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REFERENCES IN THE DESIGN PROCESS MILIEU

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ABSTRACT
This paper explores everyday references made during the design of artefacts, but more specifically, the social and cultural affects on designing. This is achieved via ethnographically oriented studies based within the context of two design studios on different continents. The term reference is used here to describe the mode of communication that contains information about the artefact, the creator and the context. Language references are described here as the words and phrases that carry literal meanings that involve clear-cut relationships with the artefacts being created [1]. Along with references being represented through words and phrases, references in design may also be presented in the form of images (*e.g.,* photographs, sketches). Goldschmidt [2] defines references to include the precedents that designers openly reveal to have inspired them along with the points of departure that are not known as precedents. Therefore, the research reported herein acknowledges that references may or may not directly link to the artefact being created, and that the use of everyday references while designing can often be fleeting and ambiguous. This paper summarises and begins to categorise references made by introducing a model termed the 'design process milieu'. This model is a result of two in-depth pilot studies and the two field studies reported here. The design process milieu model acts to provide an alternative framework to understand the multiple levels inherent in any design environment. This model is based on well-known theories within the social sciences, which identifies four key environments, the local and universal, *emic* (inside) and *etic* (outside) [3]. By exploring references within an interconnected system a number of interesting aspects are revealed about how the sociocultural context may affect the design process.

Keywords: Artefact creation, design process, references, sociocultural environments

1 INTRODUCTION AND BACKGROUND

1.1 References

This paper is about everyday references made during the design of artefacts, but more specifically, explores the notion that sociocultural environments affect artefact creation. This is done through elaborating on two ethnographically oriented studies based within the context of design education studios on two different continents. The term reference is used to describe the mode of communication that contains information about the artefact, the creator and the context. Speech and language are the central medium for references. According to Chomsky [4] words and sentences contain and frame an immense amount of meaning. Along with references being represented through words and phrases, references in design may also be presented in the form of images (*e.g.,* photographs, sketches). It is acknowledged that references may or may not directly link to the artefact being created (Figure 1).

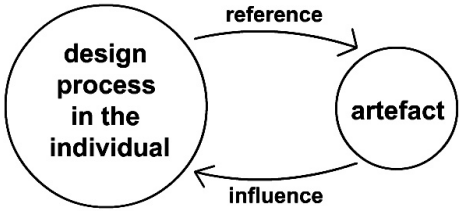

Figure 1. The role of reference in an individual's design process

At the core of this research is the assumption that all things communicated, referred to, and spoken about are considered to be meaningful [5]. Therefore, it is also recognised in this research that all references may somehow drive the act of designing. The term references is deemed suitable for this work because references are all inclusive and involve all the information communicated by the designer, even that which may be considered to be irrelevant or far from the task at hand.

In this case, understanding the references made is directly linked to context, specifically that of the sociocultural environment. Within this context there are relationships between the individuals and, in this case, the design studio culture and in the broadest sense western civilization. Therefore, there is a tension between the near (*i.e.,* local) and the far (*i.e.,* universal). In order to investigate a diverse and broad range of references a holistic model is presented that is capable of addressing the contextualized and more holistic environments of design. In the case of design education an holistic context includes those references that are connectable to the inside design environment and those that are connected to the outside. The context *inside* the design studio includes:

- The design brief;
- The educational setting;
- The tutor(s) contribution and perspective including local studio culture, group dynamics (*i.e.* social capital) and interactions (*e.g.,* conversations, presentations, visual documentation);
- The design process including the use of materials from inside and outside the classroom that are specific to design, previous projects and previous design experiences.

The context *outside* the design studio includes:

- Personal perspectives including experiences, memories and interpersonal relationships;
- Common cultural currency that relates to the sociocultural information/knowledge/capital that is gained long before entering the educational setting.

The holistic model that is used to look at all the references made by individual designers is shown in Figure 2.

