

## **Generations and Life Course: the impact of demographic challenges on education 2010-2050**

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The population of the world aged 60 years and over increased from 205 million and 8 per cent in 1950 to approximately 688 million and 11 per cent in 2006. By 2050, the number will have increased to around 2 billion and 22 per cent. By 2030, half the population of Western Europe will be over 50, one quarter of the population of the developed world will be over 65, and one quarter of the population of Asia will be over 60. This is historically unprecedented. Indeed, it make the 20<sup>th</sup> century the last century of youth, the 21<sup>st</sup> century heralds a new demography- that of maturity.

These dynamics are the result as much of falling fertility as of increasing longevity as across the world women are choosing not to have large numbers of children, to delay or even reject first childbirth. This coupled with increasing longevity sees ageing flood out across the globe. Indeed the scale of aging over the next 50 years is immense. According to the United Nations forecasts, the population aged 60 years and over is expected to increase from 20 to more than 30 per cent by the year 2050 in the more developed regions, from 8 to 20 per cent in the less developed regions, and from just 5 to 10 per cent in the least developed regions. And these are projections from incremental longevity. What will be the demographic consequences if radical longevity becomes a possibility for entire generations? The prospect of a relatively long and healthy life is real for most of us and there lies the challenge and the opportunity for every individual, country and government in a world of increasing longevity.

For the UK, as for most other countries in Western and Northern Europe, the demographic situation is defined principally by the combination of three dominant trends: a fertility rate that has been below replacement level for several decades now and is thought unlikely to rise above it; unprecedented and continuing declines in late-life mortality; and relatively high levels of inward migration. This has already resulted in a UK society which is characterised by a decline in the proportion of younger people (through falling fertility), an increase in the proportion and number of older people (through both falling fertility and mortality), and a more ethnically diverse composition (through increased migration).

The challenges posed by these trends can be grouped into four main categories: those that arise from the changing age structure of the population – specifically the increase in the proportion of older people and the decrease in the proportion of younger people (i.e. changing dependency ratios); those that arise from the ageing of the older population (i.e. more people surviving in ‘late old age’); those that arise from inward migration and the growth of migrant communities within the host society; those associated with persistent below-replacement fertility (i.e. population decline as opposed to population growth). It is evident that these challenges are not independent of each other, and furthermore that trends in one driver of demographic change may offset or compound the impact of trends in another. For example, changes in the age structure of the population are driven partly

by the ageing of the older population and partly by below-replacement fertility. Large-scale inward migration is likely to have a temporary effect on the age structure of the population and will delay the trend towards natural population decline inherent in below-replacement fertility. Policy makers need to have an understanding of the challenges and opportunities of population change that fully integrates all three of the main drivers of change. Furthermore, the challenges that demographic change poses for the UK cannot be understood however solely in terms of the demography of the UK. In an increasingly globalised world, we cannot suppose that the UK will be immune from the impact of global patterns of demographic change. Nor can the demography of the UK be understood apart from these same patterns of change.

The UK's past experience of mortality, migration and fertility is written into its age structure. Like the rest of the EU, it has moved from positive demographic momentum (growth) into negative demographic momentum (shrink) (though in practice mediated by inward migration). This *second demographic transition* is being mirrored in other parts of the world, particularly Asia as fertility falls from the replacement levels of classic demographic transition theory. A *third demographic transition* driven by international migration is also beginning to change regional and international population structures. It is currently uncertain how low fertility will fall in Europe and some of the more advanced Asian countries. A combination of further declining family size ideals, continued postponement of childbearing and bio-medical factors affecting both men and women may well lead to fertility levels so far below replacement level as to have dramatic consequences for the social and economic structures of society. The recently proposed "Low Fertility Trap Hypothesis" assumes a bifurcation among industrialized countries under which the lowest fertility countries would see further fertility declines while another set of countries would experience stable fertility only slightly below replacement level. Alongside these lie new perspectives on mortality forecasting, which acknowledge that there is much greater scope for reductions in mortality at higher ages than previously acknowledged.

