LATENT PREPARATION

Do great ideas come from out-of-the-blue?

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Abstract. Some designers have a knack of making design look easy, producing concepts, seemingly from nowhere. Other designers, suspicious of pie-in-the-sky ideas, prefer to design methodically. Are novel design ideas simply thoughts from out-of-the-blue, or are they insightful, resulting from deeper understanding? This paper reviews statements from a recent interview study of architects and designers, which assessed the extent to which conceptual designing is insightful. Most respondents stated that insights contributed to their designing, but two affirmed rational design processes and appeared skeptical of discovery based concepts. Analysis of the respondent statements generally, indicates that: 1) there are different levels of insightfulness, 2) insightful discoveries are also qualitatively different and 3) many appear to be an outcome of latent preparation (an incubation-like mental activity that ranges between active conscious designing and passive apparent unconscious activity), rather than arbitrary, out-of-the-blue inspirations. The paper concludes by considering prospects for further research and implications for both education and digital media.

1. Introduction

Concepts associated with insightful problem solving, such as restructuring, fixation and incubation, have been studied in cognitive and design protocol research. (Finke Ward and Smith, 1992; Jansson & Smith, 1991; Purcell and Gero, 1996; Lloyd, Lawson & Scott, 1996) However the role of insight in strategic activities such as designing has received much less attention, even being dismissed by some prominent researchers, such as Simon (1989).

This paper develops ideas from an interview study of forty five award winning and highly accomplished, male and female architects and designers, practicing in different locations throughout the city and suburbs of Sydney, Australia. The respondents include; 1) Two graphic designers, two architects and a professional artist-designer, all known by the first author, interviewed in a preliminary study, and 2) Twenty male and twenty female architects, about half being recipients of RAIA awards, prior to their interview.
The remainder were nominated when respondents were asked to name practitioners whose work impressed them. Figure one, at right, provides an indication of the gender balance and years of professional experience of the forty five respondents.

The aim of this exploratory study was to assess the extent to which conceptual designing, by a sample of accomplished practitioners, is insightful.

The decision to interview practitioners was made for three main reasons: 1) The unsuitability of protocol study methods, for investigating the whole design experience of a sizeable number of individuals, 2) The less constrained scope of the interview form, and 3) Demonstrated successes of previous interview studies in drawing out evidence of unexpected design behaviours. Conspicuous examples include studies by Darke (1978) and Lawson (1979). An observation by Lawson (1979) that architects tend to be solution focused, rather than problem focused, influenced a significant planning decision to orient the research towards solutions, or discoveries.

The one-on-one semi-structured interviews focused on how respondents managed creative activity and on discoveries made at any time throughout conceptual design. Questions were open-ended, to elicit revelations without leading or inducing biased answers, progressing from the general to the particular, through four stages as follows: 1) Introduction - career, personal attributes. 2) Designing and designers - design philosophy, values, features of how respondents design. 3) Working and discovery patterns - attributes of designing and recollections of breakthroughs and discoveries, 4) Completion - consisting of queries to elicit remaining or emergent unstated thoughts.

A set of well known problem solving concepts, originating in Gestalt theory, were identified and employed as indicators of insightfulness. These are, preparation, fixation, incubation, restructuring and "aha!" response. Gestalt theory proposes that solving novel problems requires productive, as opposed to reproductive, thinking and that the resulting insights, or acts of recognition typically involve a reinterpretation, or reformulation of the problem situation, called restructuring. The restructuring, which is often sudden and unexpected, leading to an "aha!" sensation, typically follows a series of acts and events. 1) a period of preparation, 2) the experience of fixations, or mental blocks that frustrate solution attempts, causing the solver to get stuck and 3) a period of incubation, thought by Gestaltists to involve some form of unconscious mental activity. (Wallas, 1926; Duncker, 1945; Kaplan & Davidson, 1988; Mayer, 1995)

Respondents scored one point, on a scale of 0-5, for positive statements made in relation to each indicator, when describing a discovery, or referring to discoveries generally. A second measure, relative significance of discoveries made during active design sessions (called hot discoveries) and at other times (called cold discoveries) was evaluated, employing four indicators, frequency, importance and degree of hotness and coldness. A third measure, insightfulness of cold discoveries was based on whether respondents attributed greater insightfulness to cold, than to hot, discoveries.
In general, most respondents (39/45) indicated that insights assist design conceptualisation, but a contrasting perspective was also noticed. Two of the remaining respondents emphasised that designing was consciously based on a rational incremental process and that unexpected discoveries and insights were rare. They also displayed some skepticism towards such discoveries. Both are well known, highly regarded, capable, productive, experienced architects, not unlike the other respondents, but they articulated a clearly different view of the origins of their design concepts.

