Abstract: In his 1980 book *The Third Wave*, Alvin Toffler proposed that in the digital age would give rise to "Prosumers" who would both produce and consume information. Since the inception of domestic computer access, the emphasis from government and business, reflected in public policy and finance, has been the capacity of consumers and citizens to access and process 'top/down' information, a tendency which has been reflected in the disability sector where initiatives like WAI, in spite of being comprehensive, have tended to be perceived as being primarily concerned with accessibility.

Although the economics of digital technology productivity are still in some doubt, some sectors have enjoyed substantial cost savings from these technologies and it is important to ask how far this will extend as Web 1.0 is transformed into Web 2.0. Outside the core creative industries the economic benefits of Web 2.0 are not clear but the capacity of individuals to create content in the context of education, employment, leisure, citizenship lifestyle/relationships will become increasingly important; and this capacity will be improved by the falling cost and rising quality of graphics and audio technologies. Disabled people face distinctive challenges and opportunities in contributing content in all of these designated areas; and there are some specific factors associated with particular disabilities which present additional considerations.

Underlying the detailed arguments, the presenter asserts that creativity is not simply a civic right but is part of what we are and that, therefore, technological evolution requires this human dimension in respect of disabled people to be considered as a matter of urgency.
1. Introduction - The Hegemony of Accessing and Processing

In 1990 Howard Rheingold, the founder of the WELL Network in San Francisco, and I had a friendly debate about the future of what came to be known as the World Wide Web. His contention, not surprisingly given his background in radical politics, was that it would be an anarchist's paradise; my contrary conclusion, more of a surprise given my involvement in radical politics, was that it would be a capitalist's paradise; and although you could argue that we have both been correct, I think that the balance of advantage has been strongly in favour of the capitalist paradise. Indeed, one of the striking features of the emerging information technology industries has been the way in which the larger organisations have swallowed up enterprising anarchists, if that isn't a contradiction in terms; literally hundreds of thousands of inventive start-ups have been absorbed into major corporations which have become near monopolies. The exception to this bonanza is, apparently, the music recording industry but that is because it has the wrong economic model, a negative situation from which analogue book and newspaper publishing will suffer if they do not learn; but that is for another day.

I think it is also a fair generalisation to say that most digital information in what we might retrospectively call Web 1.0 was 'top down', it was businesses selling, governments promulgating and academics enlightening. As the 1990s wore on, it also became clear that a great deal of linear and on-demand broadcasting will migrate from spectrum to the internet such that future standards will be dictated by people primarily concerned with moving pictures rather than those whose professional origin and orientation are in text; If you think that it has been tough negotiating with Microsoft, try News Corporation; but, again, that is a matter for another day.

The important factor which flows from all of this is the way in which public policy and expenditure have followed the 'top down' model. Because policy makers perceived - or, if you believe in conspiracy or are particularly cynical, intended - the internet as a largely consumer-oriented medium - like television only messy - the objective was to teach people how to access and process data, other people's data and, preferably, big business and government data. Accordingly, large sums of public money were poured into training and skills development to help people to access the internet. Now this was not altogether altruistic on the part of industry; after all, if people did not receive training they could not possibly tangle with keyboard and mouse-based client side computing; the profit on over-engineered products was far in excess of industry contributions to training, so the economics worked out just fine; the need for training, after all, particularly if it is incurred by the user or a third party, such as the Government, is a simple cost shift from the producer to the consumer. It seemed that nobody of any importance, from either the major sellers or the major buyers, considered including a criterion on the degree of skill required as part of their respective development or procurement policies; after all, Governments have not provided similar amounts of money for mobile
phone, digital TV or washing machine skills development. At the same time, the Government's agenda was hardly magnanimous, particularly if we note that the first interactive Government service in almost every EU country was tax collection. The public sector agenda from the beginning was to save staff costs by automating government processes, so it was imperative that citizens should know how to complete on-line forms, be more self sufficient in life skills (such as writing a CV) and become competent in on-line learning. Of course, this policy has completely backfired except in some modest savings in back office costs - e.g. merging customs and the inland revenue in HMRC - because approximately 80% of transactions with Government are conducted by people who do not have a home PC; and, just to tidy up this point, there is as great a resistance in Government to the use of the mobile phone for communication as to television, even though, according to Ofcom: "44% of UK adults use text messaging on a daily basis, compared to 36% who use the internet" and even though mobile phone technology has just about 100% market penetration in social class E.

