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Abundance of information: how do designers use information?

Philip Rhodes

Escola de Design, Universidade do Estado de Minas Gerais, Brazil

Abstract

Coleridge's famous line about water everywhere without a drop to drink may serve as a useful metaphor for the contemporary design studio. Engulfed within a sea of information, where does the designer look for references?

This paper outlines the results of an ongoing research project entitled 'Interactive Multimedia within the Design Studio' (grant awarded by FAPEMIG - Fundação de Amparo à Pesquisa do Estado de Minas Gerais).

In considering the information resources available within the design studio, McLuhan's often quoted phrase 'the medium is the message' raises interesting questions. The medium selected by the designer as a source of information may have an effect on the result of the design process. Indeed the role of the designer within the communication process may depend upon the medium being consulted. Similarly the choice of one information source rather than another may also influence the result of the design process. This paper therefore explores the mediums (information resources) available to the contemporary designer, the use of those mediums, and why the designer chooses to use certain mediums whilst ignoring or rejecting others.

The paper will discuss these issues within the context of the results of a survey conducted among practising designers within Belo Horizonte, Brasil. The survey looks in particular at the work of graphic designers, however product designers, interior designers and architects are also considered.

Introduction

Upon this gifted age, in its dark hour,
Falls from the sky a meteoric shower
Of facts... they lie unquestioned,
uncombined.
Wisdom enough to leech us of our ill
Is daily spun; but there exists no loom
To weave it into fabric...

This poem, 'Huntsman, what Quarry' by Edna St Vincent Millay, clearly illustrates the information glut in modern society. Information surrounds us, we encounter it in every place; yet is all of this information of any use, do we actually use it in a meaningful way. Neil Postman addresses this information meaninglessness when he writes:

"To put it bluntly, information has become a form of garbage, not only incapable of answering the most fundamental human questions, but barely useful in providing

direction to the solution of even mundane problems." Postman 1996: 378

As designers we are often left in a sea of information, as Coleridge describes, without a drop to drink. Yet designers have to have access to information, designers have to use information, they have to be aware of new innovations, of current styles, enter into discussions regarding new metaphors, or simply be aware of what is currently available and what is now obsolete. But how do practising designers, whether they be graphic designers, product designers, architects, interior designers, etc., navigate through this sea of information?

What is the role of information within the contemporary design studio? This question raises a more fundamental issue regarding the design process - how does the creative process function? And then what information

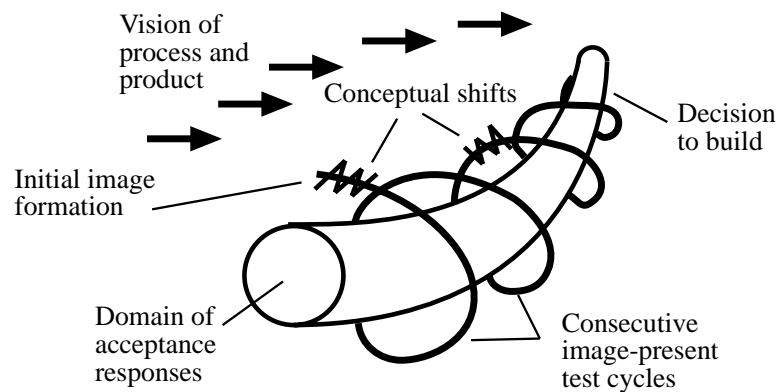


Figure 1 Zeisel's design development model (1981)

sources are actually available to the designer involved in the creative process, and why do designers choose to use one information source and not another? The paper addresses these questions theoretically and within the context of a recent survey conducted among practising designers working within the city of Belo Horizonte, Brazil.¹

The design process - or how designers think

Traditional models of the creative process see the design process as a series of identifying problems and outlining solutions. Asimov² describes the process as a series of loops, firstly a problem is analysed, then synthesised before a solution is optimised and finally implemented. Although this type of model clearly illustrates the resolution of problems, Broadbent (1984) through a comparison of the work of Karl Popper; describes the design process in terms of two elements, conjectures and refutations. Broadbent argues that the designer moves through a series of conjectures (ideas) and refutations (the abandoning of ideas), refutations being based on observations and experimentation. Broadbent notes that, this method:

"...encourages us (designers) to be imaginative, because we know that our design conjectures are going to be submitted to refutation procedures and as with scientific theories, only the good will survive." Broadbent 1984: 121

Zeisel's (1981) model of the design process is similar to Broadbent's proposition. Zeisel sees

the designer accepting or rejecting ideas based on an analysis of images which he/she produces. Zeisel's design development spiral (Figure 1) explores the architectural design process, illustrating how the designer through a series of 'conceptual shifts' and 'looping' structures moves through the creative process.

