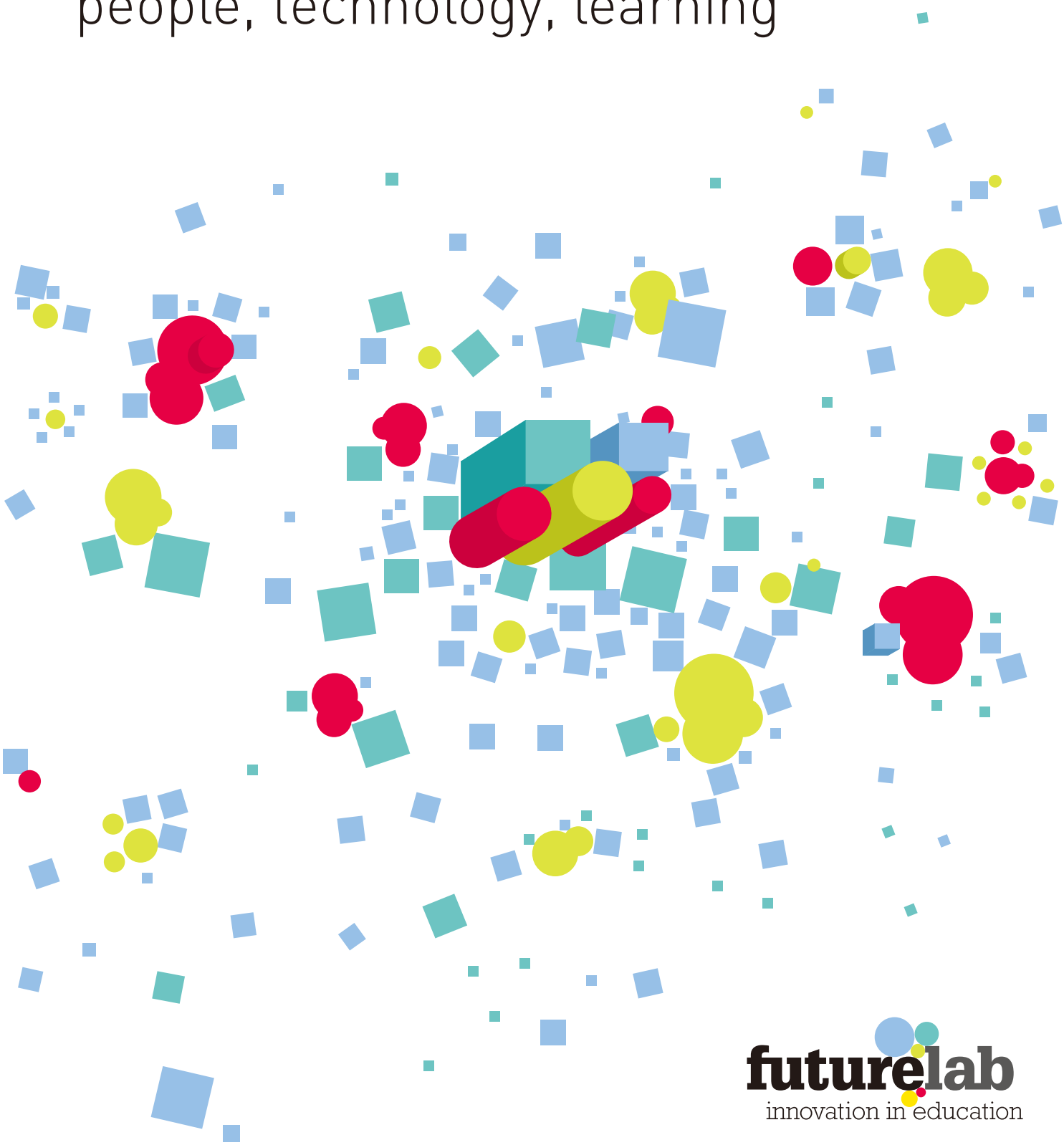
OPENING EDUCATION

KEY TO THEMES OVERLEAF

Designing for social justice: people, technology, learning



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Key to themes

Futurelab understands that you may have specific areas of interest and so, in order to help you to determine the relevance of each project or publication to you, we have developed a series of themes (illustrated by icons). These themes are not intended to cover every aspect of innovation and education and, as such, you should not base your decision on whether or not to read this publication on the themes alone. The themes that relate to this publication appear on the front cover, overleaf, but a key to all of the current themes that we are using can be found below:

Digital Inclusion – How the design and use of digital technologies can promote educational equality

Teachers and Innovations – Innovative practices and resources that enhance learning and teaching

Learning Spaces – Creating transformed physical and virtual environments

Mobile Learning – Learning on the move, with or without handheld technology

Learner Voice – Listening and acting upon the voices of learners

Games and Learning – Using games for learning, with or without gaming technology

Learning in Families – Children, parents and the extended family learning with and from one another

Informal Learning – Learning that occurs when, how and where the learner chooses, supported by digital technologies

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Focusing on emergent ideas in education and technology, this series of publications opens up new areas for debate and discussion.

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Ann Light and Rosemary Luckin

2008

Foreword

What is the Opening Education series?

Opening Education is Futurelab's 'blue skies' publications series. As its name suggests, this series is intended to open up areas for debate; to provoke, to challenge, to stimulate new visions for education.

The ideas and arguments presented in these publications are generated in a variety of ways – through events, collaborations and consultations with thinkers, practitioners and policy makers from a variety of sectors, through thought-experiments and visioning workshops, and as unexpected 'side effects' of the research and development activity that goes on at Futurelab on a day-to-day basis. The series complements our evidence-based publications by offering a space to propose new ideas that may not yet be ready for implementation or rigorous evaluation, and to flag up emerging issues of concern that may require action in the education sector.

Why publish this series?

All the research into innovation in a range of sectors suggests that having a superfluity of ideas is essential for growth and development – education is no different. We need to have a surplus of potential ideas, visions and plans so that we have a range of strategies to draw on when we face the serious educational challenges that social, economic and technical change presents us with. Not all ideas will become a reality, not all ideas will survive in the form in which they were first presented, but what cannot be denied is that education, and educators, need to know that there is scope to dream; to think about new approaches and different ways of doing things; to know that the ways we do things now will not be always and forever the same.

It is in this spirit that we publish these papers. They are experimental and exploratory, both in their arguments and in the forms in which we publish – they don't all look the same, feel the same, say the same thing. They all, however, attempt to open up a new area for debate and for action, and we look forward to hearing from you and working with you to determine their fate.

Keri Facer
Research Director

1 Introduction

This review provides an introduction to the concept of social justice and the practices of user-centred design (UCD), looking at how theories for changing the world marry up with methods to implement these changes. It then explores the potential role of technology-enhanced learning (TEL) within this framework.

Social justice and user-centred design, however, do not constitute a single coherent area of research to be neatly corralled into a literature review. Indeed, several broad and fascinating literatures abut one other within this theme and the act of choosing salient matters to describe or exclude is a difficult one. We acknowledge omission of hundreds of interesting projects and approaches in choosing an overview of the related fields and presenting how they relate to each other. Where necessary, we have pointed the reader to resources that we hope will make up for this limitation.

As such, we have focused on design as a political activity – that is, involving the organisation of relationships between different groups of people – so that we can consider how these relationships affect the design of political tools, particularly those involving technology such as those intended to help change behaviour or redistribute resources. We have chosen this focus as we believe that **how** you design will have an impact on **what** you design, though not necessarily in a straightforward or simply determined fashion. Bijker (2006) points out that no technology is without some politics of its own in how it might configure certain activities and how it is actually used.

The core of this review is divided into sections on social justice, the act of designing and the nature of user-centred design, wrapping up with a discussion of how this applies in the field of technology-enhanced learning. Throughout, we make the argument that user-centred design can be a particularly apt form of designing to apply to social justice projects, and also that the more participative forms of UCD offer the most educative potential and are often also the best fit for social change projects.

Overview

The first section introduces the concept of **social justice**, examining the contested nature of 'justice' and the multiple views of what constitutes social justice. It notes that the scale of changes needed to create social justice is too great a challenge for any single set of tools and techniques. Instead, tools and techniques might better be viewed as supporting the more tangible and immediate goals of human rights, dignity and wellbeing.

Social justice is the formal expression of the feeling that the world does not treat all people fairly and that society should be made fairer. As French philosopher Paul Ricoeur tells it, we are all "aiming at the good life with and for others in just institutions" (1992).

In the 20th century concepts of social justice became dominant and recent activities in Britain and Europe, such as the launch of a Commission on Social Justice (1994), suggest that it will continue to guide policy through the next generation. Social justice is an interventionist standpoint, in that it seeks to reorganise society's resources and structures to create a fairer social order. Thus, a social justice standpoint entails some form of design activity, since it requires ideas of a better society to be turned into actual structures and systems.

We review John Rawls' contribution to the philosophy of social justice, and contrast this with Utilitarian philosophy. We discuss the tension created, for philosophers and designers alike, by the fact that all members of society do not need or desire the same things and show how changing society to be fairer can be seen as a design challenge. In exploring ways to meet this challenge, we advocate an approach to design that potentially includes all members of society, including the most vulnerable. This position arises from a belief that the act of participating in social change itself is likely to address social justice issues and lead to systems that do not simply reproduce the status quo.

Turning to look at the process of **designing**, we show how there are multiple views of what constitutes 'design' and the act of designing. There are also varying opinions as to who can participate in the process of designing, from a 'Romantic' view that sees design as the preserve of individuals with special gifts, to an 'engineering' view that sees design as facilitated by particular professional processes and systems, to a more 'situated' view that suggests certain **contexts** support design best. We discuss the role of the design's 'users', examining the key arguments about whether, at what stage and in what role, users should be involved in the design process. We argue that a design approach that allows for the possibility for everyone to be involved is more egalitarian than one which believes only in exclusive talents or professional systems. However, in two examples of how social projects were designed, we show that different types of design problem require different processes and that no one design process fits all projects.

The concept of **user-centred design**[1] (UCD) is considered in the following chapter. It can, for example, simply mean that some attention has been paid to gathering users' requirements; or it can mean treating all participants as contributing their particular knowledge and skills, moving away from the traditional differentiation between the status of those who use and those who build the design. There are two motivations for employing a UCD approach: the business case for a better-designed end-product and the social case for a more equitable approach to designing. The former may not produce outcomes that enhance wellbeing.

Social and equitable motives drive more inclusive styles of working, including 'participative design' approaches in which users and professional designers have a more equal say in taking design decisions. Effective participative design can lead to a greater understanding of the design process by all, with participants becoming more skilled in design processes, and, through their participation, learning more about their own potential agency. However, participative design processes are more difficult to handle than designer-driven procedures and usually take longer. Despite these challenges, the value of a participative design process is clear and its potential for benefits beyond the design of outcomes or products should not be underestimated.

[1] Although there are good reasons for avoiding the term 'user' because it can imply passivity, it will be used here in generic contexts since 'user-centred' is a recognised form of design, and also when specifically discussing people engaged in using technology. For more on resistance to the term 'user' see the section below on UCD.

In our consideration of **technology-enhanced learning (TEL)** we focus upon two aspects of TEL with particular relevance to a social justice agenda. First, the way that technology can be used to recognise and address everyone's differences, including the needs and desires of minority groups. Second, the way in which it can be used to enable more people to communicate, socialise, join in debates and play a greater role in society. Towards the end of the review we turn our attention to the growth of participatory technologies, often termed 'Web 2.0', that can enable learners to take more control of their learning. However we also note the tension between individual and social needs. So, whilst technologies may enable more people to participate in debates about social reform, if they only focus on their own needs and desires, their contributions to the debate may not reflect the needs of society as a whole.

