Which Way For Education?
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Abstract
This paper combines two apparently disparate fields: environmental graphic design, and education. Specifically, it will consider how the notion of "wayfinding" in the design of environmental signage can be practically applied to learning and education. Design handbooks often present "portfolios" of examples rather than prescriptive theories. One exception is the "Wayfinding Handbook by David Gibson, which gives a practical categorisation, for instance: "Most wayfinding systems can be broken down into several categories of signs: *identification, directional, orientation, and regulatory*." This paper will expand these categories slightly and suggest how they can form the basis for a conceptual framework that can encourage progress and leadership in education. For example, an instance of orientation signage in education would be any learning that concentrated on enabling students to understand their own learning skills, styles, and strengths and weaknesses, such as giving an understanding of Gardner's multiple intelligences (the canonical "You Are Here" wayfinding sign). Each category of sign will be considered, with numerous concrete examples and practical suggestions. Of special interest will be acknowledging that signs can give different answers to different viewers, and the possibilities for viewers to learn to interpret signs differently.

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Introduction

> *"Order is no guarantee of understanding. Sometimes just the opposite is true... Cities don't come in chapters with restaurants in one section and museums in another; their order is organic, sometimes confusing, never alphabetic. To really experience a city fully, you have to acknowledge confusion."* (Richard Saul Wurman, Information Anxiety)

> *"To become completely lost is perhaps a rather rare experience for most people in the modern city... But let the mishap of disorientation once occur, and the sense of anxiety and even terror that accompanies it reveals how closely it is linked to our sense of balance and well-being."* (Lynch 160, P 4).

If you have become lost, maybe you will have experienced the emotions described above. This paper grew from a feeling that the same kinds of experience can face students when graduating from education. Most schools and curricula are places of order. But does this kind of order prepare students to "acknowledge confusion"?

Since there is a field of "environmental graphic design" and within it the practice of wayfinding design, it was a natural next step to examine the principles and see to what extent they could also apply to education and to the more metaphorical task of picking one's way through a lifetime of real-world possibilities.

We start with some background on the concept of wayfinding, look at the "Wayfinding Handbook" in particular, and draw some inspirations from influential formulations of design principles. The German cultural critic Walter Benjamin used the title "Two Way Street" for one of his books, and we look at examples not just of how people have designed environments, but how environmental design has in turn influenced the way people look at the world. Finally, we return to question of the title, suggesting an answer that may surprise.

Wayfinding Background

The term wayfinding was coined in 1960 by Kevin Lynch in the influential book "The Image of the City" (from which we have already encountered the disorientation example at the head of this paper). He explained the term "way-finding" as relating to the process of forming a mental picture of one's surroundings based on sensation and memory. Further works on wayfinding came with Romedi Passini writing "Wayfinding in Architecture" in 1984, and then co-authoring in 1992 with Paul Arthur "Wayfinding: People, Signs and Architecture". The Society for Environmental Graphic Design (SEGD) was formed in 1973, and describes itself as a "global community of people working at the intersection of communication design and the built environment." (http://www.segd.org/about-us/index.html). A good summary for the purposes of this paper is the following from the online essay "Interpretation, Decision-making and Wayfinding in New Information Environments" (http://seedandsprout.com/s11_gd573/?p=2356): "When an individual first enters an environment (whether digital or natural) the individual engages in a three part process which leads towards their cognitive

understanding of that space. First, the individual interprets cues within the space. Next, the individual makes decisions based on these cues in order to navigate the space... In the final step, the individual creates a mental map based on their navigation decisions which informs the individual's overall understanding of the environment." We will count down through each of these steps of (i) interpretation, (ii) decision-making, and (iii) wayfinding in reverse order below, drawing inspiration from concrete examples from navigational and environmental design.

(iii) Wayfinding: The Wayfinding Handbook

> *...in an era that badly needs designers with a synthetic grasp of the organisation of the physical world, the real work has to be done by less gifted engineers, because the designers hide their gift in irresponsible pretension to genius.* (Christopher Alexander, Notes on the Synthesis of Form.)

