Knowledge and Identity in the Design Field

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ABSTRACT

This research investigates knowledge and identity in design education by examining perceptions of achievement and membership within four design disciplines: engineering, architecture, digital media and fashion design. Drawing on concepts derived from sociology of education (Bernstein, 1977; Maton, 2004, 2006), we theorize how designers and those new to the field recognize and realize design practices, how "knowledge" and "knowers" are specialized, and its relation to the shaping of identity within these disciplines.

In order to explore the application of this theory, we conducted in depth interviews with design professionals and a survey with Year 10 students. Preliminary findings discuss how engineering design tends to be perceived as knowledge driven, and is often associated with adjectives such as "scientific" and "technical". Architecture, digital media and fashion design are described as "artistic" and "creative". Strategies used within the practice of these disciplines tend to be associated with personal and/or social dispositions, such as "being sensitive" and "having a network of contacts". Strategies used by engineers tend to emphasize seeking information on procedures and techniques (e.g. books, journals).

INTRODUCTION

Social structuring of knowledge refers to the arrangement of knowledge and knowers within intellectual and educational fields (Maton, 2006). This concept involves the idea that implicit agreements between members of a field will form the basis for achievement and membership within the group. As in other specialised areas, the practice of design professionals reflects and shapes how design knowledge and knowers are specialised. In the same way, such structuring also moulds the teaching and learning of design disciplines. On the learner's perspective, this means one will need to learn these "unwritten rules" of the field, in addition to the procedures and skills necessary to do design. Therefore, learning design will also involve understanding what is considered interesting or original, what are the significant readings and which design professionals are worth attention. In other words, design learners need to learn how to recognize and realize legitimate design practices.

For a design practitioner as well as a design educator, an additional factor must be taken into account. Within their practice these professionals are likely to be reproducing knowledge as established within the disciplinary group that they belong to. This paper presents the application of concepts derived from the sociology of education within four disciplinary areas of design: engineering, architecture, digital media and fashion design. We report on preliminary findings of a research investigating the perceptions of how knowledge and knowers are specialised within these disciplines, and which strategies designers are using in order to recognize and realize legitimate design practices. The next section of this paper presents the sociological theory and concepts used in the analysis. In section II, the research methods and instruments are discussed and section III and IV present the preliminary findings. The last section discusses the implications of these findings and concludes the paper reporting the future directions of our research.

I. SOCIOLOGY OF DESIGN EDUCATION AND PRACTICE

In the sociology of education, Basil Bernstein's theory of pedagogic discourses looks at its various practices, focusing on analysing the underlying rules that shape their social construction (Bernstein, 1977). Bernstein's ideas were first developed with his code theory, considering how the use of language reflects and shapes assumptions one has about groups. Within his theory, Bernstein conceptualised how, in order to produce legitimate forms of communication, one first needs to identify (or "recognize") the relevant meanings to the context one is in to produce texts and communicate (or "realize") according to what is expected within the context.

In the 60's and 70's, Bernstein developed the concepts of classification and framing as codes to analyse relationships of power and control within a given context. Within Bernstein's framework, classification refers to how knowledge is organised, expressing the power of a category in maintaining its knowledge. A curriculum in which disciplines are highly differentiated would be considered as having stronger classification (C+). An integrated curriculum in which disciplines are interconnected would demonstrate weaker classification (C-). Control relations establish legitimate communication between categories and are expressed by the concept of framing. Framing is related to how communication takes place between the transmitter and acquirer of knowledge. The control over the communication can be in relation to the selection of the communication, its sequencing, pacing, the criteria used for evaluation and over the base in which this interaction is taking place. Stronger framing (F+) is present if the transmitter is in control of the communication, and weaker framing (F-) if the acquirer is perceived as in apparent control.

Bernstein (1977) used these concepts to analyse pedagogic contexts, identifying significant differences amongst patterns of speech used by working and middle class students in the United Kingdom. Bernstein's theory then claimed that working class students' poor academic performance might be due to a lack of understanding of the implicit codes of a discipline. His theory offers a way to analyse design knowledge and education, which can perhaps provide insights into why certain design disciplines may appear unappealing or unachievable to some, and why some students may encounter more difficulties than others in understanding these "unwritten rules" of design.

