Introducing a Female-Focused Design Strategy (FDS) for Future Healthcare Design

Xue Lishan – School of Design and Environment (SDE), Department of Architecture, National University of Singapore, NUS, (65) 98484710, seetlishan@yahoo.com
Yen Ching Chiuan - School of Design and Environment (SDE), Department of Architecture, National University of Singapore, (65) 65163524, akiyc@nus.edu.sg

Abstract

This paper introduces a Female-focused Design Strategy (FDS) for the design of female-focused healthcare devices targeted at women within the self-care context. Literature review and a mixed methodology of quantitative and qualitative survey studies were conducted and analysed to gather primary information about women's needs, perception and acceptance level towards the design, use, and interaction of such products. The FDS comprises of attributes to convey a personal and special meaning over and above the product's utilitarian meaning with the aim of stimulating prolong product attachment. It should create different unique product characters which may encourage medical adherence of users and can be applied in any phase of a new product development (NPD) process. It is hypothesized that a designer who can define such areas for future healthcare interfaces can use them to 'get a grip' on the commercial success and viability of his or her healthcare product design.

Conference theme: Design & Emotion: Methodological Issues
Keywords: design strategy, female user-product attributes, interdisciplinary contribution

1. Introduction

This paper aims to synthesize a Female-Focused Design Strategy (FDS) and apply it to the design of Female-focused Healthcare Applications (FHA) targeted at women for a very important context – self-care. A concept of the FHA was first introduced as the Mobile Health Communication Unit (MHCU) targeted for women's health (Xue, 2005). Users may refer to this network-based healthcare information system (IS) that functions as a monitor, educator, and counselor (see Figure 1). It was presented as a 3-component design, consisting of a pod, a cradle, and a pendant, initiated with female-focused design qualities that could help women understand and better monitor their health concerns. It was intended that such a dedicative device which could empower certain groups of women such as the pregnant who require prenatal and postnatal care; the non-pregnant who may be suffering from chronic illnesses or any others who may be particularly interested in recording their health management regimes (Denton, 2001; Millard, Fintak, 2002; Protti, 2007).

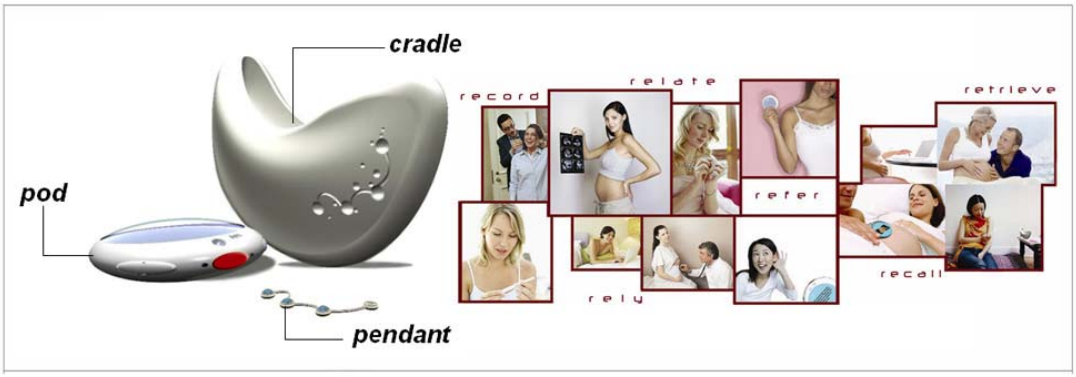

Figure 1: Design and user scenario of MHCU

The basis of this concept was supported by past research which suggested that users become attached to certain products, as they convey a personal and special meaning over and above the product's functions (Dittmar, 1992; Picard, 1997; Jordon, 1999; Djajadiningrat, Overbeeke, Wensveen, 2000). In the last decade, much design research has shown an increased awareness of the phenomenon of product emotion (Desmet, 2002), product personality (Govers, 2004), and product attachment (Mugge, Schifferstein, Schoormans, 2004; Mugge, 2007). Likewise, in future healthcare, the role of design would contribute to healing processes and probably reduce the use of drugs; patient-centred designs provide the kind of satisfaction and comfort which is therapeutic and

desirable for children's and women's acute care. (Fottler, Ford, Roberts, Ford, Spears, 2000).

Self-care has become steadily more important as professionals and patients become much more equal partners. It is defined as the actions individuals "take to lead a healthy lifestyle; to meet their social, emotional and psychological needs; to care for their long-term condition; and to prevent further illness or accidents" (Barlow et al., 2002). The potential benefits are substantial and a large research agenda surrounds it. There is a need for designers to better understand patients' needs and their expectations of healthcare, of the most appropriate ways of providing information to enable people to deal with their health concerns themselves, and of ways to help them to use services most effectively.

