Making Connections

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Abstract

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Firstly, it is through literacy in multiple fields rather than introspection that designers can be creative and better able to understand design across various contexts. Secondly, explicitly searching out and understanding the language of external precedents rather than reflecting on personal precedents can provide a better base for a good design to be built on.

Abstract

The rapidly-advancing technological landscape also means that not only are we as people are getting overloaded with information, but we are also being faced with more wide-ranging design problems. However, there is a positive consequence in that we are also getting more exposed to unfamiliar and/or new ways of thinking about problems. Adapting to these new ways of thinking can lead to superior methods of solving design problems; however, this relies on us as designers being able to externalise these problems and think analytically.

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In recent years, design theorists have coined the term “designerly ways of knowing” in an attempt to define what distinguishes designers and makes them successful. They argue that intuition and subjective experience acquired in the process of designing, is what empowers designers to create fitting designs.

This paper however, will argue that this is not a useful line of thought—more important to designers is the ability to draw connections between seemingly disparate elements or pieces of information, and to understand context objectively (or at least as objectively as humanly possible). Moreover, this ability to draw connections will only become more relevant to design as technology advances.

This paper will be organised into four main arguments: firstly, the importance of literacy in all senses of the word will be explained, as it applies to the universal contexts within which all design takes place—human history, culture and technology; secondly, the processes by which designers are and should be inspired will be enumerated; thirdly, the preceding two arguments will be put into the context of the changing technological landscape; and finally, a comparison will be drawn between “designerly ways of knowing” and the methods put forward by this paper, and the need for the aforementioned ability to draw connections will be conclusively justified.

It goes without saying that in its most basic form literacy is the ability to read and write, and everyone can appreciate the importance of this due to the omnipresence of the written word in all facets of modern society. But beyond just essential communication, what about literacy—in all senses of the word—enables effective design?

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Firstly, as Goody (1977) notes, literacy is directly correlated with the metacognitive abilities of abstract thought. As literacy increases, so too does the degree of abstractedness with which people can comprehend things (Goody, 1977). That is to say, with increased literacy comes increased ability to decontextualise (Bruner & Greenfield, 1966), to take things from the real world, comprehend them objectively and manipulate them mentally.

1

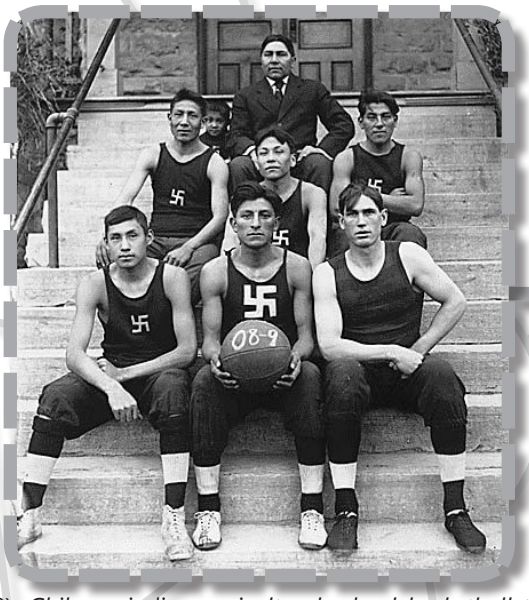
This ability is important because it enables comparisons to properly be drawn between disparate entities, and such comparisons enhance creativity. To be specific, the process of mentally breaking down a given thing into a configuration of components, and then identifying the multitude of other things that have similar configurations, not only enables the designer to infer more clearly the unique properties of said thing, but also gives them a number of applicable directions to take their design.

1

In expanding the topic of literacy, we need to look at the field of semiotics, which is often referred to as the doctrine of signs (Boradkar, 2010). Through the lens of semiotics, everything man-made in the world can be broadly described as symbolising something, through the aesthetics, purpose or any number of other measurable qualities. For example, the colour black is often recognised and deliberately used in the design of things to symbolise death. In this way it could arguably be thought of as the viewing of the world and all the products of human society as literature to be read, but a different kind of literature to that we usually think of.

