

## TOWARDS AN UNDERSTANDING OF DESIGN TUTORING:

*A grounded study of presentation materials used in tutorial conversations*

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**Abstract.** In this paper we present results of a grounded study of materials presented by students during tutorial conversations over the course of a design studio. Based on key coding categories we extracted over the course of the study, we developed a vocabulary of five notions that allow us to reflect on students' work from the tutors' perspective. We discuss these notions and relate them to previous studies on graphic representations in conceptual design processes.

**Keywords.** Sketching, graphic representations, design conversation, conceptual design process, grounded theory

### 1. Materials of design conversations

Over the course of design processes, designers typically employ a variety of materials to aid in idea development. These “designers’ objects” (Porter 2004) can be of various forms and shapes, from sketch models and scale drawings to abstract diagrams and found objects. Jonson (2005) also stresses the importance of spoken language in this context, which, despite its volatility, we also consider as a “material”. We understand materials used in design processes as statements in a circular, conversational process, in which designers engage with (imagined) others (Glanville 1995, p. 452). In this context, materials serve to present thoughts and can help designers to assume different points of view, which potentially generates new ideas. In this paper, we examine ways in which such “presentation materials” are used in tutorial conversations over the course of an architectural design studio project. Here we discuss design tutorials and design critiques as a part of the conceptual design process, during which presentation materials are produced to enable conversations between design students and tutors.

Within the variety of presentation materials used in architecture, sketches are those that are most frequently associated with conceptual design processes in previous studies (for example Goldschmidt 1991, Goel 1995, Suwa and Tversky 1997). Schön (1983) describes sketching as the medium through which designers engage in a “reflective conversation with the materials of a design situation”. He identifies designing as an interaction of “making and seeing”, or “doing and discovering” (Schön and Wiggins 1992, p. 135), a process in which sketches are made and re-interpreted by the designer, which can generate unanticipated insights and new ideas, much in accord with Glanville (1995).

Several previous studies are based on the assumption that presentation materials themselves may be used to infer insights into the nature of the thought processes these representations were part of (for examples Neiman et al. 1999 and Rodgers et al. 2000). According to this view, conceptual architectural design processes are primarily concerned with depiction of

physical form (Akin and Moustapha 2004) and conform to shared conventions (Do et al. 2000). Achten (2005) for example states that architects reinterpret sketches “in an orderly fashion” and that reinterpretations “do not diverge wildly” (*ibid.*, p.3).

While presentations of design thinking such as drawings or models may be easily observed and recorded, we do not necessarily believe that they allow the conclusive deduction of thought processes that led to their production. They are by nature products of an oblique thought process, often deliberately ill-structured and ambiguous (Goel 1995) and often only intelligible to the designer himself (Pedgley 2007, p. 466). This effectively precludes attempts to analyse the role design materials play in designing in definite and formal terms. In our understanding, the utility of materials used in design processes lies primarily in stimulating or maintaining open-ended discussion and individual interpretation of ideas by students, tutors and critics alike. In this study, our aim was not to speculate on students’ thinking processes but to develop a differentiated understanding of the roles presentation materials play in tutorial conversations, from the tutors’ perspective. This eventually resulted in a small vocabulary of five notions that allow us to have fruitful conversations about our students’ work, which, we assume, could be beneficial to us in discussing tutoring strategies and assessment of students’ design studio work in the future.

## **2. The grounded research approach**

The study reported in this paper focused on the presentation materials produced and presented in the design processes of 12 second-year students of architecture over the course of a semester-long design studio. The study drew on the grounded theory approach originally proposed by Glaser and Strauss (1968) and further developed by Glaser (1998). Grounded theory provides researchers with a qualitative and primarily inductive way of conceptualising data gathered from observations in order to extract descriptive categories for the subject under investigation. This approach was chosen in this study as it offers openness to observations and insights of unanticipated kinds. In presenting our findings, we use the term “presentation materials” instead of the more often used “graphic representations”, as we did not observe such materials to be necessarily representational in a literal way. In our understanding, they are essentially evocative placeholders for what those involved in design conversations choose to see in them. We initially intended to compare conventional and digital presentation materials in students’ design processes, but did not observe clear differences between the roles such types of materials played during the study (Section 5.1). Our focus thus shifted to observing how the various materials produced by students to present and discuss their thoughts and ideas supported tutorial conversations between students, tutors and critics over the course of the studio project. We documented our observations in field notes taken during tutorials (about 260 individual tutorial conversations) and design critiques (four over the course of the studio project). Both of us were involved in the studio as participant observers in the role of design tutors. We sorted and coded field notes following each tutorial, adopting Glaser’s (1992) approach. The coding process is discussed in greater detail in Section 4, whereas resulting coding categories are outlined in Section 5.