This paper reviews contrasting statements of insightful and incremental designers, and what these reveal about design conceptualisation. In view of space limitations and the study focus on signs of insightfulness, an issue for which other individual attributes are not vital, description of respondents and other study details is brief. Papers, presented to CAADRIA2004 and recent conferences. (Murty & Purcell, 2004, 2006a and b) contain more details and cite additional references. The authors welcome queries, comments and expressions of interest from readers.

2. Key study findings

2.1. LEVELS OF INSIGHTFULNESS

Four levels of insightfulness were identified. Nearly one third of the respondents (14/45) described discovery experiences that were mostly situated within the times, places and intentional activities of designing. In this study these are referred to as hot discoveries and categorised as Insight Level 1. Reports of protocol studies of designers typically refer to discovery while designing. Akin & Lin (1996) observed novel decisions being made while a subject was rapidly alternating between examining, drawing and thinking, in rapid succession, which suggests that hotness may be equated with peaks of design activity.

Many respondents described insights occurring over a range of situations. In addition to hot discoveries, they described what are referred to as cold discoveries, occurring outside of the normal times, places and activities of designing, at the ebbs of design activity. Respondents like these, who made few or no distinctions between their hot and cold discoveries, or described them as similar, (15/45) have been categorised as Insight Level 2 designers. Other respondents (10/45) experienced both hot and cold discoveries, but affirmed that their cold discoveries are more insightful than their hot discoveries. They have been categorised as Insight Level 3 designers. The remaining respondents, (6/45) described as Level 0 designers, are a mixed collection ranging from individuals who were not clearly insightful through to those who were clearly not insightful. Categorisations by insight level refer to a predominant mode of discovery, rather than an exclusive respondent attribute. Currently there has been no investigation of why individuals are insightful, let alone in any particular way.

Respondent statements exemplifying different insight levels follow below.

2.1.1 Insight Level 1 respondents
A21, the principle of a major mid-city practice, described his experience as a graduate student of overcoming a mental block. He referred to ideas he was carrying around, which were percolating away and expressed a familiarity with both hot and cold discoveries. He made no distinction between the discoveries themselves, but observed that discoveries achieved while he is in the full flow of designing were more frequent.

... there's a lot of spontaneity in these ideas and probably most of the time that happens... in the immediacy of actually working. It's when my mind and hand are, kind of, one.

A30, who leads the mid-city office of a major national practice, described a combination of a rational informing process, which he refers to as facilitation and intuitive designing. He affirmed that insightful discoveries occurred to him while designing and at other times, indicative of either, insight levels 1 or 2.

... you act as a facilitator, you go through the whole of facilitation and the solution lies beyond it... beyond the facilitation realm is actually where the intuitive answer lies... I’m a great believer in... things tick over in your mind... they work on a subconscious level and all of a sudden it will just come to you.

A30 has been judged as more Level 1, than 2. This is because non-work times he described, such as the following, have involved thoughts about designing, creating some doubt whether discoveries, when not at his workplace, are necessarily cold discoveries.

... I’m... a complete obsessive... [I] think about architecture all the time... driving along in your car thinking, you know, I can’t stand the fact that that lettering on the speedo is like that, then if you’re thinking about that, you’re thinking about architecture and you’re thinking about that all the time...

2.1.2 Insight Level 2 respondents
A39 a multiple RAIA award winner who leads a small but vigorous practice, described two unrelated forms of breakthrough; 1) a clear restructuring, that led him to re-site a building, when re-visiting and re-experiencing the site after acknowledging the current design was inadequate, and 2) an apparent cold discovery, involving sudden realisation of an idea for the roof of a public building. He described a design approach that combined a strong emphasis on understanding, logic and substance, but also intuition. He described his discoveries as occurring all the time, night and day, but like A21, he made no distinction between discoveries in different contexts. Referring to one, he said:

... I just woke up and there it was... you might think that there’s something romantic about coming up with an idea at two in the morning and so on, but it’s not, it’s just me still working... I don’t wake up and go, "I’ve got it!" I just wake up and say, "Oh right. So that will be like that"... It’s not like, you know, "that was a good idea and that wasn’t", or anything. It all blurs into one.