The **synthesis** suggests that this tension between the individual and the social is just one of many challenges that we need to address as we move towards an increasingly networked society where more people can be part of the design process, but in which the outcomes being designed are increasingly complex.

This publication is partnered by a practical handbook; Designing Educational Technologies for Social Justice, available from: **www.futurelab.org.uk/designforsocialjustice**.


MAIN GATES

2 Social justice

This section looks at how social justice has been understood by policy makers and philosophers. We discuss why tools that might contribute to social justice are often considered more modestly as a means of bringing about social change, fighting inequality or campaigning for human rights.

In recent years, certain understandings of social justice have become enshrined in British policy. In 1992, the Commission on Social Justice was established on the 50th anniversary of the Beveridge Report (1942), the document credited with ushering in the British post-war welfare state. Two years later, the Commission's final report was published (1994) and many of its key themes, such as the need to balance rights with responsibilities, the idea that economic prosperity could go hand-in-hand with social justice, Britain's need to develop a more 'intelligent welfare state' and the value of lifelong learning, have influenced policy since 1997. The think-tank ippr (Institute of Public Policy Research) has been closely involved in pursuing these themes and recently revisited the Commission's work with its collection of essays, 'Social Justice' (Pearce and Paxton 2004). More recently still, British Prime Minister Gordon Brown used the rhetoric of social justice to introduce new consultative measures such as citizen's juries (Revill 2007).

Utilitarian notions of social justice

Inspiring such policies is a rich vein of philosophical work. Who is entitled to justice, what justice is and whether a society can be fair are all matters of ethical and metaphysical debate. The 18th century philosophy of Utilitarianism, exemplified by the work of Jeremy Bentham (1789), starts with the premise that people should be free to choose their own values, rather than have these imposed upon them. However, one individual's or group's values may conflict with those of another, and in such situations, Bentham said that "it is the greatest happiness of the greatest number that is the measure of right and wrong" (ibid.). Bentham was progressive in even considering the redistribution of happiness and in allowing that individual values might be important in considering the structure of society. He wrote at a time when the French Revolution was brewing and Europe was a web of monarchies with patchy representation for well-to-do men and none at all for women and most commoners. So Utilitarianism can be seen as a major break with tradition and an early attempt to let the people choose what they want, instead of having their needs, values and aspirations articulated by someone else. But it suggests that it is acceptable for the values of the majority to dominate over those of the minority, a position that now seems unacceptable. Ricoeur (1995) points out that vulnerable members of a society, such as people with disabilities, would be particularly penalised under such a system, for having needs not shared by the greater part of the community.

A form of Utilitarianism still pervades much thinking about society. For example, it informs the design of the British first-past-the-post political system, where the majority choose a political party to run the country. In fact, it could be argued that the implicit utilitarian nature of the majority system is revealed every time that a minority interest needs to be protected and defended through the identification of a right that cannot be overridden by policy. The utilitarian view focuses on the freedom of citizens to express their preferences and desires, but does not protect their freedom against the will of the majority.

John Rawls and social justice

John Rawls reacted against the discrimination within Utilitarianism, searching for a means of balancing individuals' needs on an equal footing for all. Rawls (1957, 1971) revitalised the concept of social justice by introducing a new approach, balancing 'freedom from', or emancipation, and 'freedom to', or the empowerment of individuals with different needs and desires.

Rawls (1971) proposed that if rational people, placed behind a 'veil of ignorance' with no idea of where they would end up in society, were asked to choose a society to live in, they would make their choices according to two principles: the Liberty principle and the Difference principle. The Liberty principle expresses the view that everyone is equally entitled to basic rights and liberties, as long as that does not infringe upon the rights and liberties of others. The Difference principle states that social and economic inequalities between individuals should be tolerated if, and only if, they are of most benefit to the worst off in society. Further, he argues that they will choose between different societies according to the 'maximin' rule. Maximin stands for 'maximising the minimum', or choosing the option whose worst possible outcome is the least bad. Were people able to take themselves outside their existing position in society and put this experiment into action, not only would opportunities be more fairly distributed, Rawls argued, but resources would be better exploited. Unfortunately it remains impossible to test: we can never step outside our social identities and view the social order from the outside. While this approach provides a way of thinking about redistribution of social resources, it does not tell us how we might actually go about such an activity. Rawls offers it as a possible basis for a social contract. If we designed justice as if we could be so disinterested, what would we advocate?

Milne's 2005 article for the Digital Media Access Group is interesting in that it appropriates Rawls' theory of justice as fairness (1971) to examine user-centred design practice. Milne applies the 'veil of ignorance' experiment to designing computer interfaces, asking "how should we design the interface to ensure that User X would enjoy a sufficient degree of usability, regardless of their characteristics?" (Milne 2005). While not remaining true to Rawls' original intent, Milne **is** dealing with an old philosophical problem. If everyone wanted the same thing, it would be easy to design society. Allowing for choice and individual difference is a problem for both philosophers and designers.

Other approaches to social justice

Freedoms find a key place in the work of Amartya Sen, whose book, 'Development as Freedom' (Sen 1999) presents development as "enhancing the lives we lead and the freedoms we enjoy... expanding the freedoms we have reason to value" to become "fuller social persons, exercising our own volitions and interacting with - and influencing - the world in which we live" (1999:14-15). Sen's subtle arguments place emphasis on people's agency and capability, not simply happiness or functionality (1987), thus addressing some of the shortcomings of Utilitarianism and the trend to divorce broader ethical issues from what he defines as the engineering view in economics. Sen's contribution to welfare economics worldwide won him the Nobel prize in 1998, and his commitment to ethics and an "'agency aspect' [which] takes a wider view of the person, including valuing the various things he or she

would want to see happen, and the ability to form such objectives and to have them realized" (1987:59) is very relevant here. In Sen's view, justice requires us to **enable** people to engage in the activities necessary to achieve what they want, rather than to give them what they want. Thus, developing one's ability to satisfy one's needs and desires is itself a very important good to be distributed as broadly as possible. We will be returning to its importance in designing when we consider how designing for social justice may be done most equitably.

Developing a pluralist approach that draws on multiple measures of justice, David Miller (1999) argues that social justice must be understood in the context of our lived experiences. Because modern societies are complex, theories of justice must be complex too. The three primary components in Miller's scheme are what people deserve, what they need, and equality, defined as equal status for citizens by the allocation of equal civil, political and social rights. Equal social rights means having equal ability to make use of the political and civil rights, and therefore implies some concept of a welfare state. Whether what people deserve, their needs or equality determines people's treatment will depend on the kind of organisation administering the justice.

Miller's work thus advocates listening to the judgements of members of a society to arrive at appropriate notions of social justice. In this respect, he, too, is concerned with people's aspirations as well as with producing a more equitable blueprint. What can be seen as an egalitarian standpoint also opens up questions: is there no higher recourse than the combined wisdom of those in a society to call on to judge what is best for them? Does this not depend too far on conventional wisdoms? But Miller argues that for a society to be socially just, it is not sufficient that its basic social and political institutions should distribute resources according to valid principles of justice, but it is also necessary that these principles themselves should be a matter of reasonable agreement among the members of society (2004). Miller also looked at the related issue of where different regimens meet and how the boundaries of social justice systems could be decided, pointing out that at present there are arbitrary boundaries resulting in a 'postcode lottery', "where the place you live may determine whether you get access to a particular hospital, or whether your children are eligible for places at a particular school" (2005:2).

Critiquing the whole concept of social justice, another Nobel prize-winning economist Friedrich Hayek (1978) argues that any attempt to realise social justice relies on social engineering that inevitably leads towards totalitarianism. As a major influence on Margaret Thatcher and Ronald Reagan in the 1980s, Hayek advocated free markets as more efficiently distributing resources than any form of collectivism (even those theoretically based on voluntary cooperation). He held that the knowledge required for distributing resources amongst society is inherently decentralised, and thus free markets are a more reliable basis for organising resources than central planning. Further, he argued that free markets would also prove to be a more socially acceptable way of dividing resources than active reallocation.

In fact, some of Hayek's objections about social justice interventions may be met if redistribution is operated through strict procedures that are known to everyone in advance and designed to minimise decisions left to the discretion of public officers. What is vital for Hayek is that nobody has the right to change the rule of the economic game while people are playing. Interventions that change the rule of the next run of the game are not so objectionable.

Even so, most commentators on social justice, including ourselves, take a more interventionist attitude than Hayek, because money is one of the key differentiators that lead to inequality. Relying on the market to distribute resources might create an equilibrium that adjusts itself as resources change, but it is the equivalent of relying on muscle in the playground to determine who gets sweets. When teachers step in, the chances that everyone gets at least one sweet increase.

Social justice and the design of projects

Social justice involves everybody. It is not something that can happen piecemeal in a small corner of the world. At the minimum, it is about redistributing rights and privileges between and within nations. Discussion of social justice takes place largely between economists, philosophers, campaigners and politicians: it exists in policy circles rather than as a public tool of change. By contrast, much human rights work, informed by social justice principles, takes place at a local level. By bringing theories of social justice into the practical field of design, a host of pragmatic issues come into play, which we will now go on to explore. But it is, of course, wisest to see these projects, tools and techniques as informed by social justice beliefs rather than in and of themselves able to usher in social justice.

Sometimes, these social justice beliefs are obscured in the way that projects are set up. Holden (2004) notes that in many projects that pursue social and cultural value, higher purposes are left unstated and "[i]t is more common to find second-order goals articulated. For example, strategic plans may refer to 'regeneration' or 'social inclusion' as goals. What is needed is to place 'regeneration' within higher order concepts, so that everyone understands why 'regeneration' is a goal. 'Regeneration' is not an end in itself but one route to the creation of public goods. If regeneration works it will create prosperity, but it will not have worked fully unless it also produces healthier people and healthier communities" (2004: 51).

Many projects concern themselves with the design of political tools (see, for instance, Shane 2004 on using the internet for political renewal). However, not all reflect upon the way that the design of the tool influences the forms of social process that ensue, be that towards social justice, democracy or otherwise (Keeble and Loader 2001, Sahraoui 2007). And the potential benefits that new technologies could bring to political processes if applied imaginatively have largely been ignored: "In spite of the discourses of interactivity which underlie most 'electronic democracy' initiatives, most of them have in practice been executive-initiated, top-down and mostly based on giving more access to information. Politics in this form remains more of a model of convincing through the dissemination of information than of communication and discussion" (Tsagarousianou 1998:174).

So here we have an interesting relationship. Political tools are not necessarily designed with sensitivity to political processes or their impact on them. And if political imagination fails to effect change through the introduction of technology in this context, then where might we expect it to flourish? We suggest that there is value in opening up questions of purpose and process as widely as possible in talking about social justice tools. The alternative may be, as with the political tools that Tsagarousianou (1998) describes, that they merely reproduce (or

attempt to reproduce, with unanticipated side-effects) the status quo. If tools are designed to make change, but it is only change as decreed by the people in control of the design process, what kind of change is it? Unless those people are drawn from the community seeking change, it will be a top-down initiative and ignore Sen's (1987, 1999) and Miller's (1999) considerations of agency and self-determination. Thus, we argue that certain approaches, such as including users in the design process, are intrinsically more socially just than others.