Although the models identified by Broadbent (after Popper) and Zeisel do not explicitly describe how designers use information sources within the design process, they do appear to suggest that information sources are used as a means of refuting ideas, or conceptually changing the focus of the design brief. If this is the case, then the information source consulted by the designer plays a significant role in the design process, for it is on the basis of this material that the designer moves from initial conception to complete design.

So which information resources do designers consult and why are those information resources consulted whilst others are ignored or rejected?

Powell (1987) in his survey of the architectural design process has suggested that Broadbent's model of the design process is 'idealistic'. Powell concludes that within actual working design offices the process of design can be seen as a process of conjectures and confirmations and not conjectures and refutations. Powell argues that this switching of refutations to confirmations is mainly due to the lack of time within a commercial office;

he notes that architects 'lay greater emphasis on early and robust conjecturing, rather than what to them would seem time-consuming refutation.' Powell continues by asserting that designers 'often strongly pre-structure their views of problems given to them, in order to produce a reasonable solution within the inescapable restrictions of both time and resources.' Russell (1977) uses a similar argument when he writes that 'style is at the root of expressive interaction' and that designers work within a 'private frame of reference'. Powell actually notes that designers do not seek alternative solutions, but desire reinforcement of their ideas. MacKinder & Marvin (1982) reach a very similar conclusion and note that 'designers relied (instead) on previous personal experience and only used technical references as a means of finding solutions to ideas that had already been generated.' In a recent study of design students, Durling (1997) identified that although designers are noted for ideation and divergent thinking, intuition plays a large role within the creative process.

Durling's study is interesting for he indicates that certain types of information, not necessarily different mediums, are preferred by design students within the design process. He notes several information characteristics which designers look for in their information sources:

- information which begins with the big picture, concepts and then gives details;
- information which has a light overall structure;
- information with a guided explanation that allows intuitive enquiry;
- information that gives alternative viewpoints;
- information which emphasises objective data;
- information which is presented in a logical and analytical format;
- information which is based on product exemplars.

Although these characteristics are useful, it is important to remember that Durling's study was based upon student responses and not practising designers. However when comparing Durling's conclusions with the

observations made by Powell, there is at least one similarity; designers have a preference for trade literature (product exemplars). In reaching this conclusion, Powell notes that designers use this type of material for several reasons, firstly because this material is presented in an 'easy to understand' format, it could be argued that it uses the same 'language' as that used by the designers themselves (note the use of diagrams, illustrations, colour charts, etc., rather than scientific or theoretical writing), and secondly the information resource is considered by the designers as reliable, having been produced by a reputable manufacturer. In his analysis of trade literature, Powell however identified several problems with this type of information with regard to providing the right type of information for designers. Powell noted that 'trade literature' rarely presents a 'holistic understanding' of a whole project. It normally identifies only a partial solution and does not permit the designer to make subtle design alterations, not allowing the designer to make new design strategies.

The findings of Powell (1987) appear to suggest that the 'ideal' design process is at conflict with the reality of the pressures of the design studio; where time and resources do not permit the designer to explore all possibilities. Part of this conflict, I suggest is due to the availability of information resources in a form which is most accessible for the contemporary designer. I will return to Durling's information characteristics later in this paper, however at this point I would like to return to Powell's design process, that of conjectures and confirmations.

Frames of reference - styles of learning

Powell (1987) argues that a designer adopts the process of conjectures and confirmations for two reasons, firstly due to the lack of time and secondly due to the lack of resources (information?) necessary in order to test all possible alternatives. In explaining these issues more concretely, Powell explores the work of American Psychologist David Kolb (1976). Kolb, in developing an experiential model for learning, concludes that 'in an idealised learning state, we sense the world, we then watch it, and then we think about it,

and then we do something about it, and then we sense it again' (Kolb (1976)). This 'idealised' state may be compared with Broadbent's idealised model of the design process. But as Powell concludes experienced learners (practising designers) develop a preferred manner of information processing, evolving strategies to make faster decisions and therefore not participate in all four stages of the learning cycle. He concludes that designers (learners) prefer to 'operate' within one of the four stages. Figure 2 illustrates Kolb's model of the learning cycle, with Powell's four styles of learning superimposed.