UK population change also needs to be seen in the wider context of globalisation, It is essential therefore to understand the ways in which global patterns of demographic change are likely to present both policy challenges and opportunities for the UK. A key question, for example, is whether we should expect demographic convergence to accompany socio-economic convergence and the role that migration has to play in this process. Yet, globalisation also needs to acknowledge the powerful dynamic of global ageing. As restrictions on the movement of human and financial capital around the world are eased, demographic change becomes a potent force for change in the global economy. Exactly how these changes will play out remains poorly understood, though some of the outlines are clear. Large shifts in national age distributions are likely to affect national saving patterns, capital requirements and international capital flows, particularly between the more and less developed worlds. The demand for health and social care workers in more developed countries is already increasing, and is set to increase further at the same time as the supply of younger workers will tighten. The implications for the host and source countries' welfare systems, and for the family and social support structures in the

source countries, are considerable. National provision of education, health and social care, housing, transport, and basic infrastructure will all be affected.

The future promises many similar scenarios across many different sectors of the national economy, with skilled labour being pulled out of the country as well as pulled in. The whole question of UK identity becomes important here: for example, the tension between multiple identities with allegiance to both source and host country, and between ethnic and national sentiments. Broader questions include to what extent can and should immigration mitigate certain negative effects of demographic ageing; what policies should be developed for better integrating these migrants, in particular young people; how could the legislative and financial frameworks and incentives combat discrimination and promote integration of immigrants.

As the UK demographically ages, one of the main policy challenges is to enable individuals to maintain their health and productive capacity for as long as possible. We need to consider how the organisation of work be best be adapted to a new distribution between the generations, with fewer young people and great numbers of older workers, to take into account the specific needs of different age groups; how parents' integration in working life can be facilitated and how they can achieve a balance between flexibility and security to bring up their children, to train and update their skills to meet the demands of the labour market. We need to decide what is an appropriate balance between investing in early education and in adult and life long training schemes. There is also concern over the intergenerational contract and changing patterns of intergenerational solidarity as societies age.

### **Uncertainties**

Exactly how these trends will develop over the course of this century is uncertain, though the broad outlines in the shift in population age structure appear clear. In the developed world, for example, there are relatively large birth cohorts now in mid-life, that are longer-lived and have lower fertility than their parents. These three factors mean that their entry into old age will generate what is sometimes described as an 'age wave' or 'demographic shock' that will subsequently subside as smaller cohorts take their place. Old age dependency ratios will increase sharply as the consequences of rapid and large declines in fertility work themselves through the population. However, the continued increases in longevity, including potential radical increases due to new generation technological advances, accompanied by persistent falls in fertility, mean that the population structure of both the developed and developing regions may well dramatically alter over the course of this century.

There is, however, policy-relevant uncertainty. Current assumptions on longevity, for example, may turn to be too conservative due, for example, to the speed of technological advance in biomedicine, or indeed, too optimistic due, for example, to the increasing prevalence of obesity. The extreme scenarios we now have to consider include the possibility that biomedicine will enable young children today to remain active and healthy as centenarians as well as the possibility that their life expectancy will be less than that of their parents

There is also uncertainty about the future of human fertility – especially in those countries which already have fertility rates below replacement level – as to whether it will continue to fall or to ‘recover’ and then stabilise at the kind of level that the UN assumes in its medium-variant projections. Some demographers (Lutz 2006), for example, have suggested that countries with very low fertility could get stuck in a ‘low fertility whereby social and economic adjustments by institutions and individuals would make it difficult for fertility to rise to replacement levels again.

Most countries in the world have developed public institutions for transferring resources and support between working generations to dependent younger and older generations. Population ageing is bringing about such large changes in the relative size of these generational groupings that policy-makers have to re-consider the operation of the institutions that channel public resources and support between generations. In addition, declining fertility affects the collective capacity of society to provide these goods and assist with the problems that face the ageing individual.

While policy makers recognise that they have to help their societies adjust to a low-mortality and low-fertility future, they are unclear as to how large these adjustments will have to be. As individuals we may be required to reconsider the way in which we allocate consumption and resources between different stages of the life course. As societies, we have to decide how to allocate the burden of adjusting to demographic change across (i) different parts of the life course and (ii) different generations. The adjustments required in order to finance the additional consumption of longer-lived population under conditions of declining fertility clearly pose major allocation and distributional challenges. In particular, we must consider what changes in our collective arrangements for transferring resources and support between generations are fair under conditions of population ageing.

