# <ppt4.1>

# Virtual Powers:

# Information Technology and Blind People in a

# Postmodern World

by

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Postmodernism and Blindness: From Conforming to Creating

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Abstract: *The emergence of mass information (and communications technology has presented blind people with a significant absolute advantage but a massive comparative disadvantage with their peers in the ability to access, process and create information and there is a particular problem with access to graphics in an increasingly image-dominated world.*

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## 1. Introduction

The rhetoric of absolute rights obscures much more than it clarifies. First of all,

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* There are only a few countries on planet earth which have rights-based constitutions or legislation which is enforced;

and

* Secondly, even in those countries where rights are routinely respected and enforced, few rights are incontestable by another right

To take an illustration from our subject, the assertion of the right of access to information by people with disabilities in general and by blind and partially sighted people in particular, faces two fundamental barriers at the outset: <ppt4.3>

First,

* most countries do not respect anybody's right to any kind of information, let alone the right of access to information in the public domain by people with disabilities

and, secondly

* even where a right of access is granted it invariably conflicts with other rights of which two are prominent:
  + the right of authors and publishers to restrict access and
  + The right of commercial companies to refuse to make their goods and services accessible

Before I go any further, however, I think I should just make some points on definitions: <ppt4.4>

* Usability is the capacity of the consumer to apprehend and process information in a manner which fulfils the authorial intention; in other words, - the end user should be able to consume what the author produces.
* Usability is the aggregate of measurable characteristics of goods and services which accord with normative human behaviour.
* The less usable a product, the more are the skills required to accord with the authorial intention. <ppt4.5>

The Accessibility Challenge <ppt4.6>

* The challenge of accessibility is to render authorial content in a manner as near equivalent to the original as possible to enable the end user to achieve task completion in a time as close as possible to the peer normative

It is immediately clear that there are considerable barriers which accessibility techniques must overcome and these are especially difficult for totally blind people or those with poor residual vision. Such people who cannot see or understand a painting or photograph must rely on verbal description and/or very primitive diagram representation or modelling.

In this Lecture I will deal with the following aspects of access to information:

<ppt4.7>

* The economic framework
* Generic versus assistive technologies
* The intellectual property framework
* The unique problem of blindness and the concepts of Absolute and comparative advantage and disadvantage;

and

* The creative imperative

## 2. The Economic Framework

It is a fact not as universally acknowledged as it should be - particularly in what I shall somewhat synoptically refer to as "the disability sector" - that it is the primary objective of commercial organisations to maximise shareholder value; and that, therefore, any other considerations such as the treatment of employees and the exercise of corporate social responsibility (CSR) are subsidiary ends, if not simply means, to that overall end. If we recognise this over-arching commercial principle it will immediately become clear that any assertion by the disability sector that those on behalf of which it advocates have a fundamental right to access any goods or services from a commercial company is purely rhetorical unless a highly specific condition is met; and that condition is that a Government may deem access to a service or product so central to the exercise and enjoyment of citizenship that it legislates or imposes a condition of licence to operate to abridge the commercial imperative in favour of a citizen/consumer imperative; but to do that a Government needs to be clear about three conditions: <ppt4.8>

* The capacity of an organisation to deliver
* The proportionality of the measure
* The social gain to be derived

I can illustrate these three points in the following pair of examples:

### 2a) Public Service Broadcasting

The most widespread abridgement of commercial rights in favour of access rights has been in the regulation of the accessibility of public service television broadcasting which has been regarded as so central to citizenship that all major countries have legislated to require text captioning of television for people who are deaf or who have hearing impairments and, to a lesser extent, audio or video description for blind and partially sighted people, which involves the post production over-laying of additional description where the audio track does not adequately make sense of the pictures for somebody who cannot see them, e.g. creepy music is played over while a man approaches a woman in the twilight and the special audio track says: "He is creeping up behind her with a knife". Much of this additional commentary is straightforward although it faces three difficulties: <ppt4.9>

* Improvisation during live broadcasts
* Condensation during rich and fast-moving content
* Providing description but not accidentally giving away clues in thrillers

There is also the additional problem, which we will discuss in due course, of the very different needs of congenitally and adventitiously blind people where compromises must be made.