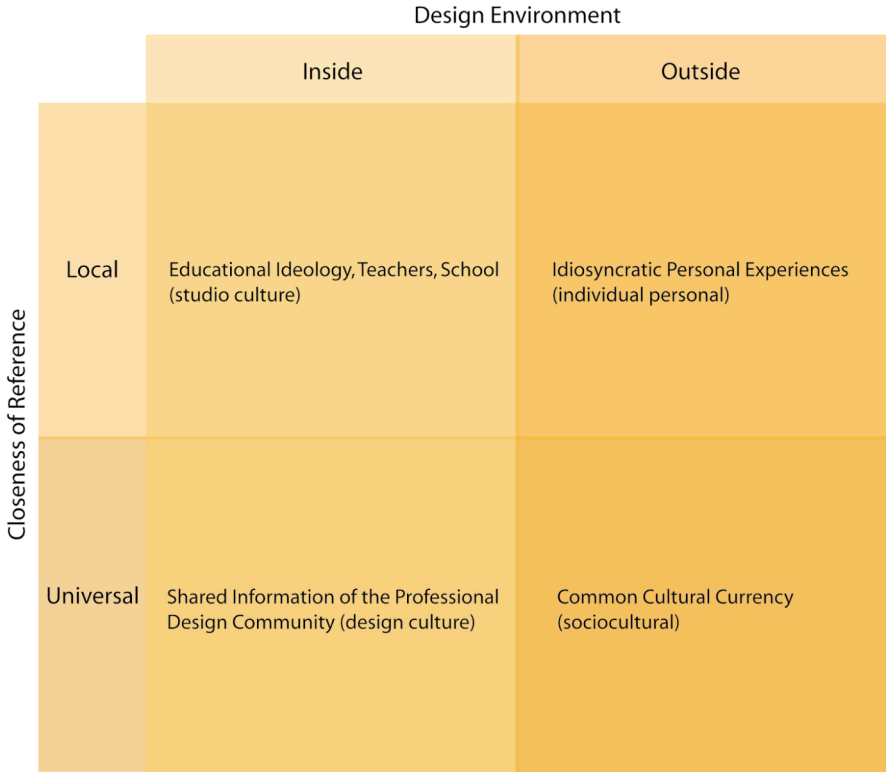

Figure 2. The model of the design process milieu

References to things outside the design environment including outside-local (*e.g.,* idiosyncratic personal experiences) and outside-universal (*e.g.,* common cultural currency); all outside references

are keys towards understanding more ambiguous connections made between artefacts and designers. Naturally, each reference contains meaningful information that is useful towards artefact creation.

1.2 What are the references linked to?

Although references are the words/phrases spoken by people, the topic of these references are naturally about things that are known to the speaker. This paper highlights the 'everyday', which typically relates to the personal interests and experiences of the individuals speaking.

Recently, there has been an increased interest in the idea of how individual experiences of individuals contribute to designing. Hellström and Hellström [6] create an interesting discussion about the relationship of past, present and future experiences in the design process. Downing [7] explores the notion of the designers experience through the use of memories by stating that designers *"re-create from memorable experiences"* and that memory *"consciously or unconsciously surrounds the [design] task"*.

Outside of the design community, sociologist Bourdieu [8] describes an individual's "*cultural capital"* as being central to the approach a person takes to, for example, their project. Bourdieu describes cultural capital as a class-based theory that considers the explicitly taught information gained through education and the non-explicit activities of everyday life as they define individuals [9]. It is easy to make a connection between the theory of cultural capital and artefact creation because Bourdieu feels that all individuals act on their cultural capital in everyday activities.

This research does not specifically look at the notions of memory or cultural capital; however, many of the references made are grounded in the past experiences and relate to the cultural capital of the individuals. When designers make reference to their past they are inadvertently making reference to their personal sociocultural background. This way of exploring sociocultural issues by means of examining references is common in the fields of anthropology and sociology. Therefore, this work is rooted in examining a broad range of references and sociocultural theories towards understanding designing from an alternate viewpoint.

1.3 Tangible and intangible

For the purpose of this exploration two kinds of references are identified. This does not intend to polarize two specific types of references, but enables a distinction between those references that are clearly connectable to the task at hand from those that are ambiguous and not easily relatable.

Tangible references are defined as those that relate clearly to the task at hand—the rational, cognitive, well-defined and teachable aspects of design including the design process and elements/principles of design. The tangible aspects of design typically reside in the inside-local and inside universal (see Figure 2) but also include references to things from the outside that are highly connectable or relevant to the task at hand.

The intangible references are subjective and specific to the individuals involved because they are about the many "*little narratives*" [10] of the designer. These little narratives are the individual personal and sociocultural capital [11, 12] or cultural capital [13, 14] that emerges through memories and past experiences referenced. Sociocultural capital is considered assets that the individuals take to designing.

These definitions of tangible and intangible are derived from a current understanding of design as established in the design community. Even so the terms tangible and intangible are used relatively infrequently and loosely. For example, Klassen's paper entitled *Tangible to Intangible* [15] uses the terms to describe a move from a relatively prescriptive teaching scenario in design to one that is more collaborative, and John Chris Jones refers to intangible design as the elusive experiences of the people who will use designed artefacts [16]. More recently, Hartley [17] states that the intangibles are: *"assets such as knowledge, competence, intellectual property, know-how…culture …"* Hartley states that the intangibles are deeply linked to culture and knowledge, which are at the heart of the sociocultural processes being explored here. A contemporary definition of the intangibles is that they are those things that are more difficult to define because they are dynamic, ever changing and relative to context. Therefore the term intangible is used here to describe the references that are less easily pinned down, which differ from those that are teachable and more generically understood in the design community.

1.4 Making sense of the design environment

The design process milieu model presented at the onset of this paper (Figure 2) has been created based on well-known theories about the individuals' environment from an anthropological viewpoint. Central to anthropology is the notion of holism [18, 19], which involves all people being interconnected with their immediate and external environments. Figure 3 is a visual diagram representing an interconnected approach illustrated by Westney, Brabble and Edwards [20].

