**Text, Textuality and Digital Media**
Professor Arjun Ghosh
Department of Humanities and Social Sciences
Indian Institute of Technology Delhi
Lecture 22
Jay David Bolter: Seeing and Writing

Today we are going to take a look at our first essay which is going to help us enter into digital media, Bolter's Seeing and Writing. He tries to look at the changes in the perception of the text in the handling of the text as it comes about with the coming of the digital media but it does so by placing everything within a historical context, in fact that is probably the only way we can understand the digital media by placing it in the entire context of changing textualities across history across human history across the history of communication and that is exactly what we are also trying to achieve, we are trying to work with in this particular course .

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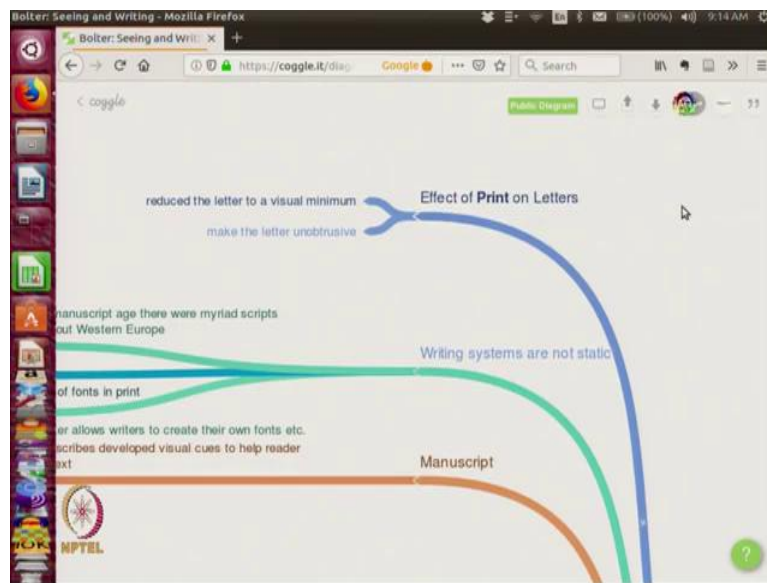
And he begins his essay by looking at the effect of print on letters the way letters were formed under went changes ever since the discovery of alphabets the discovery of writing the formation of letters undergo a certain degree of change as you would understand as you would know through common knowledge the written letter is different from the printed letter.

The print is formed differently there are certain cases where print does try to emulate the hand written letters however, that does not work out very efficiently because the way the medium of print operates and the way it shows up on paper is very different from the way hand written documents show up on paper.

So, over the years, over the centuries ever since the discovery of print, print fonts have undergone transformation different fonts are useful for different circumstances for whatever kind of use if you want to put up a poster certain kind of fonts work. On the screen certain kinds of font work which may not work well on paper.

So, each particular kind of surface requires different kind of lettering and therefore there is constant turnover of letters, so he looks at the way in which in print actually, there is am attempt to actually look at the visual transformation of the letters to a visual minimum keeping it and that is what works within print.

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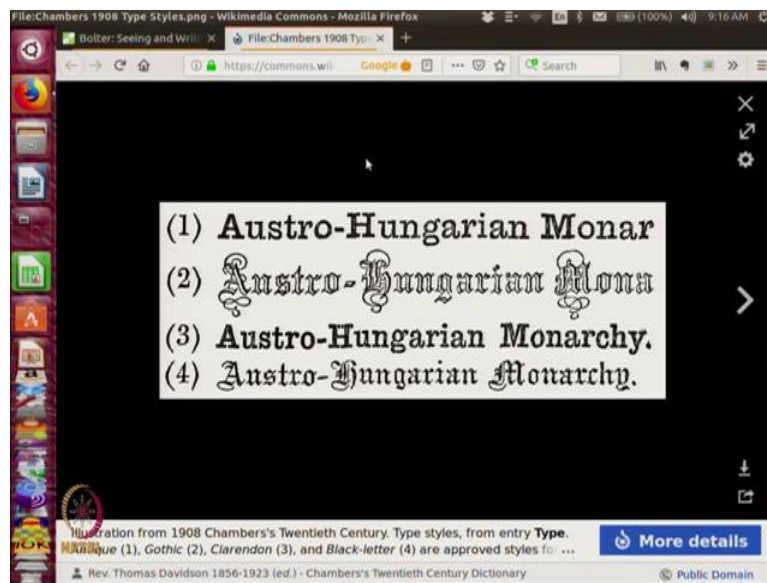
In print they try to make the letter less obtrusive, if you can see here on screen you can see several instances of various kinds of fonts which are used which we can come across but the one that is number 2 is the one which closely emulates a kind of a calligraphic style of writing.

Now, it is not a very efficient one it does not work well with the eye it looks very beautiful in ornamentation but it looks very beautiful in ornamentation primarily if it is hand produced if it is manually produced because that would also allow a certain kind of embellishment using illumination and other kinds of calligraphic techniques however because the printed letter is flat it does not have a very good effect certainly what we are perceiving right now is on the screen.

And as we can see on the screen it is number 1 and number 3 that works much better because the letters are full there is no hollowness within it and even within it my opinion would be that it is number 3 which works better because the font is much more chiselled and has a greater degree of clarity. So, there are finer nuances with each particular font that is used, so number 3 is the most developed font within the history of print it is the least obtrusive and that is what we understand by the effect of print on letters.
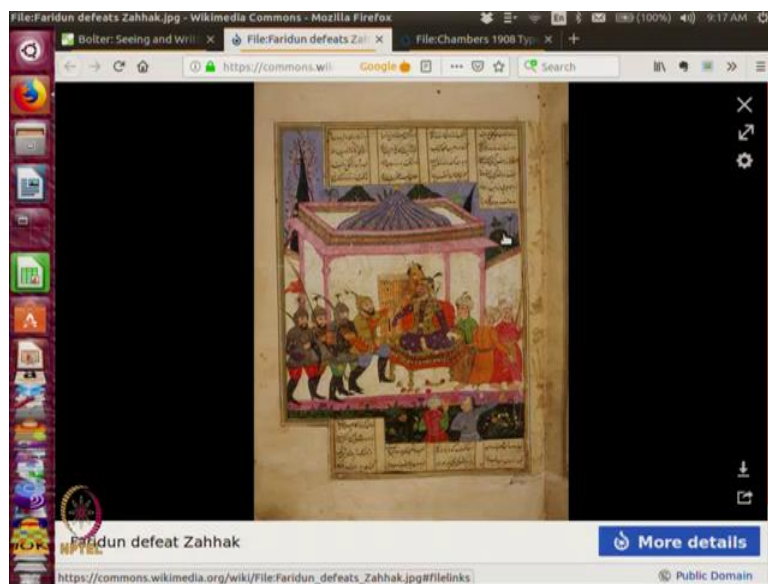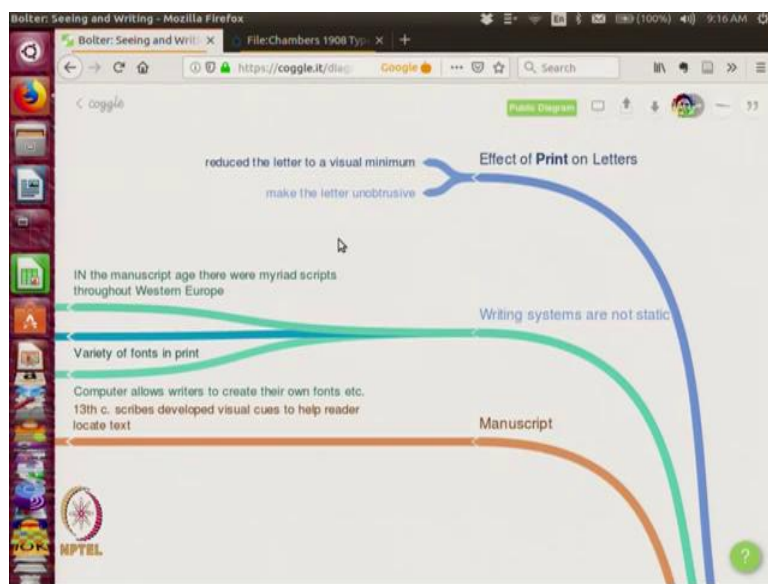
Now, we know that writing systems have always been adapted, always undergoing changes through history various kind of experiments the handwritten manuscript would be one in

which the attempt would be to be to fill up the entire page, there should not be any space which is which is left vacant, and therefore the urge to ornament and fill up the entire spot.

A part of that idea comes from the fact that the initiation of illuminated manuscripts actually emerges from ornamentation within ecclesiastical monuments either churches or mosques or mausoleums and there, certainly the attempt is to embellish the entire monument entire surface wherever ornamentation is to be done with either inscription or through ornamentation through lattice work or mosaic work or various other kind of thing, so it gets adapted to white page and it is the same kind of techniques that now in miniature get practiced on parchment.

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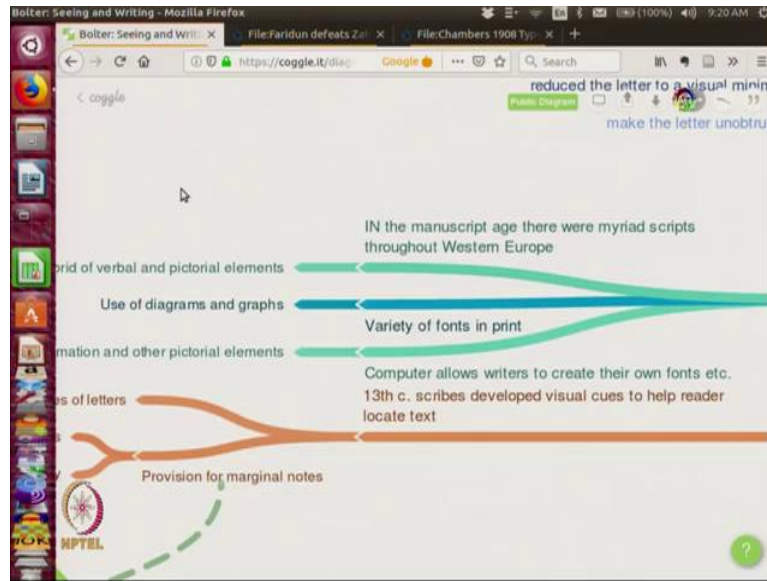
So, what we see usually is that whenever there is a new kind of technology that is used that comes into being the technology actually tries to initially emulate the preexisting one, because that is what the users the customers or those who are going to be the recipients of that particular article that particular text are used to, and always the attempt when there is introduction of new technology there it tries to suggest that you can continue doing what you are doing with far greater efficiency you really do not have to change your usage patterns you do not have to abandon what you are used to.

But, we can produce it in a far more efficient manner perhaps modes much cheaper and that is always the way technology initially is introduced. When the technology gets initiated and people get used to that technology, the technology comes on it own and creates conventions of its own which are very different from the technology it is replacing.

And in today's day and age, we find these kind of technological shifts happening at a much swifter rate in the era that we are talking about that which is the discovery of print or introduction of writing it would have taken several generations for these shifts to actually start getting initiated because we live in a world of very fast moving technological change and the human mind is constantly trying to adopt to technological shifts.

So, we find that in the manuscript age, there were myriad scripts throughout western Europe it was not that there was a singular font that was used everybody wrote with a similar style

and this would have been true of manuscripts writing elsewhere in the world as well not only western Europe.

Because as we know handwriting is idiosyncratic but it also cultural the way certain texts are written within a certain school or a certain school of thought or practice there is a certain standard that is set, even today we find that certain publishing houses would have certain standard fonts that they use for various particular purposes.