Although there are many design books that collect examples of signage, the number that provide concrete, prescriptive design directions is disappointingly low. One happy exception is David Gibson's "The Wayfinding Handbook". Of particular interest here is his discussion of the different possible wayfinding strategies that can be employed to produce a navigation system for a space. Using concrete examples of actual cities, he gives the following breakdown (Gibson 2009, Pages 37-38):

- Districts : "a place is divided into meaningful zones for use on signs and maps". The specific example is the growth of the University of Cambridge in the UK from the 13th century. "This system of residential and academic colleges, each with distinct names, coats of arms, defined precincts, and specific gateways, was a kind of early campus wayfinding, a mechanism of organizing the puzzle of Gothic buildings into coherent understandable entities."
- Landmarks : "Major nodes, like elevators or primary destination points". The example is the rebuilding of Rome by Pope Sixtus V, which featured a system of axial roads in which "the center point of each axis indicated the location of a major civic landmark. In some cases Egyptian and Roman monuments were relocated to these places to define them, in others, extant ancient churches were remodeled in the baroque style."
- Streets : "easily recognisable corridors and pathways form a comprehensible network". Gibson cites the "dramatic" contrasts in New York between the parts of the city remodeled by the Commissioner's Plan of 1811, and the "areas of Lower Manhattan that inherited the footprint of its colonial era settlements…. While the intersection of Nassau and Pine streets down in the Financial District sounds mysterious, most out-of-towners are able to find Fifth Avenue and Fifty-fourth street very easily."
- Connectors : "simple bold pathways that connect all destinations within one location". This is maybe the most interesting category for our purposes, and the example given by Gibson is that of the Forbidden City in Beijing, which he describes as "an urban microcosm carefully planned to convey a specific message… For those outside the Forbidden City's walls,

the architecture and the urban design symbolized power and dominance. For those allowed entrance, the succession of courtyards and palaces clearly led the way to important central destinations. The strong central axis through the palace complex was a connector linking the outside world to the emperor".

We can use the above categories as the basis of an analogy for education. The "district" approach is maybe the easiest to understand, since it relates very closely to the notion of separating a body of study into separate and broadly distinct subjects. This is probably the primary wayfinding strategy used by educational establishments to simplify the task of handling large bodies of knowledge and numbers of students: compartmentalised areas of study in a curriculum can be efficiently overseen by individual teachers or faculty.

There is probably a further environmental analogy to be made here with the first "capsule hotel", the Nakagin Capsule Tower, designed by Kisho Kurokawa, and constructed in Japan between 1970 and 1972. Kurokawa separated the structure of a traditional hotel into different units (actually modified shipping containers), and formed them into a tower by stacking them on top of each other (see Figure 1). The capsules even arranged with some deliberate disorder to emphasise their assemblable character.

Figure 1: The Nakagin Capsule Hotel in Tokyo
(Source: photo by pictureTYO on Flickr, approved for use in free cultural works under the Creative Commons Licence)

The "district" nature of both the syllabus and the capsule hotel decompositions are similar also from the perspective of their origins. The typical school or university

curriculum has a complicated set of roots. For instance, in "Disrupting Class", Clayton Christensen and his co-authors list four distinct jobs that "Society has hired schools to perform": "preserve democracy and inculcate democratic values", "prepare *everyone* for vocations", "keep America competitive", and "see to it that *every* child in *every* demographic improves his or her test scores" (Christensen *et al* 2008, Pages 52-64). The first three are all directly based on the real-world actions of students in their lives after leaving schooling, and the last is also similar when taking into account the description of its rationale: "The essential motivation for asking schools to make sure all students are proficient in reading, math and science is to eliminate poverty" (*Ibid*, Pages 62-63). Similarly, the capsule hotel was born of the "metabolism" movement in Japanese architecture, which looked for inspiration to the processes of nature and of real life. Since evolution and biological processes can produce complex structures by the repeated application of simple processes, similar concepts were applied when drafting plans for buildings and even entire towns.

However, one wonders whether the compartmentalised nature of the "district" model captures the essential aspects of a living system in the wider sense. It may be no accident that Gibson's canonical example is a university town. What analogies can we make for the other three strategies? The list below is a simple first attempt:

- Landmarks →flagship theories (eg, relativity)
- Districts → subjects in a syllabus
- Streets → narrative concept, interdiscipline
- Connectors → boundary-spanning projects

The list in this order has some kind of increasing complexity in its application to education (one suspects that the appropriate ordering varies according to environments, and Gibson himself also uses different orders in different places). Concentration on individual theories or subjects, builds to compartmentalised subjects, through narrative and interdisciplinary walks down streets (you don't know what building might be next), and the boundary spanning of the connector "simple bold pathways that connect all destinations within one location".