However, in considering things as literature context is very important. Several major approaches to semiotics suggest that respectively history and social context is key to understanding the meanings of the symbols that surround us. One major theorist, Roland Barthes (1972) argues that much as the words of oral and written language have numerous denoted and connoted meanings, so to do symbols, with their meanings largely being derived from mythology and historical context. Boradkar (2010) cites the GM Hummer as an example of this: at a basic level, its form indicates a mode of transportation, while on other levels it expresses affluence with its relative size and fuel consumption, and perpetuates a myth of "outdoor adventure and solidarity with the US Army". Social context is also important: Gottdiener (1995) argues that the meanings of symbols is derived from people and social groups, hence there can be multiple meanings and the environment within which a symbol is placed bears heavily on its meaning or meanings. Furthermore, as Lumsden (1999) suggests, human culture is not unchanging—like humans themselves, it is in a constant state of flux; it evolves. Cultural inventions change over time as they are passed from person to person, from generation to generation (Lumsden, 1999). Thus there is not one context, or even a fixed number of contexts through which symbols can be understood, but an ever-changing number of semiotic contexts.

(n.d.). *2004 Hummer H1.* [Web Photo]. Retrieved from http://www.carpicgallery.com/2004-hummer-h1/hummer-h1-2004-background-wallpapers-jpg/



(1909). *Chilocco indian agricultural school basketball team on home 1 steps.* (1909). [Print Photo]. Retrieved from http://commons.wikimedia.org/wiki/File:Native_American_basketball_team_crop.jpg

A good example of the importance of historical and social literacy, semiotics and context is the swastika. The swastika is an ancient symbol which was extremely common in graphic design up until Adolf Hitler refashioned it in 1920 as the icon for the Nazi party (Heller & Pomeroy, 1997). Prior to that it was a universal symbol of good luck, so old it could be found in caves occupied by prehistoric Americans, and so recognisable it was used on everything from tribal blankets to modern advertising (Heller & Pomeroy, 1997). Hitler specifically repurposed the swastika for its visual power and recognisability to the point where it is now widely recognised as a symbol of evil. It is only within the historical context of the twentieth century through to today that this icon carries this particular abstract meaning.

On the basis of the swastika, it can be seen then that often good design isn't entirely original. More specifically, so much of human civilisation and culture has come before any of us today, that anything produced by designers today is inevitably unoriginal. In science our knowledge and understanding of the universe is far more expansive and complete today than it was in the ancient civilisations due to generation after generation building on a common set of knowledge. Likewise, modern design has built and will continue to build on all the design that has come before it. In fact, Nickerson (1999) suggests that often revolutionary works fail to be accepted, and it is works that are incremental improvements on those that came before are more likely to be accepted simply due the fact that they have pre-existing frames of reference to enable them to be understood and exploited fully. In short, ideas that are devoid of a historical link of some sort tend to be doomed to failure.

2

The proper course of action therefore, is to take advantage of precedent; that is what we as designers are expected to do. As Lawson (2004) describes it, a designer becomes an expert by building a pool of design precedents and developing their own guiding set of design principles over time. In other words, it is by being a sponge for previous ideas and by constructing a network of opinions on these previous ideas that you become an expert designer. Furthermore Mednick (1962) suggests that both those in the so-called "creative" fields as well as the more scientific fields produce the most innovative advances when they individuals have the mental ability to make the largest number of associations between ideas.

2

The compelling reason why precedent is an applicable approach to design education is the fact that few or no design problems are truly unique. Much of design is driven by basic human needs we all share which are derived from our common characteristics and environment. For example, the aesthetics of consumer products are driven by a myriad of common desires—the desire for status, or the desire to express ourselves, amongst others. Likewise, many products are utilitarian in nature and seek to meet people's survival needs—warm clothes to protect against the cold, for example. In this way, a connection between evolution and design can be drawn (Wake, 2000).

Just as there are common design problems so too are there common design solutions. This where abstraction and analogising come into play, except in this case to find similar, though solved, problems rather than similar solutions (as what we don't have is a solution). As Wake (2000) describes it, once we have found a prior solved problem of the same essence, we can analyse the essence of the prior solution so we can apply that solution to our current problem. Essential solutions that serve this purpose across in a range of contexts can be thought of as design paradigms (Wake, 2000). On example of this is the coil, which serves as a compact way of storing long flexible things such as rope, but also as a means of cushioning when in the form of a spring (Wake, 2000). And it is only through the ability to abstract and analogise is this way to solve design problems possible.

2

Beyond the field of man-made things, common solutions are also widely apparent in nature. In these cases, natural selection is the designer, filtering out all the unsuitable designs (Wake, 2000). By abstracting and translating such solutions out of their original natural context and into our knowledge banks as designers we can leverage nature to be truly innovative. Tsui (1999) gives an example of this in the form of termite towers. According to him, termites have accomplished a design feat in their towers that has eluded us humans. The propotionately massive skyscraper-like structures they construct manage to passively maintain a constant, cool interior temperature, in spite of the hot environments they are constructed in. Actual man-made skyscrapers have not yet managed to achieve such homeostasis without the use of large amounts of electricity to control air temperature and flow. It can therefore be said that the limits of human design prowess could potentially be overcome by learning from nature—the original designer.