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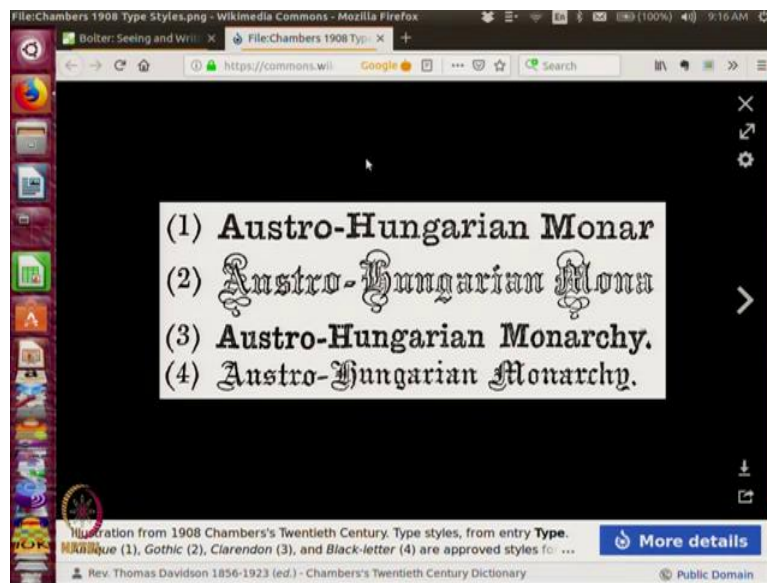
What I just showed you here in these examples of the fonts is an illustration from 1908 the Chambers' Publishing uses these fonts as various kind of styles and each of these fonts have specific names, they're Gothic, Clarendon, Black Letter, and Antique, these are the font styles which are approved and for all their publications they would use these fonts something for the title page, something for the chapter heading, something for the actual text. So, these styles would be fixed.
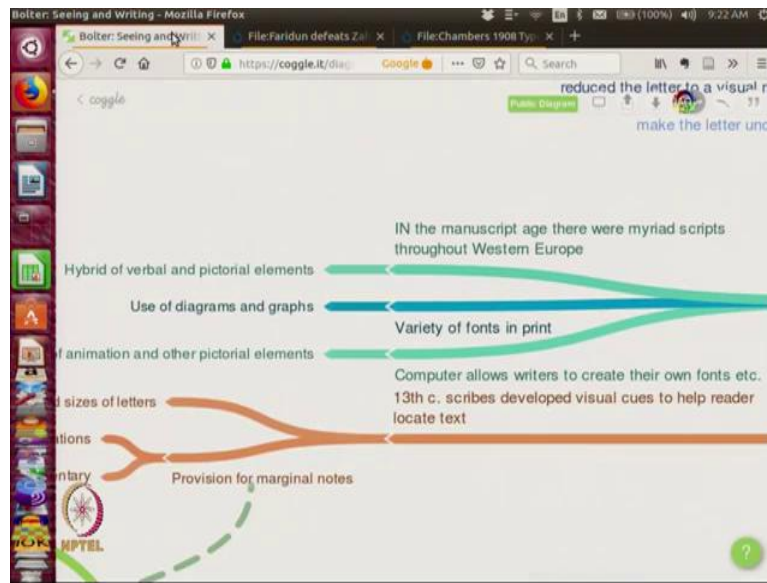
Similarly even in handwriting within a certain shop a certain manuscript a generation centre there would be certain kinds of styles of writing, certain basic standard practices the way the lay out of the page would be, there would be certain very standard practices that would be used. And there would be of course a hybrid of various kinds of pictorial elements and this is something that we had seen when we were looking at the manuscript formation that there would be certain sets of designs which would be available with certain book makers, book sellers, stationers they would have a certain set of styles from which customers would choose to customize their particular manuscript.

And these designs would also be held as a kind of secret, that this is the USP the unique selling point of this particular book seller the neighbouring book seller has a different set of styles and people are also trying to sometimes steal these styles so that they can earn a little bit more capture a little bit more of the market and sometime these styles would travel with the work men, with people who would move between print workshops.

As we had seen in Danton's work that there was no fixed recruitment for the print shops they would recruit labour according to the job and therefore labour was constantly searching for new work and therefore they were constantly mobile and this labour would sometimes carry with them certain styles and try to emulate and work with them. Though with the coming of print, it is not the style book that matters it is also the kind of typefaces which are available to particular print shops that also do matter.

In print however we have a variety of fonts which are used, the number of fonts which are available increases with the advancement of printing. As I was just saying, within topography within the traditional Gutenberg printing presses or the very early printing presses, the way the manual type setting would happen is that there would be a certain kind of set of typefaces which would be laid out on the desk and the type setter would have to pick them up according to the written manuscript and in a particular scale place each of the typefaces and create single lines of text which are then put and these are all in mirror images and put them place them in a lattice.

So, in this kind of a technology the number of fonts which are available to a particular printer would be limited would be much smaller, but with the coming of more automated printing machines you would have cartridges, you would have particular cassettes of fonts which would be stored and printers would have, some of the bigger publishers would have these very large libraries of fonts.

When printing happens within large publishing houses, through the lino type machine and the lino type machine would have these fonts which would be placed within certain cassettes installed and the operator at the point of typing out the line of text have to specify which particular font is going to be used and the machine would pick out the fonts automatically as the typing happens and put them within the line.

And once the molten led captures that particular image of that particular line the fonts would then go back and drop back into the cassette and at the end of usage the cassette can be return back to the library. So in this kind of situations large publication houses would have very large library of fonts so there could be a whole many variety of fonts that could be there. But of course you do understand there would be separate cassettes for each particular alphabet particular font sizes would be different, a cassette may have the italics or the bold so the entire font system gets very complicated as we move in technology.

But, with the coming of the digital certainly there is a far greater degree of fonts, any single computer would have at least about 50 fonts pre-install ed in it. And those who are interested in type setting documents would have far greater number of fonts which are there, so the exponential variety of fonts in the digital format of publishing is much greater.

So, as we see with advancement of technology actually the variety available with every single operator increases and therefore at one level the variety with every single operator increases

but at another level there is a certain uniformity that creeps in, in the manuscript age in the medieval age the variety would be like language because as you go to different books sellers they would be using different styles which are unique to them which cannot be replicated by other publishers. Whereas in the case of modern day printing, virtually every type setter has access to some of the top fonts and those are the fonts that would be used within printing.

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An early Helvetica specimen in the asymmetric Swiss modernist style, showing tight spacing in the poster style of the period.

In fact, there is a very informative and entertaining documentary on the font Helvetica which captures how Helvetica becomes a very important font in the history of advertising and in the history of bill boards. If you can, do watch that movie and understand what are the nuances of creation of fonts the choice of fonts and fonts do also have a certain cultural impact people get used to a certain seeing a certain kind of font in a certain particular kind of context the moment the font changes you have a feeling which is very different and therefore a font has a certain cultural baggage builds up a certain tradition with itself.

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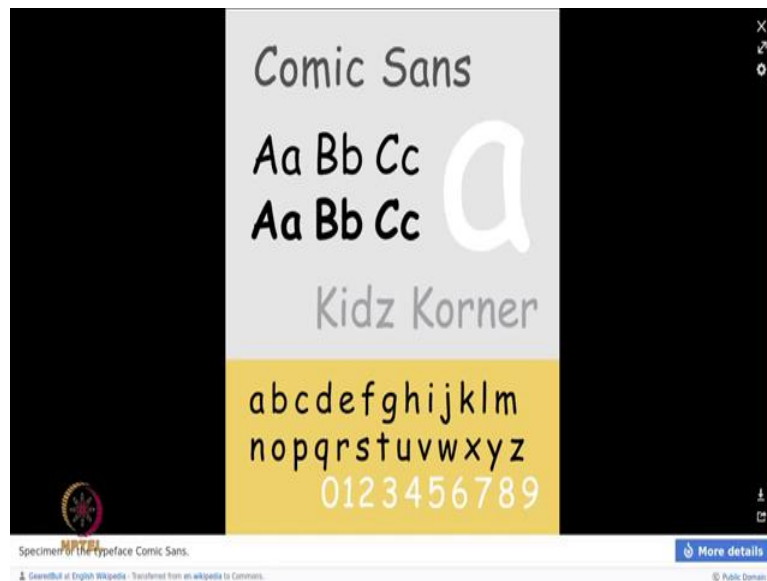
For example, a font likeComic Sans is something that would immediately give the sense that the text is non serious you can put a serious text within a Comic Sans font but the reader immediately understands that this is perhaps a non serious text. So every font also has a certain cultural baggage and that is something that we need to also understand to be able to understand how printing and expression through writing has changed across the centuries. Prints also are able to use diagrams and graphs as we have seen with the development of various kinds of graphic reproduction systems through lithography the creation of diagram and graphs become a lot easier

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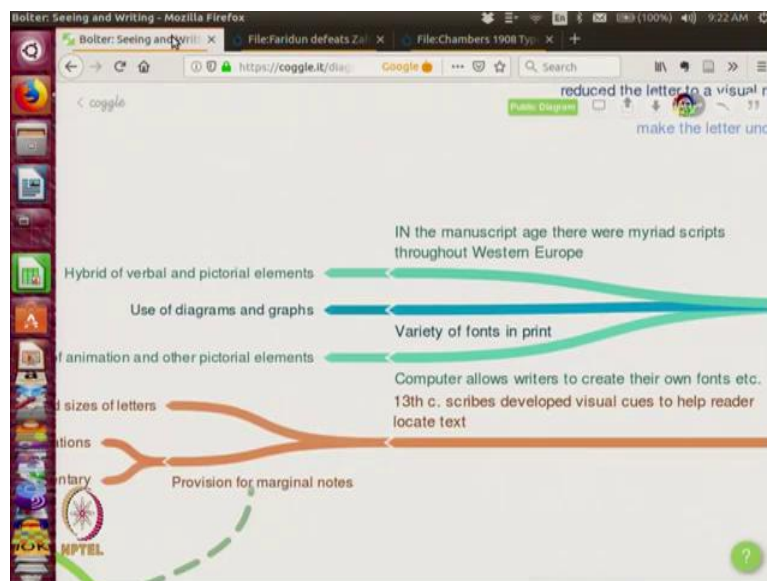
This is very important for scientific publishing but in modern day of course we do not have to depend on all that, we had other kinds of techniques where hand created documents can be scanned and easily mass printed. Computerization, digital media actually allows writers to create their own fonts and if one is particularly very creative enough, you can actually modify and use your own font.

Certainly one can use one's own font of choice from a library of fonts if one is not creating the fonts and very interestingly, any particular web page that is there, if in the browser I do set my default font to be a different font and you can of course do it on your phone for example in your phone display setting you can go and set a particular font as your default font and you would find that in various cases where the various applications, that are there the home screen and other kinds of settings, pages, on the phone will all appear in that font you can choose the font size to your particular choice.

As well as the fact that some websites may set the font to the default according to the particular user. So, one can put that setting in the browser exploit that setting in the browser and get to see web pages in the font of one's choice.