This legislative trend started not unnaturally with state broadcasters but it spread. If we look at our three criteria:

* Major broadcasters are capable of providing proportionately low cost services and in the UK the requirement to supply the service relates to the revenue of the channel
* Most lobbyists can clearly show social gain; but
* The capacity to deliver is more problematic; in The UK legislation on audio description for blind and partially sighted people was enacted before technology could be developed to meet the requirement and it is commonplace for accessibility technology development to lag behind the generic

Another limitation on delivery can be described by a second example:

### 2b) Contemporary Art

A company dedicated to purchasing and selling contemporary art on the internet might easily find that describing the pictures is disproportionately expensive compared with uploading them so that this makes the enterprise fundamentally uneconomic and, in any case, there have been no records of a blind person wanting to access the site and/or buy the pictures, so the social gain is not demonstrable; and, taking these two factors together, the requirement is disproportionate.

On the whole, providers of goods and services in an open market resent interference but are prepared to tolerate it if provisions meet the three criteria and if the regulations are transparent.

The heart of the matter, then, is shareholder value and, without anticipating our next topic of the generic versus the assistive, it might be helpful to illustrate the way that the economic argument works.

Let us say in respect of the group of people that we are interested in that the extreme ends of the spectrum can be represented by: <ppt4.10>

* A raised dot on numeral five on a numeric keypad
* The provision of a refreshable braille display with all textual information output devices

The first case is easy because the additional tooling cost for the additional dot on the numeral five is tiny, particularly if the requirement is in the original tooling; but, on the other hand, the cost of one character for a braille display like mine is $100. The problem clearly arises with goods and services somewhere between these extremes and I want to come to some understanding of the issue by way of a common error.

It is often asserted that there is a business case - quite apart from any legislative or moral consideration - for generic manufacturers of goods and services to make their products accessible. These exponents take x number of potential beneficiaries and multiply it by the marginal profit to produce a gross profit. This argument is fallacious in three distinct ways: <ppt4.11>

* Market - Potential beneficiaries are not purchasers
* Diversity - Purchasers divide between brands
* Capital - competition within corporates for investment

2bi) Market. Potential beneficiaries are not co-terminal with actual purchasers; there are very few products with 100% market penetration so beneficiaries are not necessarily going to be purchasers; however, in very mature markets such as food retail and telecommunications there may be an accessibility business case where a very small group of players is competing for as little as 1% of the market. Such market conditions may shortly apply to the global mobile phone market where three key technology packages are emerging: Apple; Google/Android; Microsoft/Nokia.

2bii) Diversity. Unless the producer is in a monopoly situation in a mature market there is no guarantee of how purchases will divide between brands. Most national accessibility provisions were made because during the last half of the 20th Century there were many monopoly broadcasting and telecommunications companies where the social gain was affordable because there was no serious competition.

2biii) Competition for Capital. Even if the assumptions in the business case argument are correct, they can only operate in an environment of unlimited capital; and

Another factor which can be less objectively measured is the extent to which the advocates of the 'business case' are capable of calculating the level of capital investment required to achieve a given accessibility feature or to calculate likely revenue.

Let me use an example to illustrate the case:

Ladies and gentlemen, may I present the 'business case' advocate for the grey phone who is asking you for $5 million of research and development costs and the summary of his arguments is as follows: <ppt4.12>

* The grey phone market for this product is ten million people
* They are very loyal
* They will keep the phone for a long time and come to love it

Now let me present a rival bidder for the same $5m who is an advocate of the rainbow phone; his major arguments are: <ppt4.13>

* The rainbow phone market for this product, like the grey phone market, is ten million people, so no difference there
* This segment is not very loyal but is swayed by a high level of performance, design and chic
* Purchasers won't keep the phone very long so we can sell them another; and they use much more traffic than the grey phone market

I need hardly tell you that the Rainbow competitor beats the grey phone advocate in the competition for capital every time: <ppt4.14>

* Same potential market but bigger actual market
* More potential for sales growth on future products
* Short life of present product
* More traffic strengthens manufacturer leverage with service providers

And so, the supposed 'business case' does not work where there is competition for capital. And even where the grey market is larger than the rainbow market - which is highly likely in populations with low birth rates and increasing longevity - the market size has to be weighed against the product life of phones and the use of traffic.

The discussion so far illustrates three principles: <ppt4.15>

* Democratic governments have to marshal compelling arguments for abridging shareholder value in order to facilitate citizen accessibility to digital goods and services
* Any abridgement of shareholder value must demonstrate:
  + Capacity to deliver
  + proportionate investment
  + Social gain.
* Where that case has not been made, falling back on a commercial 'business case' is almost always wishful thinking

In order to find a solution to this set of problems we need another way of looking at the situation which is more rational.

