A Study on Use of User Demand Evaluation in Interactive Interface – Using Virtual Fitting-Room as an Example

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Abstract—The purpose of this study is to research on thoughts transmitted from virtual fitting-room and to deduce discussion in an auxiliary narrative way. The research structure is based on 3D virtual fitting-room as the research subject. Initially, we will discuss the principles of narrate study, User Demand and so on by using a narrative design pattern to transmit their objective indications of "people-situation-reason-object", etc, and then to analyze the virtual fitting-room examples that are able to provide a new thinking for designers who engaged in clothing related industry – which comes in "story telling" and "user-centered design" forms. Clothing designs are not just to cover up the body to keep warm but to draw closer to people's demand physiologically and psychologically through interactive designs so as to achieve cognition between people and environment. In the "outside" goal of clothing's functional designs, we use tribal group's behavior characteristics to "transform" the existing personal cultural stories, and "reform" them to design appropriate interactive products.

Synthesizing the above matters, apart from being able to regard "narrate" as a kind of functional thinking process, we are also able to regard it as a kind of choice, arrangement and an activity of story expression, allowing interactive design's spirit, product characteristics and experience ideas be transmitted to target tribal group in a visual image performance method. It is a far more confident and innovative attempt, and meanwhile, able to achieve entertainment, joyful and so forth fundamental interactive transmissions. Therefore, this study takes "user-centered design" thinking as a basis to establish a set of clothing designs with interactive experience patterns and to assist designers to examine the five sensual feeling of interactive demands in order to initiate a new value in textile industry.

Keywords—"Virtual Fitting-room", "Interactive Design", "User Demand Evaluation", "Intelligent Systems".

I. INTRODUCTION

THE clothes integrated with Intelligent technology are about to be available on the market. Basic research in this area has achieved maturation and the question now is what kinds of products should be released on the market. What should people wear in the 21st century? Fashion designers will for sure go on playing with colors and styles, but hi-tech intelligent clothes are also ready to make their appearance. In addition to the ordinary purposes of covering up the body, keeping warm and making the wearer look nice, they are also equipped with functions like deodorizing, changing color automatically and transmitting data. The huge market potential of intelligent clothes have attracted chemical companies, garment factories and electronics makers to make investments in this field. Intelligent textiles are very likely to become part of fashion and these businesses are moving fast to transform (Wu Qi-zhang, 2002).

The information revolution is penetrating into every phase of our life. Digital thinking is adopted in design. It seems necessary to reconsider or redefine the borders between garments, digital technology and science. And where is the future direction of the garment industry? It should certainly break through conventional model but keep the benefits of conventional approaches consolidated. Yet how should it stay abreast of advancements in information technology and find its own new directions and markets? These are questions that related business ought to think over. After all, the final goal of the garment industry is to make clothes that can takes "interactive design" to the human senses.

II. PURPOSES AND METHOD OF STUDY

Clothing is the manifestation of culture and of civilization, as well as the integration of art expression and personal aesthetic. Clothing also exhibits one's perception toward life and mood and this display of one's emotional perception can draw resonance. The "user-narrative design model" can allow the designer to apply the logic in "user-centered design" to connect, assemble and design to guide the user's thought and satisfies users' product experience. This study therefore attempts to use the "user-narrative design model" to analyze design of future clothes, as well as to explore how to consolidate interactive design through the "story-telling" approach for the designer to empathize with users and establish a garment user experience model that is in line with both the demand of users and the concept of interactive design.

In this study, narratology and the cultural code theory are discussed in the hope that works of design, apart from meeting their functional purposes, can also fulfill the "expressive function." A successful clothes designer does not only seek solutions for "functional" issues when working on a design. He or she also tries to convey certain "connotations" outside expected functions by applying the story-telling approach and scientific techniques to create a product that can move and convince users.

The study method is divided into two parts: analysis of literature and examination of text examples. There are three purposes:

- To discuss examples of virtual clothes with interactive design in which narratology have been applied.

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- To understand of the user web interface of the network fitting use of Virtual fitting room interface and functional design-oriented analysis.
- To establish a "user-narrative design model" designated for garment design interactive experience as well as to help designers evaluate the demand for sensory experience in the interaction.

III. LITERATURE AND DISCUSSION

The intelligent clothes prove that humans no longer use only conventional shopping environment. Informational technology and advanced data transmission technology with the strength and approaches heretofore unseen will be added to them to bring a brand new lifestyle that will change the way mankind lives within the next century. Not only the inter-infiltration between cultures, technologies and thoughts will be expedited across the globe; design also will turn from tangible to intangible and practical product design will change to virtual product design through design with interactive thinking. The role of interactive design will be to help realize and meet practical needs in people's lives as well as to continue to improve on efficiency of use (feasibility) and experience (practicality).