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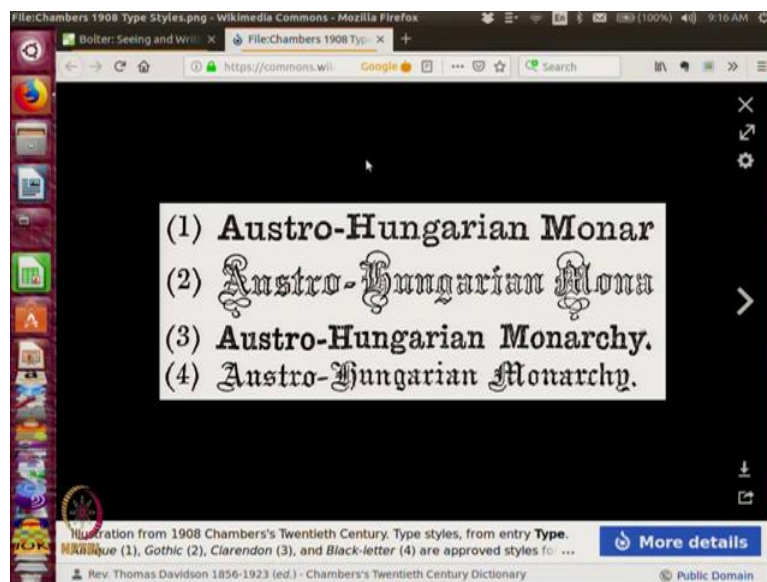
Certainly, size of the lettering can easily be altered according to one's choice, I can read a particular web page at a font size of my choice unlike that in the case of print.
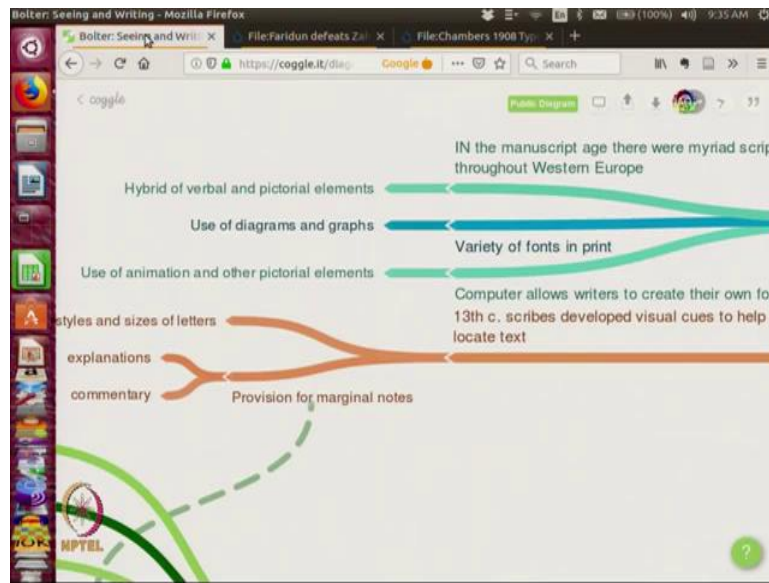
So, the digital media actually allows not only writers but also viewers to be able to use a certain font according to one's choice and the most interesting thing about the digital media is that we now can use moving images along with the written form. In the case of print pictures would be associated with print initially very crude pictures only black and white but then with full colour and photographic, but with the coming of the digital media you have the use of animation and other moving image elements you can actually embed videos within the text.

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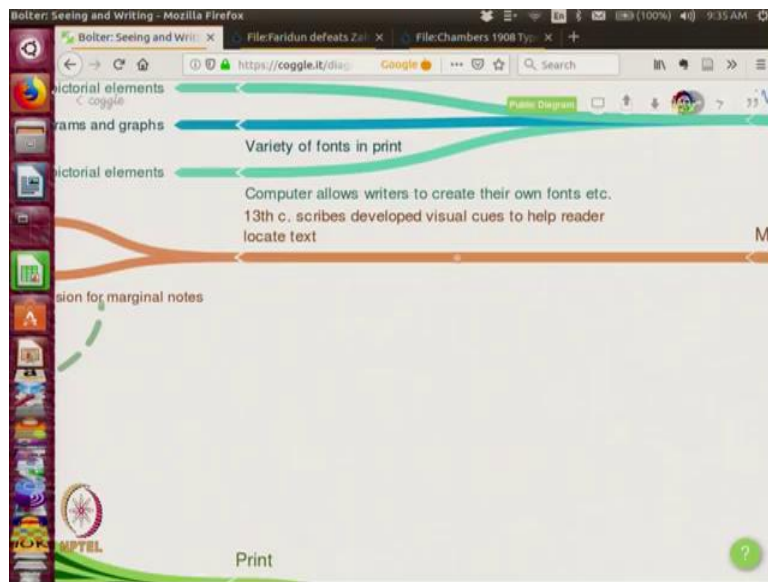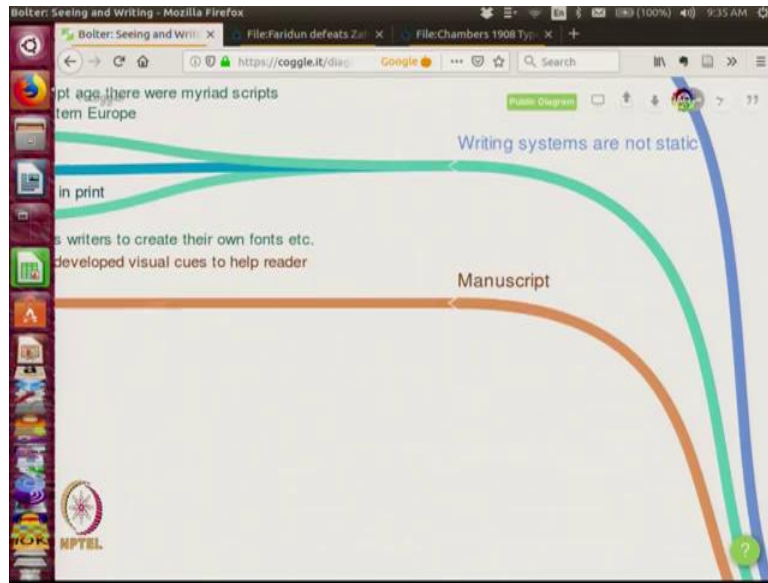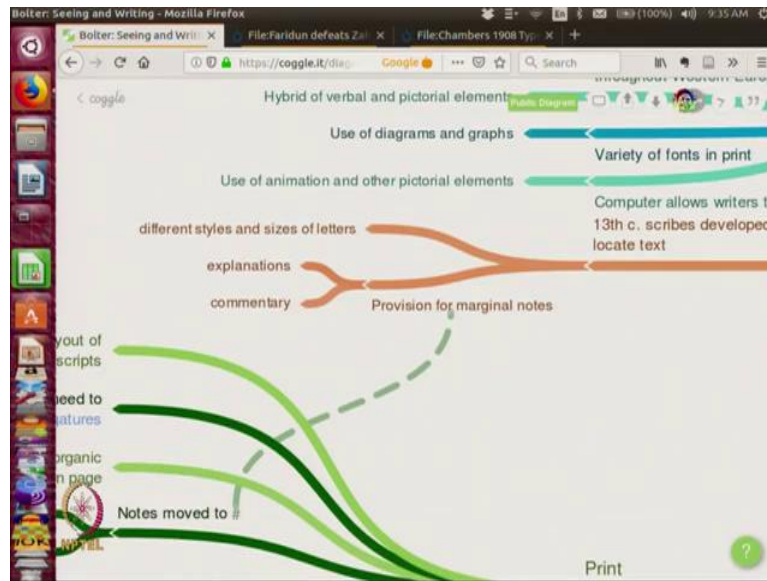
Now, he takes a closer look at the manuscript universe and he says that 13th century scribes developed certain visual cues to help the reader locate the text. So, it was not simply just written text, the text would have certain elements within it which become markers for readers to be able to book mark the text to be able to understand exactly which part of the text.

And given that the codex is a form which is almost random accessible, unlike the scroll one does not have to actually go through all to the desired sport to be able to locate it. The codex, you can actually open it to a particular page that you were interested in and therefore scribes would try to develop certain kinds of mechanism through which visual cues to help readers locate a particular text.

And this is very important especially within an ecclesiastical audience because in cases of public reading for example, when there are reading of various psalms or verses from the Bible in the church, the readers/users would have to open their bible to specific passages in order to read from them and therefore the book needed to be easily navigable and to be able to be navigable there had to be specific kinds of cues.

There had to be device of things like page numbers or verse numbers, chapter titles. And these were marked out through different kind of lay out different kind of font sizes different kinds of styles of writing within the letters so that the human eye can distinguish between various nodes of the text. There was also provision for marginal notes where there would be white space which will be available by the sides not within the particular textual area but by the sides where scholars can put in their explanations or commentary.

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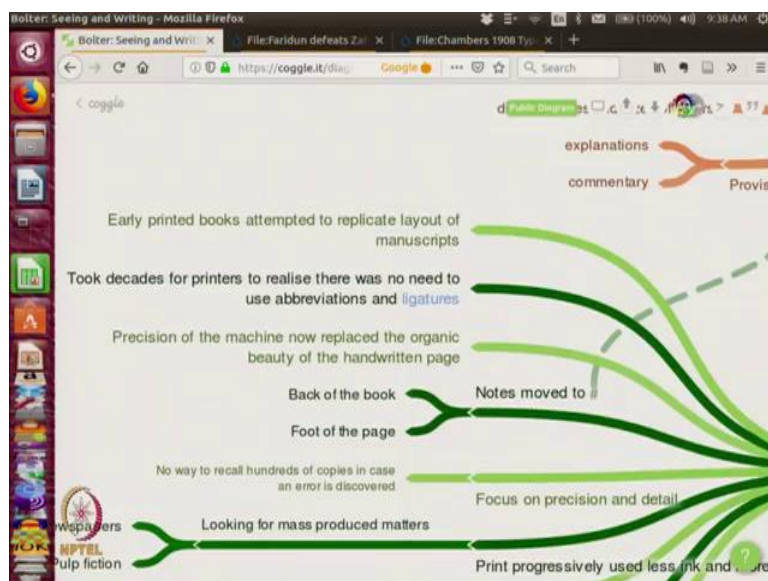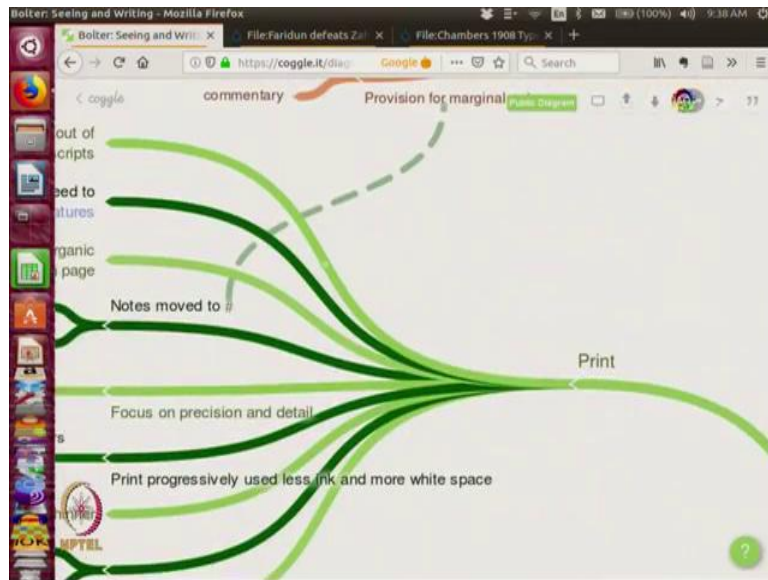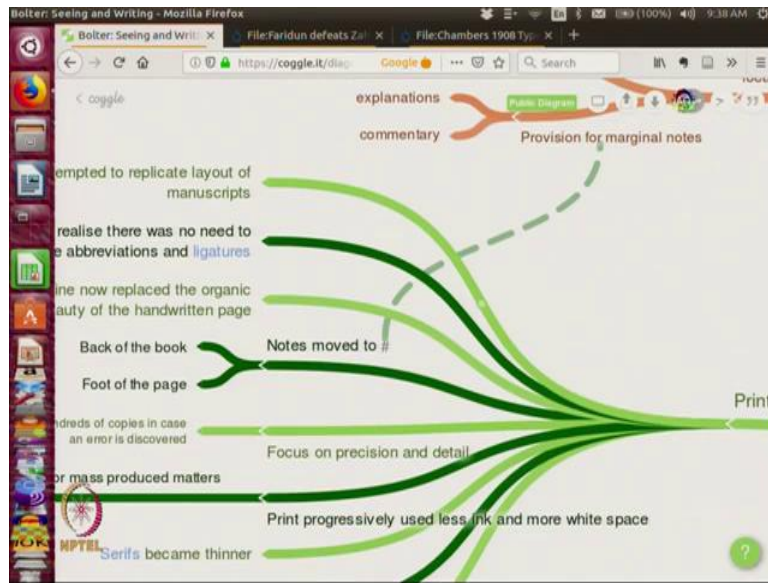
And these would probably also get included into future versions of the text. So, when a scribe is copying from a venerated manuscript, may find that the commentary is particularly interesting and also includes it as part of the written illustrated document, but with the coming of print there are certain changes that go about in the particular kind of way in which the text operates. The early printed books attempted to replicate the layout of manuscripts, the manuscript lay out would primarily be in the form of columns, clear lines as we can see dividing the next into different columns would make it easier to read, shorter width of the text, remember these were very larger parchments, very large lettering.