In recent years, women are catching up with men in most measures of online life, so much so that they have consistently engaged more in health-related online activities. Women are significantly more likely than men to look for general health and medical information on specific diseases, medical conditions, treatments or procedures (Fallows, 2005; Rice, 2006). Women visit doctors more frequently during their lifetime than men normally do (Miles, 1991). They are more likely to look for support groups to communicate with for diseases or conditions. Although a market for home medical devices and self-diagnostic products has broadened in recent times, there have not been any female- focused principles in the design of such devices for female consumers. Women differ in terms of operation, perception and understanding of medical devices (Ward, Sanson-Fisher, 1996). Different kinds of healthcare supports actually stems from the home: for instance in therapy and rehabilitation. It should be noted that a number of the women health problems are preventable right from the home setting. This can indirectly influence the design and manufacture of future healthcare devices targeted for women.

In fact, there appears to be a lack of female-focused-driven design principles, comprising on the real preferences and interesting of female end-users, offered by the industry at this moment, Designers and engineers, usually men, often test their products on their male dominated environment. When they sub-consciously project themselves as the potential user, it may create a gender bias toward male-dominated symbols and competencies. In such cases, the user representation that designers generate is one-sided, emphasising the characteristics of the designers themselves and neglecting the diversity of the envisioned

user group. By developing the FDS which truly understands the healthcare requirements and utilitarian aspects, yet fulfilling the female users' emotive needs to create unique product personality, it may encourage product attachment and thus enhance medical adherence towards illness prevention and well-being. It is hypothesized that a designer who can define such areas can use them to 'get a grip' on the commercial success and viability of his or her healthcare device design.

2. Method

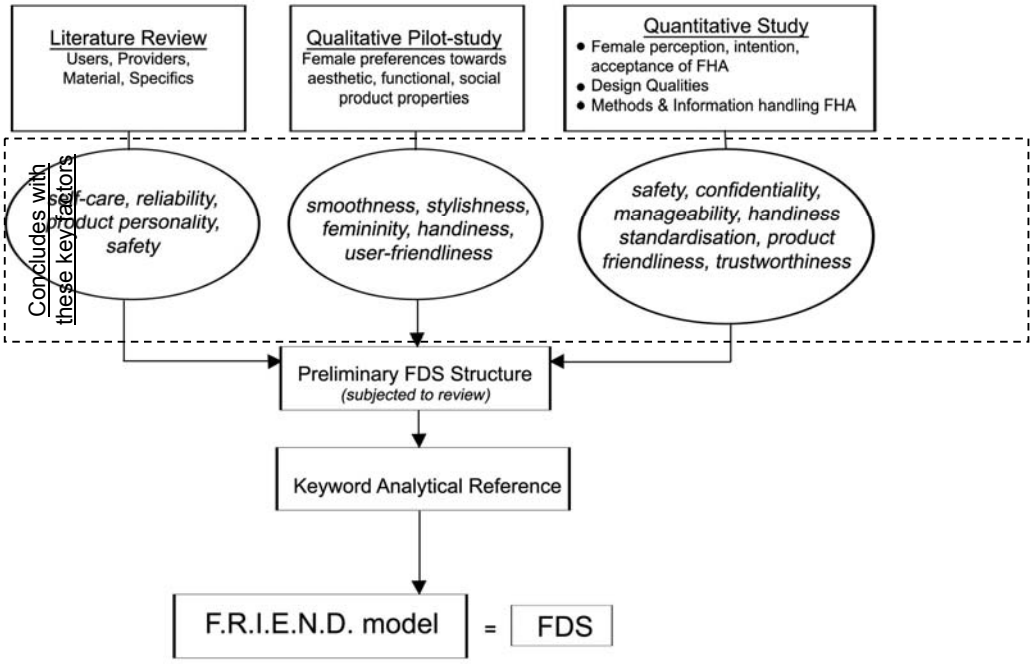

Figure 2: Steps in constructing the FDS

The introduction mentioned before served well as the background which spin off to a current doctoral research where we are exploring how a FDS can be formulated through the means of reviewing literature extensively where select theories from the domains of female gender psychology, characteristics of female users, tasks, products and contextual matters are discussed, as well as conducting survey studies to gather primary data about women's needs, perception, intention, and acceptance level pertaining to the design and use of FHA. Figure 2 presents the process of constructing the FDS, where the conclusive key factors from literature review findings and both survey studies were tabulated to provide sufficient grounds while a preliminary FDS model was drawn up next to illustrate

the essential points for the FDS. In this section, we briefly describe the theoretical background and present the summary of findings from the survey studies that were conducted.

