



Health and Wellbeing

Lunch Debate Report

February 2011

**Produced by body>data>space as part of
Robots and Avatars**

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Introduction

The education of a young person starting secondary school in 2011 will have to stand them in good stead for the next 60 years. With this in mind, Robots and Avatars has been looking at how young people will work and play with new representational forms of themselves and others in 10 to 15 years time. Through a series of debates and events we have been speculating what that future may be like and asking how the education system can evolve to respond to the changes we will face in our digital futures? These questions stem from body>data>space's previous work which has explored our evolving virtual and physical identity over the past 20 years.

About the Lunch Debates

Between June and November 2010, Robots and Avatars hosted a series of Lunch Debates which brought together diverse and specialised groups of professionals and experts to deepen the research and further the conversations around the themes of Robots and Avatars. The Lunch Debates ask, 'What sort of world are we educating our young people for?' and are designed to help extend the understanding of what young people's needs are for the future world of work, given that many of the jobs they will do have not been invented yet. The debates also envision the skill-sets, aptitudes, resources and methodologies that will be required by today's young people who will be at work from 2020 onwards.

The groups were formed from a researched pool of experts from a wide variety of backgrounds, including academics, creative practitioners, industry professionals, public service specialists, artists and designers. There were four debates in the series: Artificial Intelligence, Behaviours and Ethics, Health and Well Being and the Future World of Work. More information including, downloads and videos are available at www.robotsandavatars.net.

The Health and Wellbeing Lunch Debate was attended by:

Professor Raymond Tallis (Provocateur) – *Emeritus Professor of Geriatric Medicine, University of Manchester*

Paul Cheng - *Senior Investment Manager at CAF Venturesome*

Dick Davies – *Co-founder and Executive Producer, Ambient Performance*

Gavin Nettelton - *Head of e-Learning, Social Care Institute for Excellence*

Joop Tanis - *Head of Health Launchpad, Young Foundation*

Dave Taylor - *Programme Lead for Virtual Worlds and Medical Media, Imperial College*

Dr. Jenny Tillotson - *Senior Research Fellow, Central Saint Martins*

Professor Kevin Warwick – *Professor of Cybernetics at the University of Reading*

Benedict Arora – *Director of Education NESTA (Moderator)*

Ghislaine Boddington – *Creative Director, body>data>space (Moderator)*

“what sort of world are we educating our young people for?”

Background

The debate began with body>data>space outlining some key areas for the group to consider in the context of an increasingly fluid future which will see young people needing to be more self reliant, entrepreneurial and dynamic – particularly in their working lives. Exploring future collaboration environments, Ghislaine Boddington explained that co-operation, co-production and inter-relations between robots, avatars, telepresence, real-time presence will be come increasingly common in the workplace, asking what the implication will be on practices of health and well being? Human/Robot co-production was also explored in this context, with Japan being highlighted as an example where these sorts of technologies are already being adopted. There are currently 14 companies in Japan making robots to look after elderly people in their homes and the RAPUDA robotic arm which can be attached to wheelchairs, tables and other objects is helping elderly people extend their mobility. Robots are now being used in order to carry out surgery with very high degrees of precision and developments in nanotechnology could see robots being used for internal medical care. In terms of blended virtual and physical space, Boddington shared examples of with the group of tele-present doctors projected on "head screens" through humanoid robots, to deal with patients in hospitals. Another example of the use of robots in health environment are robotic pharmacies, which have been adopted in Scotland improve safety and save money.

Turning towards the emotional and psychological aspects of robots and avatar presence in health and well being environments, Boddington suggested that they could be used as 'life companions', to give reminders about taking medicine or even to have conversations with¹. The u-BOT 5 has been designed to help old people should something happen to them. Its capabilities include picking up small objects, dialling the emergency services and even using a stethoscope to check vitals. It contains a webcam, microphone, LCD touchscreen, WiFi, and could potentially be used to make virtual housecalls. Lastly, using avatars in simulation environments, such as Second Life, can help assess the state of mind of mental health patients and lead to better diagnoses.

Keywords

Social care, longevity and senior care, active-ageing, intergenerational exchange, special needs, robotic surgery, home care robotics, e-health/virtual care, telemedicine, telehealth, online co-production, care networks, physical gaming, disability, mobile care devices, memory, self diagnosis, prevention, cyberchondria, patient-centred approach, organ design, ethics and morality.