Let us start from a situation, not true in all countries but helpfully illustrative in any case, that there are three interested parties in a particular technology product's accessibility: <ppt4.16>

* The Government
* The manufacturer
* The accessibility advocates/charities

In the first phase the three parties simply sit on their hands and wish that the other parties would solve the problem: <ppt4.17>

* The Government thinks that business should use its resources to find a solution
* Business says it's the Government's responsibility
* The advocates say that either Government or business should solve the problem

Looked at objectively: <ppt4.18>

* The Government should not legislate an end but be totally indifferent to the means
* Business should not be expected to abridge shareholder value but should be conscious of the potential of its Corporate Social Responsibility (CSR) budget
* The advocates should not pretend they have no resources to contribute

So now let us take the concrete example of the switch-off of the analogue television signal in the UK with a legislated enforced switch to digital: <ppt4.19>

1. The Government legislates to switch off the analogue television signal but
2. The Government includes no provision on accessibility obligations on itself or others in the legislation
3. Collectively, businesses say that engineering accessibility into the new generation of digital televisions is a fine thing but each refuses to be first mover and there is no power to make the sector move collectively because of step 2 above
4. The advocate sector says it cannot persuade Government or business to move
5. The advocates fund the research and development and the production of an accessibility chip set for the new set top boxes for digital television
6. The commercial sector adopts the new technology

That is the true story of the incorporation of 'talking' electronic programme guides in digital televisions for blind people in the United kingdom.

But the system could have worked better: <ppt4.20>

1. The Government proposes to switch off the analogue signal
2. The Government consults on the impact of its intention with respect to minority groups including blind people
3. The cost of providing for blind people is identified
4. Government, business and the charitable sector agree on a financial investment package with provision for proportionate profit sharing

The principle here is that: <ppt4.21>

* The gap between the generic provision of accessibility and a generic product without accessibility must be clearly identified

I will deal more fully with this issue in the next Section.

## 3. Generic Versus Assistive

I have already illustrated a very crude model of how a determination might be made in calculating the relative merits of a generic and an assistive technology solution to a problem but I now want to go into this in more detail.

Before I begin this discussion it might be helpful to deal with the following factors: <ppt4.22>

* Design Principles
* Generic Technology
* Universal Design
* Design for All
* Assistive Technology

### 3a) Design Principles

During the past 30 years there have been thousands of standards written to define digital information accessibility requirements and the more comprehensive the list the more often they have been ignored; and there has also been a quite futile turf war between those concerned with usability on the one hand and accessibility on the other. Over the years I have reduced all these tables of principles, requirements and standards down to the following:

Accessibility - Information Design Principles <ppt4.23>

* Granular not bound - enabling each element to be discretely manipulated, as opposed to all elements locked together, e.g. a word processor file rather than a photograph of text
* Multimodal - enabling maximum access by combining pictures, symbolic language and audio which are discretely operative but mutually reinforcing
* User Interface Neutral - enabling access through a device of the user's choice

Accessibility - Information Display Principles <ppt4.24>

* Incremental enhancement - enabling simplest array at point of access and subsequent incremental enrichment, as opposed to the onus on users to simplify
* Accessibility features "on" - enabling instant access, as opposed to the user having to switch on accessibility from an inaccessible position
* Lexicality - enabling the user to apprehend the author's priorities and the processing sequence
* Economy of links - no fewer than five and no more than nine major taxonomical classes; counter intuitively, more classes make retrieval more difficult
* Multiple taxonomy - assigning more than one class to a term, e.g. the mother of Jesus appears in the Quran as well as the Bible

Accessibility - Navigation Principles <ppt4.25>

* Location - know where you are
* Options - know where you can go
* Escape - know how to revert to start or home

We can immediately see that there is hardly anything here that would be particularly objectionable to the generic user.

### 3b) Generic Technology

Generic technology is that which is available to the general market and which, if its producers are competent and rational, optimises the investment and market potential to produce maximum profit so that, in other words, fewer or more features would produce less profit than the optimal.

### 3c) Universal Design

Universal Design is a theoretical concept with a rights-based origin which claims that generic goods can be designed to meet all needs with no impact on cost and profit. Some goods and services may come very near to meeting this criterion either because they are very simple or highly adjustable; but no product is so universal that it can be truly said to be universal.