Books would typically be much larger than the usual modern book form and the lay out would be according to the convenience of the writing as well as of the reading and mostly be divided into columns. So there were certain practices within hand writing within calligraphy which became the standard mechanisms of operation.

But printers soon realized after a few decades that they could do away with some of the techniques which are common place in manuscript and that they could do away with them, in fact print actually might work better without them. One of the examples is the use of abbreviations and the use of ligatures.

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Two common ligatures: fi and fl
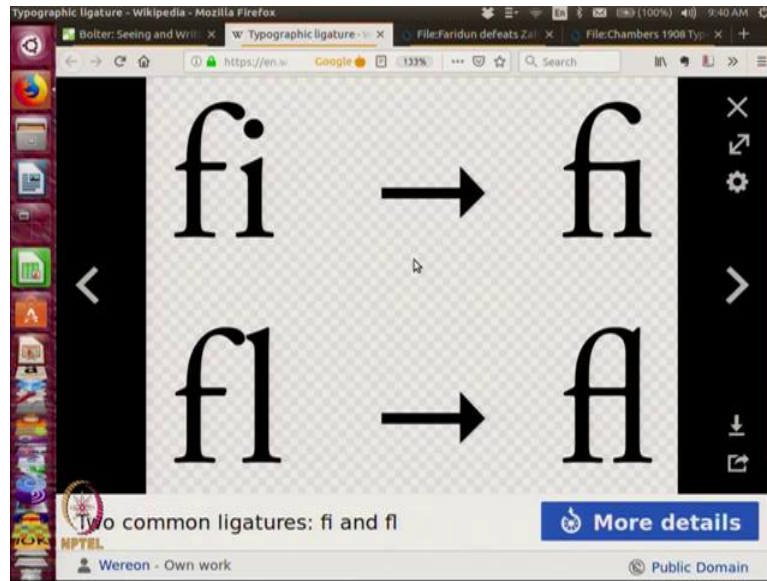
Now you may be able to recognize they're a thing of past they're a vestigial element. On the right hand side you find that 2 letters are collapsed into one. Now this would be very useful while writing by hand, to actually collapse the 2 letters together, there are many other examples of the use of ligatures.

The combination of a and e is also another very common example of the ligature, but when used in print, is actually a vestige of the manuscript practice and print can actually work in a far more chiselled fashion and therefore one without the ligature actually works much better in print rather than the one on the right.

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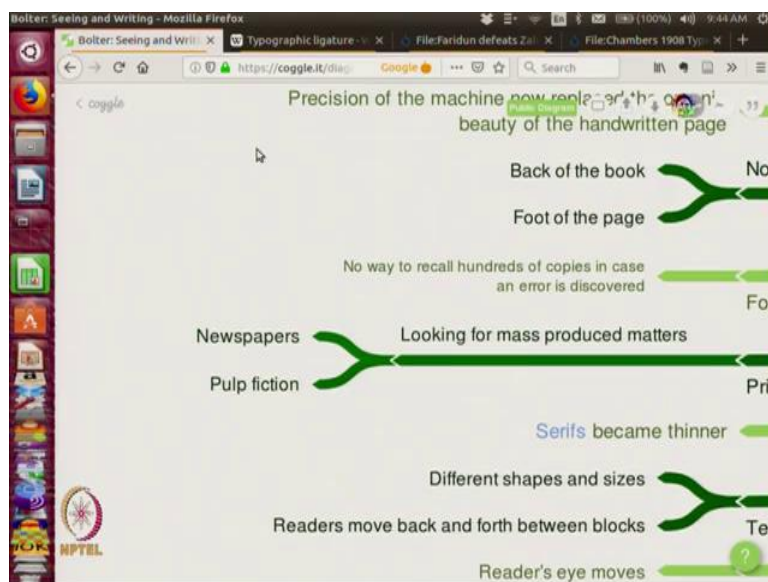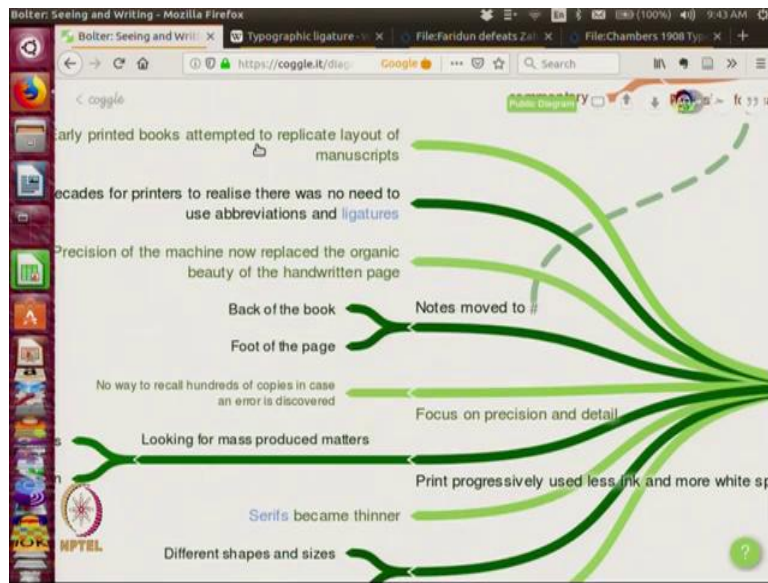
So, this is one practice that gets left behind abandoned as print comes on to its own, because the machine can be far more precise and the hand written page has a certain organic beauty because also do remember, the two different kinds of techniques that are used, first of all calligraphy uses a more flexible tip it is either the use the feather the quill pen or you use a brush both of which are flexible and therefore when the surface is in touch with the paper with the parchment and it is leaving the parchment it leaves a certain kind of a trail it leaves a certain linearity to the kind of writing.

Whereas print works very differently it's just an impression and up, so the two processes of writing actually produce different kinds of lettering and that is what printers very shortly

learn that they had to abandon a certain kind of idiosyncrasies of manuscript writing and leave them behind and bring in a much more chiselled and better look towards it.

The notes which are there in the margins now move to the back of the book or the foot of the book because that is where it becomes easier to organize the text because the notes would be in a different font different kind of format and therefore it is easier to organize them all together and in fact certain publishers prefer to put notes in the end notes rather than in the foot notes whereas for the reader I find it is easier that one uses the foot note simply because you can refer to the foot notes as you read.

Whereas for the publisher it is perhaps easier to put the note in the end note because then the pagination remains constant, the changes in the end notes do not meddle with the pagination each time there is a change in the text. So, the focus really is on far greater focus on precision and detailing and as we have already noted that there is a process which is involved in trying to ensure that there is a proper copy editing of the texts because it is impossible to recall hundreds of copies of text once if there is an error which is discovered.

So, the process of copy editing actually is precisely a print practice rather than a manuscript practice and print progressively uses lesser and lesser ink, with more and more white space the letters get much more chiselled unlike the thick black letters of the manuscript and this is what works well with newspapers and pulp fiction where they are actually dealing with a lot of texts, so therefore trying make it as easier on the eye as possible, single page has a lot of text and the font sizes really decrease. We find that the Serif fonts become thinner as we move on.

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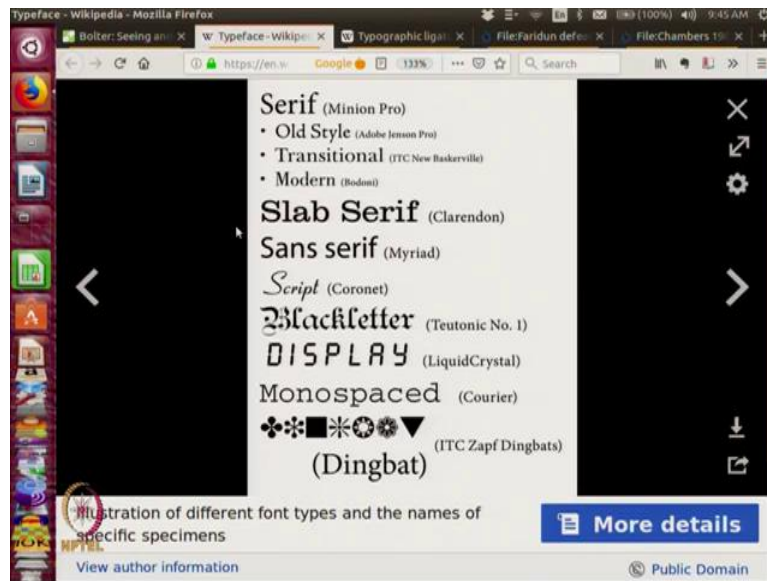
Just to leave a little note for you there are a variety of fonts but a very important distinction between the two kinds of fonts is the Serif font and the Sans Serif font. As you understand, the Serif font is one which has the more pointed endings and the Sans Serif font have the blunt endings. Various kinds of fonts actually have two versions of themselves, one is the Serif and the Sans Serif.

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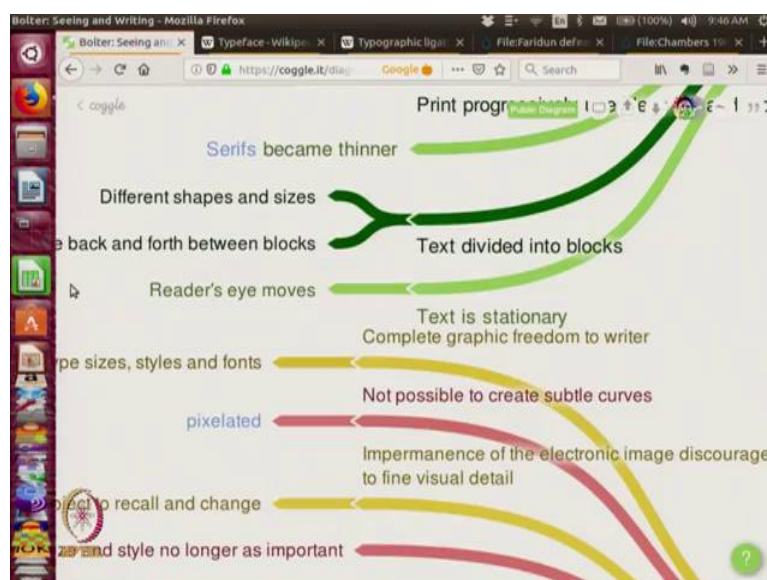
Various kinds of print technologies tried to use different kinds of fonts, normally more serious books and reading items tried to use the Serif fonts whereas we find more

advertisement and others which are less classical, they try to use Sans Serif fonts. On screens certainly, Sans Serif works far better than serif fonts.