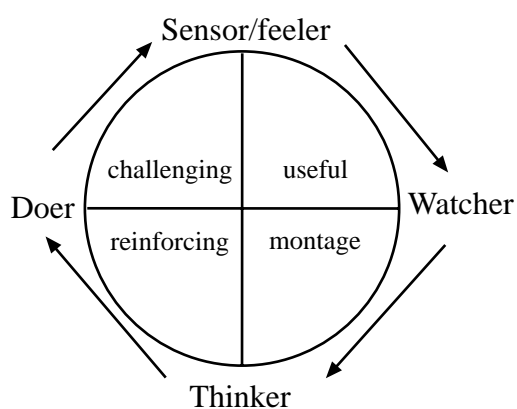


Figure 2 The learning circle outlined by Kolb (1976) and styles identified by Powell (1987) and Newland (1990)

Newland (1990) in an examination of Powell's four learning styles has identified certain 'information' characteristics for each style, see Figure 3. These characteristics are particularly important when considering the conclusions reached by Durling, for it appears that certain information characteristics identified by Durling correspond with different preferred learning styles outlined by Powell and Newland.

The preferred learning style of a designer may be considered in terms of Russell's 'frame of reference'. Following this line of thinking, the designer, in order to reduce time and resources, explores the design process from within their particular 'style' or frame of reference. All of these findings appear to support the conclusion that if designers are provided with information in a form which most readily 'fits' the characteristics of his/her learning style then maybe the designer will make use of that information source and will therefore move away from Powell's 'cynical' view of the design process (conjecture and confirmation) to that of Broadbent's (conjecture and refutation).

Conclusions from this literary survey appear to suggest that designers have preferences for certain types of information, and that these

<p>Challenging learning style</p> <ul style="list-style-type: none"> • designers rooted in sensing and doing • absorb information in short bursts • like to be presented with analogies • like trying new things • have to be personally involved • make snap decisions • like to offer personal opinions 	<p>Useful learning style</p> <ul style="list-style-type: none"> • focused designers • prefer watching and sensing • down-to-earth philosophy • 'small-is-beautiful' • like plain useful information • turn concepts into useful solutions • learn from practical examples
<p>Reinforcing learning style</p> <ul style="list-style-type: none"> • rigorous thinkers • adopt a systematic model of the world which they do not abandon easily • look for underlying patterns • like complex theories • like information presented in a structured logical way, like plans, etc. 	<p>Montage learning style</p> <ul style="list-style-type: none"> • contemplative designers • prefer watching and thinking • montage information • like to see the context • like lots of data • continually analyse data to see patterns • have difficulty in reaching conclusions

Figure 3 Preferred learning style characteristics identified by Newland (1990)

preferences may be due to the demands placed upon designers within commercial working environments, as well as the predisposition of the designer to select information sources. It can also be concluded that designers choose information resources which most closely resemble the designers preferred style of learning, and that if information is presented in a form which does not conform to the designers preferred style then that information source will not be used by the designer within the creative process. Based upon these findings, a survey was conducted to investigate which sources of information are currently available and most readily used within contemporary Brazilian design offices.

The design process in the real world

In March 1997, a small study of approximately 200 design offices based within the city of Belo Horizonte, Brazil was conducted. The questionnaire was mailed to artistic and/or creative directors of design offices after having first confirmed by telephone that those offices would be willing to participate in the survey.

The principal aim of the questionnaire was to observe the information sources currently available and used within contemporary Brazilian design studios. Several objectives were identified;

- to record the types of information available;
- to explore the frequency with which those information resources are used;
- to observe why certain resources are used more frequently than others;
- to investigate the role of new (computer) technology within the design office and within the creative process;
- to see if other information sources, not directly available within the design studio (film; television, music, etc.) are considered important references for contemporary designers.

Structure of the survey

The questionnaire was divided into seven parts: it addressed personal details such as sex, age, educational qualification, etc.; it also explored the size and type of work undertaken by the design office/studio. The questionnaire looked at books, newspapers, magazines and

journals, as well as computer resources such as Internet access, e-mail, and CD-ROMs. The questionnaire also asked the participants to describe the availability of these resources, the frequency with which they were consulted, as well as why they consulted each different information source. Finally the designers were asked to describe information resources which are not directly available within the design studio, such as television, radio, cinema, etc., which they consider are important references for them during the design process.