## **3. Design studio set-up and brief**

The 12-week second-year design studio was set up to encourage students to think of architecture in terms of urban environments, using “landscape urbanism” (Turner 1996) as a guiding principle. The studio consisted of a series of projects that progressed through the analysis of case studies, analysis of local sites, proposals of urban scale design strategies and individual design proposals. Tutorial sessions were organised as group tutorials in a relaxed atmosphere, with students presenting their individual work in sequence (Figure 1, left).



Figure 1. Conversations during design tutorials (left) and interim presentations (right).

Interim presentations of student work were held at several weeks' intervals (Figure 1, right). More than half of the studio assignments involved group work, during which students however continued to develop individual ideas. Overall, the design studio was concerned primarily with site analysis and concept development, emphasising the development of design strategies rather than detailed proposals. For this reason, final outcomes typically consist of concepts and strategies rather than proposals for building form.

#### 4. Coding of observations made during tutorial conversations

We developed categories derived from coding of our tutorial field notes in parallel to and according to our observations over the course of the studio. We regard the coding process as the construction of a grounded understanding rather than a search for an objectively valid analysis. In initial coding phases we were primarily concerned with describing our observations rather literally in what Glaser (1998) describes as “open coding”, while during later stages we increasingly focused on “selective coding”, the extraction of descriptive categories. Figure 2 gives a visual impression of how our coding scheme evolved over the 14 weeks of the design studio. Coding categories changed frequently during the first half of the studio, but remained relatively stable during the second half, when we further examined their possible relationships, implications and contradictions. Gaps in the timeline-oriented diagram result from periods during which students primarily edited materials for interim or final presentations, which thus did not elicit any changes to the coding categories.



Figure 2. Diagram of coding scheme development over the course of the studio project.

During the first stages of coding scheme development we identified material formats such as “sketch”, “map” and “collage”. These were increasingly subsumed by more general categories such as “convention” and “effect”, which are discussed in more detail below. In contrast to coding schemes developed independently of and prior to the observation process, this process of reflecting on our observations over the course of the studio frequently changed the focus of our observations, which allowed us to accommodate initially unanticipated understandings and categories.

#### 5. Coding categories and discussion

This section presents five coding categories developed from field notes in the final version at the end of the design studio. They describe aspects of our understanding of how presentation materials support tutorial conversations.

### 5.1 FOCUS

This category was developed from attempts to classify materials brought to tutorial sessions by students according to their presentation formats. Initial categories such as “hand-drawn” or “digital”, however, seemed too limited to adequately describe the variety of materials students produced and mixed by changing media frequently. Freehand sketches, for example, would be scanned, edited, overlaid, collaged, printed out again and so on. We also observed that students often used colour-coding to structure initial ideas visually (Figure 3).

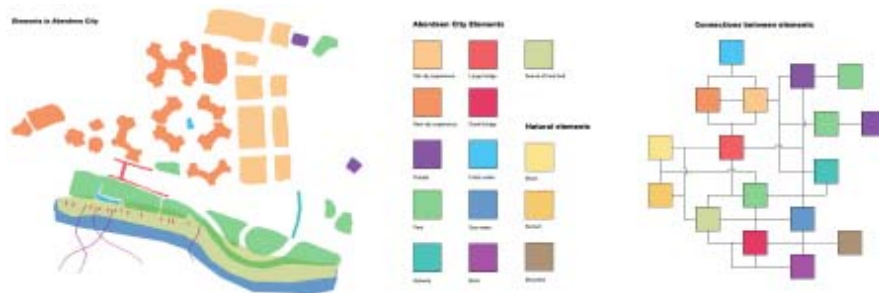


Figure 3. Colour-coding during initial thought structuring leading to conceptual diagrams.

Students often presented only a selection of the materials they had brought to the tutorial meeting, and of this selection, only one or two items became the focus of the tutorial conversation. Based on these observations, we decided not to classify all presentation materials in terms of types, but to concentrate on those materials that we found to be at the centre of tutorial conversations in greater detail, as a basis for the coding categories outlined in the following sections. Similar to Jonson’s (2005) findings, we observed that language was a key medium besides sketches and models in particular during early thought structuring. This became visible in the tutorial meetings following intermediate design critiques, when almost all students, without being prompted by us to do so, would primarily use language to describe and structure their thoughts. When presenting their work, students frequently struggled with making their understanding explicit for the first time, which often resulted in conversations with the tutor on what presentation materials “could be” in terms of figural as well as non-figural understandings (Goldschmidt, 1991). Tutorial conversations may thus be described as enabling both “seeing as” and “seeing that” (ibid.) based on and extending earlier, more private development of understanding.