Note that in addition to the four wayfinding strategies, The Wayfinding Handbook also gives a categorisation of possible sign types that can be used to implement the strategies. Since space is limited here, we just list the different types, together with possible analogies from education.

- Identification Signs: "The building blocks of wayfinding, identification signs often provide the first impression of a destination. These signs are visual markers that display the name and function of a place or space, whether it is a room, an individual building, or a campus gateway." The analogy here would be things like factual resources and handouts. Note that Gibson emphasises that identification signs do not have to be solely functional, and can be designed to promote a specific image or atmosphere.
- Directional Signs. "Directional signs constitute the circulatory system of a wayfinding program because they provide the necessary cues that users

need to keep on the move once they have entered a space." One analogy here would be rubrics or help guides for tasks.

- Regulatory Signs. "A regulatory sign describes the do's and don'ts of a place. It can be as simple as a No Smoking sign or a more complex display with rules indicating how citizens should enjoy and respect their public park." In education, too, the aspirations should be clearly signposted.
- Orientation Signs. "To make a complicated apace less baffling, orientation signs offer visitors an overview of their surroundings in the form of comprehensive site maps and directories. The design of orientation signs needs to coordinate with other identification and directional signs in a system." The larger picture signs in education should focus on things such as awareness of individual learning styles.
- Donor Recognition Signs. "…often included in many large wayfinding programs… to acknowledge the individuals who have made it possible to build and fit out a new institutional facility." One example here would be acknowledgements of previous literature

To these signs we can add the importance of feedback signs. Digital technology is increasingly being incorporated into signage to allow, for example, motorists to be informed of their current speed, for a gallery to display the number of visitors it has attracted, or for a service desk to solicit touch-screen feedback from the people it serves. Since Gibson was writing recently, it seems odd that such a category is not mentioned, especially as there are also low-tech versions such as sliders on doors to indicate the status of the occupant. In education, feedback signs seem particularly important, to provide feedback loops between teachers and students.

(ii) Decision-Making: Finding a Good Fit

If a man wears eighteenth century dress today, or wears his hair down to his shoulders, or builds Gothic mansions, we very likely call his behavior odd; it does not fit our time. These are abnormalities. Yet it is such departures from the norm [that] stand out in our minds, rather than the norm itself. Their wrongness is somehow more immediate than the rightness of less peculiar behavior, and therefore more compelling. Thus even in the everyday life the concept of good fit, though positive in meaning, seems very largely to feed on negative instances; it is the aspects of our lives which are obsolete, incongruous, or out of tune that catch our attention. . (Christopher Alexander, Notes on the Synthesis of Form.)

If we have some notion of the language of wayfinding thanks to the Wayfinding Handbook, we also need to consider how decisions will be made by people within any wayfinding system we may construct. Here again, we can appeal to the field of environmental design, this time via the work of Christopher Alexander. His book "Notes on the Synthesis of Form" (which we also saw at the head of the previous section) has been hugely influential both in design and architecture and in computer science, where its ideas provided one of the threads in the birth of object-oriented programming. In the example above, we see a version of Alexander's visualisation of a fundamental design principle. When designing a new solution ("prototype form") for a particular problem ("context"), for most interesting tasks there is a fundamental problem: "The experiment of putting a prototype form in the context itself is the real criterion of fit. A complete unitary description of the demands made by the context is the only fully adequate

nonexperimental criterion. The first is too expensive, the second is impossible: so what shall we do?" (Alexander 1964, P 22). So, how can decisions be made? Alexander illustrates with a concrete example:

> *"Suppose we are given a button to match, from among a box of assorted buttons. How do we proceed? We examine the buttons in the box, one at a time; but we do not look directly for a button which fits the first. What we do, actually, is to scan the buttons rejecting each one in which we notice some discrepancy (this one is larger, this one is darker, this one has too many holes, and so on), until we come to one where we can see no differences. Then we say that we have found a matching one. Notice that here again it is much easier to explain the misfit of a wrong button than to justify the congruity of one which fits."* (Ibid, P23)

There is a field called "cybernetics" that provides us a further wayfinding example to reinforce this message. One of the founders of cybernetics, Gregory Bateson, discusses the example of a rat trying to navigate a maze: "is there a difference between 'being right' and 'not being wrong'? Should we say of the rat in a maze that he has 'learned the right path' or should we say only that he has learned 'to avoid the wrong paths'?" (Bateson 2000, Page 411). We can say that what does not occur in a system will likely be because of "restraints". Bateson's summary is that "[C]ybernetic explanation is always negative. We consider what alternative possibilities could conceivably could have occurred and then ask why many of the alternatives were not followed, so that the particular event was one of those few which could, in fact, occur." (*Ibid*, Page 411). We will use these notions of restraints, negative explanations, and misfits in the penultimate section. Notice, by the way that the very name "cybernetics" suggests its usefulness to this paper: it is from Greek, and means to "steer" or to "navigate."