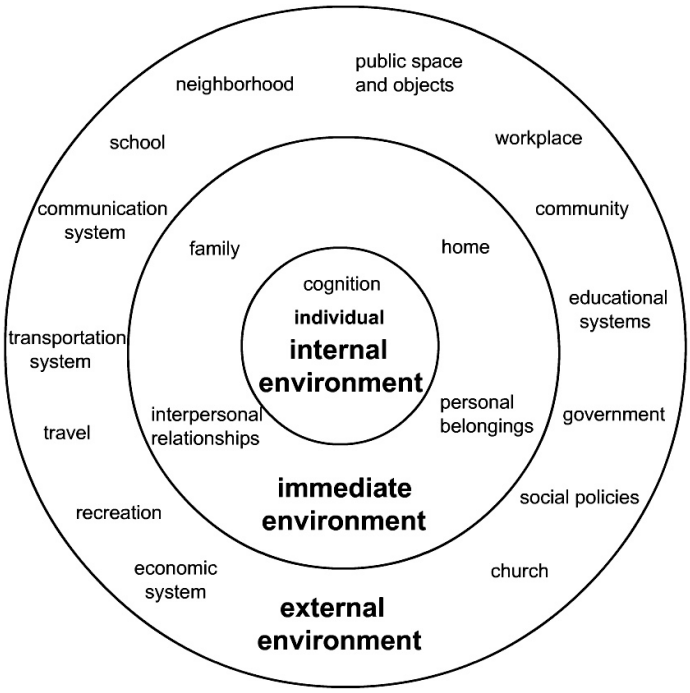

Figure 3. An individual's relationship to the immediate and external relationship [21]

This diagram reflects an holistic anthropological worldview, which is easily paralleled with individual designers within their artefact creation scenario. At the centre is the individual because whenever society and culture are involved, people are central, which is why anthropology is often described as an exploration into humanism. In design, people are central because it is human need that creates desire for artefacts, human activity that creates artefacts, and human use of artefacts that close the circle. Surrounding the individual is the context of the immediate environment, which is the near environment of the individual (*e.g.,* parents, friends, clothing, and place of residence). The external environment is the larger society and culture including particular community group(s) (*e.g.,* the design community).

The holistic worldview of anthropology assumes that individuals are affected by and affect the contexts they move within. Following this it is easy to state that designers have an effect on larger society through their designs; however, it needs to be clarified that designers also affect the design studio they work within and are affected by. Furthermore, those designers are simultaneously being affected by people (*e.g.,* friends, family) and the other environments they are in contact with (*e.g.,* home, city). In order to better understand the references, it is necessary to identify that which relates to the inside environment/references relative to the project (inside) from the outside environments/ references that are ambiguous. This necessitates the holistic approaches and methodologies used to gather information about the participants (design students) within their focused sociocultural environment (design studio).

2 COLLECTION AND ANALYSES OF THE REFERENCES

Insights are gained into the sociocultural forces through collecting all the references in as complete a form as possible. In order to do this, longitudinal [22] involvement in a design studio is desirable. In this investigation, one project with each group is followed from onset to completion. One of the benefits to ethnographic research is that data is collected in a natural setting whereby the information gathered is reflective of the participants. The role of the researcher is to understand the data as it is presented as naturally as possible. In the tradition of contemporary anthropology, these methods are a

combination of techniques that include field observation, making field notes, doing semi-structured interviews, and performing questionnaires. The modes for capturing the verbal, visual and textual references are also mixed and include:

- Videotape during observation and interviews;
- Still photography to capture the visual representations used and created by the students, and the studio/university context;
- Note-taking during interviews and observation to support the videotapes and photographs (Figure 4).

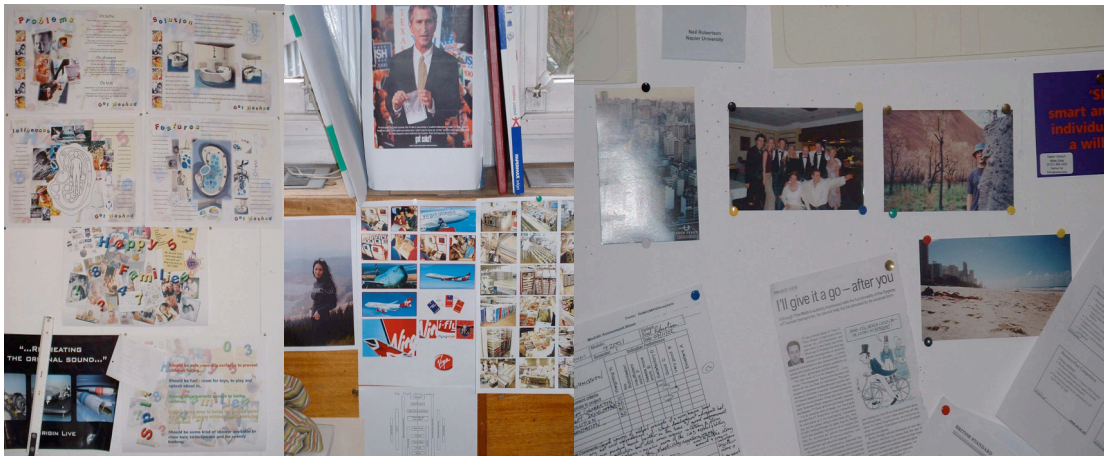

Figure 4. Visual material within the studio

References are predominantly verbalised through discussions and conversations. These references, however, often draw upon absent imagery from many different sources. Designing involves a great deal of discussion that occurs with colleagues but sometimes there is visual and textual documentation that supports verbalisation. Visual references may include, for example, individual representation of the world created by the designer (*e.g.,* illustration, charts, photographs, sketches), objects that are physically present created by the designer (*e.g.,* models, mock-ups) or mass-produced (*e.g.,* apparel, personal possessions). Textual documentation can be in the form of flow charts, tables, lists, sentence fragments, labels and paragraphs. The verbal, visual and textual are all considered references because these refer to the subject (artefact) during designing.