### **Mature societies**

There is then no doubt that population ageing will have far reaching consequences on society. It is clear that population ageing will lead to hitherto unseen consequences:

- More **generations** will survive next to each other than ever before; people will increasingly pass income, care and support down as well as up through the generations. Intergenerational solidarity will take a different nature as intergenerational transfers and justice move to the fore of policy concern and will influence the new ethics of our societies
- **Individual life courses** will change, both professionally and personally, as we recognise our personal longevity. Individuals will have to rethink their own personal life courses and when and how they wish to mix education and work.
- The **labour market** will face increasing skills shortages and a large proportion of older workers, and adapt to train and retain older workers. New cohort will expect and demand increasingly flexible working patterns. Home is likely to develop as a place of work, education and health care.

- **Societal structure and organisation** will need to change to keep up with the new demographic reality. We will move increasingly into second, third and even fourth partnerships with extended families of a complicated and demanding nature. The family as a supportive environment will change, though how is unclear. Communities will change both spatially and socially.
- **Social and economic behaviour will adapt.** Consumption will vary between ages groups and generations and will not be the same as previous generations. People's disposable income will need to be distributed between increasing leisure, education, health care, mobility, and other demands.
- **Infrastructure and services** such as housing and transport, education and health care provision will need to adapt to a large percentage of older adults. needs and capacities

### **Who will be the future learners over the next 15-50 years?**

Ageing societies require the transfer of educational resources between young and old/ There is a concern that in using national resources for education and training for older people, we may penalizing the young. However there are demographic and societal reasons for such a transfer in resources. As the UK, like the rest of Western Europe moves to over half its population aged over 50 by 2030, so there will be a general transfer of resources from younger to older populations, these will include health, education, housing, employment etc. This will be matched by changing societal needs, as individuals adjust both to the reality of longer lives, and to the fluid life courses which are emerging at the same time.

- Life long education of adults will move to the fore along side early learners, and the division of education along chronological age lines will blur.
- Education is likely to be a mix of formal group teaching (akin to current early learning in schools and universities), self-promoted learning using information and media technology, community learning, work-place learning and skills development.
- It is likely to be pluralistically funded by individuals, communities, employers, governments, private enterprise.
- The separation of education to enable personal development, to enhance employability and career progression, to develop skills, and to successfully contribute to wider society is likely to disappear.
- Education is likely to continue through-out the life course enabling individuals to draw on a portfolio of options to personal development
- The role of “qualifications” will need to be re-examined.

There are current concerns over the role of migration and immigration and the special needs of new migrants: In particular there is current acceptance that people from different cultures may have very different expectations of what learning is from the traditional British experience. Education currently can play a key role in the

- arrival and integration of new migrants
- employability
- recognition and updating of qualifications
- cultural and social adjustment
- social integration and cohesion

However, given the likely tremendous increase in international migration for all, it is likely that many of these challenges will have disappeared and or changed by 2020-70 as we move into a mobile more culturally integrated world. It is likely that individual preferences and experiences will dominate the learning experience, need and demand, as with other groups.

### **Supporting learning across and between different age groups.**

The new demography and new social forces are likely to result in life long education of adults to the fore along side early learners. In particular the division of education along chronological age lines will blur. While there will always be a demand for formative education, it is now recognised that the education of adults, including older adults, is both intrinsically important and important for society as whole. Education gives people the chance to face the rapid changes in the society, in the labour market (particularly through skills upgrading) and in their personal and community life. It enables them to participate in complex democratic societies on all levels, and gives the society a chance to pursue its social and economic development supported by socially integrated adults of all ages.

### **The learning required to support long working lives.**

Europe is now moving into a period of redefining late life work as governments, employers and workers begin to come to terms with the implications of demographic ageing and the far reaching implications this will have for institutions and individuals alike. There are now growing moves to recruit, retain and retrain that generation of men and women in their 50s and 60s who are increasingly being seen as essential to retaining Europe's economic competitiveness as the upcoming skills shortage washes across the region.

While some argue that the requirement for new skills, particularly abilities in information and communication technologies, increasingly excludes older workers, it is also clear that technological innovation and flexible working patterns will increase opportunities for older workers. Indeed, the inherent training component of new technological labour means that future cohorts of older workers will have experience of continual training and skills updating throughout their lives. Supplemented by vocational and life long learning, adult education and training, this will significantly enhance the employability of older people and address upcoming national skills shortages.

- It is important that such education and training is targeted, builds on previous experiences and skills and properly evaluated.