¹ Yorick Wilks ,Professor of Artificial Intelligence at the University of Sheffield is undertaking research in this area [<http://www.oii.ox.ac.uk/people/?id=31>]

Summary

An increase in life expectancy and better health provision means that the population in the UK is ageing. Over the last 25 years the percentage of the population aged 65 and over increased from 15% in 1984 to 16% in 2009, an increase of 1.7 million peopleⁱ. This will significantly affect the future of health and wellbeing. Robots and Avatars has been debating what these changes will mean for young people today and in the future. Looking at avatars that can predict life choices to help you make more informed decisions, doctor appointments that take place on your mobile phone and toothbrushes that send information about your health to your bathroom mirror – this lunch debate asks what young people and schools can be doing now, to prepare for a technologically pervasive future of health and wellbeing. This Lunch Debate also explored new ways that care and medicine are going to be administered – looking at robot doctors, cybernetics, brain implants and returning again and again to the question of whether humans will always need face to face care?

Context

Benedict Arora and Ghislaine Boddington began the debate with an introduction, calling for the group to “identify both interventions and inventions” in the debate. Boddington then went on to outline the context of old age in Europe saying that currently in the EU there are four people working to every one person retired, but by 2050 it is thought that this will change to two people working for every one retired. She raised some of the core concerns of the debate, focusing on how we will have the capacity to care for an increasingly ageing population, how this can be aided by new technologies and what type of jobs young people today will need to be thinking about, asking “what skills are needed now?” She also introduced the concept of “a new old age,” before handing over to Professor Raymond Tallis for his lively provocation.

Provocation – The Future of Old Age Professor Raymond Tallis

Professor Tallis centred on the future of old age, looking at four areas: **Physical dependency, cognitive impairment, financial dependency and social exclusion**. Outlining his own position, he quipped with the rest of the group that he only started using email *without* the help of his secretary in 2003, and is himself a good test case for the elderly population.

The provocation began with a survey of how the population is changing in terms of age, mortality and life expectancy. Starting by explaining the increase in the rate of life expectancy, Professor Tallis confirmed the fact that in 2011 “there are already many more older people” and called for a fundamental change in the thinking towards the whole course of life – using the term “the third age”ⁱⁱ to describe people who are in their senior years but without any significant onset of illness. He explained that one of the key factors contributing to the increase in life expectancy has been the decline in infant mortality and improvements in preventing disease. For example, cardiovascular disease fell by 30% between 1968 and 2006 and deaths from coronary heart disease in people younger than 65 have fallen by 46% in the last 10 yearsⁱⁱⁱ. He said that, “life expectancy is increasing at a rate of about two years for every decade that passes”^{iv}. Further he explained that we have “a great difficulty getting our heads around what is happening now with ageing,” because the ways we think about it have remained almost the same from “the time of Charlemagne

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(8th Century) to the middle of the 1800's!" He went on to suggest that it is crucial to consider "what sort of 'nic' you are going to be in" when you reach your latter years because of the projected burden to the healthcare and social care system.

Four Scenarios for the Future of Old Age

Professor Tallis outlined four different projections for the future of old age, using the term 'woe' as an indicator of ill health or declining health:

- 1 year of additional woe for every year of life gained;
- Less than 1 year of additional woe for every year of life gained;
- No additional woe for each year of life gained;
- Less woe despite life gained – known as the Fries Compression of Morbidity Model.

Suggesting that the last scenario appears to be occurring in some places and "is possible in all places..." he went on to say that, "it is not a biological impossibility" that people live longer and are ill for less time. He explained that he could see a scenario where there was "significant gain in life expectancy *and* greater gain in healthy life expectancy". In particular the longer people are healthy the better, because it is simply not possible to care for a growing ageing population that is unhealthy, indeed it is, "cheaper to keep old people in good nic!"

Dispelling the myth that "we can't afford to keep old people healthy", Professor Tallis explained that this idea assumes that old people are consumers and *not* producers. Given that 'old age' is social construct as well as a biological phenomenon, he suggested how it might be possible to solve issues around increased burden on pensions by "pegging the median age of compulsory retirement to the median age of death". As such, he suggested that this is all "a matter of sums!" Importantly, this outlook does not necessarily depend on major medical breakthroughs but instead on social inclusion and technology, which "is absolutely crucial because increasingly, social inclusion is being mediated *through* technology".