Once collected the data is organized in order to process the information. Two levels of processing are employed here, which are data reduction and display [23]. Data reduction involves summarizing, coding, finding themes, clustering and writing stories. Data display is when data is organized, compressed and assembled (*e.g.,* transcribing the conversations word-for-word). Data reduction is iterative and tied to data display. The data is displayed by reorganizing it, compressing it, and reassembling it in a variety of ways. In this research the data was displayed in a number of coding matrices where indicators of the specific categories identify specific themes.

The next level of data analysis is a simplified coding scheme based on data display and reduction. This involved a technique where a specific coding scheme is used involving the search for content morphemes. Gray [24] describes content morphemes as the parts of a sentence that carry meaning. These are nouns, verbs, adjectives, and adverbs that stand for objects, events, characteristics and relationships. References are content morphemes and are comprised of three different categories:

- Nouns (people, places, things);
- Metaphors and analogies made;
- Specific references to the individual's personal experiences and memories.

For each participant verbal are combined with textual and visual references. These are charted out systematically week-by-week, and are mapped out in parallel, then broken down into the three categories of content morphemes.

The researchers involved in this study are design practitioner and design educators who are readily accepted into the design studios being studied, yet are outsiders because they are not previously connected to the group/studio. In addition, data collection and analyses is done systematically in order to replicate numerous studies on the same topic.

3 TWO DESIGN PROBLEMS ON TWO CONTINENTS

Two field studies are preformed at two universities that offer degree programmes in industrial design. One university is in Scotland and the other is in Canada. Both institutions have a tradition of excellence having won a number of competitions and awards in design, along with advertising excellent career placement. Naturally, each programme has a distinct quality, yet they each teach similar types of projects. A different design brief is used with each group but each is fairly objective and represents common design problems. In both cases the tutors/instructors chose the briefs. One is from the British Design and Art Direction Award (D&AD) annual competition[1]. The chosen brief is sponsored by *Virgin Atlantic Airlines* and *Corus Steel Packaging* and involves the design of an in-flight meal tray. The second design brief is conceived by the two professors guiding the module and is titled *Vision in Sport*. The design problem involves designing eyewear for a specific sports activity.

The Scottish university boasts a programme that is a bridge between the arts and sciences and is considered to be a hybrid between engineering and fine arts in the UK university system. The Canadian university is a programme that attracts a number of international students and is within a faculty of environmental design. Both universities are selected because they are considered to be fairly typical settings with similar facilities and instructional strategies, with a cross-section of student abilities, socio-economic levels and some cultural diversity. In addition, both universities offer degree programmes specific to design, which indicates that the students have likely chosen the programmes as career moves towards a design-related profession and are not simply taking the course for general or recreational interest.

In both studies senior students were selected for their level of knowledge in design and their confidence with the subject. One could argue that they are no longer novices in design because they have completed several years of a design degree. However, they cannot be considered experts in their field either, as they do not have numerous project successes under their belts. The tutors/instructors are considered to be experts in both design and teaching because they have extensive knowledge and experience in practice and have numerous years of teaching.

At the Scottish university the brief is assigned to an all male group of fourth-year design students in the first term of their honors degree year. It is their second design brief of the year. The brief is delivered in a module titled ‘user-centered design’. One tutor was responsible for and taught this module; however, the students had access to other staff members. The design of an airline meal tray was accomplished over six weeks by each individual participant.

The Canadian university brief is assigned to a group comprised of four males and four females studying industrial design in a master’s degree programme. They are in their second year of study of a three year programme. All the students in the Canadian group hold an undergraduate degree that is predominantly unrelated to design. The brief is delivered in a studio-based module that is taught on the most part by one professor but involves instruction from a second adjunct professor approximately fifty-percent of the time. The design of sports eyewear was accomplished over approximately seven weeks by all participants.

4 RESULTS

Using the design process milieu model (Figure 2) the references are plotted into one of the four quadrants and detailed as either tangible or intangible. For example, references that fit into the inside-local relate specifically to the design brief and instruction(s). These inside-local references also include the participants’ reactions to their peers (social group) and any research that was accomplished specifically for the purpose of designing either the meal tray or the sports eyewear. Naturally, themes and patterns emerge through detailing all the references made during the design of an artefact. These themes begin as being relative to the general categories that are established for each quadrant at the onset of the study; however, nuances are identified while tracking the references. Specific patterns are identified when comparing individual participants and when comparing between the two groups. Overall, the patterns that emerge illustrate more similarities than differences among the participants and between the groups.

The most basic pattern is the occurrence of tangible references found in the inside and outside environments. In general, the majority of the references made are tangible and expected—in other words they do not have much distance from the task at hand and the artefact being designed. More

[1] http://www.dandad.org

interesting, however, are references to people, places and things that are unrelated to the expectations of the tutors/instructors and the design of meal trays and eyewear. There are a surprisingly high number of references to interpersonal relationships, culture, religious organizations, and media. There are also some references that are unique to the Canadian group which include language, economic systems, gender, and political systems.

Figure 5 details the themes for the Scottish group. As noted, the top themes referenced are all within the tangible category. For the Scottish group these include references to the design brief, the design process, user-centred design, the elements of design, research, objects, industrial design in general, and media.