### 3d) Design for All (or “inclusive design”)

Design for all is a modified version of universal design, its slightly different emphasis being that minority end users requiring certain specified features should be consulted and their needs taken into account but, again, it is a fundamentally theoretical concept.

### 3e) Assistive Technology

Assistive technology (AT) is the collection of software and hardware, compatible with generic products or self-standing, which facilitates a degree of task completion for users with disabilities not supplied by the generic market. The AT sector has the following problematic characteristics: <ppt4.26>

* High R&D costs
* High capital investment
* Fragile corporates tending towards cartel
* High prices through supply to 'captive' public sector

It is also important to note when considering the interface between generic products and the AT sector that the public sector rhetoric of "design for all" and "Universal Design" tends to toss the problem to the business sector but this leaves the public sector with high AT costs because: <ppt4.27>

* The greater the capacity of the generic sector to meet accessibility needs, the less reliance is necessary on the assistive technology sector.
* Assistive technology is almost always more expensive per function than generic

You might think that this is long overdue, but here are some examples of functions which might be delivered by generic or assistive technologies: <ppt4.28>

* Screen readers and refreshable braille displays - blind people
* Screen magnification software beyond the specifications of generic products - blind, partially sighted people and those with learning, cognitive and developmental disabilities
* Switch technology to locate symbols and nodes - physically disabled people
* Avatar signing - for deaf people
* Dedicated simplification tools - for people with learning, cognitive and developmental disabilities

Here are the major technology requirements for blind people: <ppt4.29>

* Screen readers - rendering symbolic language into braille, synthetic speech or screen magnification above generic specifications
* Symbolic text adjustability for
* Magnification (symbols)
* Font variation (principally serif and sans serif)
* Leading (space between lines)
* Kerning (space between letters and words)
* Justification on/off (uneven right margin and avoidance of word and space ‘stacks’)
* N height (proportionality between upper- and lower-case letter height)
* Tactile Graphics
* Audio books documents
* Audio/video supplementary description

If we look at these technologies we can note some trends over the past ten years: <ppt4.30>

* Screen readers are becoming mainstream in 'smart' phones and tablets and will be increasingly generic on other devices
* The generic capacity for symbolic language adjustability is rapidly improving
* The cost of magnification through standard cameras is rapidly falling and replacing AT CC-TV technology
* Computer-assisted design, 3-D printing and 'swell' paper technologies have all improved the representation of static graphics and static objects
* Many books are produced commercially in 'real' audio

In more general terms, assistive technology is becoming less relevant as generic systems become richer: <ppt4.31>

* Speech-to-text (STT), of particular relevance to those with physical and learning/cognitive disabilities, but also very helpful to blind people who might input data slowly, is now available in Apple and Android products and has been available in limited form for some years
* Text-to-speech, an essential component of the AT screenreader, is becoming standard in generic devices
* Camera technology for image magnification is ubiquitous and cheap
* Haptic force feedback, 3-D printing and 'virtual reality' devices are becoming more available

The only major area in the blindness sector where there is no immediate prospect of a generic solution to accessibility is that of refreshable braille production because of the high price and tiny market. This calls for a global investment solution and that is now under way.

Although the most obvious factor in the increased use by people with disabilities of generic products should be the increasing elderly market segment, this is not the case; the main factors are: <ppt4.32>

* The landmark USA legislative provision 508 which forced Apple to make its educational technology accessible in order to meet procurement rules
* The shift to cost cutting by eliminating moving parts
* The shift to miniaturisation

The prospects, then, are very bright for the move to generic solutions although there are particular accessibility problems for blind people which cannot be solved by this generally favourable shift and I will deal with these in Section 5. but, before that, I want to complete the exploration of the political and cultural issues within which our discussion takes place.

## 4. The Intellectual Property Framework

It is a good general rule to bear in mind that property rights precede and almost always over-ride what we loosely term 'civil' rights which I distinguish from basic rights connected with the relations between the citizen and the state and the citizen and the judiciary. In the 20th Century a new kind of rights framework was developed, notably by Isiaiah Berlin[[1]](#endnote-1) which was not so much concerned with "freedom from" interference but the 'freedom to' functions with respect to the state. This led to such proposed rights as those to education, employment and freedom of movement, not to be confused with logical extensions of constitutional equality before the law in such matters as ethnicity, gender, religion, etc.