Let us now consider design in the context of technological development. The world is rapidly changing—with the development of information technology and the Internet it is becoming more densely networked with every passing day. And, as Seltzer & Bentley (1999) opine, the world's economies are increasingly being based on the transfer of knowledge and other intangibles, with a great degree of immediacy. Businesses in these new economies control the flow of information, rather than physical goods as they did in the past. Or, as Floridi (2007) puts it, information is becoming our new ecosystem, and humans are growingly becoming connected informational organisms, as we live our lives increasingly online and vast networks of information are rapidly becoming our native habitat.

3

In becoming more networked, we are also becoming more globalised. The capability for inexpensive near-instantaneous communication between any two points on the globe is leading to more expansive design problems, which therefore in turn require far-reaching design solutions, but more importantly, require greater understanding of the multitude of contexts. Argubly, such rapid transfer of information is also leading to accelerated cultural evolution, exponentially increasing the number of potential contexts we as designers will have to deal with.

3

Technological development is making design a more complex field—designing things which take advantage of modern technology requires increasingly broad technical skills due to the nature of technology. Some designers in response may try to educate themselves in as many aspects of technology as possible, but the truth of the matter is that for most designers the complexity of technology just underscores a need to collaborate with experts in those fields. As Staples (2001) argues, increased time given over to technical aspects in design education have led to decreased time devoted to design theory, which obviously should be the key part of any design education.

By making connections with technical experts, designers improve both their lot and the lot of the aforementioned experts. According to Kirby (2001), designers and technical experts typically think in different modes—designers use divergent thinking, which is thinking that seeks out alternatives and explores the "solution-space"; whereas technical experts use convergent thinking, where they work by logic towards a singular possible solution. He goes on to argue that although this may be true, designers benefit most of all from mixing the two types of thinking, and that in reality being exposed to different ways of thinking benefits both parties. Design theorists may downplay the importance of logic and analysis in the field of design in contrast with more technical fields (Cross, 2007), but as Sternberg & O'Hara (1999) argue, the analytical part of the mind is involved in creativity, as it is only through analysis can the value of a creative solution be judged: both analysis and synthesis are key parts of design.

This is evident in the emergence of generative and evolutionary design. By defining a "solution-space" for a given problem on a computer, designers can have the computer automatically find the optimum solution within that space, using evolutionary algorithms in conjunction with human creative and critical input (Lewis, 2008). Using such a system can reduce the influence of the designer's prejudices, to produce a result that isn't necessarily expected, but is the most fit (Lewis, 2008). Thus, such a solution could be said to be innovative within the context of the problem. If the designer designs the parameters of the "solution-space" well, the optimum solution in that space is in turn, an optimal solution for the original problem (Lewis, 2008). However, if on the other hand the parameters are not well designed, such a process will not produce an original or optimal solution for the original problem (Lewis, 2008).

To this point, this paper has elaborated on the importance of approaching design process and thought from an external connective or associative perspective, but to clarify why this perspective is superior to that of "designerly ways of knowing" we need to go back and define what "designerly ways of knowing" are and contrast the approaches.

4

As summarised in the introduction, proponents of "designerly ways of knowing" posit that design is best thought of as an intuitive and subjective process, which designers become better at through introspection. One prominent theorist, Nigel Cross (2007) identifies five aspects of "designerly ways of knowing": designers tackle "ill-defined" problems; they use a "solution-focused" method of problem-solving, synthesis instead of analysis; they use a "constructive" mode of thinking; and they use "codes", both to "translate abstract requirements into concrete objects", and to "'read' and 'write' in 'object languages'" (Cross, 2007). With these last two aspects Cross (2007) refers specifically to the designer's ability to intuitively understand and use patterns, and to use illustration in the design process—arguably the word "semiotics" could easily be substituted for "codes".