- It is important to engage the business community in this, and to do this, far more research and evaluation of the effectiveness of different types of life-long learning and training is required from a business stance.
- Move from classroom training in workplace and already rapid growth in “desktop” training for all employees using CD-ROM, videoconferencing, the Internet and electronic performance support.
- Shift from trainer led training to employer led training with trainers as “enablers”. Work related education shifting to create interventions that allow employees to decide what to learn and when to learn it, employing user-driven technology : multimedia training, training technology and performance support systems.
- Use of technology to provide training and (technology-based training) and to support workers' performance on the job through electronic performance support systems (technology-based support) – it is likely that both will play an increasing role, not just in the work place but across all educational activities.
- Wide range of technology to provide both technology-based training and technology- based support: computer software, CD-ROMs, videoconferencing, computer networks, multimedia training technology and performance support systems.
- Trainers role is changing – trainers need to become supporters and enablers, particularly when dealing with a older experiences workforce.
- Growing role for Human Resources to move to employee-dialogue approach, whereby employee is positively encouraged to identify training and skills updating needs.
- Some European countries already operate study leave schemes allowing employees to return to full or part time education or training.

## **The role of digital and bio technologies in both demographic change, and in educating for diverse or changed populations**

### **1. Education**

New technologies are already playing an important role in educating a diverse range of employees in the corporate world. These need to be considered as tools for enabling education across the life course for all in the community and home as well as the workplace. Consideration should be given to:

#### Technology and training delivery

- electronic on line training with on-line certification
- videoconferencing allowing simultaneous video and audio interaction between multiple participants across the globe.
- CD-ROMs providing interactive video and audio capabilities, easily used by all ages, and which enhance learning and retention.
- local area network (LAN), wide area network (WAN), or "Intranet" learning.

## Technology to enhance learning

- electronic performance support systems (EPSS). These are electronic tools that enable individuals to access support, coaching or information to perform better. These systems have considerable potential in for other education activities. EPSS are being seen as making significant impact on productivity, performance and employee learning in the world of work.

This area is likely to develop rapidly over the next few decades with real potential for education.

## Technology and childhood

There are several broad aspects of children's relations with technology that are likely to become increasingly significant in the coming years. These include:

- the convergence of technologies and forms of communication
- the ability to 'multitask', or engage flexibly with a diverse range of media
- the individualisation of access to media
- the potential for communication and participation in creative media production
- the changing role of media in identity formation
- the difficulty in establishing the credibility of online information
- the growing influence of commercial forces.

## 2. Capacity change and enhancement

It is likely that advances in two specific areas of bio-technology will impact upon demographic change and education.

- Radical longevity
- Brain ageing and capacity change

### **Radical Longevity**

The predictions are based on incremental longevity. Consideration would need to be given to the impact of significant advances in radical longevity, not just in maximum life span, which would have a minor impact on demography, but in the normal life span for all individuals. However, so long as this radical increase in longevity was accompanied by a corresponding increase in health life expectancy, the overall effect would be a general extension of adult activities – more time for education, work et, rather than necessarily a fundamental shift in the amount of time spent in any one activity (i.e. this would not necessarily mean increased in retirement or post-working life).

### **Brain ageing and capacity change**

Cutting edge advances in bio-medical science via neuro-imaging and bioinformatics are transforming our understanding of the ageing of the brain and subsequent changes in capacity, and interventions to modify these processes. There is increasing evidence that

the rate of functional decline in late life is highly variable. It is clear that some individuals accumulate more ‘health capital’ than others in early life; and that similar variations are found in the rate at which this ‘health capital’ depreciates in middle life. We are now beginning to understand the accumulation and de-accumulation of such “health capital” in the brain.

- Neurogrid, identify age and illness-related brain changes at the population level using both existing and future large-scale neuroimaging (magnetic resonance imaging, MRI and magnetoencephalography, MEG) studies.
- detailed information has emerged about the molecular and cellular basis of core functions of the brain that provide the physical substrate for brain involvement in autonomic, endocrine, sensory, motor, emotional, cognitive and ageing processes.
- advances in bioinformatics and computational modelling, provide the opportunity to address the bigger picture of how the brain changes with age.
- cognitive enhancement to amplifying or extending the abilities of the mind through internal or external hardware or software is progressing. As cognitive neuroscience has advanced the range of potential internal enhancement treatments have increased as well as the availability and power of external hardware/software support.