(i) Interpretation: The Link to the Environment

In education, there is the important notion of "context" and theories such as that of Vygotsky privilege cultural mediation (Vygotsky 1978). With a focus on design and the environment, we can garner examples that illustrate the differing "interpretations" of individuals in other ways.

For instance, in 1976, the respected anthropologist Edward Hall linked the world's population/environment crisis to the "more subtle, but equally lethal" crisis of "humankind's relationships to its extensions, institutions, ideas..." (Hall 1976). Thirty years on, this insight still seems extremely prescient. One of the most ubiquitous human extensions is the city and study of the city and its inherent relationships has led to works with profound impact, for instance Friedrich Engel's "The Condition of Working Man", Jane Jacobs's "The Death and Life of the Great American Cities", and art such as that of L S Lowry. Author Steven Johnson has written cogently of how such works presaged the development of the science emergent systems, and of the need to think of cities "on the scale of the superorganism" (Johnson 2008)

We mentioned Benjamin in the Introduction and he offers many more insights, including the identification of connections between the crowds of a city and impressionistic painting. Looking at a crowd is an experience that, according to Benjamin, required adaptation for 19th century eyes. The crowd is made up of

moving individuals who together form a mass. The viewer's attention will move from individual to individual and by assembling these "flecks" a crowd will be apprehended. Benjamin's suggestion was that "The method of impressionist painting, whereby the picture is assembled through a riot of flecks of color, would then be a reflection of experience with which the eye of a big-city dweller has become familiar." (Benjamin 1976).

Space is too short here for further examples, but we can summarise again with an appeal to cybernetics. In "The Tree of Life", Maturana and Varela give the example of an arrowhead plant (sagittaria sagittifolia), whose leaves change shape depending on whether they are above or below water, asking the question "Is this behaviour or development?" You may wish to think about your answer to this.

The point made by Maturana and Varela is the systems theory notion that to concentrate on either "behaviour" or "development" is incorrect. Instead it is only the structural coupling of the system as a whole that can be meaningfully talked about (See Figure 2). We will take this viewpoint into the final section.
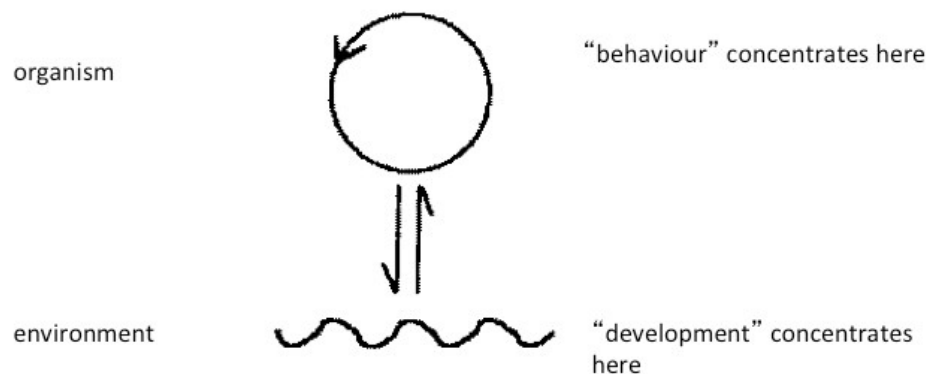

Figure 2: Viewing the whole system as one is most important: structural coupling

Go: Which Way for Education?

We may now be in a position to look again at the question in the title of this paper. Amongst others, we have seen examples from wayfinding (Gibson), design (Alexander) and cybernetics (Bateson, Maturana and Varela). We can now reformulate our question as "What education can prepare students to 'acknowledge the confusion' of the real world through their interpretation, decision-making and wayfinding?" As Alexander described, and as we can see from the ideas that come from considering the overall theme of navigation and environmental design, the real world is a good source of lessons. Does a "district"-based, compartmentalised treatment capture this nature? What shape might we expect for a "connector"-based, decision-making framework with imposed artificial restraints to maximise identification of misfit of both prototype form and students' interpretations?