Results from the survey

The results from the survey indicate that designers have a wide range of information resources at their disposal. Newspapers, magazines, journals, books as well as computer resources are all available and are used by the participating designers.

The majority of designers (more than 70%) indicated that magazines and journals were their preferred type of information source. The designers concluded that this type of information proved not only easily accessible, but also up to date. Of the other traditional information sources, books and newspapers, were often available, and used by the designers. An interesting observation was that more than 65% of participants indicated that they not only regularly read the cultural pages of the daily newspapers, but also make equal reference to the Sports pages.

With regard to 'new' technology, there appears to be a direct relationship between the size of the design office and the use of information technology. Where there are more than 5 people within an office there is greater use of information technology.

When asked how the computer was used by the designers, the majority of designers noted that it was used during the creative process. The designers also noted that computer was used in the preparation of client presentations, actual client presentations, and administrative duties. With regard to Internet access, the majority of designers questioned do not use the internet on a regular (at least twice a week) basis. The designers stated that the connection time was too slow to be used on a

regular basis, and that there was not the 'right kind of information', or 'just too much information' available on the Internet. The results indicated that e-mail was the most widely used Internet function. CD-ROMs were used very infrequently, indeed the major use of the CD-ROM drive appears to be in the installation of software, or for listening to music.

When asked to select a word to best describe the characteristics of each medium (books, newspapers, magazines, CD-ROMs, Internet) no designers characterised newspapers as sincere, instead they described them as being up to date and accessible. Books, on the other hand were characterised as being authoritative and truthful.

With regard to alternative information sources (sources not immediately accessible within the design studio), a number of designers indicated that conversations with colleagues provided a useful source of information. Television, music, and radio were also noted by a significant number of designers as important information references.

Conclusions from the survey

Before undertaking the survey I hypothesised that computer based information sources, the Internet and CD-ROMs, would be widely available and used by practising designers. I believed that these sources would be the designers preferred sources of information. The results from the questionnaire do not support this hypothesis, indeed the findings clearly refute the importance of computer based information within the design studio. Based upon this finding, I am left with the question, why?

One reason could be that designers like to consult information resources and then 'discard' them, the popularity of magazines and journals appears to support this argument. Secondly, these 'discardable' resources are separate from the working environment of the designer. Note that the majority of designers use the computer as a creative tool, magazines, journals, books etc., are physically separated from the computer. Another possible reason is that some

designers consider the Internet to be too vast. Perhaps this supports Newlands information characteristics for particular learning styles. If this is the case then the Internet could be an excellent resource for contemplative designers, since it provides 'lots of data', context, and permits the designer to create a montage of information. This idea is supported to some extent by the comments of one designer who concluded that the Internet does not provide the 'right kind of information'.

An interesting, though possibly simplistic, finding from the survey was noted by one designer, he concluded that "I use magazines because I design magazine advertisements". I will tentatively suggest that this designer is following Powell's design method, for the designer appears to be confirming his design ideas against those within magazines. The importance of magazines as an information resource for designers, and the characterisation of magazines as 'up to date' and opinionated by the majority of designers; does appear to support some of the observations of Durling. Note that Durling acknowledges that designers prefer information sources which give alternative points of view, are objective as well as light in structure.

The results from the survey do not directly address the observations made by Newland or those of Durling, however some of the remarks made by the designers, for example the use of colleagues as information sources as well as the reliance on magazine articles, do not contradict the previous findings. I hope that a second part of the research project will provide an opportunity to explore in more detail possible connections between information characteristics and different preferred information (learning) styles.

An 'ideal' design studio

The results of the recent survey and the findings outlined in the bibliographical study indicate that there are certain characteristics which an information source must possess if it is to be of use to a designer within a commercial design studio. An information source must be:

- easily accessible
- presented in a style which can be easily understood
- be reliable / trustworthy
- conform to the designers own beliefs.

This final observation comes from Powell, who suggests that the information resources should be 'tailored' or 'weaved' into a fabric which conforms most easily to the information characteristics, learning styles of individual designers. In considering this conclusion, and based upon the results from the survey, perhaps an ideal information source is one in which the designer is not only receiving information within the communication process, but is actively selecting from various types of information, from video clips, sound (interview) sequences, technical descriptions to analyses of current trends.

