A FRAMEWORK FOR CULTURALLY ORIENTED PRODUCT DESIGN

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ABSTRACT
Global corporations expanding business across different local markets have identified cultural insensitivity to be a potent barrier for expansion. The degree of acceptance by local consumer cultures has become an integral part of the success and failure of their operations. The integration of cultural aspects into the product development process has become an important aspect of design practice. The goal of this paper is to provide a culturally oriented design (COD) framework for designers to research the culture of intended users beyond their first-hand experience. The framework outlines a three-step process to research intended users' cultural context, synthesize situated cultural differences and identify and translate cultural values to new design concepts.

Keywords: Cross-cultural design, product design, situated cultural differences, design framework, cultural product design.

1 INTRODUCTION
Global era designers are increasingly challenged to design for cultural context that requires empathizing with users from an unfamiliar social, cultural, and economic background. A variety of methods, tools and techniques have been adopted in design to promote empathetic understanding of user needs in related contexts. In most reported work, designers and users have been from the same culture and empathetic methods have provided individual and anecdotal perspective of user insights often missing to provide a larger understanding of the cultural context [1]. Researchers [2],[13] and [7] have highlighted the need to develop frameworks that contextualize user insights within a larger cultural context and provide methodological ways to integrate cultural aspects into the product development process. The proposed culturally oriented design (COD) framework is designed to investigate regional and/or ethnicity-based cultural groups and provides a methodology to investigate users' culture, identify and translate cultural values in product forms.

2 LITERATURE REVIEW
2.1 Culture
Culture, one of the most difficult words (and ideas) to define in the English language [3], is a complex concept that has been studied within various disciplines. Culture is often used to refer to a broad range of groups –national, ethnic, regional, social, lifestyle, professional—with a particular way of life that highlights group values, establishes boundaries, and mobilizes individual and group identities. In some cases, culture refers to national, ethnic, or regional groups with "longstanding differences established over many generations and centuries" [4]. In others, culture refers to social groups such as organizational, lifestyle or professional groups around certain consumption patterns. For example, Apple brand loyalist, Harley Davidson or Volkswagen Bettle users are a sub-culture with unique values, practices, and behaviours shaped around consumption patterns. In this paper, culture primarily refers to ethnicity-based cultural groups and the proposed culturally oriented design (COD) model is designed to research and design for regional and/or ethnic cultural groups. The proposed framework can also be used to study lifestyle or social groups formed around particular activities or consumption patterns.

2.2 Culture dimensions and design-oriented models
The complex and multi-dimensional nature of culture has often made the task of integrating cultural factors into the product development process extremely challenging, leaving researchers apathetic and overwhelmed towards the topic. To address this, scholars have classified culture into several dimensions

(See [5] for a comprehensive review of culture-classification models); providing a diagnostic tool for systematic investigation of cultural dimensions. Stewart and Bennett [6] classify culture into objective dimensions that refer to observable and tangible aspects including institutions, arts, crafts, literature and others, and subjective dimensions that refer to intangible aspects such as values and assumptions. Similarly, Hoft [5] suggested an iceberg model to classify culture where the visible part of the iceberg refers to the tangible, observable and behavioural aspects of culture while the large invisible part of an iceberg refers to core values, beliefs, and assumptions of a cultural group. Hofstede [7] classified culture into four layers representing concentric rings of an onion. The outer layer represents rituals, the intermediate layer represents heroes and symbols, and the inner core of the onion represents core values of a cultural group. Hofstede [7] argues that cultural practices, the fifth layer, connects all layers of the cultural onion from core values to the outer ring of rituals and behaviours. Researchers [1], [8], [9] have agreed that classification models provide a systematic framework to investigate culture aspects but have questioned its capacity to integrate cultural aspects into the design process. These classification models present a 'spatial perspective' of culture but do not offer ways to investigate interdependencies between layers. In addition, these models do not acknowledge the role of design and material objects in shaping individuals' cultural context and offer insufficient methodological direction to integrate cultural aspects into product design. In addition, the classification models "postulates that an individual has clear and independent cultures or value sets" [9] and fail to acknowledge the interdependencies between the tangible, observable, behavioural aspects of culture and how they could be shaped by core values, assumptions, and beliefs of a cultural group [8]. The following section presents cross-cultural studies that address some of the limitations of the cultural classification models and offer a step-by-step methodology for translating cultural insights into new design concepts. These studies provide a direct way to adapt culture-classification models into product design that lead to design-oriented models that aid in designing for diverse cultural context.