These advances will be essential to understand how capacity changes with age across the life course, and how new educational technologies can best be harnessed to provide education across the life course.

## **The Future**

UK policy on education has been developed in the context of a traditional pyramidal population structure, and linear life courses, which result in a large investment by the individual in early year’s formal education, and a rapid decrease in such education in young adulthood. The population ageing identified above, resulting in mature societies and elongated active lives for a growing number of the population, leads to the challenge of devising education for the new demography – both individual and societal. A new framework is required to cope with the following issues:

Firstly education 2020-50 will need to combine

- formative education,
- education as a lifestyle-choice
- education to enhance employment prospects
- education to enable full citizenship

**Formative education:** there will still be a requirement for structured formative education, but increasingly here there will be a mix of “teaching” and “group learning”

with self-promoted learning using information and media technology even for the very young.

**Education as a lifestyle-choice:** new technology enables the blurring of leisure and education, education becomes a life-style choice enabling mental enhancement and enjoyment. As the relationship between mental capacity and physical health becomes clearer so, education will form a growing element of personal enhancement. Research indicates that mental development, brain capacity, and longevity are closely associated, so education contributes to active health life.

**Education to enhance employment prospects:** our traditional thinking of skills upgrading and employment will change. As new cohorts enter the workplace, they will increasingly be accustomed to regular/continual skills upgrading to keep pace with technological developments and demands. This form of education will become an essential requirement of the modern workplace, and its provision needs to be negotiated between employers, governments and individuals. Employment related education of the future will increasingly focus on language, life skills, and the global arena, to enable full mobility of highly skilled individuals in an increasingly open international labour market.

**Education to enable full citizenship:** this will be required to enable people to cope with complexity of life, to plan their lives, and to care for others. Modern complex democratic societies will not be able to function without well educated individuals at their centres. New inequalities will arise between those who are educated into modern living, and those who do not have the skills, knowledge or capacity to cope with these new demands and ways of interacting, contributing and behaving.

Secondly, education 2020-50 will need to address certain myths and assumptions within society which may deter and restrict the development of fresh thinking about the nature, role and organisation of education.

- **Life long learning and adult education cannot be developed within standard models of delivery but requires more flexible approaches.** Older adults are more diverse than younger adults. Alongside standard variables of gender, class, ethnicity etc, older people have accumulated a variety of other biological, psychological, historical and social attributes which are unique to their personal life histories. This will structure the resources they have access to (social, biological, cultural, mental and economic) and the frameworks within which they make decisions.
- **Mature societies are not societies of old people burdened by providing health and social care to frail elders.** UK government policy has tended to think of demographic ageing as leading to large numbers of old people, rather than large numbers of people who are simply living longer. Many of them with increasingly active healthy lives. Conceptualized in this way, mature societies provide the opportunity for the first time for multi-generations to live and work alongside each other, contributing their own experiences and expertise. As people age

throughout their lives they accumulate a wealth of experience, knowledge, skills, memories, wisdom and creativity. Life long education opportunities provide for this wealth to be distributed throughout our society .

- **Mental capacity does not necessarily decline with age, and almost certainly not until late old age for most adults.** Research suggest that fluid intelligence (ability to carry out higher level cognitive functions) may decline from the mid-60s, though not at a standard rate, and possibly due to lack of use; while crystallized intelligence (acquisition of new skills though education) continues to grow throughout adulthood. Indeed, it may be that reduced mental activity among current older adults - in part due to lack of new mental opportunities and activities, and lack of focused training and educational opportunities - actually contributes to apparent decline in mental capacity.
- **Few physical capacity changes are directly related to age.** Most are heavily influenced by environment and life style. Those that are age related, such as sensory change can be adapted for through aids (declining eyesight and glasses etc); others though a change in the physical environment. There is thus little which does not deter an individual taking part in and benefiting from educational activities throughout their lives.
- **Education does not end with formal schooling.** There is a large demand for life long learning, both in the community and work place. Increasingly individuals recognize that education does not stop when they leave formal schooling. There is substantial evidence that adults of all ages wish to learn, are interested in new technology, and keen to upgrade their skills base. This is likely to increase with future cohorts.
- **As we age we do not wish to withdraw from our communities and societies.** Adults of all ages wish to contribute to society –through work, voluntary activities, through their families.
- **As we age we need different learning environments** based on both our changing experiences and capacities with age, but most importantly the cohort effect of how we learnt in the first place.

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