The 'right' of access to information is a hybrid claim resting on two grounds: <ppt4.33>

* The 'right' of non-discriminatory treatment
* The 'right' of selfhood

The first ground for the 'right', advanced as a component of constitutional equality, is legally stronger than the second because the idea of selfhood is difficult to define as it is potentially limitless. To demand any and every good and service as a right on the basis of selfhood would wreck contractual arrangements, so this ground, although strongly advanced by the disability sector, is a fantasy.

The non-discriminatory ground has a sound legal basis but its extension from its initial scope of the relations between the citizen and the state and/or the judiciary into the sphere of private economic transactions is problematic. As I said when introducing this Section, property rights precede and almost always over-ride - or in colloquial terms "trump" - citizen rights.

As our starting point, then, we have to acknowledge that authors and publishers hold a historically validated and very powerful right over intellectual property. Even in the United States which has a written constitution and bill of rights and which has a strong tradition of supporting citizen rights, the property right of authors and publishers has almost always trumped the civil right of access to information; the gains for disabled people have not been obtained through the civil courts - although there are some egregious exceptions - but through legislation. Paradoxically, the supposedly light-touch attitude to regulation in the United States has been more onerous, or beneficial, depending on how you look at it, than the supposedly over-regulated European Union where nothing has been achieved in this field. The reason for this is obvious: although property rights usually trump civil rights in the United States there is at least a firm basis for the contest. The European Union, on the other hand, started as an economic organisation and has continued primarily to function as such; In Europe there are no fundamental accessibility rights to be contested in the courts - although there are some modest national exceptions - because the economic trumps the social, to think of it as a social organisation is an illusion.

Let me illustrate this with a story:

While I was involved in fighting a long-term battle to secure an exception in copyright law to render documents for blind people in an accessible format I saw a document which I was not supposed to see which said that an exception should not be made because blind people were not economically significant enough to justify it. A social organisation would have granted the exception on the basis that the cost would have been negligible.

Having sketched the rights issue, we need to look at the practicality and the ways in which the restrictions have been eased.

This is an extremely complex area but I will try to keep it simple. Blind people need to access text through alternative formats, the main ones being: <ppt4.34>

* Braille
* Modified print
* 'Real' audio
* Synthetic speech
* Audio/video description
* Tactile graphics.
* Image and object magnification

### 4a) Braille

You would think that obtaining an author and/or publisher permission to put a document into braille would be a simple matter but because the owners of intellectual property have insisted on a regime where permission has to be granted for each work the system has been immensely cumbersome. Some countries have now switched to a system where braille publishers retrospectively report what they have put into braille but that is rare.

### 4b) Modified print

Modified print presents a much bigger problem because there are commercial publishers of some forms of large print.

### 4c) 'Real' audio

For decades 'real audio' - or recording in a studio - was not a serious problem but the rise of the commercial audio book has presented problems because publishers naturally want to sell their own recordings, even if these are abridged.

### 4d) Synthetic speech

There are also problems with synthetic speech files which are a by-product of digital files for modified print because these may reduce the sales of commercial 'real' audio.

There are two major, global perceptual barriers which have led to this highly unsatisfactory situation: <ppt4.35>

* Organisations working for blind people have conflated the right to render documents in alternative formats with the privilege of not paying the authors and publishers
* Publishers have been afraid of audio and digital file piracy

In other words, the publishers have had no economic incentive to be helpful and the alternative format publishers have been totally unrealistic while, incidentally, casting themselves and their users as beggars; and the publishers have countered the proposals for a reform in which they have no economic interest with a bogus fear.

The real crunch has now arrived with the digital age where the potential for alternative format rendering is much better but the perceived danger of piracy is also much greater.

For straightforward books of text the eBook revolution will make access to most simple works both possible and difficult to resist because the end user will be buying the file on a standard, commercial basis. There has been some totally irrational resistance by authors to allow eBook readers to render text in synthetic speech because this might cut their sales of 'real audio' but I think this barrier will soon fall.