Bernstein's concepts are yet to be applied within the design field, although they have been explored within several empirical studies in the literature, analysing relationships of power and knowledge within various educational contexts (Botelho & Morais, 2006; Morais & Neves, 2001; Rifa & Hernandez, 1997; Maton, 2006).

In recent years, Maton (2004, 2006) expanded Bernstein's theory proposing a framework to analyse how "knowers" are specialised, in addition to "knowledge". The rationale behind the "Legitimation Code Theory" (LCT) is that every practice or knowledge claim is made by "someone" and it is about "something". This means knowledge claims and practices comprises of two relations: the epistemic relation to the object; and the social relation to the subject, author or actor. The framework develops 4 possible codes, in which epistemic and social relations are expressed. Different practices may emphasise these two relations differently, and as a result these relations may be represented as being stronger or weaker within a continuum of strengths. This means that knowledge can be seen as specialised by its epistemic relation, by its social relation, by both or neither, depending on its specific structure, which would vary depending on the field or discipline. These ideas were translated into the notion of "legitimation codes of specialisation". Using the concepts of classification and framing of knowledge, stronger or weaker values may be assigned to epistemic relation (ER +/-) and for social relation (SR +/-), with classification and framing of knowers (Maton, 2004, 2006).

As a result, the legitimation codes of specialisation propose four possible codes: "knowledge code" (ER+/SR-), "knower code" (ER-/SR+), "elite code" (ER+/SR+) and "relativist code" (ER-/SR-) (Maton, 2004, 2006). The knowledge code emphasises procedures appropriate to an object, whilst in the knower code, the emphasis lies on personal characteristics of the author. The elite code emphasises both, the possession of specialist knowledge in addition to the "right kinds" of dispositions, whereas in the relativist code neither knowledge nor dispositions are required: anything goes.

II. METHODS

In order to investigate the application of Maton's theory (2004, 2006) within the design field we selected four disciplines of design: engineering, architecture, digital media and fashion design. We hypothesize that these disciplines would fit into different quadrants of Maton's framework, and

also express different characteristics of the various disciplines in the field: innovative versus traditional, more appealing to males versus females, in addition to more inclined to knowledge versus knower orientation. The research questions are then:

- (1) How do new and senior designers perceive the classification and framing of knowledge and knowers in the practice within these four design disciplines?
- (2) What strategies/tactics do new and senior designers use to recognize and realize the classification and framing of knowledge and knowers in the different design disciplines?

Data collection and analysis involved in depth interviews with design professionals and a survey performed with Year 10 students:

A. Interviews

An engineer and an architect participated in the sample. The questionnaire was divided in two parts. The first part comprised of open-ended questions exploring the interviewee's perceptions of design, of designers, and strategies used within their design practices. Interviews lasted about 1:30 to 2:00 hours, and were audio recorded for transcription and analysis.

B. Surveys

A sample of 13 Year 10 students, from a high school in the Inner West of Sydney participated in the study. The survey asked students' views on engineering, architecture, digital media, and fashion design.

In the first part of the survey, participants were asked to choose three words that would describe design in these disciplines. They could choose their own or pick three words from a list of 50 adjectives. The list presented the adjectives in alphabetical order. It included adjectives that could be associated with a:

(1) knowledge code, e.g. procedural, technical and driven by knowledge,

(2) knower code, e.g. social, subjective and driven by taste,

(3) elite code, e.g. glamorous, outstanding and elite,

(4) relativist code, which included adjectives with generic connotation in terms of coding orientation but denoting a positive, negative or neutral emphasis, e.g. modern, boring and curious.

In the second part of the survey, participants were presented with statements that described personal characteristic of a fictitious designer. The statements were aimed to suggest preferences for orientation towards knowledge or knower codes. Participants' task was to choose which profile the characteristics most sounded like: an engineer, an architect, a digital media and/or fashion designer. They could choose more than one designer for each statement.