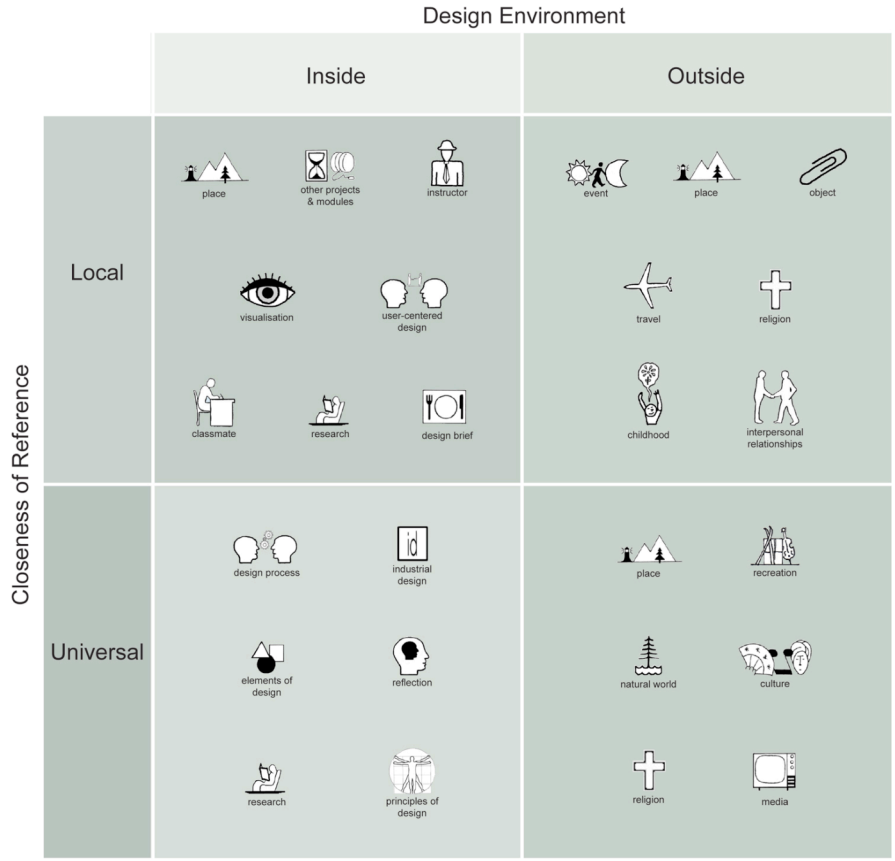

Figure 5. The references themes identified in the Scottish study

A summary of the inside-local references for the Scottish group includes the following:

1. Brief specific tangible references: the airline meal tray.
    - Turntable, music, DVD's, disc.
    - Travel experiences (personal, friends, and family members).
    - Objects (dishes/crockery, glasses/cups, trays, cutlery).
    - Food, drink and cooking (experiences, sushi, haggis, fruit, coffee, tea, wine).
2. References to things from the educational context at the programmes of study.
    - Previous projects.
    - Previous modules.
    - Other students.
    - Work experiences relating to the programme (*i.e.,* work placements, work at the university).
    - Tutors/Professors.

Figure 6 details the themes for the Canadian group. For the Canadian group these include references to industrial design, the design brief, the design process, place, the natural world, visualization (*e.g.* design skills such as drawing *etc.),* elements of design, culture, recreation, research, classmates, interpersonal relationships, and user-centred design.