Not surprisingly, the disability sector followed the general trend so that in the 1990s there was very strong emphasis on accessibility, the ability to get hold of material and process it. In fairness, initiatives like WAI have attempted to focus on all aspects of web technology, including authoring tools, but the reality throughout has been that most of the focus, in learning and training institutions, in employment and in policy making circles, has been on the ability to consume and process rather than to produce.

What Rheingold and I could not have anticipated 18 years ago was the plummeting cost and soaring quality of DVD recording, digital photography and audio technologies and the associated miniaturisation and decrease in the cost of storage. From the Government's basic skills agenda, you would not know that any of this has happened; and I regret to say that the EU's Digital Literacy Expert Group which is about to publish its official report, has shown no interest whatsoever in audio and pictures, not to mention television and telephones. It accepts an implicit definition of media literacy as the autonomous ability to access and process text and it rejected my proposal that it should be defined as: the ability to produce multi modal multi media collaboratively. Officialdom is still in thrall to the accessing and processing of text and to the PC.

In this presentation, I want to concentrate on two major areas, one general, the other particular, in discussing creativity.

- The general area concerns the role of digital creativity in the early 21st Century economy;
- The particular area is the way in which disabled people might fare in that context.

Creativity: For the time being, I will use the term creativity in its simplest form to mean the production of an artefact within a recognisable genre; I will later discuss Margaret Boden's definition and its implications.
2. Digital Creativity and Disability

2.1 The Digital Dividend and Web 2.0

The first danger of which we must be very careful is not to assume or exaggerate what is happening in the digital world. If we look at the last 30 years, we can see that there are some sectors, such as printing, where digital technology has produced substantial savings; we might also think of on-line retail which has begun to produce savings and will become increasingly efficient once supply chains are not organised entirely around analogue wholesale to retail models, e.g. when we order groceries on line they are usually 'picked' by an operative in a retail outlet. But there are large swathes of the economy where digital technologies have not proved their worth but have, instead, generated a higher intensity of input, a greater complexity of process but not necessarily concomitant output; we only have to think of two men on two different trains trying to change the time of a meeting. They might spend up to an hour's telephone conversation before concluding that there is no way they can change the time and they return to where they started; a considerable amount of email is like that, too, a kind of pointless soap opera. It is clear that the biggest gainers from ICT have, naturally enough, been hardware and software manufacturers and support staff but the evidence of measurable economically significant output has been pretty poor as a return on investment in many sectors; and so it is with caution that I greet the dawn of Web 2.0. It may make many people very happy and a few people very rich but it will be a long time before we know whether it will make a substantial number of people economically viable in new jobs.

Thus, in general terms, we have to be cautious about the economic relevance of digital technology in the 21st century in terms of many sectors of our economy; but there is no doubt of the impact of technology on the creative sector; and there is no doubt of the economic potential of the creative sector. In spite of the anomaly of the music recording industry, the information industries - what we collectively and sometimes a little sniffily, refer to as "the media" - have grown steadily since the invention of radio. If we look at the last 30 years we will see the massive rise in first analogue and now digital information consumption and there is no indicator at the moment that there will be a slow-down; in a parallel development, the massive increase in mobile phone use, for example, has not seriously dented fixed line use, so that overall telephone use is still rising. We are talking and listening more, as well as broadly maintaining our television viewing - in an ever more fragmented market - and increasing our DVD and MP3 ownership and use, even though, as noted, we have rationally dumped the recording industry and are doing the same thing but more slowly to newspapers. In other words, there is a strong case to be made for the view that our digital information industries will continue to grow. I am not inclined to go as far as to say that making information in 2020 will be as important as working in a factory in 1820 but it is by no means improbable.
2.2 Social Networking

Far more likely, however, is the voluntary, not for profit use of digital technology for self expression; here there really is a story in Web 2.0; it might not make us any money but there are other ways of getting happy! As we move into the second decade of the 21st Century, there may be an increasingly rapid transition in what is peer normative in technology use but there is little doubt that it will intensify; far from demonstrating the kind of resistance which was forecast in the early 1990s, people have taken positively to ‘always on’ communications systems.