### 5.2 CONVENTION

Similar to previous studies, we observed presentation materials in conceptual architectural design processes progressing from initially abstract and relatively unstructured to more structured and “realistic” formats at later stages of the design process (Purcell and Gero 1998, Goel 1995, Rodgers et al. 2000, Do et al. 2000). In our observations, we linked this process to the extent to which materials referred to conventional architectural presentation formats such as sections, perspectives and scale models. Early on in their design processes, students tended to avoid such formats, which may in part be due to our encouragement to reflect on conceptual ideas rather than building form.

Students initially produced large varieties of presentation materials, ranging from foam board models depicting smell intensities to diagrams depicting music or poetry with little or no reference to conventional architectural formats. As the design studio progressed, some students cultivated their own presentation conventions, which would typically refer somewhat to conventional drawing formats such as plan views, but at the same time avoid strict conformity with conventions. We assume this was in part due to students’ un-readiness to make concrete

commitments and in part due to the students' lack of experience in producing entirely conventional technical drawings. Figure 4 illustrates presentation materials developed by one student at different stages of her design process, progressing from early (left) to late (right). In our observations, this category is linked in particular to the category "ambiguity", discussed in the following section.

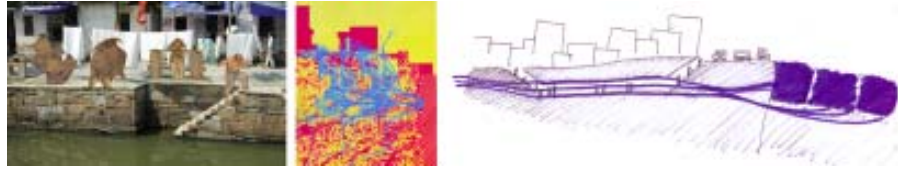


Figure 4. Presentation materials conforming to conventional formats to a low degree (left), somewhat (middle) and a high degree (right), all by the same student.

### 5.3 AMBIGUITY

Studies on idea generation and development in design processes typically emphasise the capacity of sketches to support a variety of interpretations, which are seen as key to developing new ideas (Goldschmidt 1991, Schön and Wiggins 1992, Suwa and Tversky 1997, Goel 1995). Achten (2005) however states that ambiguity does not lie in drawings themselves, but it is in "what the designer does with" the drawings. Over the course of the study, we observed that during tutorials and design critiques, presentation materials were interpreted in various ways by students, tutors and critics, provoking conversations that opened up new ways to further develop student work. Students often seemed to use materials allowing for multiple interpretations to defer design decisions during interim tutorial conversations and presentations, which seems to be a desirable design skill. We observed that this strategy permitted students to maximise the number of their options for further design development while keeping tutors and critics satisfied with their progress. Figure 5 (left) for example illustrates a model that was apparently interpreted in at least three ways: by us (the tutors), as describing ranges of possible human movement, by the student, as describing the abstract idea of "flow of activities" and by a guest critic, as depicting concrete physical form. All three interpretations coexisted for several weeks, and the model proved useful in the student's overall design process. The final design appeared to integrate the first two interpretations.

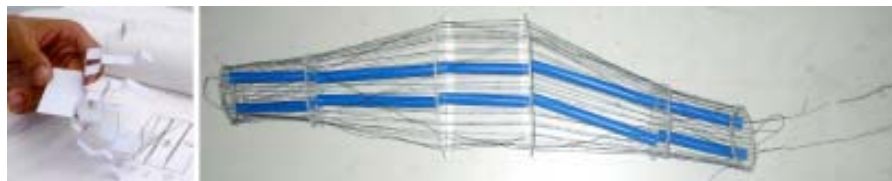


Figure 5. Interpretation-provoking models by two students.

When coding our observations, we associated the category "ambiguity" closely with the above-described category "conventions". In our understanding, ambiguity and diverging interpretations occur primarily when presentation materials make only limited references to conventional architectural formats, as this would overly constrain possible interpretations. In presentation materials produced early in their design processes students tended to deliberately disregard conventions, such that interpretations may diverge wildly from each other, and not adhere to an "orderly fashion" of interpretation as Achten (2005) suggests. In our understanding, ambiguity is a result of absence of shared codes that would suggest or enforce specific interpretations.

#### 5.4 EFFECT

We initially assumed that presentation materials can be distinguished into the categories of *analytic*, *generative* and *proposal* presentations according to the intentions the students appeared to have had before the tutorial session in which the material was discussed. From our observations, we however noticed that intentions were difficult to identify as they seemed to be re-negotiated during tutorial conversations. For this reason, we labelled this category “effect”. It describes what has been achieved by discussing the material in a tutorial conversation in retrospect. This category has further implications regarding the structure of the design studio which assumed a temporal sequence of site analysis, the development of urban strategies, and finally, the translation of these strategies into more specific proposals. During the coding process, we realised that students often seemed to address these aspects in a different sequence over the course of their design processes. Site analysis, for example, was often preceded with highly evocative (generative) materials that directed students’ attention towards specific areas of inquiry (analysis). Figure 6 illustrates one of many cases in which analytic and proposal-oriented materials could not be clearly distinguished.