In their study of the Taiwanese aboriginal material culture, Hus, Lin, and Lin [10] outline three cultural layers and the corresponding design features. The outermost layer represents physical/material aspects of Taiwanese material culture including appearance, pattern, and form of artifacts. The mid-behavioural layer includes aspects related to user-product interaction such as functionality, usability, and safety. The inner layer represents intangible aspects of storytelling, emotions and meanings associated with material objects within the culture. The authors use cultural classification (and corresponding design features) as the source to design a ten-step design process for translating Taiwanese cultural attributes into tangible product features. In a similar study, Lin et al., [11] proposed a design-oriented model to translate Taiwanese cultural features into modern product design. First, the authors classify culture into three layers: physical/material, social/behavioural and spiritual/ideal. Second, they propose a three-step methodology-- identifying cultural features, translating information to design elements, and designing new cultural products—for translating cultural features into culturally-relevant product form. Moalosi, Popovic and Hickling-Hudson [2], [12], and [13] conducted a series of studies in Botswana to develop a culture-oriented design model that integrates cultural aspects into product development process. This culture-oriented model starts by analysing indigenous products to understand the underlying socio-cultural factors that shape the material culture. The authors classify socio-cultural factors into three themes: material artefacts, emotional factors, and social practices. The second part of the model translates socio-cultural factors into product features such as functionality, significance, knowledge, mediation, gender, and aesthetics. The last part focuses on designing products that not only satisfy user needs, but also represent Botswana's symbolic, social, and cultural values.

3 CULTURALLY ORIENTED DESIGN (COD) FRAMEWORK

The COD framework includes three key elements: 1) a biaxial map for researching users' cultural context, 2) cultural situated difference: a methodological tool to direct research inquiry into each of the four cultural quadrants and 3) a step-by-step process for translating cultural values to product forms.

3.1 Biaxial map for researching users' cultural context

The proposed biaxial map demonstrates how the culture of intended users' can be studied within the context of product design. The horizontal axis represents a continuum from material to behavioural aspects of culture and the vertical axis represents the observable and the symbolic aspects of intended users' culture. The four cultural quadrants are interconnected and overlapping and hence should be researched in relation to each other. The goal of this biaxial map is to simplify the overwhelming task

of addressing a multitude of design related cultural attributes into smaller, more manageable information chunks.

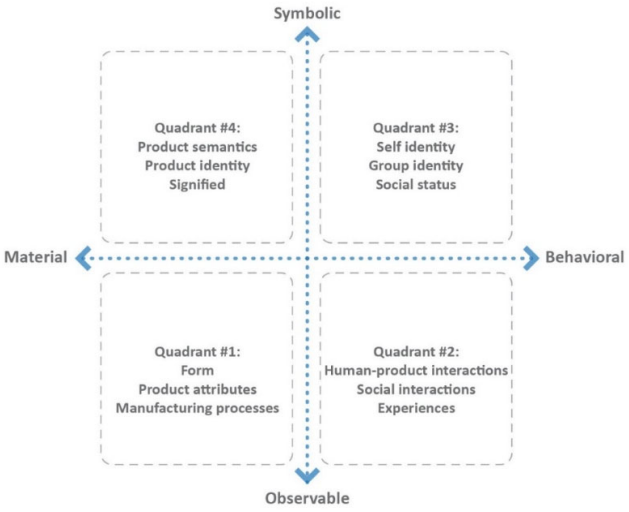

Figure 1. Biaxial map of cultural dimensions

3.1.1 Quadrant 1: Material-observable aspects of culture

The first quadrant focuses on the material-observable aspects of users' culture. Research in this quadrant includes examination of two interrelated aspects: 1) product attributes and 2) manufacturing processes. The study of product attributes includes examining form, colour, textures, graphic markings, and materials as indicators of ideas expressed by designers and/or users within a particular culture. Manufacturing processes include studying specific making practices, choice of materials and role of technology in a particular cultural context.

3.1.2 Quadrant 2: Behavioural-observable aspects of culture

Research in this quadrant should include interactions of individuals with products and social interaction and relationship among people within a culture. Human-product interactions should include cognitive and physical ergonomic considerations, as well as product attributes that communicate affordances, character, and function of products. It is also important to study social interaction and how cultural practices and norms are established within a cultural context as a cumulative result of individual interactions.