There are, however, still considerable problems in accessing information because of legal or other barriers. Here is a global summary: <ppt4.36>

* Audio/Video linear television description, established and growing, through legislation and regulation
* Audio/Video description of commercial cinema, established and growing through fear of potential diverse regulation offset by low relative cost
* Web accessibility highly successful at the political/rhetorical level but an implementational failure
* Book accessibility, established but under-implemented

You will recall that I opened the first major section of this Lecture on the Economic Framework by discussing three criteria for legislating or regulating accessibility and I want to return to these now in the light of what we have learned so far:

The three criteria for providing accessibility were: <ppt4.37>

* Capacity to deliver
* Proportionality
* Social gain

Now let us apply these to media:

* There is a clear remit for major television channels to provide accessibility because they meet all three criteria although the first, the technology, is always going to be a challenge as new generic technologies develop
* Major movie makers will continue to provide accessibility because if they have to do so for one country they might as well make it a standard procedure
* The Government and major commercial organisations should make material accessible because they fulfil all three criteria. Governments should, as a matter of principle, meet the accessibility rules they have set for others, not least because government information is paid for out of taxation and they should mandate accessibility for all entities they fund or part-fund. Most public utilities and major businesses operate under some form of Government licence and such licenses should have a accessibility conditionality; this is particularly true of telecommunications companies, banks, major broadcasters and major retailers.
* The book situation is a scandal but if both sides are prepared to be rational it could be solved very quickly. One objection of the alternative format sector to paying publishers is that it costs a large amount of money to render any work in an alternative format but that should be part of an agreement rather than a blanket request for blanket concessions.

The two major accessibility obstacles going forward - setting aside the discussion in the next Section - are: <ppt4.38>

* Government refusal to obey its own rules and refusal to see that its rules are kept by others, particularly those it finances, supports or purchases from
* The substantial area of content which is now a contested area: is television-on-demand primarily television subject to broadcasting regulation or is it simply movie material subject to lax or non-existent regulation of web accessibility standards?

This is a key debate which has hardly started.

Because of both media and device proliferation the time is approaching when we will need to take a fundamental look at accessibility strategy.

If governments actually believe that the access to information in the 'information age' is as vital as the access to electricity, then it is pushing itself towards a legislated rights-based approach. Except for the special case of globally marketed movies, all the major accessibility breakthroughs have come about through legislation and regulation; but what is required is: <ppt4.39>

* A generic right of access to information in the public domain at a fair price on a non-discriminatory basis.

which would:

* End medium-specific campaigning for accessibility
* Clarify and simplify the regulatory framework and
* Guarantee a return for the owners of intellectual property

Idealists would like such a law to apply to all publishers but I think our three criteria should be borne in mind. A more realistic framework would be regulation to insist on a 'descending' order of compliance, starting at the top with central government, the major agencies it funds, part-funds, licences to operate or lists as an approved supplier, together with organisations dedicated to the target groups that require accessibility. If all the major players observed the rules then we might take a look SMEs.

To end this Section I want to make two points about regulation systems: <ppt4.40>

* There has been a general tendency to legislate or regulate the accessibility of authorial activity, of documents, files, television programmes, software etc; but it has been almost impossible to legislate for accessibility features in hardware, the great exception being the toggle for 'closed captioning' (video description of television in North America); this leads to systems being inaccessible because the user interface is inaccessible
* In a global market, regulation at the point of production is less effective than at the point of consumption - vide the regulation and taxation of gambling - and regulating at the point of consumption would eliminate the evasion by software manufacturers through licencing

Overall, there have been improvements in accessibility across the board although the problems are all the more frustrating because their solutions are neither difficult nor costly. But that is only half of the story, as I now turn to the fundamental problems which blind people face in accessing contemporary and emerging digital information systems.

## 5. The Unique Problem of Blindness

Of course, the unique problem of blind people is that they can't see which is a glaring statement of the obvious but it does not tell the whole story as blindness has its own history.

It is said that the English poet, John Milton [[2]](#endnote-2) had read every book worth reading. Setting aside the last qualification, we can be sure that he had read all the classics in Greek and Latin, all the key Christian texts, Renaissance masterpieces such as Dante's *Comedia Divina* and Niccolo Machiavelli's *Il Principe* and so in that regard at least his blindness was not a significant problem in his double life as Foreign Minister and poet. He lived at the end of the period from the invention of printing when books were relatively scarce and expensive and before the era of mass publication. Today any blind person, like his sighted peers, would be unable to read a fraction of what is on offer but at least the seeing person has the choice of what to read; before the arrival of the eBook reader no country in the world produced accessible renderings of 10% of published books and before the arrival of the internet the percentage of magazines, periodicals &c has never reached 1% anywhere.