A. User Interface Design

The system uses the focus is to have a good interface design, Shneiderman 's (1988) proposed eight golden rule of user interface design:

- Efforts for consistency: under similar conditions, the operation should have the consistency of the order; prompts, menus, help screen, you should use a consistent terminology, and use a consistent command all applications.
- Regular users can use a shortcut: with the frequency of use increases, this type with experienced users generally want to reduce the number of times the steps of the interaction, the abbreviation (Abbreviations), function keys (Function keys), the hidden command (Hidden commands for regular users) and a large amount of skills (Macro facilities) is very useful.
- Provide useful feedback: system feedback for every user action, and for the occurrence of frequent and minor actions can be moderately to respond; frequency is not high, but important action, it should respond more content .
- The design of the end of the dialogue: the system should be action should be organized to contain a beginning, middle and end of the sequential organization. Completion of the action of the group, it should be useful feedback to the user, the operation is completed to the satisfaction, sense of accomplishment, to ease their senses of perception. If the system is interrupted, when the accident caused by the user program and options, should clearly indicate the user to the next action group.
- To avoid errors: the best possible design does not allow users to commit a serious error of the system. If an error occurs, the system should be able to detect errors, and provides a simple, constructive, and detailed guide to recovery error.
- Allows easy to cancel the operation: this feature helps to reduce user anxiety. When the user know the error is returned, you can encourage users to try unfamiliar features. Can recover the original smallest unit, may be a single action, a data input work, or a complete action group.
- Support the inherent sense of control: experienced users will strongly want to control the feel of the interface, and the system to respond to the feelings of their actions. Should, as far as possible, so that the user operation of the founders of, rather than the operation of the respondents.
- Reduce short-term memory burden: limited human short-term memory at the geographic information of the process and contents of the screen to maintain and merge multi-page picture content, a unified presentation to reduce the window, move the frequency, and to provide sufficient training time to coding, mnemonics and operation of the order.

Mental model of the user interface, according to Norman (1988) referred to the designers in the design of the interface, the four cardinal principles need to pay attention:

- Provide a good conceptual model (Conceptual in only a Model): A good conceptual model allows the user to know in advance the results of action for the user interface. If you do not have good conceptual model, the user only in accordance with the others saying do not understand their action made its impact in the end why.
- Legibility (Visibility): For the control and interface functions, operation legibility between the control and be controlled have a good virtual fitting rooms feature interactive interface design, user needs assessment corresponding and natural. If the interface information feedback, the entire operating system will be very easy to understand. Overall, as long as the user for legibility interface for high, users want to achieve the goal, the desired action and the results of the relationship between will be very clear and meaningful.
- The correspondence between (Mapping): correspondence between interface design refers to the relationship between the control and may cause the results. In the environmental context of the growing amount of information is even more appropriate idea of the interface for interactive design manipulation to achieve a good interaction between information and interface to provide users with immediate and accurate information feedback.
- Feedback principles (Feedback): Feedback is an important consideration in the design of one of the factors, and feedback on behalf of return information to the user to inform the action has been done or to return the completed message. The system needs to provide a meaningful and an easy to express and understand the form of a feedback mechanism to return information to the user.

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B. Virtual Fitting-room

Virtual fitting room (the Virtual of Fitting Room) development, the traditional virtual fitting room is a virtual reality combined with the apparel industry e-commerce are the use of 2D paper doll system, the 2D picture affixed to the body of the plane model, showing thethe garment is flat effect, the drawback of the fashion show can not watch more than angle. There are small part of the virtual fitting room combined with multimedia features and interactive information technology, VR (Virtual Reality, VR) to construct the 3D shopping interface commodity displays, 3D technology into the spatial properties can be complete and real performance, and provide visualization of three-dimensional effect, three-dimensional expression is more relevant to actual human needs, but also allow people to intuitive thinking more of a sight, not only the authenticity of goods and interactivity, makes the virtual fitting room closer to the physical store shopping experience and social interaction (Van tassel and Weitz, 1997). Highly interactive virtual reality, a strong and natural computer interaction man-machine interface (Jenny Preece,, 1994), significantly reduces the risk of consumer shopping. 2D flat picture into a 3D virtual reality is inevitable, and e-commerce combined with 3D virtual reality is also the trend of the future.

Burdea and Coiffet (2003) summarized the three I's property, a complete description of the style of virtual reality:

- Iimmersion: the five senses to experience virtual reality, and naturally into the situation which.
- Interaction: the front panel operation and feedback.
- Imagination: sensory received the stimulus of sound, light and video effects, and sent to the brain, by past experience, to create a different kind of imagination, also known as hallucinations.