Through out the discussion for the research, the term ‘user’ is used interchangeably to refer to patient or healthcare consumer. It is preferred to use the term ‘user’ to emphasise that the concepts proposed where the FDS is applied should result in tools that may be helpful in monitoring health and wellness, as well as for tools to help with illnesses that the term ‘patient’ would imply. A number of issues regarding the FDS at the ‘first level’ of interpretation identified by literature review concludes that the leapfrogging of healthcare technologies and eagerness to be involved in healthcare will lead to more self-care culture and a demand towards consumer safety and a more right-brain way of thinking reliability in systems on the part of female users. This review of literature was provided as an underlying structure for the later two survey studies. Figure 3 shows the workflow for the review of literature.

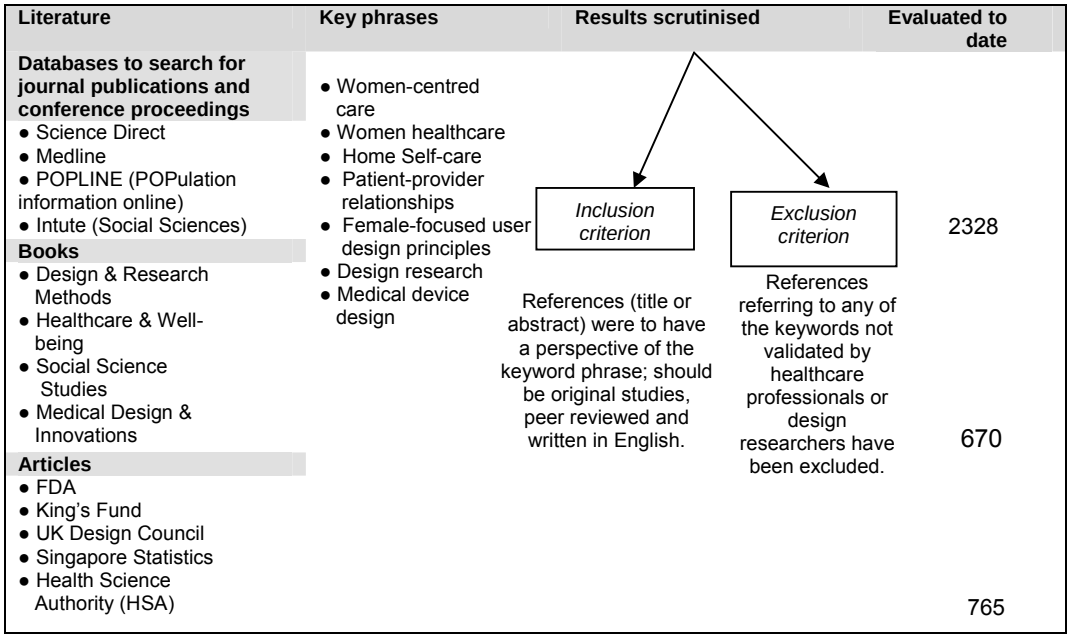

Figure 3: Workflow of literature review

To be capable of visually illustrating the whole strategy, the designer must first understand some key variables, i.e aesthetic, functional or social influences concerning product properties. These variables were introduced, examined and discussed through a qualitative survey pilot-study which aim was to investigate gender perception as it relates to product language, identity, and preferences. Data was collected by conducting semi-

structured interviews with 72 participants, of which 38 were male and 34 were female. Three types of consumer products were selected as the design stimuli, combined with a selection of product properties having aesthetic, functional and social associations. In the interviews, initial responses from the respondents were mixed and associated with reservations about the choices available. Their immediate choices of models revolved mostly around expected ranges, reflected especially so in the choices of fragrance bottle designs. More in-depth interpretive and qualitative evaluation of the choices was conducted by suggesting schemes and references to group the related keywords. This study concludes by presenting a set of female preferences towards design and demonstrates how some directions can help designers enhance future gender-focused designs, specially paying attention to creating a new culture of self-awareness and well-being in healthcare devices targeted for women. (Xue, Yen, 2006; Xue, Yen, 2007). Figure 4 shows the results of this study in relation to suggesting some female-focused attributes for framing the new strategy.