2.3 Words and Pictures

An important factor in the way that people feel increasingly comfortable with technology is the growing use of images and the decline of jargon. This fits in with two other trends, globalisation and multi lingualism. Increasingly people will want to make pitches and express their feelings graphically because that will reach the most people; but, further, as the cost of digital photography continues to fall, the cost of creating clear prose will continue to rise; while the number of people that can speak major languages reasonably well or functionally will continue to rise, the number who can speak and write precisely will continue to fall; there will almost certainly be a thinning in lexicographical range and syntactic subtlety.

Think of two of us going outside now, and one of us taking five pictures of the York Campus and the other writing a side of A4 on what can be seen from the five locations where the five pictures have been taken. There may come a time, but it is still a long way off, when good photography is as peer normative as good prose style but for a significant minority, digital photography has opened new prospects which free them from the hegemony of print in the economic sphere. In the meantime, however, there are an increasing number of digital creative activities which are peer normative, many of them based round photography and/or Web 2.0. So whatever the economic significance of digital creativity, it is set to be peer normative for large sectors of the population which will, over time, include the age profile of those who are currently considered to be less enthusiastic; as an ophthalmologist friend of mine once said about the prevalence of cataract, if you wait long enough, the backlog will die!

The general context, then, is that people will increasingly use digital technologies in the context of:-

- Learning;
- Employment;
- Leisure;
- Citizenship;
- Lifestyle/relationships;
and, as time goes by their transactions will increasingly be interactive in the genuine sense, i.e. they will contribute content to the existing corpus which will not be classified as simply reactive or inferior to content produced by professionals.

There are, I think, two final comments I need to make:

- First, one of the great inhibitors of a more democratic, or open digital economy is the lack of a really good micropayments system; it currently takes the same amount of effort and security to pay somebody 30p as £30 or £300; an open digital economy will depend on the ability to buy small pieces of information for pennies without having to go through massive administrative procedures, a form of internet petty cash system.

- Secondly, the kind of highly mixed economy of production and consumption will match the increasing trend towards labour mobility and portfolio careers; and this all adds up to the kind of vision which Alvin Toffler summed up in 1980 in the somewhat pretentious and ugly term, prosumerism, an economy in which we will both produce and consume instead of largely fulfilling one or other function as we did in the analogue economy.

### 2.4 Digital Creativity in the context of life experience

Having set that context, I now want to go on to discuss digital creativity and disability and I want to make three points as a general introduction:-

- First, I am not going to make the case that the digital environment is more or less important for disabled people in general or any group of them in particular; I will focus on problems and opportunities and because these vary widely between groups, the division of the content will not be neat and tidy; this is not a presentation about the technicalities of creativity but it would be irresponsible not to make some major points.

- Secondly, I assume that there is a particular disadvantage to disabled people in being required to act autonomously and that, conversely, they benefit much more from collaborative enterprise than their peers; one of the fascinating tangles of the digital age is the way in which it fosters both autonomy and networking in ways that are sometimes difficult to predict or understand.

- Thirdly, I largely accept the maxim that it is difficult to be a good writer if you don't read; by extension, then, I think that accessing and processing are necessary preconditions for creating and I am therefore not putting these into some kind of opposition or false dichotomy; and it follows from this that although there will be exceptions that, for example, blind people who cannot see the work of graphic designers
may nonetheless learn enough about elegant layout to design an aesthetically pleasing web page, in general terms if people cannot experience an attribute they will find it proportionately difficult to create it.

To organise my material I will use the life experience classifications from the previous section:-

- **Learning.** Until there is a much more graceful, seamless and unobtrusive digital network which allows people to switch easily between autonomy and collaboration, disabled people will continue to favour a learning environment which is personal rather than technology centred. Even in environments and situations that are not competitive, most disabled children and adults in the learning process will require human support and validation and if that is true for consumption and processing it is even more true for creativity: a person with a particular kind of learning disability or a blind person will want to know that a product is acceptable; and, of course, where it is not acceptable; this requires very delicate handling and it means that the use of distance learning for promoting creativity among disabled people needs to be considered very carefully.