The statements associated with a knowledge code orientation included descriptions of a designer that enjoyed reading and solving puzzles. Someone who was practical, skilled, technical, methodical, and who searched for solutions mostly through books. Statements associated with a knower code orientation involved descriptions of a designer that enjoyed talking to people and was greatly connected to others ideas. This designer was a gifted person, who values beauty and whose educated background influences his/her practice, someone who is a very unique person. Examples of the statements and its corresponding codes are in Table 1:

Knowledge	X. is a very technical and methodical person. That is why s/he chose this sort of work.
Knower	X. recognizes the value of beauty. In her/his profession one certainly needs a great sense of taste!

Table. 1. Examples of knowledge and knower oriented statements

III. INTERVIEWS RESULTS

A. Designers Descriptions of their Design Disciplines

The engineer described his discipline as strongly grounded on a knowledge code. Engineering design was defined as involving the management of vast amount of technical content. The passages below illustrate his views:

"I often say that Engineer is the science of compromise. It is about knowing what options are available to you. It is about acknowledging that there is no perfect solution to a problem, but it is about developing the best compromise you can possibly develop, using techniques from anywhere, physics, chemistry whatever..." (engineering designer)

"There is an increased push to talk at a more abstract level. And again it is really about managing complexity. In fact there're a lot of tools out there (...) It gives you a higher level to talk to your peers, and again that is I think, increasingly important, is to have these abstractions as it gets more complicated. You've got to abstract more. Basically so that it fits inside the human mind, you can't know everything at the lowest level anymore, it is basically impossible, our minds are too small." (engineering designer)

For the architect on the other hand, an emphasis on personal dispositions seems to be used to describe the practice within his discipline. For this designer, architecture involves communication, and stimulation of a sense of pleasure to design consumers. Adjectives that were used to describe architecture included integrity, enjoyment and stamina:

"(...) I explain that doing architecture is speaking to people through a building, it is communication, it is an act of communication. (...) It is communicating an idea or a story or... to the people that use it, making a building function is terribly easy, not terribly easy but easy, not incredibly difficult. But making a building that stimulates people or makes them or communicates to them a sense of pleasure or makes them feel a sense of pleasure is very difficult. So I think it is an act of communication that is what I would say." (architecture designer)

"I think, the integrity, the ability to understand what makes people enjoy their life and the stamina to make it happen. Stamina, enjoyment, and integrity." (architecture designer)

B. Perceptions of a Designer

Personal characteristics of an engineer involve the ability to problem solve, or the ability to locate where to reach the information needed, when needed. Again, emphasizing the management of technical knowledge:

"(...) It is basically having a very good general knowledge of I guess those fields that I just mentioned. It is about understanding not necessarily the specifics of any of them, you know. All engineers are going to have a big bookshelf of references, but it is about knowing where to go to find the information that you need and when. It is basically, knowing what tools are available to you and being able to make the judgment of what is the right tool for the job." (engineering designer).

In architecture on the other hand, a person needs to develop or to awake certain personal characteristics like empathy, sensitivity or sensibility for perceiving the environment they are in.

"(...) architecture links to everything you have learned since you were born, since your eyes opened and your ears opened. So I tell them is not like another course where you are starting from scratch, the important thing is to try and be aware of what, you were working with these, what you have learned about your environment since you were born, so you already have got 18 years or 19 years of experience in the results of architecture and maybe all that you have to do is to turn that over and see... if you are sensitive, if you are not insensitive, you would have gained nothing in 19 years. But if you are sensitive to your environment you can... now you can use what you have been learning for 19 years making things. (architecture designer)"

"I think we are very very different in terms of what gives pleasure to us, what natural abilities allow us to do, or to enjoy. So I don't think everybody can do it. If you can't take pleasure in walking around the field and the countryside and a lot of people can't. Or if you can't take pleasure about spending Saturday afternoon walking down in the CBD, so if you don't find some pleasure, then you are in the wrong business in trying to be an architect because almost everywhere you are, there is something to look at and to enjoy and to be curious about (...). I think we are not all born equal, and we are not all sensitive to the same things." (architecture designer)

The validity of ones' contributions to the engineering community is measured by the person's ability to build on the existing body of knowledge in the discipline:

"...a great designer, I guess, is one that (...) over a period of time continues to do novel things, but novelty (...) has to be measured with respect to that baseline, which is what has come before. (...) I think that at the industry you can absolutely make the case that a great designer is one that is technically excellent. And again you would measure that against, you know, one that consistently produces material, I guess, that is equivalent or better than industry best practices, whatever that is. But again it means that you have to be knowledgeable about the field. But that also informs how you design". (engineering designer).