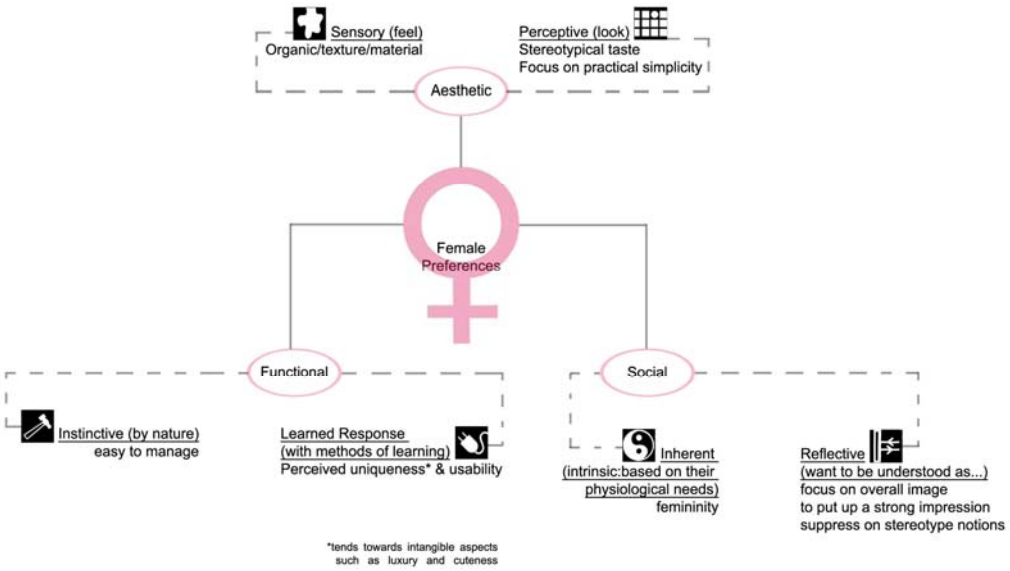

Figure 4: Female Preferences from Pilot-study

Another quantitative study (Xue et al., no date) was conducted through structured questionnaires to explore the differences in perception, intention, and acceptance level of new innovative FHA between different ages of women, with different influencing social backgrounds using an extended Technology Acceptance Model (TAM) entitled the Female-focused Acceptance Model (FAM). Their choices to design qualities and methods and information in handling FHA were also collected. The questionnaires were directly distributed in Singapore and 1071 female participants responded to this study (71.4%

response rate). Regression analyses were performed with SPSS 13 for Windows, SASS and Minitab to explain how different predictors may be correlated to each other in terms of significance.

The result from this study revealed that to encourage women to adopt and use FHA, there is a need to communicate the potential usefulness of the applications to the user herself, and emphasize the ease of use of the possible technologies such as female-focused, user-friendliness in self-management, not neglecting the importance of the technology in managing healthcare and personal well-being. To be more specific in encouraging women to use FHA, e.g. the pregnant, issues such as their past experience with medical devices and social status were highlighted. The specific requirements identified from the study for FDS consideration includes factors such as safety, confidentiality, manageability, standardisation, and trustworthiness.

3. Results

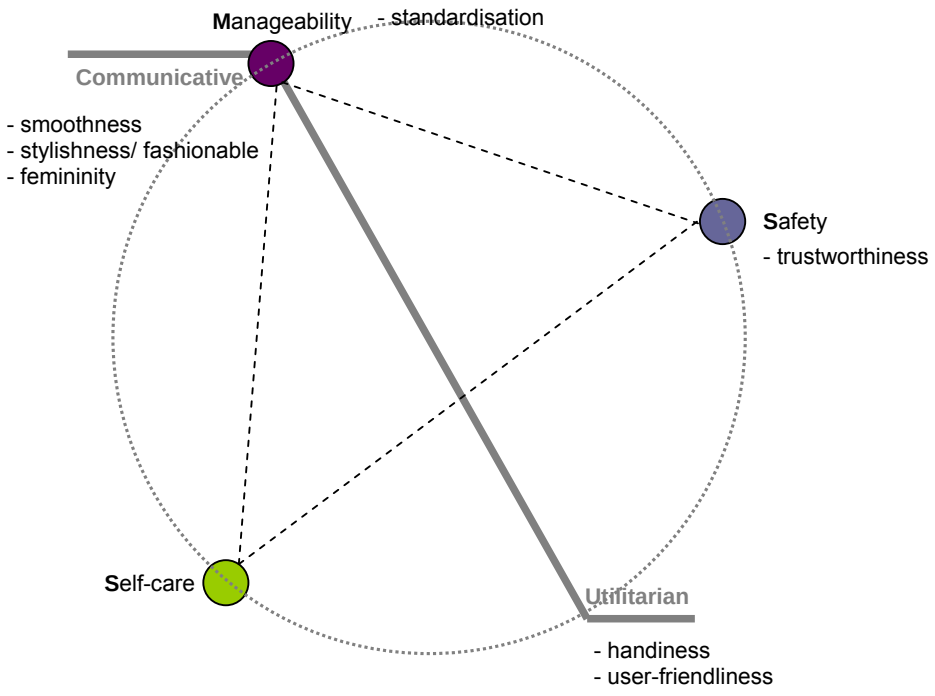

Figure 5: Preliminary FDS model.