They are easier on the eye because on the screen you are looking at usually a back lit document a kind of a reading surface or if you are watching this particular transmission on a projector device then there is a lot of light coming your way from around the text from all the white areas of the text of the screen and it is the Sans Serif font which is easier on the eye.

In print, text would be divided into various blocks, different shapes and sizes they would be organized, readers would easily be able to navigate between different blocks of texts, so chapters or sub headings become a very important way to differentiating between these blocks of text and and very interesting thing about print and books is that the text remains stationary it is reader's eye that moves. Whereas when you look at the screen, it is very different, it is the text that moves and the reader's eye remains stationary. So, as you can see in the case of the digital text it is the text that keeps moving and the reader's eye is always looking at the text and this is the way the text really is in the digital form.

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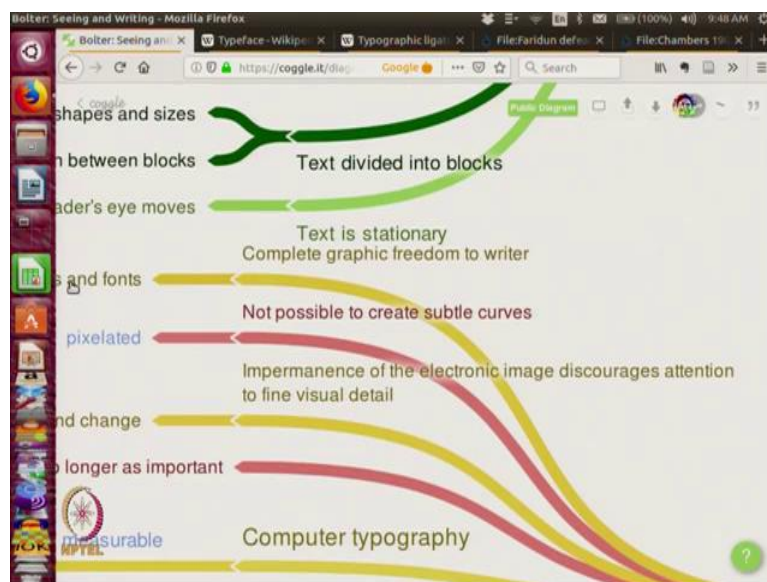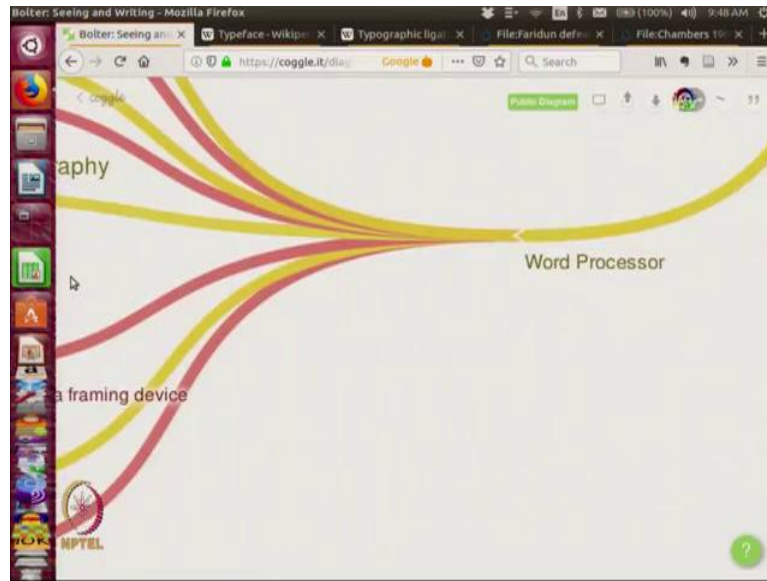
And, now he moves to discussion to the word processor, now far greater graphic freedom is there to the writer, the writer can now no longer only while writing during the act of writing, the writer is not merely concentrating on the words but also how it is to be presented these topographical elements now move into the act of writing. Something that would have been the job of the topographer the type setter in the printing press has now become the domain of the writer.

When you are writing out a certain term paper or a report, you are supposed to have formatted it properly. If you do not format it in a presentable way, your assignment may be returned if you submit a manuscript to a publisher which is not properly formatted then the

publisher may return it for formatting it in a more intelligible way which is very strange because it was in one generation the job of the type setter to look into these formatting issues.

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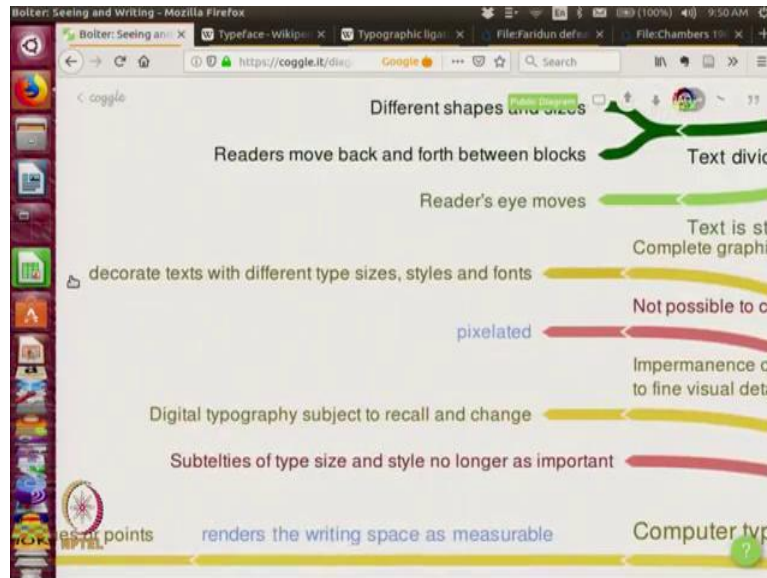
Remember, there was a point of time when writers would submit hand written documents to the printer not typed out but now everybody expects that any kind of submission should happen in a typed format and people try to decorate the text with different type sizes, styles, and fonts but a little bit of warning that I would like to give you, it is better that a single particular text does not use too many fonts, it is not readable, it is hard on the eye.

So whenever you are writing try to reduce the various kinds of type styles and font sizes and other kinds of decorative elements to a minimum in terms of variety. You can use decorative elements but let there be may be two or three different kinds of things that you do within a single page of text or a single document and that is what works. Another problem of the digital space is that it is not possible to create subtle curves, text often gets pixelate d.

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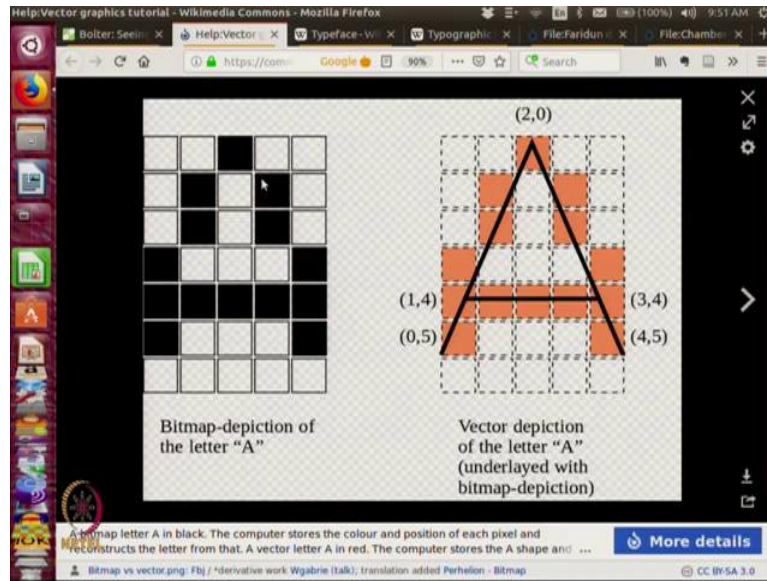
Certainly with the discovery of far higher resolution of texts, pix-elation gets reduced, now you have more higher resolution screens and with data becoming more easily available this effect of pix-elation gets reduced as we move on with technology. But still you understand within the digital media every single spot every single pixel is separately defined that is what you talk about when you have a very higher resolution camera, the more pixels that you use within the image, when blown up, the image will not get pix-elated. And this is important for lettering because if you are creating particular letters which are supposed to be expanded enlarged then this problem of pix-elation might occur so that becomes an important choice.

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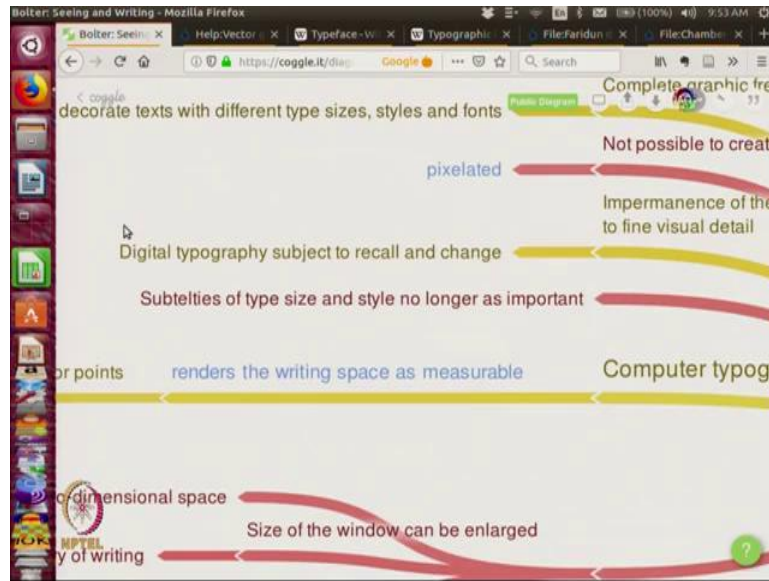
The impermanence of the electronic image discourages attention to find a detail because people can recall it. So as I said you can post something or a website can be uploaded and then there is a problem that is found people can go in and make that correction. Though in situations where people do make a mistakes and there are others who would like to point out these mistakes and they would resort to the permanent form that is their screenshot to be able to arrest that particular mistake but once again we must be very careful because in the age of fake images, people can actually pass off a fake screenshot as an authentic one.

So, these various subtleties of type size and style are no longer very important because the default settings of different browsers now according to the screen size the particular page layout, people are accessing the same text across different particular devices different screen sizes, you can sometimes be looking at a very large screen you can also be watching this looking at a particular page on a small mobile phone or a tablet or a desktop.

So, various kinds of screens can be used to be able to access the particular text, and adaptability becomes much more important than a fixed form, this computer topography renders the writing space as measurable, so this is something which you will see.