However, we are not suggesting that socially-designed technology will be a magic bullet to cure social injustice, or that what has taken policymakers and economists so much consideration will be easily resolved with a new approach to design. The nature of justice is not only disputed and likely to change with the appearance of each new kind of opportunity (think, for instance, of the appearance of digital divides), it is also impossible to enact without elaborate joined-up thinking at all levels of society. Of course, creating the conditions for this to happen is a social design project in and of itself.

Donald Schön identifies many elements in the complex process of designing an artefact, system, or situation including: "materials, a sense of purposes and constraints as the designer sees them, and the designer's sense of the people who will eventually use the artefact resulting from the design process" (1996). Schön sees unpredictability as an important characteristic of the design process, and one that is inevitable, given the complexity of many problems. When a designer makes a move in such a complex problem space, it almost always has additional, unpredicted effects to those that the designer intended. For this reason "there is no direct path between the designer's intention and the outcome; [designers] are continually in the process of developing a path into it, forming new appreciations and understandings as [they] make new moves" (ibid). This process of simultaneously creating something and deciding what to create can be conducted in many ways, and some choices are more supportive of social justice than others. We suggest that when designing with social justice as an aim, the form of interaction between the people involved in the design process – including professional designers, domain experts and users – is critical. In arguing this, we also acknowledge that vision and experimentation are necessary. But design for social justice has unusual constraints and materials: many of them more socially-determined than other forms of design. For instance, in designing for social ends, people themselves may constitute part of the fabric of what is worked with and changed (Light and Miskelly 2008).

But Schön's implication – that design is not a predictable activity – is an important consideration to bear in mind in reading all that follows. Even if a relevant process is united with an inclusive approach, there will always be a windy path towards the outcome. Social justice projects, with their inherent complexities, are particularly prone to producing surprises.

In the next section, we shift our focus from the nature of social justice to look at beliefs surrounding designing and how these work to make educational technology that promotes social justice more or less likely. This, in turn, will allow us to look at what is special about user-centred design and why it may be particularly suited to work for social justice.

3 Design, designing and design processes

The politics of design

Of course, like Hayek (discussed above), one may not believe that any individual or group of people can have sufficient overview to respond to the constraints and opportunities of a situation as well as the ebb and flow of unregulated commerce. In effect, Hayek argues that societies should not be designed; that no design team is sufficiently competent to avoid a dangerous centralisation of power and resources. He believes social justice is not something to design for. However, most people would willingly see some forms of design for social justice sanctioned to organise the chaos and make decisions more effectively, especially in order to ensure fair processes for democratic inclusion and projects to alleviate poverty.

Many misgivings around design come from a failure to distinguish between **what** is designed and **how** it is designed (output and process). Process is often overshadowed by outcome, yet without appropriate processes, good (ie appropriate) outcomes are unlikely. In other words, design processes need as much designing as the products they yield.

The recent history of the Design Council (www.designcouncil.org), a UK government-supported organisation, illustrates the increasing recognition that **how** you design counts. In the last decade, the Council has made a total shift from a focus on 'designer products' to design processes. In 2002, the Design Council embarked upon a series of projects supporting design-led solutions to social and economic problems as well as more technical challenges. These saw designers working directly with selected businesses, schools and public service organisations. Jennie Winhall, who worked as part of such a team, uses the term 'transformation design' to describe a process that facilitates "collaboration between designers, policymakers, economists, social scientists and ordinary people in order to solve complex socio-economic problems" (2006). The RED project to which she refers took in issues of democracy, energy and citizenship (www.designcouncil.info/mt/RED).

As noted, this need to design appropriate processes is especially true of designs that deal with complex systems and are intended to have social outcomes as well as, or instead of, material products. We believe that such approaches are intrinsically more socially just and also more effective than less inclusive approaches. But what are the assumptions implicit in choosing a more or less inclusive approach? How do beliefs about designing map to different methods?

Can 'ordinary people' design?

Very often designing is a collaborative activity (Warr and O'Neill 2005). The introduction of large multidisciplinary teams, required by complex design processes such as those involving interactions with digital technology, has increased discussion about the role of domain experts (see, for instance, Sonnenwald 1996) and non-specialists.

Opinion is divided on how far designing can be regarded as an inherent human skill or form of intelligence. Cross (1990) suggests everyone possesses design abilities to some degree. Buxton, in contrast, argues that calling non-specialists 'designers' is equivalent to saying that everyone is a mathematician because they can add up their grocery bill (2007).


Toilets

Clearly, deciding whether design skills are exclusive to trained professionals, or accessible to everyone, is, in part, a political discussion. It is informed by one's beliefs about human potential at the same time as by how one understands the meaning of the word 'design'. But this question has significant bearing on designing for social justice: must one design for, or can one design **with** a wider populace? And what particular issues arise if one designs with people who do not have professional design training?

Designing can be seen as a very formal process, or even a science. This view is common in engineering and industrial design contexts, but has come in for extended criticism. Over some 25 years, Cross has sought to clarify aspects of the relationship between design and science while making it explicit that design is not scientific. Cross stresses **designerly** ways of knowing that are directed towards "proposing additions to and changes to the artificial world" (2001: 5) and thus are fundamentally different from scientific ways of knowing. He points out that using systematic methods is vital to the practice of science (where it validates the results) but methodical behaviour is not vital to the practice of design "where results do not have to be repeatable, and in most cases must **not** be repeated, or copied" (2001: 2). So, although the scientific school of thought produces a range of formal methods, which is an attractive prospect for the non-designer wishing to learn design, there is little evidence that these methods can be abstracted and applied across design contexts as scientific methods might be. In fact, design is at its finest when it fits closely with its context – it is an applied activity. Design that creates any meaningful change cannot be accomplished by picking up a book, attending to a method closely and copying. By its nature, it is a process of acting on the world and finding a path to transform it in a desired direction. A scientific understanding of the potential of the things in hand is useful, but not enough.

However, although designing cannot be learnt as a science, it can be worked on as a skill and it can be based on certain practices. This becomes more evident if we contrast one extreme of design philosophy with another. At the opposite end to the formal scientific approach exists the Romantic tradition which links design to individual creativity (Gough 1979), and, yet more exclusively, talent. This creed is more likely to appear within the artisan extremes of product design and architecture. At its most dogmatic, the Romantic notion of the designer is akin to that of the artist – privileged beings held in awe for their unique creative talents. (There is a long-running discussion of art/design boundaries, which we will not pursue here, but see Irwin (1991) for a historical perspective on this debate.) Taking this high view of design would deny access to almost everybody: you are either born with the ability or not.

Although, self-evidently, there are people more interested in and more skilled at design than others, a range of commentators have noted that both the circumstances of production and the discipline of the people involved have considerable bearing on the result. If contextual factors can have such an impact on both the kind and the quality of what is produced, successful design cannot be attributed solely to talent. In particular, Coyne (1997) has set about debunking the Romantic position: "the romantic faculties of feeling, imagination and genius were not so much discovered by the Enlightenment as invented by it", he asserts (1997: 137). "Designing a house today is different to the experience of designing a house yesterday. The way I am creative today is sufficiently different from the way that I was creative

yesterday that it makes little sense to ascribe the occasions to the same cognitive process" (1997: 141). Exploring conceptions of creativity in relation to learning, Banaji et al (2006) show both the variety of ways the term 'creativity' is used and how poorly distinctions between uses are analysed and policed.

In summary, within discussions of design, creativity is most often seen as an outcome of a collaborative social process that can be affected by cultural and other organisational factors. Seeing creativity as affected by the social, cultural and organisational context distinguishes it from something that takes place in a person's head. This means it can be cultivated, but that it is neither an outcome of a specific process nor wholly the result of teaching people particular skills. Designing, then, involves experience of problem-solving, patience with uncertainty, familiarity with the materials and awareness of the likely challenges of the discipline in which the problem is situated. These aspects support the evolution of practical design solutions, whether or not there is a formal design process.

Do 'ordinary people' design?

There are emotional reasons why designing may be left to the preserve of experts. Dorst (2003), like Schon (1983) before him, suggests design is complicated because one partly creates the landscape one will travel through in reaching a solution. By the very act of design, designers change the problem space, or landscape, in which they are working, and so have to continuously re-evaluate that space. The pressure of time in most people's lives fights against the patience and belief that is needed to form these landscapes. Time pressure makes people likely to choose the safest option, and to cut out stages they are unsure will add value to the process (De Young 1996).

Yet, there is also evidence that everyone is involved in designing in their everyday lives. Cultural studies literature discusses how and why things become appropriated (Silverstone et al 1994; Silverstone and Haddon 1996; Aune 1996). Moran (2002) memorably describes how handbags are modified and their contents structured by their owners as a consummate act of design by appropriation. Fleck (1993, 1994) and Stolterman (2001) make much the same point: that the distinction between the designer and the user can become blurred at the time of use, as the user alters the design by the very act of using it.

As systems become more complex, there are expectations that many users will be involved in 'design by appropriation' to get these systems to work in specific contexts. This has led to calls for more formal consideration of users as 'end-designers' (Light 2002; Cook and Light 2006). Some designers have argued for 'underdetermined design' that allows users to more easily appropriate designs. At the most accomplished end of this spectrum appear the end-user programmers and users who take whole production processes into their hands. Von Hippel (2002), whose interest is user-led innovation, talks about "user/self-manufacturers" who handle the manufacturing process from idea to use in "innovation development, production, distribution and consumption networks".

The differences between the practice of trained and untrained designers are sensitively caught by Louridas (1999), who builds on the distinction made by Alexander (1964) between

unself-conscious and self-conscious design. Unself-conscious design existed before design was held as a distinct activity. Later, when design became a distinct activity, it was institutionalised and achieved the status of a profession – that is, it became self-conscious. Louridas (1999) argues that both kinds of activity can be analysed and described in the same terms. He suggests that they follow the same logic but are applied to different contexts. Unself-conscious designers try to make a structure out of events by using what's already available around them. They do not analyse existing designs, but employ materials directly in their work. By contrast, self-conscious design is metaphorical; it proceeds "by using analogies of the envisaged artefact" in the shape of models that the designer can examine in ways that s/he never could with the artefact. (It should be noted that the 'self-conscious' understanding of designing dominating industrialised societies sits in contrast to the valued craft skills of developing economies that continue to exist in less self-conscious though highly trained forms. This form of designing behaviour has largely been written out of the discourse of design elsewhere.) If we take Louridas' analysis, we can understand the different design behaviours of trained designers and 'ordinary people' as a matter of degree and experience, and not as two unrelated activities.

Designing with and for people

Depending on one's sense of people's capability to determine needs and use for themselves, one looks to create a more or less specified design as a result. The purpose of the resulting design and its intended users will inform the degree to which a system is left open for further adaptation or made closed for one type of use. For example, a software system designed for competent 'techies' can be handed over confidently with many options visible for adjusting what it does and how. A less technologically confident group might prefer fewer options and a clear, simple path to achieve their ends. Yet another group might benefit most from a design that allows them to learn over time how to change aspects of the system as their requirements develop. Tools and systems that contain opportunities for users to learn and develop are most challenging to build, but get closest to embedding social justice ideals, since they are most enabling.

When the outcome of the design is a new social system rather than a software tool, the choices and concerns are the same. However, concerns about users' potential competency to contribute to the design process may be less important than allowing them to develop a sense of ownership through being involved in the creation of the project.