Professor Tallis explained how that e-literacy can bring older people "into the conversation," and how computer technology is "absolutely essential" to achieving this. He went further to assert that it is vital for older people to be able to navigate an increasingly electronic collective reality. He also suggested that whilst there has already been lots of work in the area of technological assistance for old people that this will, of course, only increase and will have a particularly important relevance for people with cognitive impairment. Lastly, he talked about the delivery of medical monitoring and care through tele-care, as an example for the future of health and well being.

In addition to technological solutions Professor Tallis also outlined the importance of the arts and human to human contact for older people, through practices such as dance, music, poetry, reading groups and the University of the Third Age. In this context, he also went on to express some of his concerns about technological developments by suggesting how important it was that, "hands on care is delivered by a sentient human being who is full of human sensitivity and compassion," leading to what would become a cornerstone phrase of the debate – "you can get a machine to wash your bottom – but it depends on how the bottom is washed!"

"It is not a biological impossibility that people live longer and are ill for less time"

The Group Debate

The group then went on to consider “fundamental questions around illusions,” in terms of non-sentient beings' such as robots and avatars and this potential role in the future of healthcare. Reflecting points raised in the Artificial Intelligence debate the group considered that whilst healthy people might be able to distinguish between a human and a robot, people who are ill or incapacitated in some way might struggle to do so. This raises important ethical questions around this sort of care. Professor Tallis suggested that for people who need care that they “require compassion *and* the presence of a human being”. As such, he suggested that robot and avatar ‘carers’ “could be quite a dangerous and destabilising illusion”.

Dick Davies responded with some examples of his work with Ambient Performance, who use virtual worlds and avatars to in clinical scenarios. He explained how through the use of clinically realistic avatars they have been able to create very effective training scenarios. By creating avatars which simulate the conditions of a real patient it is possible to help people learn what may happen in certain scenarios, for example, in emergency responder training.

Using Avatars to Predict Life Choices

The group then went on to consider how it might be possible to re-apply the use of avatars in training scenarios to young people. Benedict Arora asked if it was “possible to programme an avatar...to show what will happen to you based on life choices?” Dave Taylor then went on to outline a number of projects that he has been working on at Imperial College based around nutrition and which do exactly this^v. For example, “if you make particular food choices then the size of the avatar is affected”. He also added that there is research emerging from the USA which suggested that “simply taking part in physical activity as an avatar,” alongside working collaboratively with others as a community, “can actually make you loose weight faster than if you are physically exercising”. Ghislaine Boddington added that community and belonging as well as the concept of “connected communities” have a big impact on well-being , whether in virtual or physical communities. Professor Tallis responded to Dave Taylor by saying that, “it is very interesting that in a virtual world one can get real effects” and echoed Boddington’s comments saying that “solitude is very bad for you and the more you connect with others the better your health”.

Cybernetics

Cybernetics is the field of science concerned with processes of communication and control, especially the comparison of these processes in biological and artificial systems^{vi}. Professor Warwick gave the group an overview of how this cutting edge research is contributing to the future of health and wellbeing. He focused on neurological illnesses such as Parkinson’s and suggested how implants, which are far less visible than robots, might assist patients and how such devices could be of significant help to patients with other brain diseases. He explained that despite there being pharmaceutical drugs to help patients with Parkinson’s disease, these are “either are not too good or wear off after a while,” and so patients may be “very happy to have technology subbed directly into their brains, because it opens the possibility of overcoming their condition”. He also went on to explain how he agrees with Professor Tallis’s model of minimising the period of “woe” before death and how he believes that technology has a significant role to play in this to “counteract what your brain is

“Is it possible to programme an avatar...to show what will happen to you based on life choices?”

“Patients may be very happy to have technology subbed directly into their brains, because it opens the possibility of overcoming their condition.”

deciding to do by itself". He gave the example of a "slim plant" which could monitor your activity, improving your lifestyle by telling your brain that you shouldn't eat certain foods at certain times.

Do doctors need bodies?

Joop Tanis asked the group why we accept technology in some places but not in others? Giving the example of the pacemaker, "which we accepted right from day one," the group went on to consider how technology such as this has led to a significant revolution in cardiology and beyond. Tanis also explained that he is "intrigued by the gap between what is possible and what is done," and he asked the group whether the "anthropomorphic manifestation (when physical objects taken on human like characteristics)" of, say, robots "are a hindrance or a help?" He suggested that it might be easier if instead health care technologies were understood as "just another mechanical device rather than something that attempted to look like a person".