"For us it (original work) is that that adds something to the discipline. When you see it described, whether that is written down or just talked about, that you learn something. Something that you didn't know before." (engineering designer)

In Architecture a great architect is described as being able to achieve something (adding to the field) as the engineer. However in addition to contributing to the community, the achievement must be done in a special manner, taking into account a sense of "purity" (personal disposition).

"The designer is giving you something that you didn't expect. He found an opportunity in creating the answer to give you something which is not necessarily new, but it does more than solving the problem. So it is looking for that opportunity to give you something more... it can't just solve the problem and it can't just be new, in fact both of those things are irrelevant. It is to find an opportunity to do one other thing, at least, than what needs to do..." (architecture designer)

"There are thousands, millions of architects but lets take the good ones, not the bad ones... if I see a project by a good architect and a project by somebody who is either not a good architect or not even an architect, I would be able to identify the architect's project because it deals with certain issues that we have floating around amongst us... and it is not just fashion, it is like purity, it all sounds a bit silly, but even in the most flamboyant building there is a sense of economy, economy of... not effort, but it's got to be effortlessly, it's got to appear effortlessly flamboyant, even the most exotic building has to appear effortlessly exotic rather than just exotic, so we have a kind of... you can look at some of the buildings, see they are exotic but you look at this one... it is beautiful, it is so effortlessly exotic." (architecture designer)

"A great architect does things, achieves things, achieves fascinating things effortlessly, and makes you wonder why you haven't been able to see the route to doing that. An interesting architect just gives me something that is interesting." (architecture designer)

C. Strategies

Strategies used in engineering include knowledge oriented strategies with the consulting of scientific journals, and technical literature. Nevertheless, the importance of knower oriented strategies is acknowledged. Participation in conferences is seen as an opportunity to network and build associations with peers. This is exemplified with the idea that there are the "right kinds of venues" to which students need to attend:

"You can see on my desk here and there, that is number one, the reading, journals and so on... we belong to some organizations, and we get all the up to date stuff, that is absolutely important. There are certain conferences you know we have a list that we manage as a group. We say to our students, we will only let you go to these conferences because we think they are good and you will get exposed to good research from around the world. We don't want you to go to these little marginal ones that are in holiday resorts because, you will enjoy it but you won't learn anything and you won't be able to establish what you are doing within the broader community exactly. And part of that too is to network with those people and to build those links, all of those are really important." (engineering designer)

In architecture, the strategies used involve a more knower oriented approach. The designer needs to use his/her own sensitivity and sensibility to identify an original, interesting design concept. How the design community reacts to the concept is also mentioned. However, peer recognition alone would not suffice or dictate what is genuine, and an internal resonance needs to be present.

"Does it knock me over? Am I stunned by it? Am I jealous? Do I wish I could put my name on it? (...) I am not saying that if a building has recognition that I think it is a great building. There are some shocking rubbish out there (...) you have to filter. (...) I know that I am not the only one that thinks she is a genius. And I think that probably everybody I think is a genius has had some degree of recognition. It may not be intellectual. So I have never been the only person to think that somebody is a genius." (architecture designer)

VI. SURVEY RESULTS

Participants in the survey used 33 adjectives from the list they were given. The total adjectives used by the participants are arranged under their code orientation in Table 2:

Knowledge	Brainy, Clever, Difficult, Methodical,
	Procedural, Scientific, Technical,
	Driven by knowledge
Knower	Artistic, Creative, Driven by natural
	talent, Driven by taste, Social,
	Subjective
Elite	Elegant, Elite, Fancy, Glamorous,
	Influential, Outstanding, Powerful,
	Privileged, Snobby, Superior
Relativist	Average, Contemporary, Curious,
	Different, Modern, Old-fashioned,
	Unusual

Table 2. Adjectives used by participants

Figure 2 illustrates how adjectives associated with knowledge code were used to describe engineering (16), architecture (7), digital media (6) and fashion design (1). Engineering design is the discipline that seems to be mostly perceived as following a knowledge code.