3.1.3 Quadrant 3: Behavioural -symbolic aspects of culture

This quadrant guides researchers to study symbolic aspects of consumption that establish social status, self- and group-identities. Commodities are not solely used to satisfy needs; they are used to communicate social status, self-identity and stabilize group identity. Group identities mediated through products becomes a medium to understand shared meanings and establishes practices that act as boundaries among different cultural groups. For example, in a culture, the act of buying a car is not necessarily for the sole purpose of mobility; it could be an act to communicate social status or stands as way to align with a particular social identity. The act of buying "environmentally sustainable" products can promote certain self-identity and mobilize group identity of "environmentally responsible citizens."

3.1.4 Quadrant 4 Material -symbolic aspects of culture

Objects do not just acquire meaning through use or exchange, but through comparisons with other objects [14]. The material-symbolic quadrant includes understanding product semantics, product personality and branding. Product semantics explain the mechanism by which objects acquire meaning (and how humans assign meanings to things) and the role that design plays in this process [15]. Product personalities provide insights into the symbolic characteristics associated with products shared among individuals of a cultural group. Product personalities can be shaped by national culture (S. Korean,

European, Japanese), period style (Art Nouveau, Mid-century, post-modern), corporate design style (Nike, Apple, Braun) or word associations (boxy-organic; emotional-rational; geometric-curvilinear) attributed to products. Symbolic meanings of objects cannot be studied in isolation as user interactions (quadrant 2) are key in shaping meanings ascribed to objects that help establish individual and group identities (quadrant 3).

3.2 Culturally situated differences

The proposed COD model recommends that researchers should utilize situated cultural differences as a common diagnostic tool when synthesizing insights from different dimensions of culture (biaxial map with quadrants). Culturally situated differences are "differences in relation to something local, embodied, and significant" [16] that "either express, or set the groundwork for, the mobilization of group identities." Situated cultural differences become a frame of reference for emphasizing local, embodied differences that represent cultural values and mobilize group identity. Situated cultural differences becomes a diagnostic mode to categorize everyday experiences into meaningful cultural categories. For example, using manufacturing processes as a diagnostic mode will result in a continuum from *hand-crafted* to *mass-produced*. Manufacturing processes in a particular cultural context can be mapped on a continuum to understand if certain underlying values shape the selection of materials and manufacturing processes. On a continuum are "hand-crafted" products valued more over "mass-produced" goods and how do the manufacturing/making processes shape individual and group identity in a particular cultural context. Situated cultural differences do not replace anthropological methods; it provides a common methodological tool for conducting and visually summarizing research.

4 CULTURALLY ORIENTED DESIGN (COD): A STEP-BY-STEP FRAMEWORK

4.1 Step 1: Research users' cultural context

At the onset of a study, researchers should identify intended users' cultural context and utilize the four quadrants of culture (biaxial map) to conduct cultural inquiries. Both primary and secondary research methods--such as interviews, observations, contextual inquiries, participatory codesign, surveys, market research, competitors benchmarking, content analysis--should be used to investigate the four cultural quadrants and the dynamic interdependencies between the material, behavioural, observable, and symbolic aspects of intended users' culture. Researchers should continue to use anthropological methods such as observations, participatory design methods, contextual inquiry, surveys, and others to understand intended users' needs, behaviours desires, emotions, and values. How can designers understand the underlying values that shape everyday user interactions? Researchers should utilize situated cultural differences to identify local embodied differences that mobilize group identities. Using situated differences is a two-step process. First, from the research identify criteria or differences that classify everyday experiences into culturally meaningful categories. Second, identify the resulting group identities (local and significant) established by situated cultural differences. For example, if product attributes are used as a diagnostic mode (situated difference), products from a culture can be categorized on a continuum from utilitarian on one side to ornamental on the other. Figure 2 and 3 provides examples of continuum based on various situated cultural differences in four cultural quadrants. The following examples not an exhaustive list; researchers are encouraged to identify situated cultural differences relevant to their studies.