- **Employment.** Because the policy makers in disability organisations are, by and large, congenitally disabled and have been brought up through 'the system', they tend to emphasise the education and employment which has constituted their challenges and achievements; but there is an often different set of challenges and opportunities for those who acquire their disability later in life. Trying to create layout or a simple graphic from a position of total blindness, for example, is different from performing the same tasks shortly after losing sight. this differentiation should prompt us to be cautious about 'reading across' from one set to the other.

Whereas many jobs are predictably structured - there is a consistency in the work of a production team or a lighthouse keeper - in media production there are violent swings between collaboration and autonomy which are sometimes difficult to absorb. This is a key factor because it feels sharper if you are disabled than if you are not:-

- The VIP does not notice 'scenes off stage';
- The hearing impaired person may not overhear conversations;
- The physically impaired person may feel that social relations are rather restricted; and
- The learning disabled person may not get up to speed at a meeting or quite grasp the autonomous brief that results from it.

These factors obtain in the analogue world - as I can testify from my time working in television in the mid 1990s - but what is different today is the speed at which the digital creation process works and its capacity to make very rapid
changes in both major orientation and in detail because of the falling cost of production and the related tendency towards tighter deadlines.

There is no room for sentiment here; global digital markets will drive out the mediocre and increase the return on quality, particularly as the costs of transmission and storage continue to fall. When television was restricted to two or only a handful of channels, the repeat was an abomination but today it is an increasingly significant source of revenue; why watch a mediocre comedy today if we can access the best comedy of the last 50 years at a lower price per hour?

This last point links in with some wider macroeconomic factors which have particular relevance to disabled people:-

- First, because of the skills ratchet, we need to be very careful when we talk about basic skills; if we simply mean doing less well what machines do faster and more accurately, then we are condemning people who acquire these skills to permanent unemployment; 'basic skills' rarely include aspects of creativity which contribute to economic viability.

- Secondly, the global cost of graduate labour is falling which means that people with basic skills may be competing for the same or nearly the same job with a graduate.

- Thirdly - and in my view this is by far the most important of the general factors relating to commercial creativity - our whole system is oriented, to use Margaret Boden's* terms, towards autonomous transformational creativity, i.e. inventing or subverting sonata form, radically extending the possibilities of the novel, starting a new school of painting and, within that, creating original works of music, literature or art, whereas most of the money in the commercial sector is made through techniques of exploring known space or, to put it another way, inventing variations on a theme: jazz, rock, soap opera, game shows, fashion, games, light fiction and journalism all involve grasping a simple theme and ringing the changes; this is an area where many disabled people could create in a team environment; but if that is to happen the education system needs to recognise this cultural/economic phenomenon so that as a culture we need to think less about Proust in his sound proofed writing room as an icon for our culture and think more about movie makers.

- Leisure. As I indicated earlier, I think that leisure creativity will be the largest sector of the digital pie in terms of transactions though not, of course, volume where entertainment both linear and on demand, will account for the lion's share. The significant factor here is that there will be a wide variety of peer normative activities from photo sharing to genealogy. We have already had an immense struggle to obtain any kind of additional services to access broadcasting - sub titles, signing and audio description - and I will be surprised if web accessibility compliance as a proportion of sites does not fall even if the absolute
number is probably rising. There are some very special factors which I will mention later when I come to make a few remarks about individual groups of disabilities but the main point is that there is a dire shortage of accessible digital information creation tools which matches the shortage of good user interfaces, which is another reason why validation and peer working are so important; but, of course, in the context of leisure and social use, people often live or spend a great deal of their time alone which is when they particularly need to be able to make contacts, add to team efforts, comment on the works or opinions of others and generally become involved in communities of interest which are replacing physical, geographical communities; for disabled people who may have difficulties in breaking their geographical isolation, online communities may be vitally important.

- Citizenship. One of the major changes in citizenship since the development of the internet has been the change from a deliberative to a much more telescoped public consultation process. 20 years ago, if Government wanted to do something it put out a document which was considered by democratically - or otherwise - by elected bodies or bodies working on behalf of interest groups, such as RNIB or RNID. Today the speed is such that staff have to assume what their customers or clients want, and individual response is much more widespread. This represents problems for disabled people who are in competition with those who can handle digital information systems more quickly or competently.