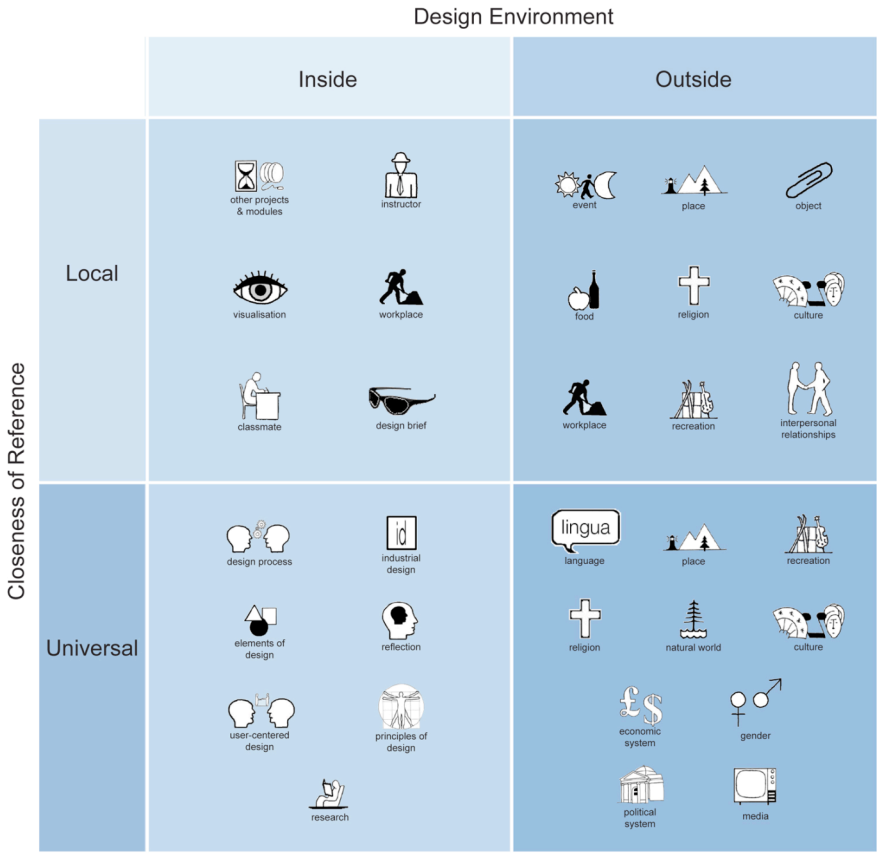

Figure 6. The references themes identified in the Canadian study

A summary of the inside-local references for the Canadian group includes the following:

1. Brief specific tangible references: sports eyewear.
    - Sports activities directly related and sometimes not to the sport being designed for (mountain biking, surfing, kayaking, skydiving, motor biking, swimming, horse racing, paint balling, skate boarding).
    - Eyewear of many types (glasses, sunglasses, goggles, safety glasses).
    - Head gear including helmets.
    - Objects (goggles, eyewear, and glass head models).
2. References to things from the educational context at the programmes of study.
    - Previous projects.
    - Previous modules.
    - Other students.
    - Work experiences relating to the programme (*i.e.,* work placements, work at the university).
    - Tutors/Professors.

A summary of the inside-universal references for both groups include the following:

- Elements of design (*e.g.,* form, shape, volume).
- Shape classification (*e.g.,* a spider's web, organic, rectilinear).
- Aesthetics.
- Materials and production.
- Principles of design including user-centred design and branding.
- Skills relating to design (*e.g.,* model making, drawing).
- Research into anything that related to the artefact development.

Tangible references are also present within the outside-local and outside-universal. These references are, as noted, to things that relate to the design of the meal tray or eyewear. For example, it was not out of the ordinary for the students to reference flat mates, family members, or friends who they had interviewed about travel, eyewear or the artefact context. They also discussed places in the immediate and external environments that they had visited or remembered that they thought was relevant to

designing their project. For example, the students in Scotland mentioned local landmarks/attractions and foods specific to Scotland (*e.g.,* sites in Edinburgh and Glasgow, haggis); and the students in Canada mentioned local shops to purchase gear and locations for doing the sport they had chosen (*e.g.,* skateboarding stores, rivers in Kananaskis, beaches in Nova Scotia).
It is not surprising that the top referenced categories relate primarily to the topics of the design brief, the module and the expectations of the tutors/instructors (*i.e.,* tangibles). This shows that students are responding to instruction on design assignments and the environment they are in. The references to industrial design, elements of design, and the design process are clearly ways in which the students define what they are doing (designing) since these are things not explicitly taught in the module. What is surprising is the relatively low number of reference to travel and objects relating to the Scottish design brief and a high number of references to interpersonal relationships with the Canadian group. It is clear that the context of the design process milieu provides a framework that allows a rich and wide range of references and categories to emerge. The main question that remain is: how do the full range of references including those that are not defined as precedents act to affect or aid in designing?

5 DISCUSSING THE REFERENCES

It is clearly illustrated in both studies that the majority of the activity that takes place within the design studio is focused on the inside environment, except when students seem to have a need to draw upon information from outside. The approximately average number of references from inside the design environment is 80% of the total references. Of these, the majority of these references across the studies are to everyday things that are easily relatable to the artefacts being designed. The approximate average number of references that are considered intangible is 3.5% where, again, the majority of these references across the two studies are to everyday things.
Within the Scottish group the use of references to everyday things is conservative compared with the Canadian. For example, the majority of the Scottish participants refer to everyday objects such as keys, a toolbox, a door hinge and games; and they refer to everyday experiences such as eating in restaurants, flying on flights and train journeys—all of which are to non-specific everyday things. It appears that this group is cautious about making connections to thing that may be perceived as too far 'out there' or too abstract. On the other hand, the Canadian group references a broader range of everyday things. There are a number of references to everyday objects including clothing items and numerous references to everyday events (*e.g.,* shopping, socializing). There are also references to local and childhood places and references to the natural world are also popular. Overall, the references used among the Canadian group are much more ambiguous and individualistic than those made by the Scottish group.
When comparing the two groups it is interesting that the Scottish participants stay on task and rarely make intangible references, whereas the Canadian students are more random when speaking about their projects. Typically, both groups made fewer references to everyday things during formal and informal critiques; however, in both groups references to everyday objects are the most frequent and common theme. It is probable that because students are learning how to design everyday objects (*i.e.,* industrial design, product design) that looking at such objects for sources is the natural choice.
It is clear by looking at the context of the references within discussions and connecting these to final designed artefacts, that some of the tangible references may act as precedents for designers to engage in puzzling-out the design problems that they encounter, in this case either a meal tray or sports eyewear. Referring to an object such as a 'door hinge' allows the designer to explain through visual reference a structural/functional component of his/her concept. That is, although a door hinge will never specifically be used in the final design of a meal tray this reference acts to move towards a solution that hinges. In addition to directly affecting the design outcome tangible references are also used to test and evaluate ideas. For example a reference to 'socializing' as big part of being on the beach aided one of the designers to move towards a fashion-conscious variation of swimming goggles.
Intangible references, on the other hand, hold a much more ambiguous role in designing. Naturally, intangible references, like tangible ones, may also be used to describe, test and evaluate ideas. But more interesting was that these highly ambiguous, personalised references were most often used to develop the inside-local sociocultural environment. For example, in the Scottish group there were references made by two participants to religion. These references were intended to help guide the rest of the group towards a stronger work ethic, in other words, to develop a culture that involved hard work and a sense of community. In the Canadian group there were many intangible references to