It can be seen from this overall summary that the comparison of Milton's position with that of a blind adult today such as myself, presents a paradox: <ppt4.41>

* I am comparatively disadvantaged but absolutely advantaged compared with Milton

In other words, while I have access to much more material than Milton - the absolute advantage - I have access to a much lower percentage vis a vis my peers than Milton. To give you an idea of the way technologies work, here is a simple table of comparative and absolute advantage/disadvantage: <ppt4.42>

|  |  |  |
| --- | --- | --- |
| Medium | Comparative | Absolute |
| Books | x |  |
| Photography | x | x |
| Cinema | x |  |
| Radio | = |  |
| Television | x |  |
| Voice Telephony | = |  |
| Internet | x |  |

In every case except photography, blind people enjoy an absolute advantage with new technologies but are only equal with or disadvantaged comparatively vis a vis their sighted peers.

At this point I want to recall a passage from my first Lecture on the education of blind children. The emerging crisis facing blind people is so catastrophic that organisations working with them hardly dare face it; what I am talking about is the graphics explosion: <ppt4.43>

* As the price of clear prose rises the price of digital photography falls
* The text equivalent of multiple taxonomical graphics is unsustainable
* As memory and transmission tariffs fall, the price of digital graphics publishing falls
* Global markets and multi-lingual domestic markets increase the pressure for graphics

Let me very quickly explain these points:

### 5a) Price

Producing prose is labour intensive and producing clear prose requires special training and although the same can be said of graphic design and photography the trajectory of prose quality is downwards, even in the legal and administrative professions, the only exception being advertising where the objective might well be to be ambiguous if not to mislead. This phenomenon, incidentally, causes a an additional problem for blind people which is the inability of their sighted peers to describe objects and graphics clearly. The cost of capturing digital images is now negligible.

### 5b) Multiple Taxonomy

The easiest way to think of this problem is to imagine taking a photograph in a street and then trying to describe it. That one image tells you about architecture, history, the weather, social mores, urban sanitation, pretty girls or an unusual happening. Even if you have the facility to describe all this, it takes too long; and if your alternative strategy is that the blind person should specify the taxonomy to save time, then serendipity or interesting combinations of elements might be omitted.

### 5c) Publishing

As I also noted in the Lecture on children, we are a publishing age; and the price of digital graphics publishing has fallen rapidly because of the fall in digital storage and transmission costs as well as the fall in data capture costs. Consumption and publishing costs have both fallen but the gap between them has radically narrowed to such an extent that specialist publishing houses are in the same position today as that faced by the commercial music recording industry in the 1990s. The power over media sales has shifted from the producers to the retailers which means that there is no longer necessarily a brokering agency between authors and retailers.

### 5d) Markets

It is not surprising that global brands opt for images rather than words where they can; but we also need to be aware of local multi-lingualism which is also pushing towards graphics.

There is, however, a further factor which requires very special attention and that is the growing use of graphics outside the commercial sphere. When I was a child we used to look forward to letters from distant relatives but now we are referred to internet sites where there are photographs and now the audio telephone is being overtaken by web cameras. The whole world is going visual while the capacity to describe it is shrinking.

To summarise, then: <ppt4.44>

The accessibility of graphics:

* Requires a high degree of descriptive or tactile graphics proficiency
* Is labour intensive; and, therefore
* Is expensive

And on this basis:

* There is a trade-off between task completion and serendipity
* High quality description should be deposited as a global resource
* For static objects modelling technologies such as 3D printing should be much more widely used

## 6. The Creative Imperative

As we noted as early as the introduction to these Lectures, our age can be characterised by a shift from data consumption and processing to publishing. Rather than borrowing directly from that Introduction and my first Lecture, let me more fully describe the situation in which we now find ourselves:

Until the development of the printing press both reading and writing were elite occupations; the press broadened access to both skills for the purposes of public and commercial administration, as well as for leisure; but it was only in the late 19th Century that mass primary education and popular newspapers and periodicals made reading and writing peer normative, with reading dominating writing, most people outside work only writing the occasional letter or completing government and, to a lesser extent, commercial pro formas. The great revolution came with the telephone when people began to conduct lengthy transactional and leisure conversations. In the early 1990s the growth of email, the use of the internet, the world wide web, home computing, the mobile phone and the growth of digital photography all began to revolutionise communications as the price fell spectacularly[[3]](#endnote-3). People who might have been somewhat nervous of formal letters were comfortable with email and even more so with text messaging; early in the 21st Century the SMS was joined by the web log (blog) and the tweet. The use of social media has grown spectacularly so that many people live their main identity in domains such as Facebook. They are serial self-publicists. And in South Korea - which is admittedly fanatically keen in this area - people not only create digital identities but they also purchase virtual goods for virtual identities.