4

In contrast, the view of this paper is that externalising the design process, rather than internalising it is the key to success. With regards to the first described aspect of "designerly ways of knowing" (the tackling of "ill-defined" problems), it has clearly been argued earlier that because of shared physical characterisitics and needs, this is rarely an accurate summation of design problems in reality. Furthermore, although proponents of "designerly ways of knowing" may argue otherwise, analysis is an inseparable part of design and not purely a scientific tool. In this way, the second aspect of "designerly ways of thinking" described by Cross (2007) ("solution-focused" modes of problem-solving) is arguably overly simplistic. Such modes of problem-solving are also transparently suboptimal, as unfocused evolutionary processes are able to generate better designs than human designers, and the development of technology is increasingly allowing such processes to be used in everyday design. Because of technology, synthesis is becoming of lesser importance, while analysis is becoming of greater importance.

With the third aspect of "designerly ways of thinking" proposed by Cross (2007) ("constructive" modes of thought), again the relevance of both analytical thought and synthetic thought is downplayed or ignored in favour of a black and white dichtomy between more purely creative modes of thought and more purely logical modes of thought, which is of increasing absurdity as technology pervades every aspect of the design process. Tacit design knowledge is put on a pedestal as designers "find it difficult to externalise their knowledge" (Cross, 2007), a statement which could just as easily reflect on designers as it could on design as a field. As this paper has explained, comprehension and analogising provide a sizable, external means to generate design solutions.

It is through analogising that semiotics or "codes" are possible, thus is makes no sense for the use of such elements to be understood purely as an internal process, as implied in the last two aspects of "designerly ways of knowing" (Cross, 2007). In addition, it has been shown that context needs to be taken into consideration when using semiotics in design solutions, making explicit the requirement for externalisation of design knowledge and analysis of said knowledge. Due to technology, the breadth of contexts that need to be considered is rapidly increasing, requiring wider bases of expertise and communication, which just reinforces this need.

To conclude, thinking of design in terms of making connections and understanding context objectively is a more useful approach to thinking of design than in terms of "designerly ways of knowing". This is for several reasons.

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Firstly, it is through literacy in multiple fields rather than introspection that designers can be creative and better able to understand design across various contexts. Secondly, explicitly searching out and understanding the language of external precedents rather than reflecting on personal precedents can provide a better base for a good design to be built on.

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Bibliography

Barthes, R. (1972). *Mythologies.* New York: Hill & Wang.

Boradkar, P. (2010). *Designing things: a critical introduction to the culture of objects.* Oxford: Berg.

Bruner, J. S., & Greenfield, P. M. (1966). *Studies in cognitive growth: a collaboration at the Center for Cognitive Studies.* New York and London: Wiley.

Cross, N. (2007). *Designerly Ways of Knowing.* London: Springer.

Floridi, L. (2007). A Look into the Future Impact of ICT on Our Lives. *The Information Society , 23* (1), 59-64.

Goody, J. (1977). *The domestication of the savage mind.* Cambridge: Cambridge University Press.

Gottdiener, M. (1995). *Postmodern semiotics: material culture and the forms of postmodern life.* Cambridge: Blackwell Publishing.

Heller, S., & Pomeroy, K. (1997). *Design Literacy: Understanding Graphic Design.* New York: Allworth Press.

Kirby, P. (2001). Experiences of interdisciplinarity: observations from the Masters course 'Interdisciplinary Design for the Built Environment', Cambridge University. In R. Spence, S. Macmillan, & P. Kirby (Eds.), *Interdisciplinary design in practice* (pp. 123-139). London: Thomas Telford Publishing.

Lawson, B. (2004). *What Designers Know.* Oxford: Architectural Press.

Lewis, M. (2008). Evolutionary visual art and design. In J. Romero, & P. Machado (Eds.), *The Art of Artificial Evolution* (pp. 3-37). Springer Berlin Heidelberg.

Lumsden, C. J. (1999). Evolving Creative Minds: Stories and Mechanisms. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 153-168). Cambridge: Cambridge University Press.

Mednick, S. A. (1962). The Associative Basis of the Creative Process. *Psychological Review , 69* (3), 220-232.

Nickerson, R. S. (1999). Enhancing Creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 392-430). Cambridge: Cambridge University Press.

Seltzer, K., & Bentley, T. (1999). *The creative age: knowledge and skills for the new economy.* London: Demos.

Staples, L. (2001). The New Design Basics. In S. Heller (Ed.), *The Education of an E-Designer* (pp. 6-9). New York: Allworth Press.

Sternberg, R. J., & O'Hara, L. A. (1999). Creativity and Intelligence. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 251-272). Cambridge: Cambridge University Press.

Tsui, E. (1999). *Evolutionary architecture: nature as a basis for design.* New York: John Wiley & Sons.

Wake, W. K. (2000). *Design paradigms: a sourcebook for creative visualization.* New York: John Wiley & Sons.