Gavin Nettleton suggested that emotion and touch are vital in the conversation, "if you look at what old people really need...it's not just the wiping of the bottom...it's about human touch". He added that it is not about replacement but instead about finding ways to enhance what we do already. Dick Davies then explained how we are "surrounded by these devices anyway...washing machines, vacuum cleaners...etc." and suggested that we should focus on the "skill sets" rather than the machines themselves because these can, in theory, be active until cognitive impairment sets in. Later in the debate the group discussed what skills young people need to be developing from an early age to aid them in their latter years.

Virtual and/or Real

The virtual world appears to be a very good environment to "*rehearse* what you can't get wrong in real life," however, Professor Tallis felt that "the more time you spend in 'second life' the less you spend in the utterly unscheduled and uncontrolled mess of the real world". Dave Taylor was keen to assert that the virtual world is every bit as chaotic as the real world. Professor Tallis challenged the group by asking if he thinks we will ever be able to supersede complexity of the brain and be able to "speak to it in the language it understands"? Professor Warwick went on to say how vital research into the brain is for the future of health and wellbeing^{vii}. Suggesting that the "body is obsolete," he explained how his research is trying to "extend and improve abilities – particularly mentally...improve the range of senses that you have as input, improve the ways of communication". He sees that these developments are going to "significantly change what it means to be human [as the] brain becomes much more critical to your function as a human being in the world".

The Dark Sides

The group then went on to consider the potential problems with these future visions. Paul Cheng asked, "what are the dark sides?" and whilst he recognised the positive elements to have come out of recent technology, he also wondered about the issue of isolation, with people spending "too much time in virtual worlds". Professor Warwick immediately challenged this idea explaining that, "the point is that it's *not* isolation" because "a child or an adult *linked* via a computer to the internet," allows them to be deeply connected to the rest of the world. Professor Tallis explained again that whilst it might be useful for trainee doctors to *enhance* their learning through working with

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simulated patients, it is also a vital constituent of their study to “spend the vast majority of the time working with real patients”.

Is it a human that you need?

Telecare is a form of remote care that has been used to provide assistance to older and physically less able people by giving them the reassurance needed to allow them to remain living in their own homes. In its simplest form, it can refer to a mobile phone connected to a monitoring centre through which the user can raise an alarm. Technologically more advanced systems can use sensors, whereby a range of potential risks can be monitored. These may include falls, as well as environmental changes in the home such as floods, fire and gas leaks^{viii}. Joop Tanis championed the use of telecare, which he traced back around 40 years when images of skin lesions were has been sent to doctors who were not physically with patients and who were remotely able to make initial diagnoses. However he went on to say that “he can count on one hand the clinics in the country that have adopted this technology”. For Tanis the question is about how to get both carers and patients to *adopt* these new methods?

Professor Tallis heralded the advances in medical technology in terms of MRI scanners and the CT scan as revolutionary tools for doctors but taking issue with telecare, expressed how he thinks technology has a future as “as support, as prosthesis, but not necessarily as a substitute”. In this context Dick Davies suggested how important the “fullness of human communication” was to the debate. He linked this idea to the work of anthropologist Gregory Bateson^{ix}, who makes a very clear distinction between analogue and digital communication, saying that “most of human communication is analogue” and the richness of human communication comes from our ability to “meta communicate”. Davies called for the group to embrace technological development but understand this development in the context of human (analogue) and not just digital communication.

Professor Warwick reminded the group that currently “robots are being built with biological brains”. Indeed, here the group returned to a fundamental question of the Robots and Avatars programme – is it going to be at all possible to artificially create something that will have the characteristics of a human? Professor Tallis asserted that “it is a person you want when you are ill...you want somebody, who even if they don’t feel profound sympathy are sympathetic enough to simulate sympathy”.

Lastly, Joop Tanis was very keen to stress how important it is to not get trapped between “an either/or” when thinking about future technologies. Seeing technology’s role as augmentation rather than replacement, he explained that whilst you do, of course, want a person to look after you when you are ill, “it doesn’t mean that’s all you should have”.

“Whilst you do want a person to look after you when you are ill, it doesn’t mean that’s all you should have”

Skills for the Future

What can we say to young people now about the future of old age?

Benedict Arora asked the group to consider where they thought we would be by the middle point of the century in terms of the needs of our elderly population and what that means in terms of the workforce?