It is often argued by protagonists of computer technology, that hypermedia (interactive multimedia) is an 'ideal' information resource. Through its simultaneous combination of many different mediums (text, images, sounds, videos, etc.) on a single computer screen, it provides a 'rich' information space which is non-linear. Hypermedia causes the user to move from a passive observer to become an active participant. Plowman (1997) argues that hypermedia bridges the gap between the author and the reader, changing the roles, and although she identifies various problems that this reversal of roles creates, she and other researchers have acknowledged that hypermedia does have several advantages in terms of information transference.

Doug (1993) in *Multimedia in Design* identifies various ways in which a hypermedia package could be used as an information resource in the design studio:

- design retrieval - combining audio, video, 3D models of part projects
- capturing design intent - audio notes, 3D models, recording the design process may help to explain the process to other members of the design team
- training (computer based training)
- design standards - reference material, industry standards detailed in a 'language' which is accessible to the designer

- design review and changes - permitting collaborative reviews
- communicating design solutions - detailing finished projects, integrating the design and the production processes.

Although I agree with Doug's uses of hypermedia, the results from my survey do not support the use of hypermedia (CD-ROM based or the Internet) as an information source for practising designers. But why, if hypermedia arguably has all of the necessary communication characteristics is it not considered as a 'useful' information resource?

The designer who noted that there was 'too much information' on the Internet, returns us to the problem identified in the introduction of this paper, that of information overload. Perhaps what that designer needs is a 'gatekeeper', 'someone/something' who can search through the mountain of different mediums and information and then select the most appropriate information sources. In some way this is the role that the magazine or technical journal does, however instead of the magazine editor being the 'gatekeeper', the designer requires a personal 'editor', selecting information according to his or her personal criteria. The findings highlighted within this paper suggest that different individuals prefer information presented in different formats, if a hypermedia package (perhaps a combination of CD-ROM with tagged Internet pages) is designed so as to include the mediums most readily used by designers, and presented in a form which follows the learning styles of those individuals, then perhaps the designer will move away from a 'sea' of information uselessness into a context in which information is accessible and useful.

In returning to consider the four preferred learning styles identified by Powell (1987), Newland (1990), etc., it appears that a hypermedia package is capable of providing information in a variety of different forms so as to communicate with each learning style. For example, Newland identified that the challenging learning style prefers information in short bursts, enabling the learner to be personally involved in the message. Useful learning style designers prefer to watch and

sense and receive information which is presented in a plain useful format. These characteristics can help in the design of hypermedia packages which can be tailored so as to provide information for designers which fit within the characteristics identified by Newland. Information which is easily accessible, presented using various mediums, designed according to the designers own preferred style of learning. There is not sufficient space here to describe in detail how one hypermedia (CD-ROM / tagged Internet pages) package could be designed so as to provide information on a particular subject for all learning styles, but I hope that you can see that there are a number of possibilities in which a hypermedia structure could be a very valuable information resource if designed in terms of the four learning styles.

An important element when considering different information sources in general and hypermedia packages in particular, is the use of different mediums. The observations of McLuhan in this area are particularly interesting, for he noted that 'it is the medium which shapes and controls the scale and form of human understanding'. When considering hypermedia and the preferred learning styles, perhaps there is a connection between different preferred styles of learning and different mediums. Questions such as these will form the second stage in this ongoing research project into the use of information within the design studio and the design process.

Conclusion

Postman (1996) writes that 'the tie between information and human purpose has been severed. Information is now a commodity that is bought and sold; it comes indiscriminately, directed at no one in particular, in enormous volume, at high speeds, disconnected from theory, meaning and purpose.' (Postman 1996: 380). As a counterbalance to Postman's statement, Powell (1987) concludes that designers will use information sources if they are 'easily accessed and understood in design terms, within the conventional design time, and also give the designer confidence in his proposed solution' (Powell 1987: 192). Perhaps what both Postman and Powell are

suggesting is that we need to humanise our information resources. We need to think of information not in terms of technological solutions but in terms of human understanding.

Notes

- 1 Belo Horizonte is the capital of the state of Minas Gerais. The city has a population of more than 2 million inhabitants, the fourth largest city in Brazil.
- 2 Asimov's general process of problem solving model:
 - Analysis of problem solution
 - Synthesis of solution
 - Evaluation and decision
 - Optimisation
 - Implementation

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