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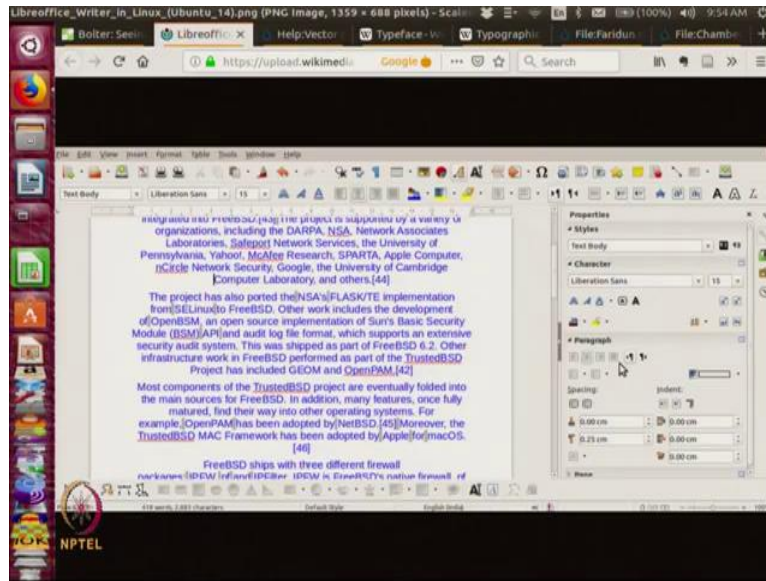
That when you open a word processor you get this rulers by the side and this precise measurement of what is the spacing between words 1 single spacing 1.5 spacing how many centimeters from the left how many centimeters from the right, the writing space becomes exactly measurable, you know exactly which part of the page that you are in, and the writing space has always been measurable because if you looking at print the printer does all these exercises of precision.

But these were never as important as in the kind of the WYSIWYG word processor. When I say WYSIWYG I mean 'what you see is what you get' what you are seeing on your screen is exactly how the page will get printed out, so while writing you are already aware of the composition of the text, how the text would be looking like.

It is very much like a playwright, writing a play and seeing a play in action. That is not what traditionally writers would do the writers would not be aware of the kind of print, writers novelists even today may not be so much aware of the exact placing of particular letters, because they would go through a certain process before the book is published, but if you are printing a report, a term paper or a letter then you know exactly what format that you are typing it out in. So, therefore all these measurements entered the writing stage rather than in the printing stage.

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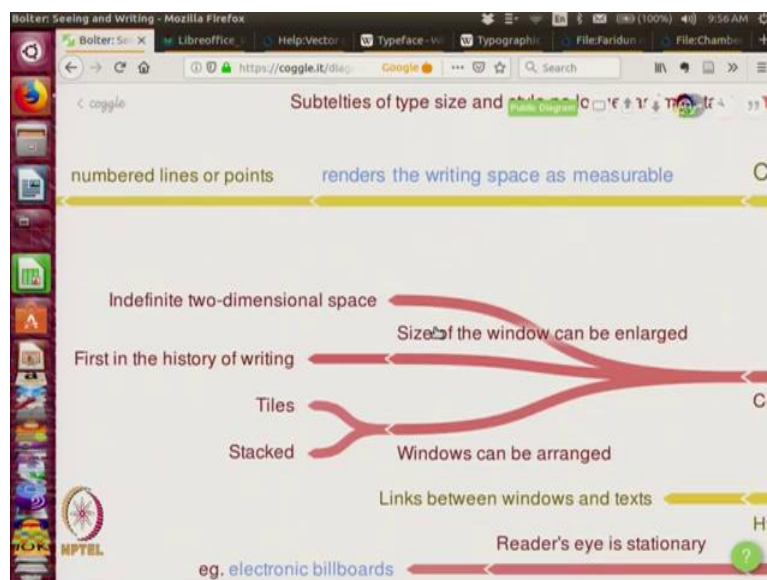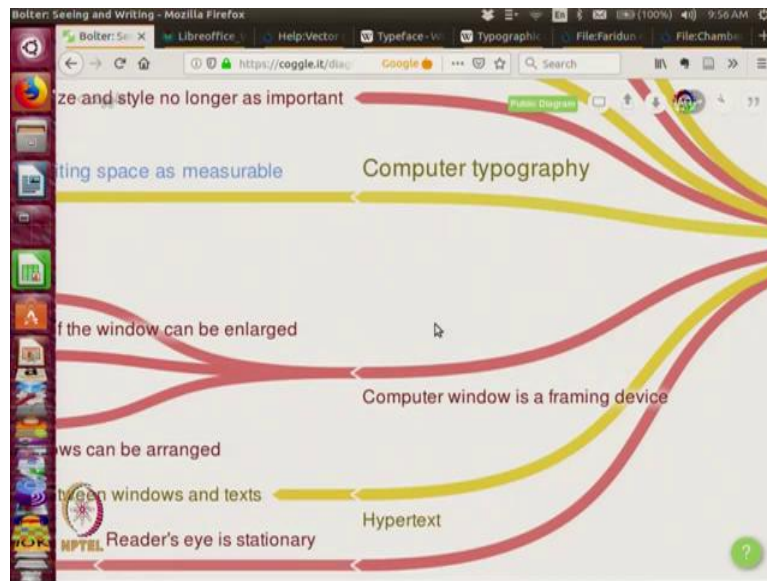
So, the computer window becomes a framing device we can actually fathom any particular text that occurs within the space the length and breadth of the screen and that is the amount of text that you can hold, this is very different from the written page where the written page has a certain standard size and that is the amount of text that you can see.

The computer window however can be enlarged I can reduce this and see this becomes an indefinite sort of 2 dimensional space I can keep on increasing it even on the word processor I can keep adding as many pages as I want there is no finiteness to it and if I change the view to that of a web page, then one can keep on scrolling infinitely in fact this mind map that I am using this actually can keep on going infinitely as big as possible.

It can be a very large mind map which could be there and there is no limit, the digital space will keep on expanding to accommodate as much as I want to write, and I can zoom at whatever level that I really desire to be able to make my point and as much text that is necessary. So unlike a manuscript writer who had to choose the gatherings very carefully remember they would have to choose the gatherings very carefully because if the writing does not, the page does not fill up within that particular size of the prepared parchment then it would create a problem because there would be a lot of white space that would be left.
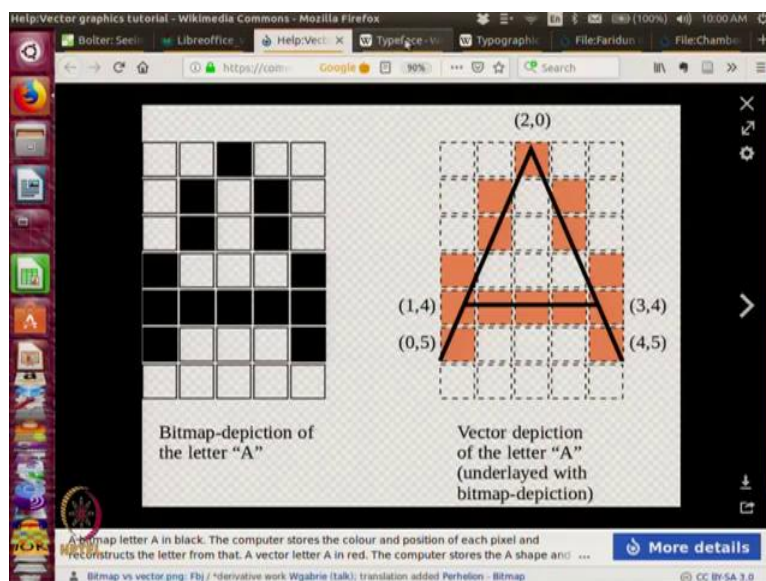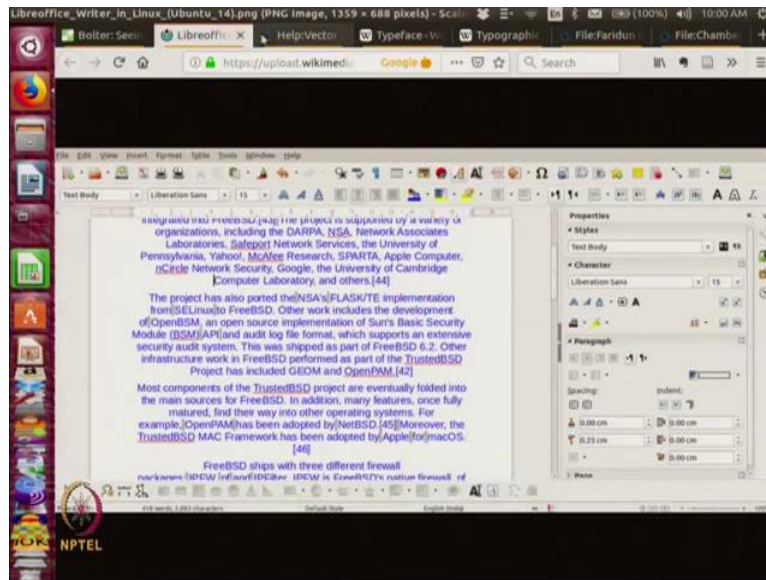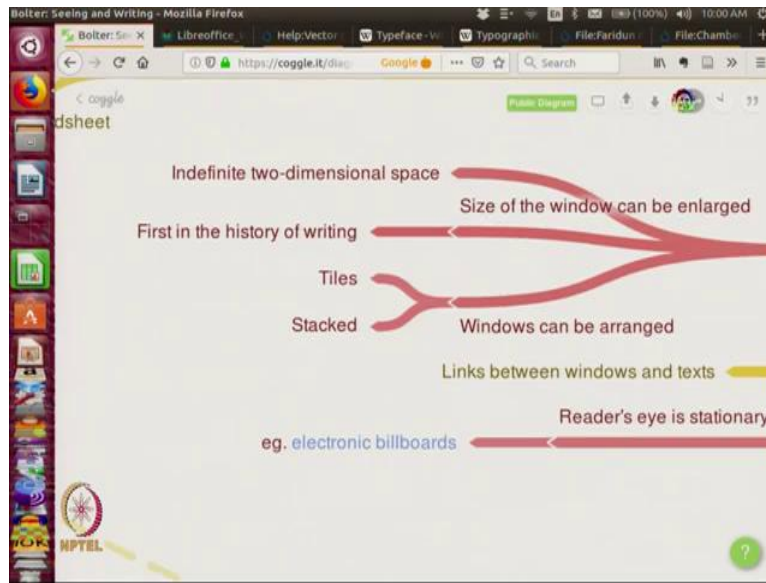
And therefore and certainly newspapers have this kind of a problem because they would have to fill in a certain white space if there is a kind of a story which is not really being able to fill up the entire page, you have never seen a new paper with a certain white space that is left behind, you may have seen books with couple of 2 or 3 empty pages here and there, but you would never see a newspaper with a large white space, the newspaper will always be complete in the text, that is when they would enlarge put in a certain photograph just to fill that space up.
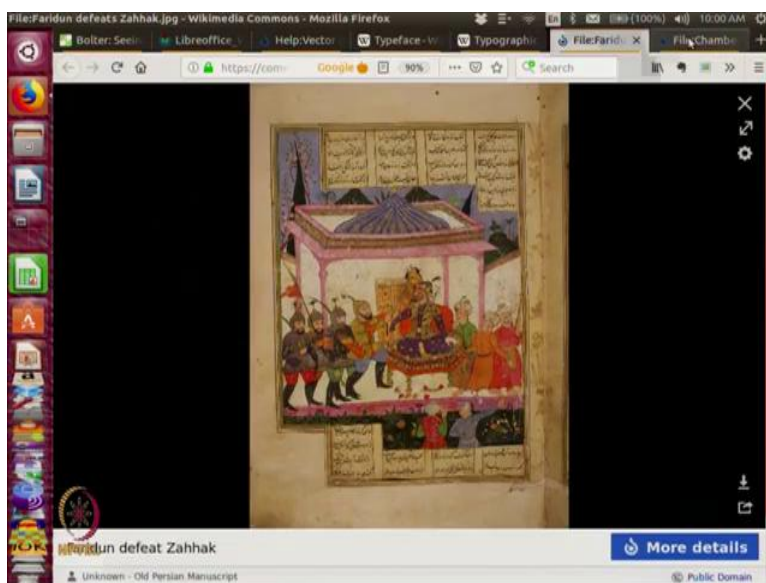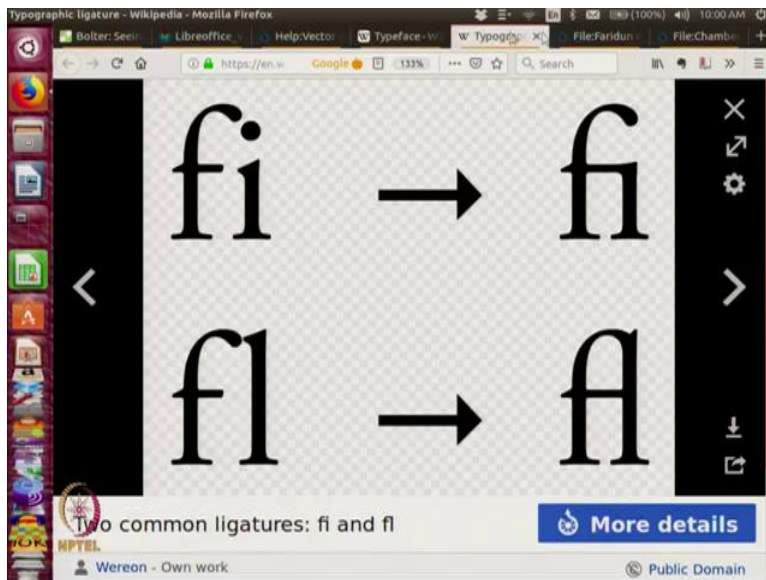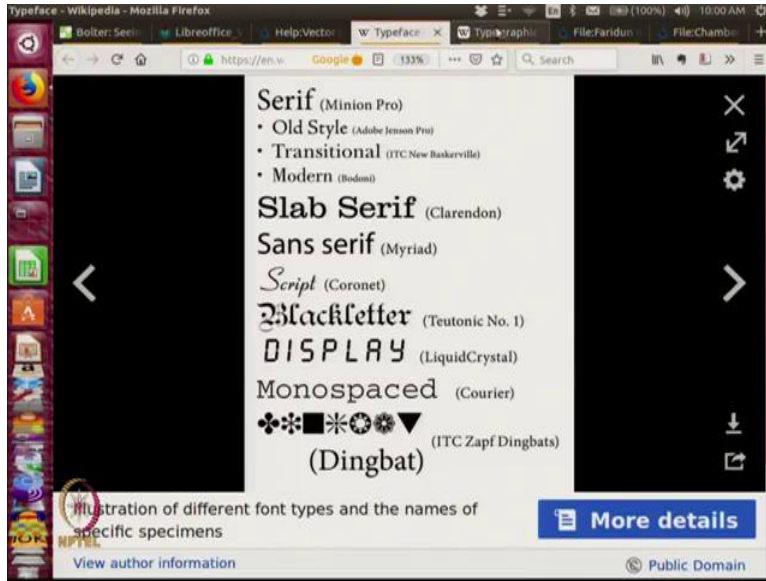
Or they might have some story which has a very long shelf life, low on immediate news value which can be pulled out from a rejected story from the previous day and put in there simply to fill up that white space. So, the print has a definiteness, a newspaper if it is 8 page newspaper, every day the newspaper publishers will have to ensure there are 8 pages of news that are there.
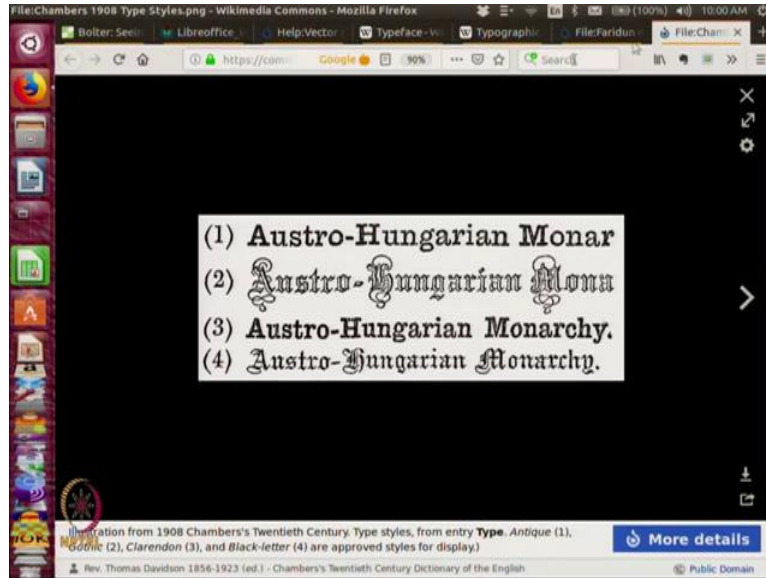
This is also very interestingly true for TV channels, 24 hours TV channel they need 24 hour programming to be able keep on running it all the time. So, therefore there are various kinds of repeats of programs which they have to constantly bring in and they have to produce, if you cannot report enough news you have to produce the news in your own studio at prime time.