Professor Warwick stressed the need to recognise that there are going to be four age groups, as opposed to the three that we most commonly think about currently. He explained that there would be “the kiddy-wink age group, a working age group and then there is another age group where you are still active and you still contribute...but you also enjoy yourself a little bit...and then when you are 85 or 90 you are into the category that we understand as old age now. So 85-90 will be the new 60-65.”

Gavin Nettleton proposed a less linear model, which sees break periods within a working life. He thought this vision would allow older people to play a great role in “production and therefore become more valued”. Professor Tallis thought that young people should know that there is still going to be “a huge demand for face to face contact” and he contextualised this in terms of the recent history of general practice where “they have tried to smarten it and smarten it and regulate it,” despite the demand for face to face contact with doctors, who are at the front line, appearing to get greater and greater.

By way of a challenge to this vision, Joop Tanis expressed how he was “amazed by the conservatism in the room,” and sighted Dr. Sam Everington as an shining “adopter of technology.” Everington challenges the idea that face to face contact with patients is essential in all cases. He sees 70% of his patients by telephone initially so that only 50% actually need to come in and see him. Tanis was keen to point out that “this is a radical shift away from a growth in the demand for face to face contact”. His vision was that, “we have more [tele-care] which frees up our time to deliver the face to face contact *when it really matters.*” He also added a second vision - that “much of that technology needs to be *not* noticed by me, it should not require action by me, it should not mean that I have to do something different from my daily life...so ‘true technology’ is pervasive in my life without me knowing it.” He sighted the example of a diabetic patient who might have a mirror in their bathroom which displays information about their insulin levels via an electric toothbrush with sensors in it. This sort of integration of health, wellbeing and technology require innovative and socially centred thinking.

Dick Davies talked about ‘drivers of change’ in terms of old age, which he felt were primarily going to be demographic and economic and agreed with Professor Tallis’s model of a new old age, coining the term “work-sioners” for people who are in their later years but still contributing economically. He sighted the example of his 80 year old mother who is, “running around the internet,” and how important this is for her as a “window onto the world”. Ghislaine Boddington share with the group the uptake of the ipad with people over 60, due to it's user-friendly and touch based interface. Professor Warwick added to this by asserting how much easier it is to be able to check up on elderly people if they are connected through the internet. In terms of care, Gavin Nettleton commented that in 50 years time, people may well be caring for themselves. As such, self-reliance, initiative and problem solving emerged as core skills, which if developed now in the context of health and wellbeing, could be of significant benefit to young people in the future.

Paul Cheng saw the potential for avatars to help with scenario planning as a tool through which young people might be able to get a sense of what their futures might be. He felt that “the ability for avatars to augment feedback loops, and look at how decisions upstream will affect those downstream, is a very exciting and useful possibility”.

Dave Taylor drew attention to issues around access to the internet in schools, in what he described as “isolated classrooms”. He stressed how technology can remove barriers to distance and suggested that given that it is not possible for a class to visit an NHS hospital, they could instead experience it interactively, in a virtual world.

Lastly, Benedict Arora emphasised how important it is not to “set up false dichotomies between ‘it’s either got to be this or that. Realistically you wanted a blended mix...” In this context Joop Tanis shared with the group that there are 6000 health apps available for the iPhone, only a fraction of which have been developed by healthcare professionals. He added that, “because the space is occasionally occupied by rubbish, we don’t actually see the full potential of it.” He went on to recommend that, “if we were to occupy that space...and put some really good stuff in there,” there would be significant opportunities emerging from a new blend of everyday technology, healthcare and well being.

Sources

ⁱ Office for National Statistics <http://www.statistics.gov.uk/cci/nugget.asp?id=949>

ⁱⁱ For more information See the University of the Third Age: <http://www.u3a.org.uk/>

ⁱⁱⁱ BHF Statistics Website (accessed 2011)

^{iv} House of Lords Select Committee, 2005

^v Imperial College – Virtual Worlds: http://www1.imperial.ac.uk/surgeryandcancer/divisionofsurgery/research_themes/virtualworlds/

^{vi} Definition: <http://wordnetweb.princeton.edu/perl/webwn?s=cybernetics>

^{vii} Kevin Warwick is Professor of Cybernetics at the University of Reading: <http://www.kevinwarwick.com/>

^{viii} For more information see Wikipedia: <http://en.wikipedia.org/wiki/Telecare>

^{ix} For more information see Wikipedia: http://en.wikipedia.org/wiki/Gregory_Bateson