Now it may be argued that this self-publishing is an over-stimulated use of a new medium and that things will settle down; and it also may be argued that much of this self-publicising is froth, a kind of highly selective soap opera, but more and more data consuming, processing and publishing activities have become peer normative in the past 20 years and the trend shows no sign of slowing.

Let me now revert to the observation made in the first Lecture that what we consume has a direct effect on what we are able to produce. I said then that blind children were suffering from a severe creative disadvantage; and that extends into adulthood. Even in the field of text publishing the focus on accessibility has been almost entirely on the consumption and processing of data in the form of the Web Accessibility Initiative Web Content Accessibility Guidelines (WCAG) and there has been much less concern with authoring tools.

There is yet another feature of the publishing era which presents a peculiar set of difficulties for blind people and this is in the area of irony. I said something about this in my second Lecture on employment but let me just re-visit the topic briefly.

Although self-conscious literature employed irony, most routine communication in the modern era was straightforward; but the most modernist self-publishing project is deeply ironic. AS long as this is confined to text then there is some leverage but once we enter graphics and symbols, the situation changes. Take, as an apparently trivial example, the failure of screen readers to pick up 'smiley face' symbols. But of course the problem goes much deeper than that.

It would be unhelpful to be melodramatic but, equally, ignoring the problem won't make it go away. No matter how much absolute advantage blind people gain in the technological world the gap between them and their peers is wide and will continue to widen. In many ways the virtues of modernity fitted very well with the strengths of blind people - a high level of focus, clear boundaries, rigid structures, unambiguous syntax - and even then it was difficult enough for most of us to function fully but now the cultural ecology has - to mix metaphors - 'flipped'. The new virtues in the postmodern age are spontaneity, improvisation, bricolage, personalisation and irony.

So what, in conclusion, is to be done?

The key to change, as I indicated in the conclusion of my first two Lectures, is to recognise the problem for what it is. For those who follow intellectual history there is a case to be made - noted in my introduction- that postmodernity, as such, has passed its zenith. Certainly history, as Francis Fukuyama posited [[4]](#endnote-4), is not dead and fundamentalist religion is vividly alive; and many of the more reductio ab absurdam claims of the acolytes will be seen in retrospect to have been outrageously self-indulgent, self-referential and pointlessly playful; but, like all movements, there will be a residue of consciousness and practice; and in our case it will be the technology-enabled facility to self-publish.

For blind people the challenges are many and obvious: <ppt4.45>

* Comparatively slow data accessing and processing
* Disruptive change that lowers the return on investment in learning
* The subversion of irony

And, conversely,

* Blind people, without a substantial degree of training and support will appear to be rigid, dogmatic and humourless.

## 7. Conclusion

If we recognise the problem it does not mean that we can immediately deal with it but let us provisionally say that our objective is to keep the gap between blind people and their sighted peers as narrow as possible. For the person born blind this will mean grasping the problem, for the person who loses sight in adulthood this will mean refreshing skills acquired and adapting as the situation changes, often in small but unpredictable ways. So let me finish with some concrete proposals: <ppt4.46>

Investment in:

* Haptic force feedback and 3D printing
* A Global centre of excellence for and an archive of description
* Techniques to mediate generic digital material into accessible formats
* Specialist 'smart phone' and tablet applications
* Accessible authoring tools
* Mediating augmented reality

At best these are holding operations but at the moment even a short breathing space would be welcome.

Contact details <ppt4.47>

1. Berlin, Isaiah (1909-1997); <http://en.wikipedia.org/wiki/Two_Concepts_of_Liberty> [↑](#endnote-ref-1)
2. Milton, John (1608-1674); <http://en.wikipedia.org/wiki/John_Milton> [↑](#endnote-ref-2)
3. Web Content Accessibility Guidelines 2.0 (WCAG 2.0) [www.w3.org/WAI/intro/wcag20](http://www.w3.org/WAI/intro/wcag20) [↑](#endnote-ref-3)
4. Fukuyama, Francis: *The End of History and the Last Man* (1992) <http://en.wikipedia.org/wiki/The_End_of_History_and_the_Last_Man> [↑](#endnote-ref-4)