Most of the key factors identified from the studies have to do with emotion as they involve a relation between the user experiencing them and the particular healthcare device in discussion: one is afraid of something (e.g. the information system failure), proud of

something (e.g. the device symbolising their profile), concern with it (e.g. the accuracy) and so on (Frijda, 1994). All of the above information could be explained in words or shown in a statistical table, but neither of these has the same impact as relating the key concepts through a model (Saffer, 2007). Through a model, designers could easily see and demonstrate to others features users want to use and their possible extensions within the system (Saffer, 2007) (refer to Figure 5). The more perpetual factors revealed from the studies, i.e. manageability, safety, and self-care, and the background dimensions – communicative and utilitarian aspects were concluded to be the essential conditions for facilitating the design strategy. Due to the explorative nature of this strategy, and the great amount of variability involved in generating design possibilities with it, the current position for the factors versus the dimensions shown are not empirically determined.

Words are an essential instrument for people to build connections between technology and emotion or affect. People need words to communicate to those who are interested in their systems; probably to allow some designs to communicate with users; to organize their own thoughts; and not least to articulate the intuitions that brought them into the area. The scale of difficulty to find a truly satisfying way of organizing should not be underestimated. The language that lies within is more complex than it looks. This gives rise to traps when designers forge ahead relying on a model which is appealingly simple, but which in fact conceals both the complexity of the language, real user concerns, and cultural context that the product should describe. Hence, a keyword analytical reference was undertaken to select the right adjectives for the new strategy, most importantly to match closest to the conclusions of the respective findings; it truly reveals the existence of a large body of knowledge.

An appropriate design strategy is to help define and refine the prioritizing of the end user's perspective on key issues on specific product facets and should provide as much relevant information as possible about the user's product requirements in order to create the best solution, supplied easily within today's information age. The FDS is eventually presented in a model using the acronyms 'F.R.I.E.N.D'. The attributes within the model should be responsible for eliciting strong emotional responses from end-users and strong experiences would influence the end-users' intention to pursue better health. However, it is important to invite some potential end-users to cooperate in an early stage of the process and making them aware of the importance of the decision-making phase that the design strategy will be more or less successful. The potential end-users of the strategy

who are most likely designers, researchers, and practitioners can offer valuable insights to the research team in expressing objective opinion as well as to provide positive as well as negative feedback. A survey filing card was sent through email to 5 designers who are in either interested or trained in the field of medical design.

The result was a mutual consensus on the general context of the F.R.I.E.N.D. model and provided a profound insight into the underlying concerns of designers to implement this strategy into designing for women. The report that resulted from the interviews covered an expert analysis of the existing situation, the level of quick understanding, and the barriers to actual implementation and adoption. The interviews carried out were of great value for the design research team as they uproot problems and validate the entities, thus forming a thorough basis where creative impulses could materialise. Some parts of the model were revised based on the comments collected from how other designers understood things For example, the initial keywords forming the FDS were in the adjective form but it was suggested to use the noun form instead.

4. Discussion

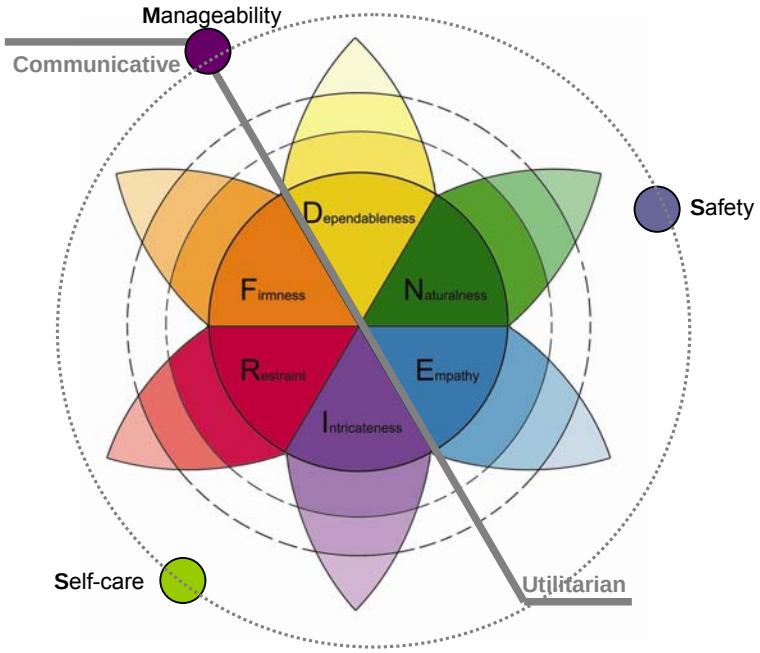

Figure 6: Female-focused design strategy – F.R.I.E.N.D.

Designing products to appeal to consumers' emotions is an up and coming paradigm in the area of healthcare design research. However, it is not clear which aspects are needed in a female-focused design to drive female consumers' emotions. The results of this

combination of review and studies demonstrated a strong relationship between design attributes of healthcare devices and female acceptance considerations. The 'F.R.I.E.N.D' model incorporates in it two background aspects – utilitarian and communicative. The utilitarian side represents the design to human physique, the product's technical functions, construction, and production. The communicative side relates to the product's ability to communicate with humans and to adjust to human perception. Such categorizations are familiar to some extent as they have been described in previous studies (Möno, 1997). Within the two aspects, some meaningful attributes are proposed distinguish factors related to the product itself, from influences related to the user's identity and the brand identity (see Figure 6).