things that were already part of their inside-local culture. For example, numerous participants referred to 'ships and boats' a metaphorical phrase the tutors/instructors had developed in order to explain the magnitude of design concept— boats could fit on ships and not vice versa therefore a designer should seek to design a boat and not a ship.
This research confirms that references, as defined by Goldschmidt, are points of departure towards the design of an artefact. References point the designer in both expected and unusual directions in order to accomplish a given task. They aid in acting as precedents, describing thoughts, testing and evaluating ideas. In addition to this, early findings of this research suggest that references also serve to build sociocultural environments.

6 CONCLUSIONS AND FUTURE WORK

This paper has illustrated how design students reference a range of things that are easily related to the task at hand (*i.e.,* tangible) and things that are abstract and less relatable (*i.e.,* intangible). In addition, a model has been created called 'the design process milieu' that aids in provides an alternate way of looking at the design process that includes the inside, the outside, the local and the universal. Along with this, figure 7 identifies discussion themes that are present across the two studies presented in this paper.

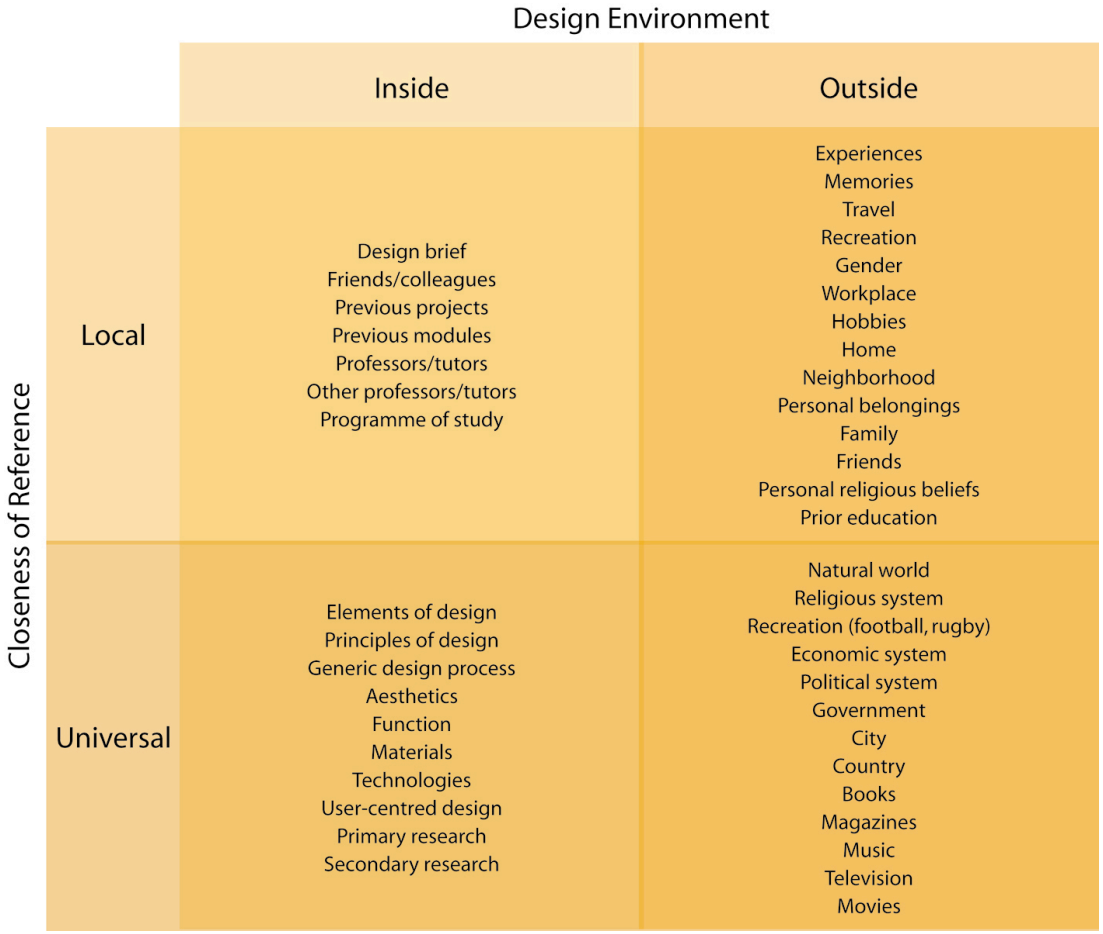

Figure 7. Themes across the studies within the design process milieu model

As a result of this research, this paper argues that design students (and designers) work within a sociocultural context that feeds the design process in a variety of different ways including building and enhancing an inside-local sociocultural environment. Judging from our field studies, the main reason for a breadth of reference-use remains consistent with how contemporary design is defined— design problems are elusive, complex, and exceedingly difficult to define and comprehend, especially by novices like design students. Louridas [25] states that a designer acts as a bricoleur who is at the mercy of contingencies including the internal (*i.e.,* cognitive) and external environments (*i.e.,* local, universal) and this research emphasises this. Design students act to make sense of their projects and

