ELEMENTS OF DESIGN – DIGITAL MEDIA

Sam and I have been working again on the eigenvectors paper – trying to get an analytical hold on the design principles that operate on (digital) media and mediation.

see my comments on digital humanities last year

Archaeology – looking at the design of things, in time, history, in relation to materiality.

Made some breakthroughs
– we had begun with the aim of developing some media *eigenvectors* – independent summaries of complexity and variability – we now realize that the notion of eigenvector (as an *independent* summary) is not right for what we are doing – we are developing a set of *interrelated elements*
– digital media are material processes (operations performed, such as computation)

– that an archaeology of media involves a focus on this materiality, in a genealogical frame

Hopefully this comes through in what we have written here.

Aims

to discuss and describe media in the abstract, that is as distinct from technical and material properties
to develop a set of terms and methodologies for proactive design of media forms – tools for product design

These terms will also function as components of a history of media and of (media) design.

Premise and timeliness – media and design in the light of the digital

Design is here seen as heterogeneous engineering (that is not presupposing any particular definitions of materiality, virtuality, the technical or the cultural) and not presupposing anything about the components (people, materials, values, concepts).

The aims imply an analysis of the components of product design today in a digital world – creativity, collaboration, research, analysis, styles, and with the digital involving an erosion of conventional distance between the real and the virtual.

The digitization of media removes artifacts from material culture. This allows a more rigorous and abstract analysis of media forms and a more deliberate construction of them for specific tasks. The goal is to put forward a set of well-defined terms and methods for doing this analysis and construction.

Alternate way of expressing this: the digitization of media replaces the media artifacts of material culture with different artifacts of digital culture.
(See also the Metamedia Lab discussion document on digital media as modes of engagement)

Definition of medium

A medium is a formalized method for conveying structured information to some participants (known or unknown). The manner in which this happens is subject to control and negotiation. Usually there has to be some agreement over encoding and decryption. Historically the notion of medium has been intimately associated with and constrained by material and technology, e.g. paint, paper, etc. And also certain institutional forms that controlled the technology. Now it's becoming less constrained because of the increasing digital nature of communication. More worldly information is becoming fungible and therefore amenable to computational processing and therefore transformation between media forms is accelerating.

In this regard it is better to think of medium as process of mediation, and as mode of engagement and symbolic manipulation.

More and more parts of society and culture are becoming available to computation and therefore can be considered as media – as mediation, as modes of engagement.

The digital does not just mean static information – it is about computation – process, actions performed, temporal structure, context,
(the equivalent of archaeology in the digital realm is to understand these processes – to track back from digital form – perform genealogical analysis).

All digital media are trivially reducible to binary data. There is no literal

materiality at this level. Materiality is in the algorithmic context of the media form – the compression, encryption, interaction, latency, redundancy and temporal context of the media form. This is the digital equivalent of materiality – the context in which the content of a digital media form has to be understood, manipulated and transformed.

This grounds the ideas here in the traditional study of culture.

Conventional terms/definitions/components

Media Studies are well established as a branch of cultural studies. Topic – cultural production.
Consider also the importance of the theme of creativity – creating in a cultural sphere.
(And here culture is often oppposed to material infrastructures in that it is seen to consist of ideas, values, images/representations.)

Components of such a cultural studies

technology – eg TV
tools as extensions of the person and the group
material form – paint, film, paper
rules and norms
qualifications for entry
archives/storage
gatekeepers
organisational architectures – TV studio, movie studio
groups, communities, producers, consumers, institutions, organizations
relations of cultural production
power relations – access, control
ideology critique – mass media as ideological state apparatuses
semiotics – communication – signifier-signified-referent
narratology and applications of literary theory/cultural theory
media history

media components/parameters – ELEMENTS

Latency

The delay from changing information to it being consumed by other participants. E.g. IM is extremely low latency, email has this weird asymmetric latency – it's fast to respond but may be slow to read. Newspapers are very slow. Blogs are very fast. Most digital media have low latency. Except eg digital layout for conventional print media.
People notice latency.

Latency is often relative to expectations within the task at hand. A 10 second delay in the context of IM is noticeable and annoying, but in the context of web publishing, is nothing. Hydra is another good example of this.

Persistence

How robust the medium is, how long the data persist without active maintence. Email is fairly persistent, IM is not. Documents are mostly about persistence.
issue here of materiality and curation – in relation to archives
matter here of the archaeology of media

Redundancy

Persistence is related to redundancy. Digitization gives us the choice of how much redundancy we want, and this is an economic choice and we always choose the short-term most economically efficient path. So, we tend to have very ephemeral digital media, because there's no (economically acceptable) way to choose robustness.

Temporal Redundancy – data can be redundant across time, as in a source code control system where a given document has an existence in a timeline (tree), and its relationship between other versions and branches is as important as its current state. ie it has a significant genealogy. Archives are an aspect.

Spatial redundancy – local and distributed. Local means, how high a degree of error correcting is in the actual format. Distributed means, how many copies of a given bit of media are there in the world. – The latter meaning is typically ignored in most modern systems, except for specific applications.