Some forms of design and designing are more open to participation by untrained and inexperienced people than others. Believing in the potential of everyone to design is more egalitarian than believing in exclusive talents and specialised roles. However, this is not the same as involving every potential user in every design project, or at all stages, or in the same way as the next person. Reymen et al (2005) suggest that to address the differences in expertise, it is important to facilitate communication between these different levels. This can enable untrained participants to understand the potential choices available to them, to be reflective and to benefit from the differing contributions of design specialists. It can also enable designers to incorporate the users' own expertise and to understand what users want from designers.

Projects that aim for social change have followed both the approach of 'designing with' and 'designing for' users.

An example of 'designing with' users is the 2007 Designs of the Time (DOTT) initiative (www.onenortheast.co.uk/page/dott07), a collaboration between the Design Council and the regional development agency One NorthEast, which put local communities in charge of developing environmentally-friendly ways of living. DOTT director John Thackara boasts that although Dott 07 was a design event, people – not "shiny products" – were the main exhibits of the culminating festival (www.doorsofperception.com/archives/2007/10/why_our_design.php). This approach can make the design outcomes situation-specific – another group of users might come up with different designs that are more conducive to their different lifestyles.

By contrast, an example of 'designing for' users, mySociety (www.mysociety.org) gives British people improved online access to their governmental institutions for the promotion of social participation and change. mySociety is behind websites such as WriteToThem (www.writetothem.com), an easy means of contacting people's elected representatives, and PledgeBank (www.pledgebank.com), a website that allows users to make pledges and recruit others to their cause, inspiring joint social action. These sites and others are the work of a small group of talented and motivated programmers. People can volunteer their time to help. Public ownership of the result is achieved by the use of accessible language, the models of interaction embedded in the design and the public display of the ethical motivation of the developers. Given the broad base of intended user, there is no way that all users could have been involved in the design process. However, mySociety projects are modified in response to users' feedback, which is actively solicited as part of the development process. Usability is identified as a key part of making tools which challenge accepted practices and give new access (Steinberg 2008).

Greenbaum and Kyng (1991) argue that in projects where social change, rather than commercial profit, is the main aim, the most appropriate form of process is likely to be one that encourages the maximum number of relevant people to become involved in development, or which results in a significant group of people feeling ownership of the outcome as well as the desire to use it. The design processes of the two projects described above are quite distinct from each other – one much closer to this user ownership than the other – but in both cases the design outcomes are successful, born of the designers' goals, their ways of working and the demands of the situation, as well as considerable attention to detail. So, participation from all users isn't necessarily a prerequisite for good design.

Perhaps the most striking example of designing for social justice that doesn't ostensibly require any form of user participation is website accessibility. The guidance for ensuring that people with disabilities can access websites is managed and updated through the Web Accessibility Initiative of the World Wide Web Consortium (www.w3.org/WAI). Adhering to the guidance is necessary, but not sufficient, to ensure that people with disabilities can use sites. The guidance ensures that people can **access** sites; however, there is more to use than

access. As anyone using a badly designed 'accessible' website knows, the site only becomes useful when usability, content, and the user's requirements, as well as access, have also been considered.

Thus, while it is possible to create simple generic tools to support social justice without much involvement from the intended users, if projects focus upon complex activities, involve significant changes of practice and are embedded in a rich social environment, it is a practical necessity to adopt a full user-centred design approach. Support for this argument comes from recent research into the failings of top-down administered social change projects (Gaved and Foth 2006, Anderson and Gaved 2007). Although many social projects succeed in delivering promised artefacts, they may not inspire take-up of the artefact, new social practices or greater social coherence. These projects must be deemed a failure if the artefact was intended as the agent of change and not an end itself. We will not go into details of failures here, but consider the number of unused computer banks donated to give students in developing countries access to the same resources as their counterparts in industrialised countries. Without the addition of a curriculum that supports computer use, trained teachers, a plan for maintenance, and good internet access, the act of handing a school a wall of computers is unproductive.

4 User-centred design as a process

We now focus on the approaches characterised as user-centred design (UCD), which are a subset of design processes and currently gaining in popularity. Typically, their popularity comes about not from the social value of engaging users in the process but rather because they offer a means of avoiding costly mistakes. UCD is a catch-all term for a wide range of techniques which put the targeted beneficiaries in the spotlight. However, although all UCD acknowledges the relevance of the design's intended users, it is understood in different ways – both politically and in terms of how people are engaged. We explore the significance of these differences, before concentrating on the aspects that seem to have most to offer when designing for social justice.

What does 'user-centred' mean?

At its crudest, 'user-centred' can be a form of lip service; in other words, a statement that some research into requirements was undertaken before or during the work (Carroll 2002). Olson (2004) identifies several degrees of user involvement: from users as designers and co-designers, through user collaboration and user participation, through continuous user access and user contact, to ending with users represented through personas and designers thinking about users.

At its most radical, even the term 'user' is a source of political controversy (Suchman 1987, Thimbleby 1990, Laurel 1991). This is because calling non-process-specialist participants involved in the process by the term 'users' strips them of agency. This would seem to set these people up in opposition to 'producers', 'developers', 'designers', and those at the core of the designing work. Thus, the term's use may foster perceptions of 'us and them', with expertise, power and decision-making on one side and recipients on the other. While some forms of UCD do work in this way, others resist this separation and treat all participants as having special knowledge and skill – including expertise in how a design may work with their own lives and aspirations.

The UCD movement has brought to the foreground the needs and aspirations of the people who use the outcome of the process by including them more prominently in the process of design (Norman and Draper 1986, Daly-Jones et al 1999). There is considerable human-computer interaction (HCI) and computer-supported collaborative work (CSCW) literature on the need for this approach (see, for instance, Bannon 1991, 1992, Carroll 2002, Preece et al 2002).

Within this literature there are two apparent motivations. One is business-focused; a history of catastrophically inappropriate design (see Grudin 1988 for an early general critique; Finkelstein and Dowell 1996) and increasingly fickle consumer contexts of engagement (eg Thompson and Failmezger 2005, on website choice) have highlighted the need for greater insight into how and where things are used. Achieving designs that are successful in such business terms could, in part, be met by developing better models of systems' users, without recourse to individual people. As a business approach, there is nothing implicit in UCD that means the design outcomes should be good for society: streamlined killing machines and compelling gambling websites are as much potential outcomes of a UCD process as

an efficient charity database. Though, Thimbleby and Duquenoy argue (2001), even making technology that works as it should is an ethical stance: "It is, of course, possible to program ignoring ethics, but this does not make the issues go away: it means, rather, that poor decisions will be 'hard coded' regardless of their impact."

The other motivation for embracing a UCD approach is social. UCD is regarded as a more equitable as well as informative way of designing (Kyng 1994, Bjerknes and Bratteteig 1995). This motivation could not be met without involving individuals, either out of personal interest in the outcome or to represent the views of a wider target group. Thus, UCD at its most participative has a form of social justice at its heart. Winhall (2006) calls UCD a "political standpoint in itself" in that "participatory design work, if done well, can be fundamentally democratic, giving ordinary people a voice and an opportunity to influence outcomes". In this way, UCD can be seen as promoting aims of social justice, almost regardless of exactly what it is that is being designed.

Doing UCD to ensure usable products

In the design of generic products – where a very broad constituency of users is likely to exist – the methods chosen tend to fall at the more straightforward end of UCD, assessing needs and testing as part of the cycle of designing. At the very least, **user testing** takes place once a design is mooted and user testing modifies that design so that it is usable by the group of people it is intended for. This pragmatic engagement of users as testers is a basic form of UCD and now goes on in an increasing number of commercial design contexts (e-Consultancy 2007).

If a particular group of people are the main or only intended users of the final outcome, especially in a specific context such as a single workplace and with a complex social system, there are good reasons for using more thorough UCD research practices, such as **requirements gathering** involving ethnographic research (Crabtree 1998, Jirotka and Luff 2002) or contextual enquiry (Beyer and Holzblatt 1998). Ethnographic research for design takes an anthropological starting point and then, having observed users in their natural habitat and going about their usual business, turns these observations into material for designers to consider. Contextual enquiry is a similar process, underpinned by less theory and usually conducted in less depth. For instance, detailed interviews at a place of work (rather than in a lab) would count as contextual but would be too insubstantial upon which to base an ethnographic study of the workplace. This initial engagement with the target group of intended users before designing begins is intended to gain an understanding of their practices and how these might be modified, and with what impact, by any changes introduced. It also allows for some evaluative reflection after the introduction of any new system.

Both user testing and requirements gathering are forms of research that do not require direct involvement in the design process from the intended users. Both are valuable to ensure a workable outcome, yet they are essentially pragmatic activities to determine usable design.

This is very different from design that is ethically motivated to 'practice what it preaches' in the context of social justice. If either the social structures embedded in the design process

or the winning of commitment from users is important, then the focus of activities shifts towards an emphasis on the process of design rather than the product itself and moves from a pragmatic style of engagement to more engaging participatory and co-design approaches (Greenbaum 1993).

Doing participatory design

In designing for social justice, we advocate a form of UCD in which users play a significant role – such as participatory design. The role of users in participatory design processes will vary between projects and between stages in projects but users will play a core part: participatory design is as much a philosophy as a method. Participatory design emerged in the 1960s and 1970s in Scandinavia, partly as a result of the trade union movement campaigning for workers to have democratic control over changes in their work, and so its origins are rooted in ideas of social justice (Preece et al 2002).

The University of Aarhus lists four principles of participatory design as: cooperating, experimenting, contextualising and iterating (www.daimi.au.dk/research/areas/human-computer-interaction/participatory-design). "**Cooperation** stresses the egalitarian principle which assumes that all stake-holders within a design process are juxtapositioned, all are experts in certain areas and more like novices in others; and the **co-working** principle which assumes that a design process is a learning process for both computer systems developers and users" (bold added). The emphasis on **experimentation** recognises that the design process always takes place in the space between new possibilities and current conditions, while participatory design takes its starting point the particular **context** in which the new computer application is to be applied. This is handled in an **iterative** process of design and use.

A particularly successful participatory design initiative is the intergenerational design team at the Human-Computer Interaction Lab (HCIL) at the University of Maryland. Started in 1998, children aged 7-11 work with HCIL staff and students from computer science, education, art, robotics and other disciplines after school and over the summer to create new technologies for children (Guha et al 2004). Working this way gives the researchers new insights while providing a fantastic learning opportunity for some local children. For instance, the International Children's Digital Library that provides free access to children's books from around the world (ICDL: www.icdlbooks.org) was a collaboration with HCIL and involved the Kidsteam in sketching their ideas and supporting the interface design, while book digitalisation techniques, and storage, retrieval, annotation and delivery technologies were being created (an ICDL case study can be found at: www.id-book.com/casestudy_14-2_2.htm).

A participative design process has the benefit of being a great motivator for all involved when it is conducted well. However, it is more difficult to handle than a more limited procedure and usually takes longer, as time must be made to discuss things fully, ensure understanding and keep all participants engaged. Time can be a major factor in how people engage in creative activities.

When a participative design process is poorly facilitated, being involved can disenchant rather

than engage, and people's appetite for discussions about process can quickly wane. There is also the danger that participants absorb the values of the design team to such an extent that they lose touch with the requirements of users not involved in the design process (Sutcliffe 1995). Conversely, the developers can get too close to the participative process to design effectively (Dittrich and Lindeberg 2001). However, at its best, and with enough reflective space, this immersion from all sides can be a strength, especially when shared ownership and mutual understanding are important goals.

