartphones, and social media, in which they lag behind younger generations. Most present services and courses require a certain degree of digital competence and even the government may require digital access irrespective of age, without providing proper training facilities.

For education, digital competence is more than just handling computer, tablet, or smartphone. It includes navigating efficiently through large amounts of semi-relevant information, consulting metadata, handling illustrations, collecting related items in special files and subfiles including efficient retrieving, knowing one's way in the subspace of helpful selection tools, and handling hardware and drivers. This can only be mastered by sustained and repetitive use. For any educational course, the requirements for digital competence should be made clear, as a kind of entry test, complete with the tools and materials to attain such skills.

Table 1. Part of application matrix[24] of possible human goals in various domains of life. Cells indicate a selection of useful products and services, the fruits mostly to be reaped dependent on digital competence

	LIFE DOMAIN				
GOAL	**Health** **Self-esteem**	**Housing** **Daily living**	**Mobility** **Transport**	**Communication** **Governance**	**Work** **Leisure**
Enrichment **Satisfaction**	*E-health* *Updated education*	*E-shopping* *E-banking*	*Travel information* *Navigation*	*Digital competence* *Tablet* *Smartphone* *Internet courses* *Government sites*	*Digital organizing tools* *Social media*
Prevention **Engagement**	*Health monitoring* *Healthy lifestyle*	*Safety illumination* *Fall hazards*	*Navigation*	*Digital security* *Privacy protection*	*Safety rules*

Fruits of sufficient digital competence are many. Table 1 gives a selection of applications serving human goals in the various domains of life, in a format as proposed earlier[24].

The example of e-health

A proper use of e-health facilities requires a certain level of digital competence. The older the person is, the greater the probability that such level will not have been attained. This might be the case for younger professional users such as nurses as well, but they can be specifically trained. The urgency of such training has not been sufficiently recognized. The unfortunate result will be that the advantages of e-health both as to content and as to financing will not be realized[25,26]. This will count the more because of the ongoing shift toward a greater participation of patients in responsibility for their own health[27]. Also, discussions about balancing privacy protection and general professional access would gain in quality if digital competence of patients became increased.

In searching for health information on the web a specific problem is to assess the quality of the information and to distinguish between valid objective information on the one hand and open or hidden advertisement on the other. Here there is a need for reliable websites for general public use, properly maintained and announced. Learned medical societies or universities might take the lead. The financial model of such informative websites will have to be developed, for example including user contributions.

Supporting research competences

Education is multi-disciplinary in nature as content, teaching, tools, and learning are connected. This is reflected in the research supporting education. If we add the perspective of educating older people, it may be clear that we have entered a rather complex field of interest. Gerontechnology adds the additional aspect of technology both as the digital skills to be mastered and as the carrier of content such as via the Internet.

A selection of insights gained is depicted in the matrix of Table 2[28], which plots a few research disciplines of gerontology (rows) against a few disciplines in technology (columns). Obviously, developmental psychology concerns human development lifelong. The cells display some concepts relevant for lifelong learning to be met by continuous education. Situated learning[29] refers to the insight that skills are better learned in the situation in which these are to be used as compared against learned from courses or books outside the situation of use. Frequent repetition means that learning of digital skills endures only if used often and repetitively, and easily fades away if not used over a longer period of time, and frequent interaction means that the social environment may help to keep up trying and practicing. Inclusive design[30] means that both in the design of user interfaces and in the presentation of learning material, representative users have to be involved preferably in an interactive way[31]. This includes the influences of age and cohort effects[32] and the social settings in which the actual learning will be organized. Inclusive design is also known as universal design[28] because design for difficult groups of users may also do for less difficult groups of users, but not vice versa. The technology adoption or acceptance model (TAM)[33] indicates the interplay of factors that lead at the end to adoption. TAM is modelling both psychological and social aspects.

Conclusion

Young people need to be educated to prepare for full participation in society. To achieve this, an extended infrastructure exists and is financed, defining goals, methods, and means, and controlling the outcomes for primary, secondary, and tertiary education. Successful students have a command of and access to the concepts, theories, tools and data to equip them to pass their exams. However, in a dynamic society, such concepts, theories, tools and data are in constant flux. In order to remain up-to-date, there have to be continuous educational opportunities; otherwise a lag will develop between the requirements and expectations of society and the actual capacities of its citizens. This is particularly true for older persons, many of whom have had little if any formal education since they left school.

It is argued that lifelong learning should be matched by continuous education in order to increase independence and full participation in society of all people, and older people in particular, throughout life. Digital competence has a

Table 2. Part of cross-fertilization matrix[28] showing relevant disciplines of both gerontology and technology. Cells display concepts relevant for lifelong learning to be matched by continuous education

	TECHNOLOGY		
GERONTOLOGY	**Computer science**	**Ergonomics / Design**	**Business management**
Cognitive psychology **Developmental psychology**	*Situated learning* *Frequent repetition* *Skill development*	*Inclusive design*	*Technology Adoption Model*
Social psychology	*Frequent interaction*	*Inclusive design*	*Technology Adoption Model*

central enabling role. Open education environments with proper navigation tools can provide answers. A first step would be to organize reliable websites with tested user interfaces for well-defined learning goals. Such a set-up can be organized in order of priority, e.g. for purposes of e-health or access to government information. Opportunities for continuous education will result in a better society with increased opportunities for everyone and in particular for people who have had only limited educational opportunity before. Since society as a whole is gaining if citizens update their skills, it would be the natural role for national departments of education to organize a continuous education program and they should be encouraged and enabled to do so.

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