Format redundancy (algorithmic or combinatorial) – a good example of this is error correcting codes – the data can be locally redundant, so small damages to the data can be repaired. DNA is a good example of this as well. This property is

definitionally in opposition to compression and efficiency, and is typically referred to as entropy in information science literature.

Visuality

‘realness’ – richness – how close to human senses the final output is. Email (text) is artificial, not really directly experienced, but cerebrelly experienced. Video or sound is more directly experienced. A medium is said to be “rich” if it facilitates a more direct experience for the end user, ‘poor’ if it does not. Richness is often a sideeffect and not inherent in the medium, e.g. sending images via email. This is an unique vector – it is subjective, and not an inherent property of the medium.

Raw email text may not be very rich – is very flat – a haiku may be very rich – layout may increase the richness of text.
NB McLuhan?s hot and cold media

I (MS) think of this as something to do with people liking naturalistic media.

Complexity

In an information sense this is related to entropy (how much disorder is there?) eg a string of digits is non-entropic because it can be easily compressed – compression is about finding non-entropy/order – and high entropy looks like random noise.

Digital media can be more complex – they are more entropic – more difficult to compress. But, this is not inherently true. The previous sentence is much easier to compress as ascii text than as an analog waveform (spoken text). Digital media are often more capable of describing complex structure, though even here there are challenges from the analog world (e.g. the fractal nature of physical items).

Encryption

– compression is related to encryption (the encrypted form looks highly entropic)

A painting therefore doesn?t look very complex – eg digitally curating the Mona Lisa might result in a high res compressed file of 10MB – but this is not very

redundant.

Network topology

– the nature of the transmitting community and audience addressed. Perhaps this might be more generally described as the nature of the communication network (graph). This gets even more complicated with things like dark nets where the nodes are connected, but hidden from each other. (NB Latour on black boxing).
A broadcast factor (1-1, M-M, etc)
Node-link balance
how much priority is given one over the other
dendritic – hierarchical/linear/distributed structures

Transparency

can you see who you are talking to?
why does it matter?

Computational accessibility and Structure/formalism

Text vs video vs paint vs XML – eg trying to create semantic webs – semantic computation as a project that ignores (usually) the sociology, the culture
a new factor is available computing power – Google has lots of computing power

Programming language, HTML, vs raw text, etc – the degree to which it is parsable (and is therefore computationally accessible). Going back to digital materiality, this is how well you can describe the desired mode of interaction with the content. E.g. an HTML parser is rigidly describable, a parser for english text is not. This can also have a social element, depending on how much cultural data the reader needs to decode the content.

Structure and CA, are often at odds with people. This can be solved, and is more and more, with additional computation. eg Google. Or, my ‘mood indicator’ on my email program, etc.

Lots to think about here with respect to grammar and formal anaylsis.

NB also langue/parole

Forgivingness

How well a message has to adhere to the agreed format to be accepted. HTML is a not well specified media form, so the browsers are typically forgiving. But, JPEG is well specified, and the JPEG parsers are not forgiving. Because most programmers have programmer mind and are themselves rigid, most digital media to date has also been rigid. HTML isn't only because of the intrusion of lots of non-programmer minds into the medium.

Accessability

If normal people can author a media form directly, it tends to be more forgiving (e.g. HTML vs JPEG).

Temporal structure

The ability to capture, index, retrieve data over time.
also – synchronous communication/concurrence – also NB speech and text, image v movie
also genealogy – tracking changes in a wiki

genealogy is a crucial component in new digital media

genealogy (tracking changes in a text eg) has become cheap

Transactional costs

– go down across the board with computation and digitization. E.g. painting with oil vs painting with Painter Pro. wet plaster v Epson printer – NB the sociology of this and matters of democratization/ status/prestige goods/media) WWW has low transactional costs v TV (with its studios, licenses, organizations)

Maintenance costs

– are related to compression, richness, redundancy, and even the physical form.

Network effect/stickiness

– how easy it is to transfer content from one media form to another. ASCII text is

easy, it’s an open, simple format with a lot of tools. Word is hard, they deliberately obfuscate and complicate the format, and change it often. There’s a high barrier to entry to write any kind of transfer tool.
eg everyone uses Word, and hates it, and Powerpoint doesn’t work.

Centralization

how ditributed, controled
part of network topology, and more

Interactivity

Personal accountability/anonymity – whether a participant is known or anonymous, affects the structure and nature of interaction.

notes

What we’ve found is that media always has a social context, even when there is no physical manifestation.

We need some vectors with more social/political implications – control, accessibility, hierarchy.

NB cross linkages
persistence/robustness/archive – related to complexity, entropy
Examples, with their vectors
– email
– Hydra
– blogs
– video
– instant messaging
– google
– newsgroups
Analytical methodologies

event engineering – this is partly what the new media do
and media are now so evidently about social/cultural groups making themselves via things/interactions/information transfers – as they always were

what does it mean now to invent a new medium?

eg — is this blog a medium?