Shared agency in design does not need to be restricted to the design of outcomes. It is possible to involve everyone, or a representative constituency of users, in designing the process of design as well. Depending on who initiates the project, a group of social activists might employ a facilitator to enable designing and part of this would be to co-design the design process. But more often a new project is born from outside the intended user group and results in a form of more or less benign imposition. Even so, there might be a collaborative definition of 'social justice' as part of getting started on a social justice design challenge, and a collaborative definition of the problem space before any design decisions are anticipated. This is to echo Miller's assertion that social justice should be made meaningful to those involved by ensuring that it is contextually defined (see Miller 1999 above).

There is a substantial literature on participatory design as it affects the development of interactive products and systems (see www.cpsr.org/issues/pd and Muller 2002). Much of this literature is about practice, though particularly the Scandinavian School (Ehn 1993, Kyng 1993) and Greenbaum (1996) also address the rationale of participatory design, be that an explicitly social or political goal. That said, most overtly political texts within this field appeared when the main domain of computing was professional work, so there is little broader reflection on technological tools for social action or technology design.

Participatory action research and other design practices

Action research, which is a form of research in which researchers become involved as participants in planning and implementing change (also often described as 'learning by doing'), can be seen as an extreme form of designing with the community. As a social science, it comes in for major methodological criticism. Krimerman (2001), in his defence of participatory action research describes two objections: first, that of "Popular Incompetence and Bias", questioning whether non-scientists can contribute properly; and second, that of "Confounding Political Ideals with Scientific Criteria", given that the outcome often seems simply to be "research that has an emancipatory or empowering effect" (2001: 63). Whether or not action research is social science, as Krimerman argues, his four case studies – roofless women of Boston, child labourers of Bogota, battered wives of Cologne, and schizophrenic recidivists in New Haven – could be deemed fine examples of participatory design for social justice. Each researcher has taken action alongside the members of each group that not only improves the position of the group, but also "involves people, first of all, becoming conscious of their prior socialization, of the beliefs, attitudes, aspirations, and ideologies that they have unconsciously 'internalized' or been indoctrinated into; and, second, reflecting on these received norms" (2001: 72).

Participatory evaluation

UNESCO has backed the benefits of ethnographic action research with its reflective and continuous approach to project evaluation. Tacchi et al (2003) reject an approach that measures a 'baseline' and then subsequently monitors and evaluates changes from that baseline to measure the effectiveness and impact of a project. They advocate a "research culture through which knowledge and reflection are constantly fed back by all parties in ways that help the project to develop" (2003: 3-4). Involving all participants in assessing the development of the project fosters ownership, increasing accountability and commitment of all involved. Distributed ownership in and of itself improves the chances for a more longitudinal approach to evaluation, overcoming the short-termism of much evaluation and assessment work. This reflects the likelihood for longer-term impact as ownership also increases the chances of sustainability within the locale or community that has taken it up.

Another voice promoting democratic evaluation methods is Hall's (2003) who has named her approach 'process-generated evaluation'. This stresses the involvement of all stakeholders and allows for a negotiated form of evaluation that emerges from the activities of the group. In allowing for greater engagement, it complements participatory design well and its emphasis on learning through activity rather than fixed goals and targets offers the flexibility needed to be responsive to the forming and reforming that accompanies listening to all participants.

Themessl-Huber and Grutsch (2003) note that in addition to supporting decision-making and problem-solving, evaluation can have an empowering effect for projects' users. They show how the changes in stakeholder behaviour and the changing roles of evaluators can influence the evaluative process, arguing that it is an illusion for evaluators to think that they are in control throughout the entire evaluation, any more than those who commission the project will be. They suggest that these shifts are themselves important outcomes of the act of evaluating and deserve the same attention as other effects (2003: 108-109).

As mentioned, Holden (2004) makes the point that 'regeneration' is not enough without prosperity and increased community wellbeing. In choosing evaluation criteria, it would be possible to focus on the achievement of processes and products that are the means for change, instead of the end goal. This introduces a danger of overlooking the benefits actually achieved or focusing on short-term outcomes at the expense of valuable progress. By contrast, the methods described above have measures within them that reduce the dangers of evaluating the conceived means of making change instead of the change itself. First, the likelihood is that open and participative evaluation activities act to embed the changes being discussed through the process of reflection that evaluation should entail. Second, an unimpressed user-designer community often reveals itself in open evaluation processes: using blunt questioning of purpose and value to raise concerns. The very act of joining in a participative evaluation process is a marker of commitment and absence of comment may be an implicit comment on the success of engaging people. Thus, flexibility and openness are rewarded as qualities of a project, but only when they too serve its higher goals. There is little room here to look at the effect of overly-restrictive reporting expectations from funders,

or funding conditions that curtail collaborative exploration of effective change mechanisms. It is enough to note that both long-term engagement and evaluation and the accompanying pronounced shifts in the nature of the work (so that actual on-the-ground desires are being followed) are made difficult if support is not sensitive to the value these can supply.

Sustainability

Sustainability is an issue for any social justice project at some level. Whether sustainability is about taking the next step, maintaining the achievements of the project, or ensuring that the next generations can also benefit, there is a challenge to giving life to the next iteration once the funding has run out or the people who championed it have moved on. Gaved and Anderson (2006) note that people bringing initiatives into a community "need to have an exit strategy and be aware of the effect they may have if they leave", whereas "[g]rassroots initiatives may be more sustainable, as they are supported from within the community usually on a financially self-sustaining model, but need to ensure a sustainable social model as they draw heavily on the community's social capital, which can be spent as well as accrued through the maintenance of the initiative" (2006: 27-28).

The Department for International Development (DFID) provides guidance on sustainable ICT projects for development (www.sustainableicts.org) and offers ideas that could apply to any social justice project. Amongst the case studies it describes is CDI, the Committee for Democracy in Information Technology. CDI facilitates the running of Information Technology and Citizens Rights Schools (ITCRSs), providing the equipment (hardware and software), training of local educators, and local administrative and technical support. The schools are self-managed and self-sustainable, as are the regional CDI offices that support and monitor them (www.sustainableicts.org/infodev/CDI.pdf). Developments like this one, that run so much on local enthusiasm, bring with them the question of how you maintain that degree of commitment. "Unsustainable systems deplete or run down capital, spending assets as if they were income", say Batchelor and Norrish (2002). For CDI, a key factor in avoiding this has been the link back into the needs of the communities served: "CDI trains the future educators of the schools who, in turn, will train others back in their communities. The fact that the local people are heavily involved in the process means that the courses offered are tailor-made and relevant to the community."

Batchelor and Norrish (2002) define the many forms of capital that they see as needed for sustainability, including financial, physical, social (structures and institutions which support uptake) and human (actual people). Arguing that to become embedded, information must become knowledge held by local people, they suggest that "[t]he critical question in all this is where is information to come from if it is to be relevant and usable to local populations and where is the support to come from if information is to become knowledge? Are information only projects sustainable? Or is the step to knowledge vital for sustainability?"

Similar issues arise when scaling up projects from a pilot to a programme with wider reach. Clarifying which aspects of a project are scalable is crucial to meaningful transformation. Participatory design is hard to scale to large generic projects, as we noted above. So, in evaluating goals, there is little difference between planning for sustainability and planning for scaling. Key values need extracting that can be protected. The rest is merely the conduit for change and can be adapted pragmatically for effectiveness.

There is evidence that the model of participatory design used affects the sustainability of a project. Carroll et al (2000) compare their long-term process in Virginia Tech University, which ran over five years, with more common short-term 'duck in-and-out' techniques. "Participatory design is fundamentally a process of mutual learning, and thus of personal development for participants. But it is often exemplified by rather singular and ephemeral learning interactions" (2000: 249). The Virginia Tech researchers engaged in long-term cooperative design interaction with roles and responsibilities for participants that developed as their interest and experience developed. Teachers gradually became analysts as well as designers on the project and, in this way, embedded the technology they were co-developing more profoundly in the school.

The report into the British Creativity Action Research Awards (CARA 2005) hints at the difficulties with both introducing and maintaining any new strand of activity, especially in the tight curriculum of the secondary school. The CARA scheme provides funding for schools to bring together a teacher and a creative practitioner to carry out action research investigating an aspect of creativity. However, the evaluative summary following the first round (ibid) found that it was hard for schools to sustain the lessons they learnt during the project. Those who had most success in sustaining change often were those "that made links with people and places beyond the classroom, recognising in the wider community an invaluable source of information, stimulus and support."

The potential for mutual learning was a key part of the more successful CARA projects. Fulfilling this potential relates to the relationships developed during the project, such adults and children establishing "'age-appropriate equal status'" (CARA 2005). This kind of mutual learning sustains a social justice project beyond its formal life, for it allows a change in power structures or at least greater awareness of their impact.

Thus, stakeholder involvement in a project that begins to shape the social landscape has educational value in itself that is often unacknowledged because it is so integrated with the activity being undertaken. Transferring project ownership from the core to a wider group often involves transmitting relevant skills, if only informally. This 'gearing up' is a natural process and can contribute to the global potential for social justice by creating awareness and a sense of agency in participants.

We will now turn our attention from the global aspects of designing and social justice to look particularly at the way that technology can impact upon education.

5 Technology-enhanced learning

What role is there for technology-enhanced learning?

Learning is important to any debate about social justice. Learning is the process that can equip people with a voice in their future trajectory in the world. However, the issue of social justice and education is a complex one as highlighted by Abbott (2007). Some groups and individuals are recognised and included in education, whilst others are marginalised (Gewirtz 1998, 2006). Technology can help to address the needs of many, including members of these marginalised groups. It can enhance learning and equip learners with skills, abilities and knowledge to help them articulate their voices. It can also amplify those voices to draw attention to their needs and support and showcase their strengths.

Technology-enhanced learning (TEL) therefore has a role to play in social justice, but what kind of a role is this, and how does it relate to the idea of UCD? In the sections that follow we will answer these questions. These discussions are not concerned with access to technology or access to the internet, but with the potential benefits that TEL might offer once this access has been established. The issue of access is important, but is not the central issue of this publication and is dealt with elsewhere (see Grant 2007 and Selwyn 2002 for example). Here we will explore instances where TEL has proved beneficial to learners of all types, ages and backgrounds. In addition to considering these potential benefits we will explore the ways in which UCD approaches have been applied in the development of TEL, and the ways in which such approaches might best contribute to the future development of TEL in relation to social justice.

The breadth and depth of technology-enhanced learning

TEL research is increasingly interdisciplinary, encompassing computer science, education, psychology, philosophy, sociology and philosophy. It is influenced by numerous theories about how people learn. TEL research recognises and contributes to the move towards a learner-directed style of learning, such as that described by Knowles (1984) as 'andragogy', and the more self-determined learning paradigm proposed by Hase and Kenyon (2000) referred to as 'heutagogy'. Researchers are now particularly concerned with the role of motivation and the way that systems can recognise a learner's motivational state (D'Mello and Graesser 2007), and the role of metacognition, through for example developing systems that support learners' help-seeking behaviours (Aleven et al 2004).