So, various kinds of media have various kinds of imperatives and the digital space allows this possibility of an indefinite kind of space, it can be as small as you want, it can be as large as you want. But you really cannot be as large as you want because the human mind cannot read infinite amounts, so that is one drawback which we will discuss in a different lecture and this is the first time in the history of writing that the writer actually operators with an indefinite space.

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Serif (Minion Pro)
· Old Style (Adobe Jenson Pro)
· Transitional (ITC New Baskerville)
· Modern (Bodoni)
Slab Serif (Clarendon)
Sans serif (Myriad)
Script (Coronet)
𝕭𝖑𝖆𝖈𝖐𝖑𝖊𝖙𝖙𝖊𝖗 (Teutonic No. 1)
DISPLAY (LiquidCrystal)
Monospaced (Courier)
❖❉■❇❀❂▼ (ITC Zapf Dingbats)
(Dingbat)

Illustration of different font types and the names of specific specimens

More details

View author information

Public Domain

fi → fi

fl → fl

Two common ligatures: fi and fl

More details

Wereon - Own work

Public Domain

Faridun defeat Zahhak

More details

Unknown - Old Persian Manuscript

Public Domain

These windows can be stacked as you can see I have several of these tabs which are opened which I have opened through the duration of the lecture and there are all stacked one after another and we can access them at random access whereas in the case of a book you open to a particular page at a time you can of course open several books at different points of time.

And you can actually simultaneously see different pages on the computer screen you can actually see a certain number of text, I can separate the window I can resize them and place them one beside and alongside each other, so these are some of the different ways in which the digital media work.
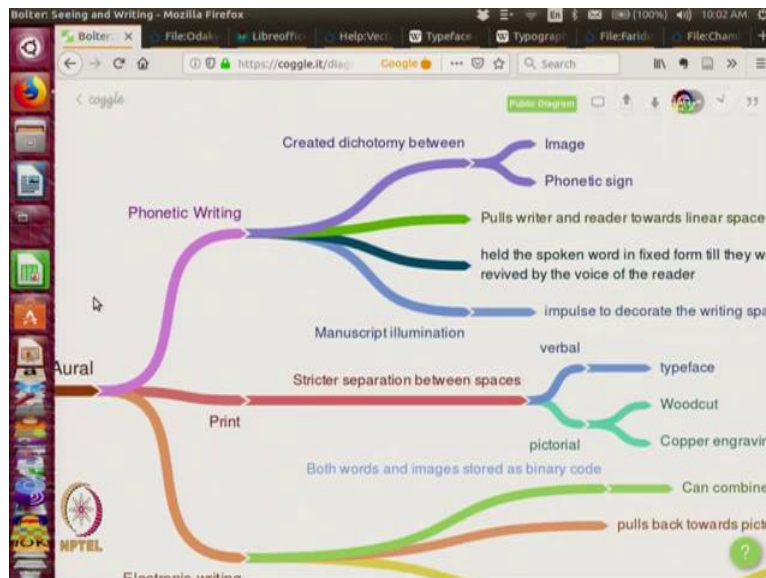
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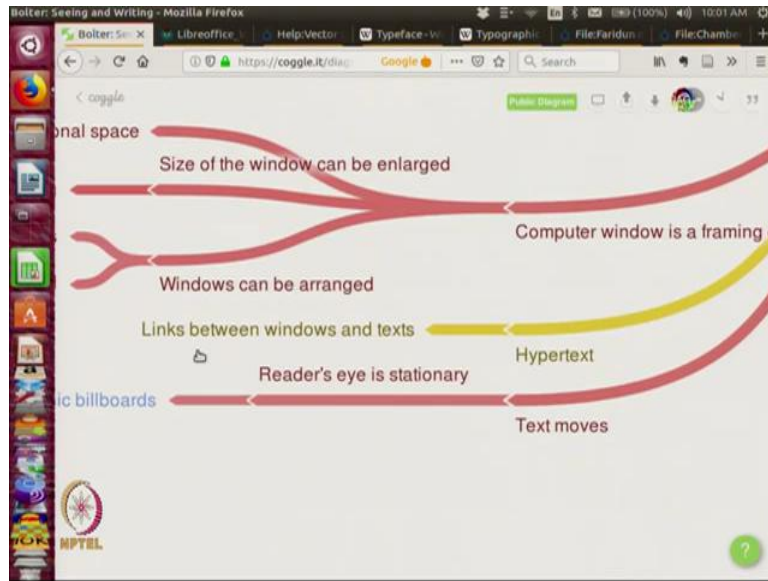
Now, we come to the hypertext, hypertext is a particular format which allows the linking of texts between windows and between different kind of texts and in the case of digital it is the text that moves but the reader's eye remains stationery.

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This is also true of electronic bill boards where the text would keep on scrolling and moving, the reader's eye remains stationary and so these are the various ways in which the digital media actually operate differently. After that, Bolter goes into discussing the difference between various kinds of reading practices or perception of the texts and he actually gives us a certain overview, some of these matters we have covered in other lectures it would be useful to just go over them.

So, when writing emerges it creates a dichotomy between the image and the sign and he says that the act of writing actually pulls the reader towards the linear space whereas the oral as we said can be dissociated it can link between various nodes of the text randomly. Whereas in writing there is a certain linearity, you have to write one thing after another, there has to be a certain sequence in which things are written.

And when things are written down in the early days of writing even now when you are reading something what you're doing is the writing itself does not carry a meaning when you read it you are actually vocalizing that word and the vocalization is what gives you the meaning.

And there is an impulse to decorate the writing space within the manuscript universe that he talks about and that is something that we see in the form of the manuscript illumination, to fill up that visual space and that impulse as I said arises from the practice of decorating the visual space within ecclesiastical monuments for the faithful to be occupied.

As we had noted, that it is a technique to help the mind concentrate to focus on the visual element while the written text is being understood and imbibed, so illuminations help concentrate, help hold attention. However with print there is stricter separation between spaces, between typefaces, between the textual space and the pictorial space, the 2 are separated they are you do not have writing intermingling with pictures, there is far clearer separation between the pictorial and the verbal. However with electronic writing we find that there is a certain synonymity between intermingling and interweaving of word and images because both words and images are stored as binary codes. That is what ultimately the machine understands.