One good fit for this reformulated question in the field of education is work such as that of Tina Seelig, who in "What I Wish I Knew When I was Twenty" has constructed a program at Stanford University that challenges students to carry out

real-world tasks (Seelig 2009). For example, she has one project inspired by the feat of Kyle MacDonald, the Canadian blogger who bartered his way from a single red paperclip to a house in a series of online trades over the course of a year (see his online blog recording this at http://oneredpaperclip.blogspot.com/). Seelig has described the problem in an interview with Guy Kawasaki (2009):

> *"students are given a handful of paperclips or rubber bands and are challenged to create as much value as possible in only a few days. Value can be measured in any way they like. The lessons they learn are priceless: They realize that there are opportunities everywhere, that they can easily leverage limited resources, and that they can create real value in only a few days. Also, they experience the power of rapid prototyping, effective teamwork, and how to execute on a plan. It is amazing to see the range of solutions from teams from around the world. This exercise reinforces the idea that life is the ultimate open-book exam—the doors are thrown wide open, which allows you to draw on endless resources to tackle open-ended problems in creative ways."*

A fit from a rather different medium is the series of TV programs "The Apprentice", which started in the USA in 2004, and was developed by British TV producer Mark Burnett. In this series, two teams of contestants compete on various real world tasks such as developing a new brand of perfume, or setting up a new junk disposal company. The teams are given various supports, such as access to professional designers who can make product mock-ups overnight, but also function under severe restraints, notably the prohibition of using the Internet or any computers themselves. They must manage everything from project management to physically selling goods, including brainstorming, negotiation, questioning focus groups, market research, and pitching to companies and industry experts. Each episode ends in "The Boardroom" where the losing team's failures are exhaustively negatively explained by the boss, and one candidate is fired. A notable feature in the vocabulary of contestants is how they "grow" and "learn" over the course of a series.

Since the actual etymology of the word "apprentice" is from the French *apprendre* (to learn) it is perhaps not such a long distance we have travelled to end at this point. I am indebted to Malcolm Field for the observation that apprentice-style learning has notable similarities to the Web 2.0 models of knowledge sharing, with the "few-to-one" relationships of "traditional" apprentices replaced by a "many-to-many" network of people with similar goals. In our other paper in these proceedings we have jointly written "There is a growing awareness that the main threat to the academy of higher education (HE) is the declining relevance of its core product: knowledge." Independently of my insertion of The Apprentice as the last example in this paper, Dr Field has suggested that the apprentice model may be about to start regaining popularity unless HE solves their relevance problem.

In the UK, the apprentice system stretches back to the Middle Ages. In 1802, the Health and Morals of Apprentices Act decreed that there should be a maximum of a 12-hour working day and a requirement that factory apprentices be taught reading, writing and arithmetic. There were around 240,000 apprentices by the mid 1960s, but the system declined due to concerns about factors such as exclusivity, male-domination, focusing on serving time rather than on outcomes,

and failure to embrace new and expanding occupations (data from the UK National Apprenticeship Service http://www.apprenticeships.org.uk/About-Us/History-of-Apprenticeships.aspx). Maybe the times are now becoming more conducive? At least, we are planning our own apprentice education course next year.

Conclusions

Borges will pass his hands over the spines of the books, as if feeling his way over the rugged surface of a map in relief and, even if he does not know the territory, his skin seems to read the geography for him. Running his fingers over books he has never opened before, something like a craftsman's intuition will tell him what the book is that he is touching, and he is capable of deciphering titles and names which he certainly cannot read. I once saw an old Basque priest work in this way among clouds of bees, able to tell them apart and assign them to different hives, and I also remember a park ranger in the Canadian Rockies who knew exactly in what part of the woods he found himself by reading the lichen on the tree trunks with his fingers). (Alberto Manguel, With Borges)

To achieve the navigational ability of a Borges is beyond the reach of most. But in this paper we have used environmental graphic design and navigation as starting points to ask what we might learn about education and educational leadership.

We ended with the real-world example of "The Apprentice" TV series, questioning whether the apprentice style of education may deserve some re-consideration. In the UK there is also a "Young Apprentice" series for participants of 16 or 17 years of age. Each episode of the program starts with the voice-over "It's an education like no other". Should it be?

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