Figure 6. *Generative analysis: a student's diagram.*

These observations put the sequence of steps of logical inference implied and demanded by the design studio setup into question. In retrospect we realise that site analysis should be recognised as being based on a subjective and directed viewpoint rather than on a disinterested objective one, as suggested by Turner (1996). Artificially separating analysis and proposal generation appeared to confuse students and thwart idea conception.

#### 5.5 ABSTRACTION

In our understanding, the coding categories outlined above may be linked through the overarching category of abstraction. Students appeared to use different levels of abstraction to describe their ideas, which in turn influenced the focus of tutorial conversations. We see students’ ability to abstract from observations and thoughts as key to their capability to produce evocative presentation materials. According to our observations, abstraction seems necessary in particular to produce presentation materials to communicate without referring to conventional architectural formats. The need for abstraction when structuring early thoughts may also be a reason for the almost exclusive use of language in tutorial meetings immediately following intermediate critiques and the use of colour-coding as described in Section 5.1.

### 6. Summary

The outcomes of this study outline our understanding of presentation materials used in tutorial conversations based on observations made over the course of a design studio. We developed a vocabulary of five notions that allow us to discuss students’ studio work and their progress: focus, convention, ambiguity, effect and abstraction. As suggested in previous studies, we observed that differing interpretations of presentation materials between students and tutors were key to advance students’ conceptual design processes. In our view, presentation materials can thus not be considered in isolation from the conversational processes of which they are a part. While other studies have associated designers’ ability to interpret materials in various ways to specific properties of conceptual sketches or specific ways of drawing, we see ambiguity as a beneficial result of avoiding references to and use of conventions in presentation materials.

This, in itself, appears to be a design skill. We further observed that students employed a variety of presentation materials during their conceptual design processes beyond sketching, with language being an important medium for early thought structuring. Contrary to our initial assumptions, a distinction of different roles of presentation materials produced by analogue, digital and mixed means seemed hardly justifiable based on our observations. We also came to form an understanding of the interrelation between analysis and proposal presentations and conclude that these should not be artificially separated as it can commonly be observed in architectural design studios.

### Acknowledgements

We acknowledge the support and feedback from our colleagues at the Department of Architecture at The University of Hong Kong, in particular Jia Yunyan and Juliana Rotmeyer as well as the second-year students involved in this studio project.

### References

- Akin, . and Moustapha, H.: 2004, Formalizing generation and transformation in design, in J. Gero (ed.), *Design Computing and Cognition '04*, Kluwer, Dordrecht.
- Achten, H.H.: 2005, Resolving Some Ambiguities in Real-Time Design Drawing Recognition by Means of a Decision Tree for Agents, in Martens, B. and Brown, A. (eds.), *CAAD Futures 2005*, Springer, Dordrecht, pp. 311-320.
- Glanville, R.: 1995, Communication Without Coding, *Modern Language Notes* 111(3), pp. 441-462.
- Glaser, B.G.: 1998, *Doing Grounded Theory*, Sociology Press, Mill Valley, CA.
- Glaser, B.G. and Strauss, A.: 1968, *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Weidenfeld and Nicolson, London.
- Goel, V.: 1995, *Sketches of Thought*, MIT Press, Cambridge, MA.
- Goldschmidt, G.: 1991, The dialectics of sketching, *Creativity Research Journal* 4(2), pp. 123-143.
- Do, E.Y-L., Gross, M.D, Neiman, B. and Zimring, C.: 2000, Intentions in and relations among design drawings, *Design Studies* 21(5), 483-503.
- Jonson, B.: 2005, Design ideation: the conceptual sketch in the digital age, *Design Studies* 26(6), pp. 613-624.
- Pedgley, O.: 2007, Capturing and analysing own design activity, *Design Studies*. 28(5), pp. 463-483.
- Porter, W.L.: 2004, Designers' objects, in G. Goldschmidt and W. Porter (eds.), *Design Representations*, Springer-Verlag, London.
- Rodgers, P.A., Green, G. and McGown, A.: 2000, Using concept sketches to track design progress, *Design Studies* 21(5), pp. 451-464.
- Suwa, M. and Tversky, B.: 1997, What do architects and students perceive in their design sketches? A protocol analysis, *Design Studies* 18(4), pp. 385-403.
- Turner, T.: 1996, *City as Landscape: A Post-postmodern View of Design and Planning*, Spon Press, London.