Variables F.R.I tend to refer to 3 attributes important for a female-focused product, which in general aims to reflect its "user identity". Such attributes make a product attractive because it can respond to the user's wish to be affiliated to a group or on the contrary to be seen as different from a group of individuals. A product can facilitate this type of communication and inform others about individuality, status, ambitions, lifestyle and social standing. Variables E.N.D represent another 3 attributes related to the product itself, which can be directly related to the product's intrinsic qualities, such as the product's working principle, quality, and newness. Attributes related to the product itself may also be based on associations that refer to the product's cultural context or to elements in its design that create affection for the product.

In view of the above mentioned related studies and detailed systematic content analysis of relevant references in the previous literature review, it was suggested that in the background of the 6 attributes, the concepts of *manageability*, *self-help*, and *safety* should be mentioned as important considerations as they have also been strongly emphasized by the analytical conclusions from quantitative data. *Manageability* refers to the notion of being capable, managed or in controlled. 68.3% of women think manageability is important (Authors, 2007). *Self-care* refers to providing for or caring or the ability to provide for or care oneself without assistance from others. 79.9% of women think self-care is important (Authors, 2007). Last but not least, *safety* refers to the state of being certain that adverse effects will not be caused by some agent under defined conditions. The six attributes are discussed below in length and should be taken as overlapping considerations in female-focused designs.

Firmness. It means the trait of being resolute, possessing much determination. According to the survey results, women intend to use FHA despite opinion from family and friends (no date). Women today want to be thought of as competent, capable, and in control of their lives. No doubt, they have embraced some 'mannish' attitudes. They are also organising their personal lives, interests and likings; demanding direct solutions to their problems. Women want to rely on strong designs which must demonstrate repeatedly that they have earned their recognition and some level of popularity and are up to the times. Some level of standardisation is expected in this sort of firmness that it may be used for comparison or bench-marking.

Restraint. It means the state of being physically constrained. The "small is better" syndrome has permeated the female mentality from early times, and a variety of rationales have been used in attempts to explain it. The smaller size of the female physic due to anthropology, which becomes a feminine attribute, may have made it practical and psychologically sounder for women to prefer small things. Secondly, religious philosophies, social backgrounds, and even psychoanalytic traditions can be explained for creating some 'pressure' or phenomenon on women to only be accepted with smaller things compared to their counterparts (Elliott, 2002; Stoller, 1992). No doubt, religious teachings have played a significant role in the social propensity across different cultures to compact things down to their essence for women, to cater to both their attitudes and behaviour. These are just two of the many possible reasons why there appears to be a tendency for women to appreciate smaller things. The commercial advantages of miniaturisation have of course long been obvious. According to primary data collected, women value the size of their devices.

Intricateness. In this context, it means an appreciation of elaborateness which is about the nicety of detail. Women show a distinct preference for more colour and graphics (Basow, 1992), which refers to some expectations for finer detailing. The result from an interaction between biology and social environment may have resulted in social differences for women to notice tactile things a lot more than men. As females (or feminine and androgynous-sex-typed individuals) generally use more self-disclosure, display greater eye contact and smiling behaviour, have smaller personal space, and exhibit greater listening and attending skills than males (Rosenthal et al., 1979; Hargie, 1997), this explains for them noticing intricate details more than their counterparts to

much extent. The results from authors generally support earlier research and justify for this expression here (2007).

Empathy. It is about ready, sensitive comprehension of others' states. Empathising is about spontaneously and naturally tuning into the other person's thought and feelings and reading the emotional atmosphere between people. It is about effortlessly putting oneself into another's shoes, sensitively negotiating an interaction with another person so as not to hurt or offend them in any way, caring for another's feelings. There are many evidences to show the female brain as the empathiser, as well as appreciating others to empathise with her. Through sad looks, sympathetic vocalisations and comforting behaviour, women definitely show more comforting behaviour, even of strangers, than men do (Hoffman, 1977; Zahn-Waxler et al. 1992). Women tend to value the development of reciprocal relationships and appreciate the supportive experience that is derived from being in an equal relationship (Knight, Fabes, Higgins, 1989; Baumeister, Leary, 1995; Willingham, Cole, 1997). Women are much more prepared to share, express their views and feelings, thus encouraging different perspectives to emerge and knowledge exchanged (Maccoby, 1998). In Western culture, femininity has traditionally included features such as gentleness, patience, and kindness. To further support the need for empathy considerations, according to survey results, 76.2% of women value female user-friendliness and 33.2% of women expect some level of relational communication (Authors, no date). The type of empathy referred here can embrace the issue of confidentiality.