The range of possibilities afforded by TEL increases as the range and nature of technology increases, the visibility, tangibility and embedded nature of technology changes, and the boundaries between the physical and the digital blur. This expansion away from fixed desktop technologies to small, affordable, mobile devices suggests that there is even greater potential for TEL to be experienced by the masses, and therefore for it to promote social justice. But how best can we help people to take advantage of these technologies to enhance their learning and their role in society?

Throughout the discussion that follows we address this question, and two aspects of TEL applications are identified as being particularly relevant. First, TEL can offer learners an experience that is specific to them and that is **designed to meet their individual needs**. In

this way the technology can be used to do more than address the needs of the majority and can recognise the different needs of minorities. Second, TEL can support learners' **social and communicative activities**. This can enable them to join the debate, voice their views and needs more effectively, and play a greater role in participation, including participatory design.

What benefits does user-centred design offer?

Much of the current TEL research has evolved from previous work that either considered the design of computer technologies for learning, such as the work done by computer scientists to develop intelligent tutoring systems (ITS) and computer-assisted learning (CAL); or work that focused on the nature of learner and teacher experience with technology and how best it might be supported. Work done by education and learning technologists would fit into this latter category. In many ways these two aspects have merged, and certainly the increased use of user-centred and participatory design methods has helped to blur the boundary between system building and learner experience.

There has been little investigation of how education about technological processes and their impact would equip people to engage in promoting social justice (Cook and Light 2006). Democratising Technology (DemTech - www.demtech.qmul.ac.uk; www.thenotquiteyet.net) created methods to make the design of technology less opaque so that everyone might participate in the decision-making process about the development of future digital networks. These were based in performance techniques and stressed the associative thinking necessary in considering how networks could change the way that we interact with each other. In particular, they have been aimed at members of the public who do not normally get involved in design thinking to build their confidence and their interest in the potential of technology. Practical Design for Social Action (PRaDSA - www.technologyandsocialaction.org) is also part of this educative movement to support social design. PRaDSA maps the activity of design intermediaries as they translate between technological potential and social action. The project follows those whose job is to design tools and systems for NGOs, charities, political organisations and activists, learning about their support needs and the practices they find most effective in upskilling the teams they work with. By understanding the ways that technology can support design for social justice, PRaDSA seeks to promote the growth of social change activities. Both PRaDSA and DemTech aim to broaden understanding of the potential of technology to a wider constituency and, in so doing, improve social justice.

An increasing amount of work on the development of TEL is now conducted in collaboration with the users and learners for whom the technology is being designed. Examples of this type of engagement can be seen through the work conducted during projects such as Kidpad, that have involved children in the design of a collaborative, non-linear storytelling system (Druin et al 1997); and Homework, a system to link home and school maths learning designed with children, their teachers and parents (Luckin et al 2006). The benefits of these participatory methods can be seen in the acceptability of the systems developed and the manner in which the system users are able to appropriate the technology and use it to meet their needs. For example, the Homework system enabled parents to engage in learning dialogues with their children about learning done at school and learning happening at home, it offered them improved information about what their children were learning, and the parental involvement in the design process helped to ensure that the technology integrated well with home life (ibid).

In the sections that follow we expand upon the two issues identified above. To address the way in which TEL and user-centred design approaches can offer learners an experience that **meets their individual needs and addresses the needs of minority groups as well as the majority**, we explore the ways in which technology has been beneficial to learners who are disadvantaged by physical, cognitive, socio-economic or status related factors. We also discuss examples where these technologies have been designed with these learner groups. The potential of TEL to support learners' **social and communicative activities** and give a voice to a wider bandwidth of people is discussed through consideration of Web 2.0 social software applications, learner-generated content and contexts, and citizen journalism. To conclude, we consider the ways in which TEL can expand our understanding of the world and increase our capability for global exchange and engagement.

How can TEL approaches help support disadvantaged learners?

In this section we consider a variety of groups of learners for whom learning resources may be less easily available, or less well-suited to their needs. We consider the ways in which technology has been effectively used to support adult and community learning, and learners who are disadvantaged through social, cognitive and physical disadvantage or impairment.

Learners with profound and multiple learning disabilities

One of the groups with the clearest need for support from technology to help them develop their voice and make it heard are the small group of learners in the UK who have profound and multiple learning disabilities (PMLD). The fact that TEL provides the capabilities for activities to be adapted to the individual learner is no less important for learners with PMLD than it is for able-bodied learners. In addition, the ability of TEL applications to offer activities that are simple, and that can be repeated as many times as desired, is important (Williams 2006, Williams and Minnion 2007), as is the recording of achievements (Martin 2006), and the provision of multiple modalities and adapted input devices. For example, project @pple (www.rixcentre.org/appleproject/index.htm) developed a prototype learning environment for users with learning disabilities that offered learners a personalised experience and the chance to create their own multimedia for self-advocacy and assisted communication. The learners who used the system demonstrated complex patterns of ICT use and on occasions performed better than expected for their perceived intellectual ability. The project team found that the use of multimedia enabled them to bypass conventional oral communication with visual imagery, sound and interactivity. This helped relationships between learners using the system, their peers, teaching staff and families.

Learners with specific disabilities

If we turn to groups with more specific needs we find further evidence of a role for TEL, and once again, the possibilities it offers for adaptation to individual learner need. More than half a million people in the UK suffer from autism and Asperger syndrome (The National Autistic Society: www.autism.org.uk), conditions that impact on an individual's social development and capabilities throughout their life. There are encouraging results from TEL research with these learners.

Research has not been restricted to software and desktop-bound technologies. Dautenhahn

and her colleagues (Robins et al 2004; Dautenhahn and Billard 2002) explore the role that robots and robotic dolls can play in therapy and education for children with autism. Similarly, Massaro and colleagues have developed Baldi, a three-dimensional animated talking head with synthesised and natural speech. This technology has been used as a conversational agent in the development of computer-assisted speech and language tutors for children with language challenges (Massaro et al 2006). To enable children with autism to interact with a virtual peer and to build social skills, Tartaro and Cassell (2006) are developing an 'authorable' virtual peer. This is based upon Sam, a virtual, life-sized, language-enabled, computer-generated animated character that looks like a child and interacts with children. Sam uses eyegaze, body and head posture, hand gestures and speech to exchange turns, act out stories and offer feedback. The authorable virtual peer will interact with children by telling stories. Children will be able to select predefined responses and to author the virtual peer to create new behaviours and responses. These interactions are intended to enable children with autism to rehearse and manipulate the verbal and nonverbal behaviours of the virtual peer, and to construct their own interaction examples.

Specific physical disabilities such as deafness and blindness can also lead to social and educational marginalisation. There is evidence that these too can be aided by TEL, for example, sign language websites for the deaf that incorporate video technology and animated signing avatars (Verlinden et al 2002; Kennaway, Glauert and Zwitserlood, 2007). The ways in which audiobooks can be best designed to assist blind learners has been studied by Parkin and Aldrich (1989), computer assisted language learning has been studied by Wiazowski (2002). The development of tangible TEL applications also has the potential to offer benefits to blind and visually impaired learners.

Learners experiencing social disadvantage

Finally, we need to recognise another group of young learners, who are disadvantaged socially rather than cognitively or physically. Technology can be used to offer support for learning and communication here too. For example, a variety of projects explore the ways in which technology can be used to support socially and economically disadvantaged learners to increase their participation in society. This can involve making new forms of learning possible, including personalisation, communication and the facilitation of creative expression, as well as using ICT to widen access to learning. An increasing number of projects adopt user-centred and participatory design methods. For example, Vital Regeneration, an independent regeneration charity, works with community centres, schools and employers to promote education, employment and enterprise to reduce deprivation in London's Westminster neighbourhoods. Their projects aim to break down barriers to participation and learning and include **FreqOUT!** and **Museum of the Moment**. FreqOUT! is a community education programme for young people that explores the artistic and educational potential of wireless technology to engage socially excluded young people. Experienced artists, tutors, youth workers and volunteers from sponsoring companies facilitate activities that consult with and encourage young people to discuss and create responses to current issues and technologies. The resulting artwork has been exhibited in venues such as the Institute of Contemporary Arts and Trafalgar Square (see www.vitalregeneration.org/freqout). Museum of the Moment involved teams of young people working with an artist and interviewing local residents and visitors about their lives, opinions and knowledge of local history

(see www.vitalregeneration.org/freqout/projectarchive). Further examples of the range of ways in which TEL can support learning for socially disadvantaged groups can be found in Futurelab's 'Designing Educational Technologies for Social Justice' handbook (Grant 2008).

The Make IT Yours 'Telling Stories with Images and Words' project at Windmill Hill City Farm Computer Centre, funded by national UK online centre network (www.ukonlinecentres.com) as a Social Impact Demonstrators project, aimed to provide adults who have mental health issues with the opportunity to use technology to get online, take and edit photographs and write for self-expression. Participants were offered the equipment and skills to take photographs for the Make IT Yours website and an exhibition. They were provided with a set of themes, such as Personal Space and Neighbourhood, as a framework to help people to tell the stories behind their images, and have also been involved in the production of short films to be linked to the Make IT Yours website. In this way these learners can have a voice to communicate more widely and are helped to develop the skills they need in order to use that voice more effectively.

Adult and community learning

Adult learners form a significant constituency of learners and there is pressure, for example from the Leitch review (2006), for an increase in standards of achievement in the post-16 sector. There is also evidence from a recent report commissioned by NIACE that participation in adult learning by poorer people is around half that found amongst the upper and middle classes (Aldridge and Tuckett 2007). Could TEL encourage adults from all social classes who left school at an early age to return to learning?

There is little mention of technology in the Leitch review, and whilst there is evidence to support the potential for technology to aid adult learning whether in pursuit of qualifications or not (Grubb 2004), its effectiveness is questioned by some (Selwyn et al 2006, for example) and considered in need of further study by others (du Boulay et al 2007). Learner confidence, expertise and self-efficacy are important factors in learners' success with technology (Cook and Light 2006, OxIS 2007). Prior knowledge (both operational and conceptual) and the presence and involvement of a tutor or teacher have also been identified as important for effective use of technology (du Boulay et al 2007). This review also highlights the importance of the learner's context to the effectiveness of the technology they are offered. A UCD approach to design might help to capture these contextual factors in the design of TEL.

6 How can user-centred design approaches help enrich and support disadvantaged learners?

There is growing evidence that TEL can assist the types of marginalised learners discussed in the previous section, but what role might there be for UCD with these groups? The need for good communication skills to participate in UCD might suggest that it would be too challenging to consider with learners with physical and or cognitive impairment. This has not been the case. UCD approaches have been used successfully with PMLD learners (Poulson and Waddell 2001), as have participatory design methodologies in which user groups have been involved in the specification and validation of system requirements (Williams and Minnion 2007, Williams 2006). Working with these groups brings particular challenges, and yet groups at centres such as the Rix Centre (www.rixcentre.org) and SMARTLab (www.smartlab.uk.com, Goodman et al 2005) demonstrate both how this can be done and the benefits that it affords. For example, the use of techniques such as 'Talking Mat' interviews, which uses symbols and drawings to capture the views of learners as part of the @pple project, then enabled the team to develop a personalised learning environment in which people with learning disabilities engaged in complex use of ICT (www.rixcentre.org/appleproject/index.htm).