A29, the youngest respondent, and an RAIA award winner, described hot and cold discoveries, but emphasised that cold discoveries were a frequent occurrence.
… Oh all the time. Sometimes in the night… in the middle of the night… or in the morning, I might wake up and have resolved something which had been really bugging me… I think I love that part of your brain.

2.1.3 Insight Level 3 respondents
A04 described a design approach that included emphasis on development of understanding. He recalled a competition winning design for a museum, stating that the fundamental idea came to him fairly quickly, while thinking, rather than drawing. A04 also indicated that he experiences discoveries when not actively working. He readily acknowledged the clarity of discoveries perceived in the head, without the detail and complexity of drawings and other externalities, saying:

… You get the sense of bits clicking together in a simpler way, because it’s happening in your head. All things are possible and there’s a clarity. Sometimes when you try and when you’re drawing, you sometimes just realize the complexities of things. In the head, in those serendipity moments, it just is … it becomes effortless, the connection.

A23 advocated a design approach that involved attacking a problem from different vantage points, systematically mapping and distilling concepts through the use of diagrams. A23 recalled an instance where changes to a competition entry that she and her partner A22 ultimately won, followed recognition of weaknesses in the design.

I think a lot of ideas, or clarity of thinking, probably comes when you're not actively trying to make it come. I think it comes when you're kind of relaxed, basically… Quite often the solution… might come when you're not sitting in the office, or when you're doing something else in the office, that's unrelated to that…

2.1.4 Insight Level 0 respondents
Only two respondents emphasised that their designing is based on a rational incremental process and that unexpected discoveries were infrequent, or of uncertain value. The insightfulness of the remaining four Level 0 designers, who made few or no statements indicative of insight based discovery, could neither be confirmed, nor ruled out. These individuals either: 1) were unable to recall discoveries, 2) their statements about discoveries lacked indications of insightfulness, 3) they often designed in workshop settings, where credit for ideas is shared, or 4) a combination of these factors applied.

A01 described a way of working as initially methodical, analytic and deterministic, adding that this may lead to cognitive breakthroughs. He recalled one accidental discovery, which involved recognising a solution in an error, by a drafter he was supervising. A01 clearly associated discovery with externalisation, or hot discovery, which need not necessarily be insightful.

… rather than some sort of flash of inspiration, it's usually finding that a deadline has crept up… So you… draw it at the stage that it is… that usually… moves the project onto a new plane, because it suddenly brings out all of those things that have been floating around, but are not yet articulated.

A28 described a rational process when talking about his work and indicated some skepticism about the place of discovery in architectural work. He also referred to a house design where, in his view, the conceptual
development owed little to discoveries and more to precedent and attention to detail, a rational approach. He acknowledged cases when progress was made after making notes of ideas that came to him, when not working, but appeared to not see much significance in them.

I've never dreamed a solution, and if I have they never work… I probably enjoy the ones more, that I make while I'm working and that maybe comes out of... the methodical problem-solving… because it's been a lucid approach to the problem… That's satisfying, much more than [ideas arising from inspiration] because I am wary of those things.

2.2. DISCOVERY EXPERIENCES

An unanticipated finding was that qualitative differences in discoveries could be characterised by one of four types of experience, *clarity, fluency, recognition* and *idea*, as follows: 1) clarity experiences involve a noticeably stronger sense of realisation or understanding of a situation, a design, or a vital aspect of either. 2) fluency experiences typically involve a succession of ideas. This may, but need not be associated with a clarity experience. 3) recognition experiences typically involve the designer encountering something seen, or thought before and perceiving, in it, something that was not appreciated before. 4) idea experiences are typically, classic "aha!" discoveries, eg. a solution to a problem, or a generator upon which a design can be based. These experiences have distinctive characteristics, evident in the following respondent statements. Where possible I have cited respondents already referred to in Part 3.