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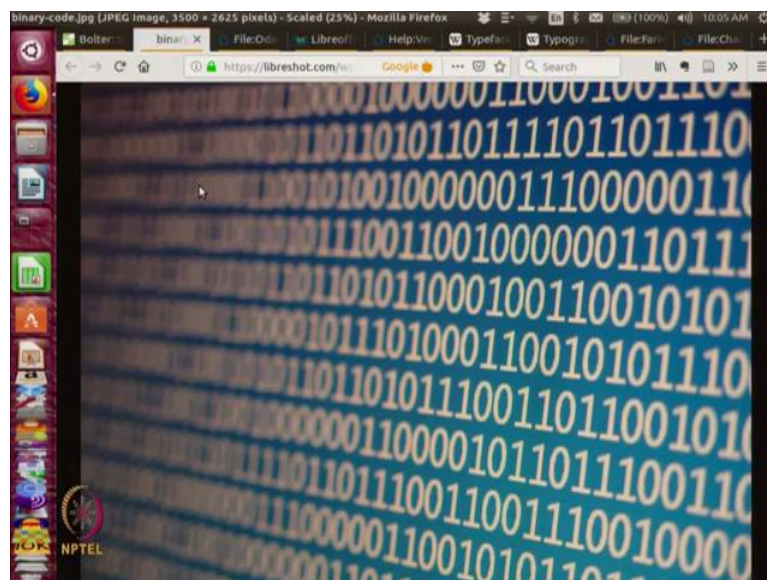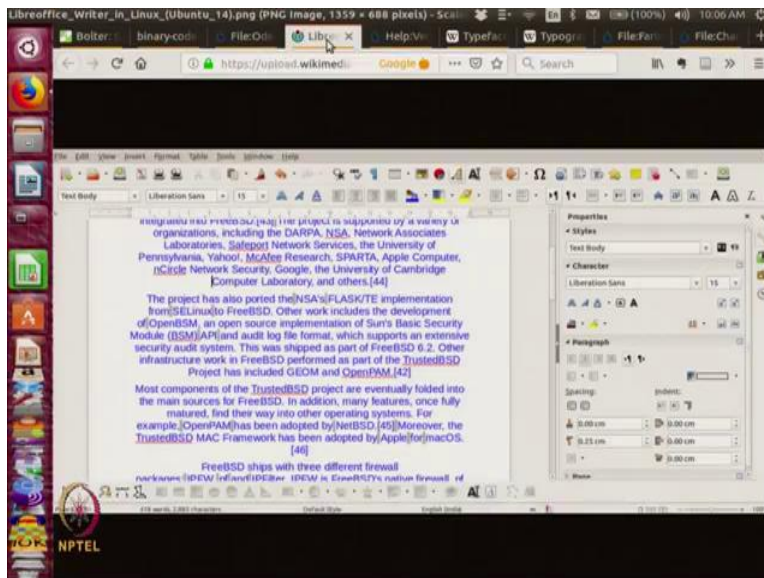
This is the format in which any document that it be there at the end of the day, this is what the computer actually stores, either a 0 or 1 or an on or an off or a yes and a no that is the binary code that every document no matter what you have written it could be an image or it could be piece of written text at the end in the back end this is the ultimate machine readable form which the machine understands and there is a certain algorithm there is a certain code through which the machine actually decodes this series of ones and zeros and is able to serve it up to the human eye or the human user in a format that one can use.
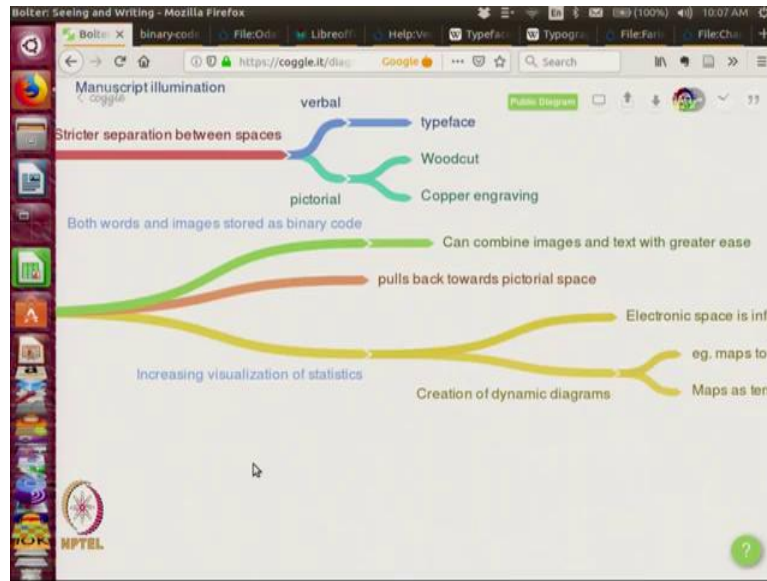
Now, what this does is that therefore for the machine to be able to combine images in text together is far easier, which is something that printing cannot do, in print for a very long period of time the way of handling images is very different from the way word or text is handled.

But, we see that in the electronic form, words and image can be combined with greater ease the importance of this is something that we will understand as we move along because we can today theoretically if you can think of it and this is something that is very useful for digital humanists who work with the code behind with the texts, behind humanists texts is that it is possible for example to take a GPJ file and create music out of it because if you just change the algorithm if you take an image file which may be stored in a gif format or a jpg format each of these formats are basically ways to converse with the machine ways to tell the machine.

That this is how you are going to read that particular code and this is the result that is going to be devised, now if we do a little slight of hand and we confuse the computer and say read the jpg file as an mp3 format, then it can produce certain sound patents. So the code can be intermingled and therefore it is easier for the computer to actually locate certain patterns within the code and return very interesting results. Also another thing that happens with electronic writing is that there is an increasing visualization of the presentation of texts.

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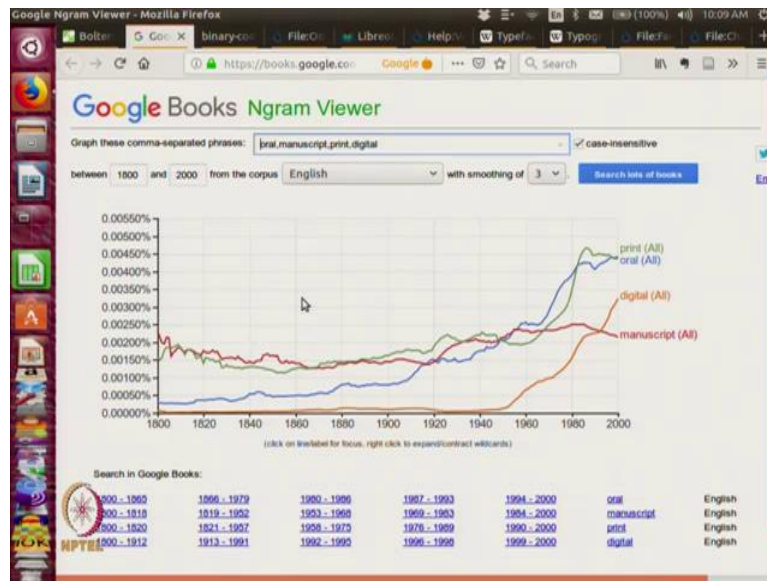
And this is something that is very interesting that you can do is that if you can go and experiment a little bit with the Google Ngram Viewer. What the Google Ngram Viewer does is Google today has a corpus of texts a very huge number of texts, you can see that button there which says search lots of books, this button right here, if I can just blow it up just a little bit you will be able to see it a little bit more, it says search lots of books, enormous number of books and what I have done is I have just taken certain keywords and seen the occurrence of these words across the various centuries.

And what Google does is presents the percentage of the proportional presence of those words across the centuries and we can come up with a very interesting kind of result which shows what is the distribution of each of these words across various books and this can help us understand for example I can take another interesting word and say which has been an important element in our study of this course and let us see what result it produces.
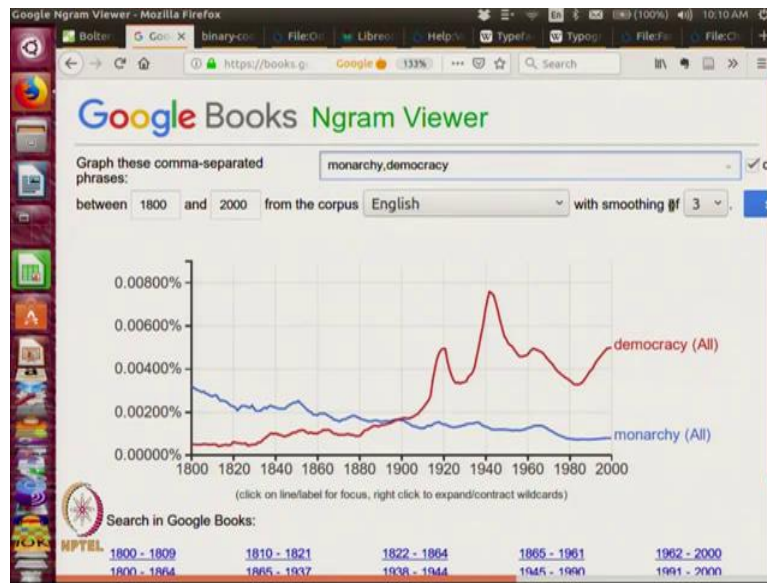
So, we find that the use of democracy really rises and if you see those 2 little peaks and if you can see the kind of peaks which are there can you identify what those picks are? These are immediately post war, post first and second world war that democracy takes a peak, the desire for democracy really rises after periods of intense wars and these are the kind of cultural meanings that we can draw from these kind of tools.

Now, this is happening because the machine is immediately in the moment has read billions of books and produced this result for us and this is something that the human beings can never do and it representing it to us in a visual format in a statistical format but what we really have is cultural data.

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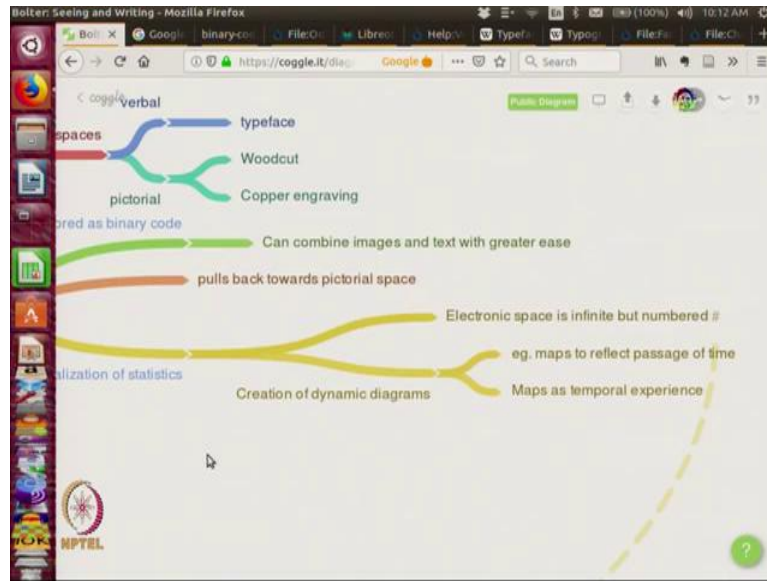
For the machine it is all a certain code that is there behind whatever it is doing and therefore it can now create various diagrams and maps and present data in a more visually perceptible way. This has certain cultural effects, this tendency towards data visualization, these have certain cultural reasons why these visualizations do happen. The human eye is able to on the screen perceive or read text we are becoming weaker in being able to read longer bits of text, our attention spans are falling something that we will look at in a different lecture we will study the matter and therefore visualization of research data, of news data is becoming of paramount importance now. Thank you.