design through all the resources they have, which includes the materials being taught, information available in libraries/internet, overall values of the studio/programme/place/westernized culture and more personal materials that relate to their experiences and memories.
The research presented in this paper is but the first step in the investigation of references during designing. It was accomplished through an iterative research process and has moved in unanticipated directions by the results. For example, through looking into the references used while designing the design process milieu model has been developed. This constitutes a practical tool with guidelines for determining where references come from and a resulting theory about designing. Naturally, with the introduction of a theoretical model such as the design process model, further research is needed to test the model in different design environments and situations.
In addition, it is recommended that further research be done, in general, on the sociocultural forces that affect the designer during artefact development. More specifically, research is needed into intangible and sociocultural references where, for example, how references are chained including interconnectivity, patterns, strengths, diversity and duration of chains is explored. And finally, more research is needed into how the intangibles/sociocultural influence designing and the final artefact.
Where there was a need for an understanding of generic design processes in the past, this research builds upon this by beginning to look at the antithesis—the ambiguities of designing including sociocultural environments. Many questions remain about the nature of references; however, this research has revealed that a great deal can be learned through empirical studies on designing.

REFERENCES

[1] Good D. Language and Communication. In Fraser C, B Burchell, D Hay and G Duveen (editors). *Introducing Social Psychology,* 2001, 76-94 (Polity Press, UK)
[2] Goldschmidt G. Creative Architectural Design: Reference Versus Precedence. *Journal of Architectural Planning and Research.* 1998, 15(3), 258-270 (Locke Science Publishing Company, USA)
[3] Wolcott H.F. *Ethnography A Way of Seeing,* 1999. (AltaMira Press, California)
[4] Chomsky N. *On Nature and Language,* 2002 (Cambridge University Press, UK)
[5] Alvesson M. and Sköldberg K. *Reflexive Methodology–New Vistas for Qualitative Research,* 2000 (Sage Publications, London)
[6] Hellström C. and Hellström T. The Present is Less than the Future–Mental Experimentation and Temporal Exploration in Design Work. *Time and Society,* 2003, 12(2/3), 263-279 (Sage London)
[7] Downing F. Remembrance and the Design of Place. *Sara and John Linsey Series in the Arts and Humanities,* 2000 (A & M Press, Texas)
[8] Bourdieu P. *Distinction–A Social Critique of the Judgment of Taste,* 1984 [1979] (Routledge, London)
[9] Julier G. *The Culture of Design,* 2000 (Sage Publications, London)
[10] Dormer P. *The Meaning of Modern Design–Towards the Twenty-first Century,* 1990 (Thames and Hudson, London)
[11] Strickfaden M, Heylighen A, Rodgers P. and Neuckermans H. Untangling the Culture Medium in Design Students. *CoDesign,* 2006, 2(2), 97-107 (Taylor & Francis)
[12] Strickfaden, M. (In)tangibles: Sociocultural References in the Design Process Milieu. *PhD Thesis*, 2006 (Napier University, UK)
[13] Bourdieu P. *Distinction–A Social Critique of the Judgment of Taste,* 1984 [1979] (Routledge, London)
[14] Strickfaden M. and Heylighen A. Exploring the Cultural Capital of Design Educators. In *International Conference on Engineering Design, ICED07*, Paris, August 2007, in print.
[15] Klassen F. Tangible to Intangible. In Davies A (editor). *Enhancing Curricula: Exploring Effective Curriculum Practices in Art, Design and Communication in Higher Education, 2002 First International Conference,* 2002 (The Centre for Learning and Teaching in Art and Design, London)
[16] Mitchell C.T. *New Thinking in Design Conversations on Theory and Practice,* 1996 (Von Nostrand Reinhold, New York)
[17] Hartley J. *Communication, Cultural and Media Studies–The Key Concepts,* 2002 (Routledge, London)

[18] Geertz C. *The Interpretation of Cultures: Selected Essays,* 1973 (Basic Books, New York)
[19] Geertz C. *Available Light–Anthropological Reflections on Philosophical Topics,* 2000 (Princeton University Press, New Jersey)
[20] Westney Q, Brabble E. and Edwards C. Human Ecology: Concepts and Perspectives. *Human Ecology Research and Applications,* 1988, 129-137 (Society of Human Ecology, USA)
[21] Ibid.
[22] Bernard R.H. *Research Methods in Anthropology–Qualitative and Quantitative Approaches, second edition*, 1995 (Altamira Press, London)
[23] Harper D. Reimaging Visual Methods: Galileo to Neuromancer. In Denzin NK and YS Lincoln (editors). *Collecting and Interpreting Qualitative Materials, second edition,* 2003, 176-198 (Sage Publications, USA)
[24] Gray P. *Psychology,* 2002 [1991] (Worth Publishing, New York)
[25] Louridas P. Design as Bricolage: Anthropology Meets Design Thinking. *Design Studies*, 1999, 20(6), 517-535

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