2.2.1 Clarity experience

A23, referred to earlier as insightful level 3, expressed the view that the projects she did with her partner A22 are not resolved by a specific idea, but rather by insight and critique, or a more general realisation. This may be positive or negative, recognising a need, or a wrong that requires corrective action.

… its not like a light bulb comes on in your head or anything… a lot of the projects we do are kind of large and complex, so they're not resolved by one single idea…I think a lot of… design is less ideas, its more insight and critique than, you know, "Eureka!, I've got the solution”…

2.2.2 Fluency experience

A30, referred to earlier as insightful level 1, described how the design of one of his best known award winning houses flowed from mind to paper, as he drew continuously, without changes or corrections.

… the first house I designed… lying on the beach… I drew it in my sketch book, a section of it… and I thought, "that’s it!" … came from nowhere, just drew it…. practically the first time I tried to draw what I was thinking about…. It was a Saturday afternoon… I got off the beach and I went straight to the office…. And I sat there and I tried to draw it and I couldn’t… so I enlarged it on the photocopier… put a piece of tracing paper over the top and traced it and that’s the section.

The word drew, as used by A30, signifies both the realisation of a *gestalt*, or whole, and fluency without clarity, demonstrated by the failed attempt to
draft the design at his board. It was necessary to make a scaled photocopy which could be traced whole, with all relationships preserved.

2.2.3 Recognition experience

P2, a graphic designer, classed as insight level 3, recalled the development of a driving idea for her Masters thesis on the print era. The discovery occurred as P2 was organising her books in stacks and began idly reading a book by Edward de Bono, called Parallel Thinking.

...something he [de Bono] said about parallel thinking and design... that we tend to argue or look for the truth in things by having adversarial arguments... I ended up deciding that instead [of] dealing with the end of print, because the computer's come along... to look at where this had happened before [which] was with illuminated manuscripts... [There] was a huge industry, of designing and making these incredible books. And along came the printing press. There was this wonderful contrast of the two... that just came out of stacking some books. I would never have just come to that.

2.2.4 Idea experience

A04, referred to earlier as an insightful level 3 architect, described a classic "Aha!" idea experience as follows.

... the insight came very quickly. To say, "well look, what you really need to do is... create a big cheap space, which is just the shed, which has some soaring vertical qualities which... become the shelter for the smaller museum part, but... gives you a whole bonus space to put the sort of junk which you might normally find littered around a country museum's yard.

3. Conclusions

The interview data suggests that many highly accomplished designers are familiar with insighted conceptualisation. The statements of the insightful respondents suggests a rich variety of design discovery. Discoveries can be distinguished by insight level and qualitative experiences of insightful discovery are also distinctive.

Many of the insightful respondents associated cold discoveries with mental activity for which the underlying cognition is less apparent. A21 referred to ideas he was carrying around, which were percolating away, A30 to things that tick over in your mind. A04 referred to bits clicking together and effortless connection. A23 referred to clarity of thinking, when not actively trying to make it come. These experiences, referred to as latent preparation, appear to include incubation-like mental activities, ranging between active conscious designing and unconscious activity, at any time. Rather than simply getting inspirations out-of-the-blue, insightful designers appeared to be rational, methodical and mentally engaged in their work, in many different ways. There are few signs in the interviews that insightful hot, or cold discoveries are necessarily less attributable to cognition than are incrementally derived concepts.

So far this study has been primarily exploratory. That only two rational incremental designers were found among the forty five respondents was entirely unexpected. It is proposed that practitioners in design and other disciplines and locations will be interviewed, to find the extent of variation
among a wider population of individuals who plan and make intelligent, strategic decisions in their occupations. Whether skepticism of insightful discovery is rational, or self-constraining, whether insight experiences are outcomes of learning, and many other questions will be focused upon in future research, into issues of causality and individual differences. More accurate and authoritative methods of analysis and verification will also be developed when required and as research needs develop.

It is proposed that outcomes of this research, as it progresses, may influence education, for example by strengthening the case for support of individual modes of learning, shifting the focus of learning from fact acquisition to deeper learning and understanding, and raising awareness of the utility of latent preparation skills. An implication of relevance to design media, is a possible potential for development of cell-phone based, or similarly compact, mobile voice and freehand applications that support latent preparation, by enabling recording and facilitating communication with computer based text and graphic applications.

References