Naturalness. It is to limit or produce the effect or appearance of nature but representing something real, not abstract or ideal. Four of five women admit to be feeling over-whelmed by their current possessions and are eager for a less materialistic life (Kanner, 2004). No doubt, women who previously hid their desire for things naturalistic and simple behind business suits are allowing it to reveal. As women grow increasingly comfortable with themselves, non-pressured femininity is making a comeback. Women show a preference for more rounded shapes, and favour informal rather than posed graphics (Zhang, Feick, Price, 2006). As this trend occurs, it means that design considerations with naturalistic pro-female qualities are close to the hearts of women and would be accepted quite readily. Similarly, the results Xue and Yen generally support earlier research and justify for this expression here (2007).

Dependableness. To be dependable means worthy of reliance or trust as well as consistent in performance. According to survey results, 64.6% of women expect the FHA to be useful, while 29.1% of them are concerned with the reliability of information. Especially so for women with their stereotypical associations that they tend to be more emotional and sensitive, and a chance that the medical device would be revealed in the public, the design needs to be both functional and socially dependable. In medical devices (artificial nature), being dependable means having it perform reliably time after time. They are to perform precisely according to expectation and these expectations may come from multiple sources: the advertisements and recommendations that lead consumers to buy the item in the first place or through well-known branding. Although medical devices are less likely to be status symbols because of their discrete use, they could nevertheless be chosen as group-identity objects. Before they are chosen as such, the product or application needs to be trustworthy enough. It should be one that users will take the time to examine and learn, discovering and using more features because they are not afraid that something bad will happen to them if they do.

F.R.I.E.N.D. should

- Improve insight into both the design problem and the design process
- Contribute to a better end-product, connecting to good user experience is of top priority
- Stimulate user information collected by improving the interpretation and communication process between client and designer: mutual agreement in selecting design alternatives within a common context – provider, user, health, design, home.

The FDS is structured to fulfil diversity in designing: it can build assurances of variety and choice into its processes and products, and it can also be the source or catalyst for change. There are many dimensions in human diversity. They go beyond obvious differences such as race, age, physical abilities, and marital status. Less obvious dimensions include education, lifestyle, nationality, religious or political affiliation, organisational culture, and operator skills. It is believed that ripples around the attributes are about to create a wave that will change the experience of healthcare for the better. Understanding such diversity adds value in product design and use. Actual applicability and acceptability would have to be tested out in NPD processes of new innovations or in the pre-design process of a possible redesign project in order to see if requirements of

user value, product properties, and cultural factors related to design have been sufficiently considered. Figure 7 illustrates the semantic mood board of FDS with its basic attributes, which could be seen as a useful structure for making an inventory of emotional concerns and particular product focuses.

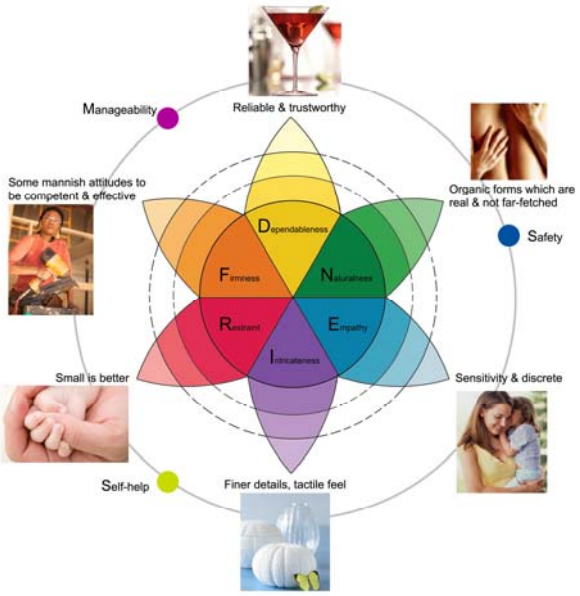

Figure 7: Basic semantic mood board for F.R.I.E.N.D.

Introducing the FDS to a NDP process can greatly impact the investigation of the market, leading to the development of a unique product design specification (PDS), which constrains and controls stages of concept design, detail design, and eventually manufacture. A further step to develop and enhance the strategy is to apply it to the NPD of an actual medical device for women's health. It is believed that FDS has the ability to create comfort and pleasure with healthcare devices in people's lives because the attributes came forth based on human perception and acceptability including emotional reflections and responses. The FDS aims to be a quick and effective strategy which consists of various steps which can function on its own to advise designers depending on their cultural and social contexts. Depending on different eras and technological feasibilities that the product should incorporate, the emphasis of each attribute within the model may vary accordingly in the design (see Figure 8).