4.2 Step 2: Synthesize situated differences to identify values

In this step, researchers synthesize multiple semantic differentials/continuums identified from step one. For example, for a cultural group, one can identify continuum such as traditional/futuristic, utilitarian/ornamental, masculine/feminine, vibrant colours/neutral tones, self-oriented/group oriented, low/high social status, individualistic/shared experience, etc. Researchers [17][18] have suggested that these situated differences or cultural dimensions mapped on a semantic differential always contain an element of value. Values are defined as "a broad tendency to prefer certain states of affairs over others" [19]. Cultural values provide intensity and direction and represent two opposite ends of a semantic differential [19]: masculine vs. feminine. Researchers should compare and combine situated differences from various quadrants to generate a set of values that represent intended users' cultural context. For example, identifying situated differences and values in quadrant 1 (material forms and manufacturing processes) can shape form development, product styling, and selection of culturally appropriate manufacturing processes. Similarly, researchers should identify values that shape user interactions and

behaviours (quadrant 2), self and group identities (quadrant 3) and symbolic meanings of products (quadrant 4).

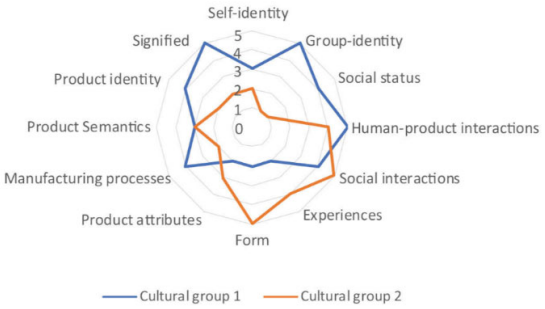

Figure 2. Synthesizing situated differences and identifying values

4.3 Step 3: Translate values to product form

In this step, a set of values (identified in the previous phase), are translated into culturally appropriate product semantics: "the study of the symbolic qualities of man-made forms in the context of their use and the application of this knowledge to industrial design" [20]. Gros [21] outlines four key semantic functions of products: practical, formal aesthetical, indication, and symbolic. Practical semantic function relates to the material-observable (quadrant 1) aspects of culture and indication function can be derived from the behavioural-observable (quadrant 2) aspects that includes interactions, affordances, character, product category. Similarly, symbolic semantic function relates to the symbolic-behavioural (quadrant 3) and symbolic-materials (quadrant 4) quadrants of the biaxial map.

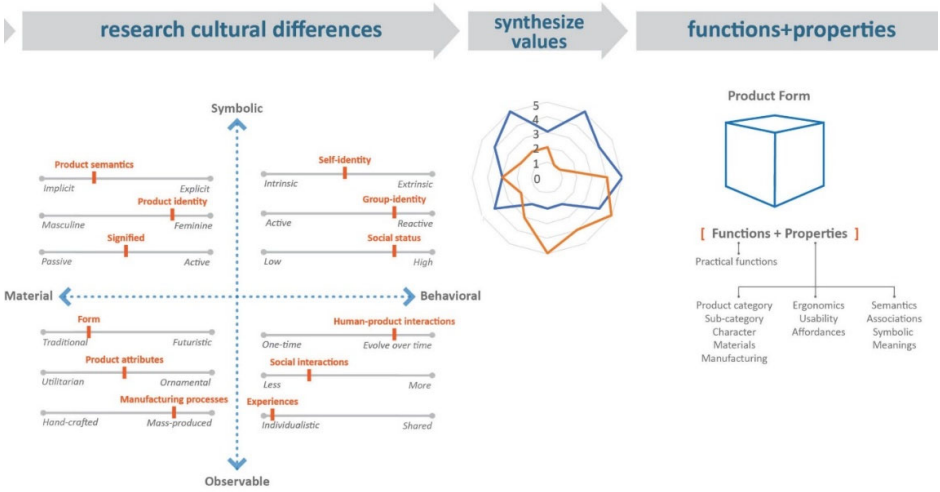

Figure 3. Step-by-step culturally oriented design framework

5 CONCLUSIONS

The proposed COD framework is an essential link that connects anthropological methods, culture-centred design, and product semantics. The proposed model does not replace the current use of anthropological methods used to investigate culture; instead, it advocates using these methods to investigate the four quadrants of cultural context. The goal of the COD framework is to provide students and educators with a step-by-step framework to study various aspects of culture, synthesize situated cultural differences, and translate cultural values into product forms. The proposed framework can be used to strengthen cross-cultural product design studio projects were student design for users from unfamiliar social and cultural contexts.

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