- Lifestyle/Relationships. There are no specific comments in this field except to refer in a slightly different form to the comment about reading and writing; it is increasingly difficult, in a postmodern, ironic culture to infer style without experiencing it.

2.5 Specific Disability Factors

I now want to turn to some specific challenges which we need to consider:-

- First, the graphical environment and the increased price of clear text pose both a challenge and an opportunity for blind and visually impaired people. The challenge is obvious enough; in many small businesses the price of describing pictures may be higher than uploading them; the notion that access to multimodal content is a right is economic nonsense; conversely, however, the ability to write clear prose will soon command an economic premium; for those blind and visually impaired people who can gain a high level of competence, the prospects are good but, of course, the one area in which they will not be very good is in describing pictures; but there are many sectors where clear prose will be needed for a very long time. Related to this, there has been a remarkable upsurge in the use of music and an equally remarkable continuation in the high level of the use of spoken word material. There is a kind of cultural cliché that thinks that blind
people are musicians or radio presenters when the number in these capacities making money is remarkably small. In summary, we need to consider very carefully how blind and visually impaired people can live in the graphical world.

- Secondly, and not unrelated to graphics, there will be an increasing market for simplified text which will be useful for people with learning difficulties and those who live in a place where their first language is not used; here is a particular case for a prosumer model where those who have the difficulties may be able to produce materials which they can use and share. I don't want to become sentimental about this, it might not work out that way, but we do need to try.

- Thirdly, just as there may be an alliance between learning difficulty and second language, there may be a useful alliance between those who cannot see and car drivers; currently driving is accompanied by accessing information with a little conversation on a mobile phone but as automobile driving becomes more simplified and dirigiste, creativity may emerge as a way of using time profitably.

- Fourthly, just as we have begun to modularise the user interface which should, although it has not done so yet, enable disabled people to carry a user interface of choice which can drive a variety of processors, so we ought to be able to develop creativity tools which plug in to general tool sets. Personally, I do not think that the current strategy of seeking to impose a set of special requirements on general products is going to work in the foreseeable future - about five years - in a deregulated, increasingly global market; the argument for such a policy is that global standardisation will create markets large enough to justify the investment but it actually does not work that way; in a global competitive market, including features that are non competitive imposes additional cost; accessibility has only been possible on a universal basis through statute and there is no prospect of imposing any abridgement of shareholder rights in order to impose a statutory requirement for special features for disabled people to be incorporated into creativity tools. The contrast between statutory provision for television services and market failure over set top boxes is instructive from many points of view.

- Fifthly, collaborative creativity, which is what I advocate, in itself requires a change in the way we educate, train and work with disabled people. We have generally adopted two models for disabled people: the special, closed system and the 'sink or swim' open system with very little in between. There has been a great deal of emphasis on "awareness raising" but this is too unproductive; we need to focus on the minds we need to change rather than on trying to change society; if we want more blind people working in radio stations we need to convince the radio industry not the general public; if we want more learning disabled people to work in signage, we need to convince the signage industry.
Sixthly, we need to remember that the ability to create, as in the ability to access and process, depends on an end-to-end process, that there is no point having either appropriate hardware or software but not both.

3. Conclusion

While I would not go so far as to say that to access is human, to create is divine, I am more than half way there. As an Aristotelian I do not believe, like Plato, that human creativity is doomed to make imperfect copies of ideal archetypes, I believe that the whole is more than the sum of the parts and that the whole made up of those parts need not be an autonomous enterprise; I have as much love of Dickens on television as on the page. I therefore regard creativity as part of the human condition; we were created to influence our environment and that simply does not mean grasping or subsisting; it means contributing. I hesitate to call this a human right as I think it is higher than that; I think it is an actual part of what we are. It therefore makes sense that all of us might at some time want to exercise this faculty and that it is part of who we are to do so. to this extent I think that the disability sector has misunderstood itself by calling for rights as if these were the highest form of self recognition; to put barriers in the way of my creativity is to deny my basic humanity.

In the past, with few exceptions, disabled people - and those who have bossed them, worked for them or worked with them - have been so tied up with matters of survival in an economy which has largely involved non creative work and consumption as the main channel for leisure and pleasure, that little thought has been given to the place of creativity.

The digital environment now makes that consideration urgent.

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