For children with more specific needs there is also a small but growing body of user-centred and participatory design work. Keay-Bright (2007) developed the ReacTickles© software as part of the Reactive Colours project. ReacTickles is a software games package for home or school use. The games are colourful and use different input modes to offer sensory experiences to autistic children in order to encourage spontaneous play and learning. The software is designed to be consistent with the way in which autistic children interact with their environment so that simple actions, such as that associated with squeezing bubble wrap, result in a special effect from the software. In order to achieve this consistency, a participatory design approach was taken to designing the embodied user interface and involved understanding the social worlds of autistic learners and those involved in their learning. As a result, children have been found to be less anxious when using this software and to solve problems effectively. The participatory design process is ongoing, with the software and feedback forms available to freely use on the Reactive Colours website, ensuring that there is a continuing participatory evaluation feeding into further development. The software is not downloadable, it is intentionally online to draw people back to the site where users can also create their own personal gallery and can download screensavers. Keay-Bright is also part of the ECHOES I and II project team, working with children with Asperger syndrome to explore the potential of technologies such as tangible interfaces, embodied agents and video games (wiki.inf.ed.ac.uk/ECHOES/WebHome). The ECHOES II project will also be exploring inclusivity in participatory design. ECHOES II aims to develop an adventurous TEL environment in which both typically developing children and children with Asperger syndrome at Key Stage 1 (ages 5-7) can explore and improve social interaction and collaboration skills. During the design of the environment, the project team works concurrently with two design teams, one consisting of children with Asperger's Syndrome, and one with typically developing children. Within each group, work will focus on developing, challenging, critiquing and refining ideas. As consensus is reached within groups, design ideas will be exchanged between groups, and further discussed and refined. This approach aims to allow the views and sensibilities of both groups to be expressed and ultimately blended into a design that is responsive to both.

Work with adult learners in UK online centres has indicated a clear role for user-centred and participatory methods (Garnett and Cook 2004). Successful socially-inclusive community learning has been shown to be learner-centred, interest-driven, sensitive to the learning context and best supported by mentors who use learners' interests to develop learner engagement (ibid). The Community Development Model of Learning developed by Garnett and Cook was the result of studies into the way people learnt in UK online centres. This research identified a 'life-cycle' model of learning within the centre, where the learning objectives of the centre, the staff and the learners developed. As a model of socially inclusive learning it informed the development of e-learning resources for the NLN-ACL learning resource (www.aclearn.net). The Community Development Model of Learning proposes an 'Attractor Stage' that offers learners open learning in a non-formal context where they can follow their interests as part of a self-supporting learning community, followed by an 'Engagement Stage' that offers formal learning developed andragogically with 'Trusted Intermediaries'. The studies illustrated that UK Online centres could be seen as emerging, networked entities that had a valuable role to play in both formal and informal community-based learning. This work indicates that people excluded from learning and looking to return were motivated by social issues and community engagement rather than individual achievement-orientated activities. This highlights the tension between the pressure for learning to be recognised through qualifications and formal learning programmes and the need for people to desire to learn and be motivated. The work suggests that the "co-creation of the learning process" could integrate interest-driven learning with a curriculum-driven learning world (Cook and Smith 2004, Garnett and Cook 2004).

In a similar vein, Day and Farenden (2007) and Day (2008) also discuss the development of a community engagement strategy and emphasise that it takes a great deal more than simply finding ways of engaging in dialogue with the community. They promote a process of identifying ways of supporting the community to engage with community research and development processes through iterative interaction between inclusive partnership building, community empowerment and encouraging community ownership. A three-stage cyclical approach is presented: Stage 1 promotes the project and provides support and knowledge exchange with and between individuals, groups and organisations in the community to identify local needs, harness local ideas and facilitate community innovation. Stage 2 involves individuals and groups becoming empowered to shape community communication research and development priorities for themselves as they engage with technologies, develop new skills and knowledge bases and are encouraged to reflect and engage in critical discussions in order to stimulate community learning. Stage 3 is the point of increased community ownership as the community is able to identify more with the project, its outputs and outcomes.

7 New networks, new interfaces, new directions for TEL

Here we move away from the individualised to the social, and consider the role that TEL can play in giving a voice to a wider bandwidth of people than was previously possible, for example through Web 2.0 social software applications, learner-generated content and contexts, and citizen journalism.

Web 2.0 learning and social justice

One aspect of the increasing variety of tools available to support people as they live and learn can be found in Web 2.0, or the participatory web. The term refers to the way in which the internet supports social activity and offers a structure to support new forms of user involvement. Web 2.0 is often discussed in terms of technologies, such as blogs, wikis, content creation, tagging and in particular social networking software. Crook et al (2008) discuss Web 2.0 in terms of the following overarching themes: the scaling up of user participation to create new possibilities for sharing and emergent 'network effects'; the evolution of sharing into more organised forms of joint knowledge building to create arenas for user collaboration; the exploration of a wide range of expressive formats through the increasing opportunity to manipulate more than conventional text, in particular, the exploration of images, sound and video; and the provision of novel frameworks and resources for research and enquiry through the rich and democratic patterns of exchange and publishing inherent in Web 2.0. Web 2.0 technologies have the potential to foster social interaction, collaboration, and the creation, mixing and sharing of content, networking and participation. All foster the types of skills and activities that could help support learning (Crook et al 2008; Luckin et al 2008) and help a whole range of people and communities make their voices heard, including some of the marginalised groups discussed earlier.

A core element of the Web 2.0 approach is about fostering participation, and is therefore consistent with much of what we have already said about UCD. In this section we do not therefore separate discussions about the benefits of TEL in the form of Web 2.0 applications, including social software, citizen journalism, open education and learner-generated contexts from discussions of user-centred and participatory design, but rather we deal with them as a piece.

There is a rise in social networking and content creation activity. A review by Demos suggests that digital technology is integrated into the daily lives of teenage learners: "Almost all are now also involved in creative production, from uploading and editing photos to building and maintaining websites" (Green and Hannon 2007). A similar situation is reported by two US studies: one in October 2006 on behalf of Pew Internet by Lenhart and Madden (2007) reported that 55% of teens use online networks, with 48% stating that they visit these sites daily, and that 55% have created personal profiles. A second on behalf of the NSBA indicated that 96% of students with online access use social networking technologies, spending about nine hours a week on social networking activities such as chatting, text messaging, blogging, and participating in online communities such as Facebook and MySpace (Grunwald Associates 2007). This high usage is one of the reasons that Green and Hannon suggest that more needs to be done to understand the implications of these tools, activities and practices. Others, however, favour a more critical stance and the drawing of a balance between those who wholeheartedly subscribe to these new technologies (Freedman et al 2006) and those who see them as a threat to established contexts and cultures (Conlon 2007).

Bryant (2007) suggests that social software has the potential to motivate cooperative learning and can provide authenticity in learning experiences. Yet a recent call for applications to explore the educational potential of Web 2.0 technologies by Becta (2007) indicates both the lack of empirical evidence currently available and highlights the current interest in the role of these technologies for learning. Web 2.0 technologies are "democratising the creation and sharing of content and offering new opportunities for young people to engage and collaborate in socially connected networks of people, data and services" (Becta 2007: 5).

In accord with earlier discussions about the importance of the individualised learning experiences made possible with TEL, Web 2.0 technologies may enable learners to take more control of their learning, to have more choice. Potentially then they offer the possibility of increasingly tailoring the technology-enhanced learning experience to the need of the individual learner. And yet, as Owen et al (2006) point out, there is a tension between individualising learning, and the social and collaborative nature of learning.

Much learner activity with Web 2.0 technologies is conducted outside of formal educational institutions. Learners are not all doing the same thing and can differentiate which activities are the most worthwhile. For example, some are more interested in **making** stuff and are described as **creative producers**, whilst others are more concerned with **finding** stuff; thus: **information gatherers**. However, the numbers of people who are involved in what Green and Hannon deem to be "groundbreaking activities" (Green and Hannon 2007) is small, which may suggest that there is still a role for scaffolding activity by more able learning partners. The fact that so much activity is both collaborative and completed outside school offers some encouragement to users of these technologies with groups outside the mainstream of formal education. The online, multi-player, networked gaming communities through which geographically distributed users take part in social and or collaborative activities offers another type of participatory internet use. Collaborative skills and shared knowledge become well developed amongst participants (Jenkins 2006), and new modes of learning emerge that are driven by overcoming a shared challenge (Thomas and Seely Brown 2007).

Various authors highlight the ways in which students entering education have changed in the way that they make use of technology. Buckingham et al (2006) refer to the "digital generation", Prensky (2001) identifies changes in thinking styles and talks of "digital natives", and Negroponte (1996) refers to the concept of "being digital". Tapscott (1999) and Oblinger (2004) describe students born after 1982 as the "Net Generation" and suggest that their activities are different to those of their peers and siblings just a few years older. The concept of 'digital natives' and the 'net generation' has been heavily critiqued and has been the subject of much debate (see for example, learningevolves.wikispaces.com/nativesImmigrants, and www.henryjenkins.org/2007/12/reconsidering_digital_immigran.html).

What does seem clear is that there is a gap in experience, expectations and technical experience between many young people and their teachers and administrators. Educators need to ask the right questions of their students to find out about their needs and preferences. They need to find out what learning activities are most engaging and how technology can make learning more successful (Oblinger and Oblinger 2007). A participatory

UCD approach is needed here to ensure that the development of learning activities that involve new technologies such as Web 2.0 are relevant and meaningful for young learners and that their existing skills are built on and further developed.

However, as with other technologies there are still issues about the inclusivity of Web 2.0, that should concern those interested in social justice. The view that these technologies are democratising learning is not a unanimously held one. Some believe that new divides between those who use social software and those who don't are being created along with a divisive 'participation gap' (Jenkins 2006). Benefits of participating in Web 2.0 are mainly for those who are already socially integrated, with socially or economically disadvantaged users not benefiting, leading to the potential for a "second wave digital divide" (Coughlan 2007). There are divisions between social networking site user groups along class and race lines. For example, of the two leading social networking sites, MySpace (www.myspace.com) is seen by some researchers in the USA as more "working class" and Facebook (www.facebook.com) "upper class" (boyd, 2007). Within education itself there are barriers too, as many teachers and lecturers are only too well aware; technologies, tools, sites or ports are blocked and access is restricted to a limited subset of specific sites and content.

Learner-generated content and contexts

Learner-generated content "is becoming a significant feature of the educational landscape" (JISC 2007). Early investigations suggest that content generated by the learner for themselves and for other learners can be beneficial for learning (Lee et al, in press). Students who took part in a podcasting exercise were seen to engage in collaborative knowledge building. The activity was seen as "a powerful way of stimulating both individual and collective learning, as well as supporting social processes of perspective-taking and negotiation of meaning that underpin knowledge creation" (JISC 2007: 185).

Sener (2007) confirms that such content creation activities can increase student engagement, but asks why there are so few examples of good or effective student-generated content available online. He suggests that enthusiastic learners and good ideas are not enough if there is no imperative to improve the quality of content generated, and that we need to encourage and support the move to co-innovation as well as co-production and consumption.