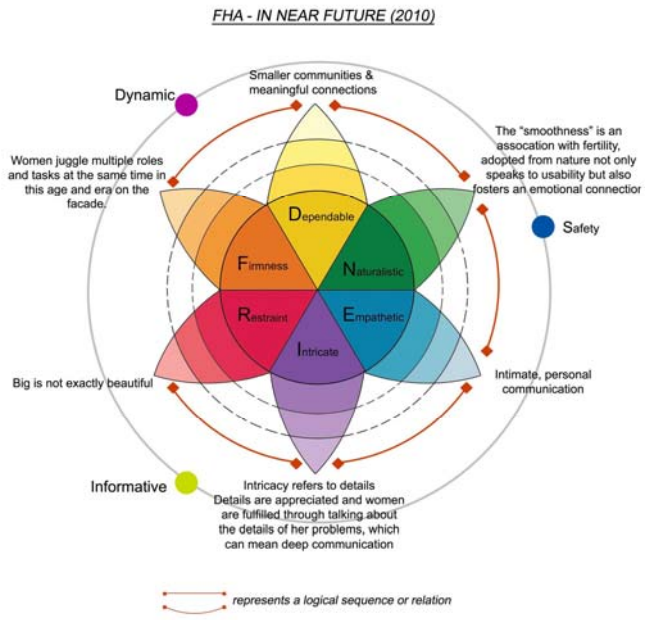

Figure 8: Flexibility of FDS.

It aims to be sustainable on its own in the long run and dynamic enough to extract a diversity of parameters as well as differentiate possible markets (see Figure 9). The results obtained give indications for female-focused design parameters which can be in turn introduced to different target audiences amongst the female population. The question is how many the FDS support designers in manipulating the emotional, aesthetic, functional and social impact of their designs for women's health. Although it does not offer anecdotal design principles, it does offer distinctions that can help designers to understand what female users in relation to their health think and provide a richer context for interpretation for gender-specific design.

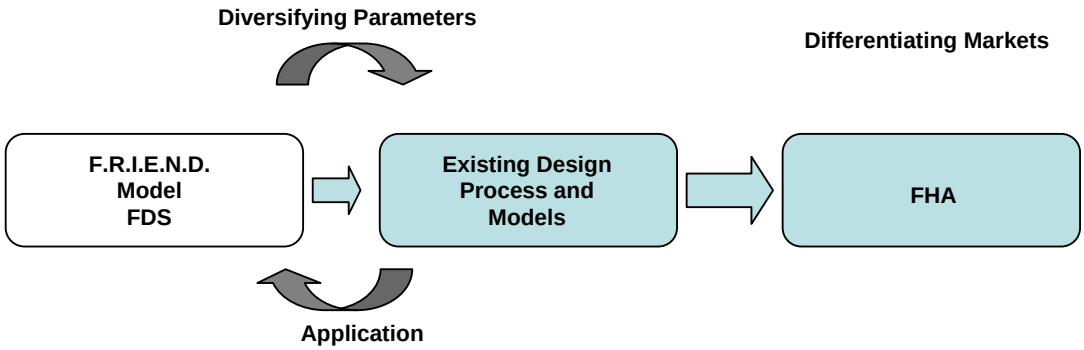

Figure 9: Dynamism of FDS

It is envisaged that a designer who can define such areas presented in the FDS can use them to 'get a grip' on the commercial success and viability of his or her medical product

design. Emerging applications, designed with the female perspective in mind can reassure women emotionally to maintain health, to seek better quality of life, and to prolong life. When women are empowered with devices which inspire, care, and educate themselves about diseases, treatment options and management, it can help them move from knowledge to action, improving medical adherence and fostering fruitful communication with their health care providers. It is hoped that the applications of such a research outcome can help female consumers be more actively involved in seeking prevention and treatment in the near future, hence have the opportunity of deciding subsequent impacts which may improve on their own quality of life. The next possible further implication would be to apply FDS into designing a realistic healthcare product (for women's health). In order to assess if there should be modifications, an evaluation study would be carried out from this new product creation, by asking participants to compare the new design alongside with existing healthcare devices of similar nature. The attributes may differ from product to product, but it is desired to know their relative importance empirically – if related to form, function, or usability. The validation of the next possible further research could use contentment and encouragement as meaningful predictors of purchase and use intentions.

5. Conclusion

The result of this paper presents the most essential elements for understanding the adoption of female-focused design, in terms which can be exploited by designers of healthcare interfaces. The attributes for FDS are considered to be simple in application and the results are convincing despite the simplicity (for understanding even before executing). They are flexible and can be applied in any phase of the NPD process. This flexibility has made it unique and has the potential to expand beyond the realms of NPD into possibly other realms such as social and cultural ecology. FDS hopes to generate new design visions to offer essential and unique insights for designing healthcare devices effectively to the needs of female-patient users and recommendations of health care professionals.

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