Inversely, adjectives associated with the knower code were used to describe fashion (14), digital media (12) and architecture design (9). Adjectives categorized as following a knower code orientation were not used to describe engineering design, which reinforces the notion that engineering design follows a knowledge code of orientation. Fashion and digital media design are considered more as following a knower code orientation. The results in Figure 2 also suggest that architecture design is perceived as slightly more inclined towards a knower code orientation (9), but followed very closely by the knowledge code (7).



Fig. 2. Perceptions of code orientation within the disciplines

Similar perceptions were identified with the profiles of imaginary designers. Figure 3 illustrates how statements following a knowledge code orientation were more frequently used to describe engineering designer (39), than knower oriented statements (16). Fashion designers also seem to follow a trend with participants using (39) statements of knower code orientation to describe designers from this discipline, against only (6) knowledge oriented statements.



Fig. 3. Perceptions of designers

Figure 3 also illustrates how digital media designers were described as being mostly (28) knower oriented. However, the gap between knower and knowledge codes was not as pronounced with (19) knowledge oriented. Statements used to describe architecture designers were again almost even for the two codes orientation. However this time, slightly emphasis on knowledge code orientation (31) is noted, as in comparison with (27) for the knower code.

V. DISCUSSION AND CONCLUSION

The results suggest that social structuring of knowledge and knowers within engineering design follows a knowledge code orientation, with an emphasis on epistemic rather than social relations. Strategies used to recognize and realize design practices are mostly grounded on technical content although social networking within conferences and/or peer's interaction are highly valued. Overall, for engineering design there seems to be a clear inclination towards the procedural content and skills within this discipline, a trend that is well identified by the students surveyed. Year 10 students were able to recognize that engineering design and designers follow a knowledge code orientation.

On the other hand, results of the interview with the architect imply that this design discipline follows a knower code orientation. Greater emphasis is given to social and personal dispositions as in comparison to technical content. The development of personal characteristics such as sensitivity and empathy is considered essential. These are not clearly translated in the perceptions of outsiders, suggesting that it may be a little difficult to identify which code orientation the discipline is working on, or perhaps that architecture may be perceived as following an elite code. The results of the survey show that almost equal emphasis is given to knowledge and knower code orientation.

It is important to consider that design practitioners and educators develop strategies to recognize and realize design practices grounded in their experience within the discipline, in a continuous process over the years. Outsiders and design learners however may not be clear of what are the relevant meanings for a particular design discipline. For instance, these preliminary findings illustrate how architecture learners may have problems in de-codifying the "implicit rules" within the discipline, and how conflict may rise between learners' perceptions of a dual code, while there is a suggestion that the discipline strongly values personal dispositions.

The implications of these findings are that if learners perceive the discipline as following both knowledge and knower oriented codes, they may attempt to draw on meanings that are not necessarily relevant for the particular architectural context they see themselves in. This may affect design learners in both settings, in a more unstructured setting such as informal learning contexts (e.g. museums) as well as formal settings for design education. Consequently, learners may get disinterested in pursuing a discipline they do not quite comprehend. Moreover, design learners may have difficulties understanding a teaching approach that mirrors the social structuring of architecture knowledge, or a knower oriented code only. Therefore, it is crucial that design educators take the perceptions of the social structuring of knowledge in consideration when planning their pedagogical strategies. Educators will perhaps need to develop alternative approaches so that design learners may construct a sound understanding of what is relevant within a particular discipline, which should be based on the learners' perceptions or preferences of orientation towards design knowledge, as well.

In the survey, fashion, and digital media design seem to be perceived as following a knower code orientation, in which personal characteristics and attitudes are the main underlying values. These perceptions are more emphatic for fashion design. Interviews with design professionals from these disciplines have not been reported in this paper. This research is still in progress. To further explore this topic, other design professionals are to be interviewed, as well as other surveys with Year 10 and tertiary students from the four design disciplines. Findings from this research will be informing the development and implementation of an elearning environment for experiencing design in a technology museum.

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