The lack of 'groundbreaking' Web 2.0 activity is also an issue with respect to user-generated content. We need to ask how we can better support the creation of content for learning and the formation of learning communities (Wolf 2007). There are wider implications for educational policy and practice arising from the popularity of Web 2.0 technologies, and in particular user-generated content. The fact that user-generated content breaks with the traditional top-down hierarchical model of education raises questions about power balances, democracy, culture, privacy and how we might ensure that user generated content can improve learning for all citizens (ibid). The need for a UCD approach to the development of the education system, and, in particular, the way that technology is used, is at the heart of the work being done by the Learner Generated Contexts group (learnergeneratedcontexts.pbwiki.com, Luckin 2007). This work moves on from user or learner generated **content** to consider how technological developments enable learners to construct and negotiate their

own **contexts** for learning. The potential for learners to have an greater voice in the nature of the subject matter being learnt, the resources, including the technologies, being used to support their learning, and the nature of the physical or virtual environment in which they learn, is central to this agenda. It is also central to increasing social justice through the provision of learning experiences that meet individual needs and that increase learners' communicative power.

Citizen journalism

Citizen or participatory journalism involves people reporting, analysing and disseminating news (Gillmor 2004). It means all of us who have access to the skills and the technology have the opportunity to offer our views of the world to the world. This democratic and participatory behaviour offers potential for increasing social justice by giving a voice to a wider range of people. An example of citizen journalism can be found in the work done by intoMEDIA, a multimedia development company working across HE, FE, schools and community learning. Its STREETSAFE project (www.intomedia.org.uk) illustrates the benefits of citizen journalism and a participatory approach. Its motivation is tackling youth crime by encouraging young people to negotiate their environment through media channels rather than gangs and weapons. Groups of young people learn the skills they need in order to design and produce short form media.

8 A global perspective

In this final section, we take a wider view to consider the ways in which TEL can expand our understanding of the world context. Examples demonstrate that it can be used to work with scientists to collect and analyse data on a global scale, to have a richer perspective and an increased understanding of issues such as climate change, poverty and the developing world. An increase in global exchange, supported by social software and even e-mail, is another feature of the growing international perspective. The work of the Fiankoma Project (www.fiankoma.org), for example, uses simple ICT to connect communities and promote cultural exchange, providing opportunities for learner-generated content to travel between continents and furthering understanding between very different environments and communities.

E-science

The UK National e-Science Centre describes the e-science initiative as a global collaboration in science. It is developing the next generation technology infrastructure to enable us to do science in new ways (NeSC 2007). The potential of e-science to support learning has also been recognised and is discussed by Woodgate and Stanton-Fraser (2005), who define e-science with respect to education as "the use of ICT in education, to enable local and remote communication and collaboration on scientific topics and with scientific data" (15).

Underwood et al (in press) offer a characterisation of educational e-science projects as including one or more of the following four features:

- access to remote resources, such as sensors, electronics laboratories and telescopes, for example the Faulkes Telescope (faulkes-telescope.com)
- collaboration with science projects by contributing computing resources such as those offered by Stanford University (Protein Folding@home: folding.stanford.edu)
- the provision of human resources to gather data such as Walking with Woodlice (www.nhm.ac.uk/woodlice) and The Big Bug Count (www.rspb.org.uk)
- the use of communication tools to support scientific enquiry activities between remote participants, learners in different schools, learners in school and out on field trips, learners, teachers and remote science experts (see, for example, Pea et al 1997).

This type of e-science is interdisciplinary, collaborative and inherently participative. It offers the possibility for people to get involved in science in a way not previously possible. This helps with respect to social justice in two ways. It increases people's knowledge about issues that impact upon their lives, such as climate change, poverty and new uses of technology, and allows them to get involved in their discussion and dissemination.

Information and communication technology for development (ICT4D)

Further interdisciplinary activity that takes a global perspective on social justice is that surrounding the growing interest in information and communication technology for development (ICT4D). Probably the best-known work is that around the development of the One Lap Top Per Child initiative (OLPC: laptop.org) started by members of the MIT Media Lab and dedicated to the development of low-cost technology "that could revolutionize how

we educate the world's children" (laptop.media.mit.edu). An increasing focus of attention is being paid to the need for participatory and UCD approaches to take into account the full context of potential technology innovation in developing countries as is evidenced at a workshop at the HCI 2007 conference (www.hci2006.org) entitled: 'Designing Human Centered Technologies for the Developing World' (see hct4d.blogspot.com).

Four research projects funded by the EPSRC Ideas Factory programme share the common objective of using participatory design to explore how best to support groups in developing countries who are currently excluded from world telecommunications and digital networks (www.bgdd.org/Wiki.jsp). For example, technologies have been developed with and for rural village communities in India to provide the opportunity to create and use audiovisual stories to give them a stronger voice (cs.swansea.ac.uk/storybank/about.php). In Sub-Saharan Africa the Vesel project is working with rural farming communities to develop participatory methods for designing flexible resource kits that will enable rural communities to use advanced and mobile digital technology to improve their agricultural practices and literacy levels (www.veselproject.net). The challenges are significant - for example the language and cultural differences between designers and user groups - and yet the need for technologies to be appropriately developed and introduced is great, as is the potential for benefits these technologies can bring.

9 Synthesis: social justice, user-centred design and technology-enhanced learning

In this review we have introduced multiple understandings of social justice and presented the issues that make it problematic to choose a definition. We have considered politics in a very broad sense, as the organisation of the relations of different parts of a society or group, and looked at projects and approaches that serve a social justice agenda. In advocating such an approach, we have not sought to pin down exactly what social justice should be, but considered how tools and techniques that support human rights, dignity and wellbeing might best be produced. To this end, we promote a user-centred design approach that has the potential to support **all** members of society, including the most marginalised, in the belief that participating in design is likely to address social justice issues and take us beyond systems that merely reproduce the status quo.

In our discussions of social justice we highlight the fact that the nature of justice is subject to change as new opportunities arise, and we stress the need for joined-up thinking at all levels of society in order to bring about social change. The need for equality, freedom and an understanding of the differences amongst members of society are clearly part of any social justice agenda. However, there are tensions in these needs, for example as a result of the fact that all members of society do not need or desire the same things. Through our discussions of design we have considered not only the way in which the design process can lead to the creation of useful products, but also the value of the design process itself as a means to help each of us appreciate the perspectives that others bring to the process.

As with the concept of social justice, the nature of design and the act of designing are complex subjects. Opinions vary as to what constitutes design and who can participate in the process of designing. We have taken the view that providing the possibility for everyone to get involved in design is more egalitarian than believing in exclusive talents and specialised roles. However, we have also acknowledged the complexity of involving people in design and the variety of ways in which this is done. The term 'user-centred design' can mean different things. It can, for example, simply mean that some attention has been paid to gathering users' requirements; or it can mean treating all participants as having valuable knowledge and skills, moving away from a distinction between the users of a system and those who build it. There are two motivations for UCD: the business case to create a better-designed product, and the social case for a more equitable and informative way of designing. This latter motivation is a driver for the practice of participatory design.

The beneficial aspects of a participative design process as a motivator for all involved are exemplified in our consideration of technology-enhanced learning. However, we also acknowledge that the participative design process is more difficult to handle than more limited and designer-driven procedures, and usually takes longer. If not handled appropriately it can disenchant rather than engage. Despite these challenges, the value of the participative design process is clear, and its potential for benefits beyond the design of outcomes or products should not be underestimated. Effective participative design can lead to a greater understanding of the design process by all, with participants becoming more skilled in design processes, and, through their participation, learning more about their own potential agency.

Our discussion of technology-enhanced learning focused upon two aspects of particular relevance to a social justice agenda, stressing the important role that both learning and technology can play in giving a voice to marginalised groups. First, the way that technology can be used to recognise and address everyone's differences, including the needs and desires of minority groups; and, second, the way in which it can enable more people to communicate, socialise, join the debate and play a greater role in the development of society.

TEL research is becoming more and more user-centred, conducted in collaboration with the learners for whom the technology is being designed. This includes work with groups who are subject to particular risk of marginalisation, such as those with profound and multiple learning disabilities (PMLD), specific cognitive challenges such as autism, as well as those who are deaf and blind. The examples drawn from this work with disadvantaged learners also demonstrate the value of UCD. This offers encouragement for the future and should motivate us to continue exploring new methodologies.

The potential of new technologies, and in particular those afforded by Web 2.0 social networking tools and the citizen journalism movement, also provides some positive evidence about their application for social justice. However, we also note the need to be alert to the emergence of new inequalities arising in education and society, especially if already economically and socially disadvantaged people are excluded from participating in Web 2.0 and other newly enabled practices. These examples highlight the need for policy and practice to be reviewed and changes made to the traditional top-down approach embodied in the education system. User-centred and participatory methods are needed at the system level as well as at the level of individual interventions.

While participatory technologies, such as Web 2.0, can enable learners to take more control of their learning, we also note the tension between individual and social needs. So, whilst the technology may enable more people to engage in debates about system reform, for example, if they only focus on meeting their own individual needs it is questionable whether their contributions to the debate will be motivated by the needs of wider society and thus, in any way, promote social benefit.

This is just one of the challenges that we need to address as we move towards an increasingly networked society – a society where more people can be easily included in the design process but the outcomes being designed are increasingly complex and therefore hard to visualise. Those promoting participatory design continue to develop methods which seek to ensure that the users of the system are effectively involved and that the skills of all participants are recognised and engaged. As the complexity grows, so must our skills in engagement. We have presented examples of effective participatory design within education. Participatory design continues to be a slower, more demanding way of working than other approaches, and not every attempt at engagement finds participants forthcoming or the outcomes useful. Yet, as we develop approaches for technologies such as Web 2.0, and especially when we do so with a social justice agenda, its philosophy may offer a way to provide the kind of system-wide joined-up thinking that can bring about change.

Further reading

Participatory design

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The Participation Resource Centre (www.pnet.ids.ac.uk/prc/index.htm) unites more than 5,000 documents, books and videos, comprising the collections of the Participation, Power and Social Change Group at the Institute of Development Studies (IDS) and the International Institute for Environment and Development (IIED)

Bob Dick, academic at University of Queensland and specialist in facilitating the design and implementation of participative change in organisations and communities, presides over further action research resources (www.uqconnect.net/action_research/arhome.html)

The Participatory Methods Toolkit 2003 (www.kbs-frb.be) is a joint publication of the King Baudouin Foundation and the Flemish Institute for Science and Technology Assessment in collaboration with the United Nations University – Comparative Regional Integration Studies, offering information on 40 different participation techniques, including 10 detailed studies

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Starting from a different perspective, the World Bank has literature on effectiveness and sustainability; most relevantly their Independent Evaluation Group has brought out a report on monitoring and evaluation called 'How to Build M&E Systems to Support Better Government' (www.worldbank.org/ieg/ecd/better_government.html)

Tips defining the participatory design approach can be found on the Computer Professionals for Social Responsibility's (CPSR) website, the organisation which runs the biennial Participatory Design Conference (cpsr.org/issues/pd/introInfo)

There is useful guidance, including case studies and descriptions of different design disciplines, from the Design Council (www.designcouncil.org.uk/en/About-Design/Design-Disciplines)

Technology-enhanced learning

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About Futurelab

Futurelab is passionate about transforming the way people learn. Tapping into the huge potential offered by digital and other technologies, we are developing innovative learning resources and practices that support new approaches to education for the 21st century.

Working in partnership with industry, policy and practice, Futurelab:

- incubates new ideas, taking them from the lab to the classroom
- offers hard evidence and practical advice to support the design and use of innovative learning tools
- communicates the latest thinking and practice in educational ICT
- provides the space for experimentation and the exchange of ideas between the creative, technology and education sectors.

A not-for-profit organisation, Futurelab is committed to sharing the lessons learnt from our research and development in order to inform positive change to educational policy and practice.

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