C. Application of Narrative Design Thinking as the Foundation of Interactive Design

A designer can look at people and problems separately through "externalization" to ponder on the influence of problem description on the user and which part of the user's behavior may be affected. When using tangible matters to depict the user's feelings and emotions, the designer can perceive the user's problem and, based on this, try to build the solution in the interactive product. "Transformation" means finding the main axle and branches of the story through the progression of the story. The designer finds new meanings and possibilities of further development among the branches. "Reformation" refers to the designer's choice of available solutions in the new meanings and possibilities of further development to address the problem and rewrite the story or come up with new development.

Application of narrative design thinking as the foundation of interactive design takes place after the designer has observed the user's environment and behavior, so that he or she can fully utilize his or her imagination and make up a story to convince himself or herself as well as the user in order to produce a better design. The designer should also be able to add sensible thinking and expressive thinking in narrative design – sensible thinking that enables the story to touch and explain for the user as well as emphasizes only imagination and cultivation of

sensibility are the focus of narrative thinking in interactive design. Through narrative therapy, the designer learns how to listen closely to the user.

Study of design of interactive clothes includes text story interpretation and design of the interactive interface. Interface design covers identification of functions, equipment, sense of touch, the body and uses, and sensory manifestation, while the approaches of interactive design include expression through color, material and style of clothes. However, the focus of this paper is not to discuss the physical form of clothes but on interpretation, experience and analysis of text stories. Unlike other types of interactive design, design of interactive cloths calls for the strategy to integrate stories in customers' experiences to stimulate product sales and bring profit for the business. Therefore, the strategy of interactive clothes design is the concept of consolidating narrative design approaches with the three cultural code levels.

IV. RESEARCH ANALYSIS : THE INTERACTIVE EXPERIENCE OF THE VIRTUAL FITTING ROOM WEBSITE

In this study, the virtual fitting room clothing interactive website experience as a case study to analyze the ideas conveyed and communication point of view of narrative design and user requirements, This study to Network fitting more representative of the online store "zugara" "Fig. 1"as the study sample: According to the focus group method to the random 12 people (six men and six women) age between the 20-year-old and 50 in-depth interviews and observation of the subjects were performing experiments samples and interviews show that the virtual fitting room "Fig. 2".
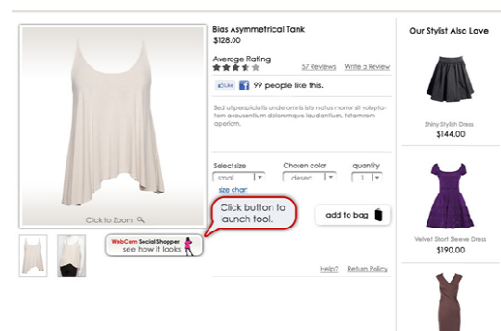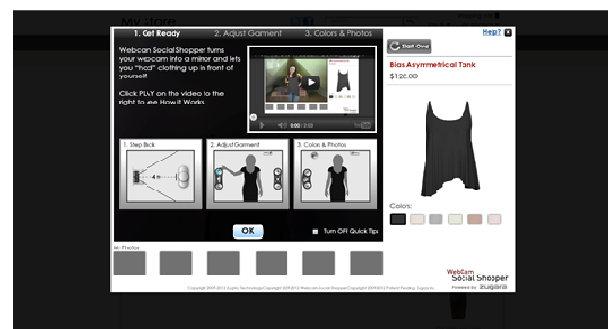

Fig. 1 Table Zugara Styles

Fig. 2 Table Zugara Virtual Fitting-room

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A. Virtual fitting room interface and functional design-oriented analysis

In this study, based on the operational processes and layout analysis, will be elected by the virtual fitting room samples, the interface-oriented "and" function-oriented individual and comprehensive comparison, summed up the virtual fitting room must have tenoriented discussion contains five interface design for the five-oriented and functional design. Described as follows:

- Interface design-oriented: Virtual dress fitting room interface design should be intuitive and interactive operation, according to the interactive way of user roles are different. Provide the functionality of the user to try on clothes, allowing users to use with clothing, the interface operation is no longer a traditional static presentation, but to show the way to the dynamic interaction of the goods, not only can improve the interface affinity, more allows users to immersive environment.

- Navigation of the auxiliary interface: virtual dress fitting room interface design should be designed to guide and assist users to obtain information to use user interface (User Interface Design).

- The layout features: virtual dress fitting room interface to the center of the main users try on costumes viewing area, the left column of the Menu link, right-hand column selected for 3D product range.

- Imaging products: Virtual clothing fitting room should be based on the 3D imaging performance products, mainly the authenticity of the products closer to the physical space.

- Background music: virtual dress fitting room should provide background music to increase in purchasing situations, and interface design that allows users to choose to play or pause function.

B. The design of the virtual fitting rooms feature oriented

- A scene or theme: virtual dress fitting room should have multiple style sets, so that the user in accordance with the style of clothing to replace the theme, or you can use the original web interface design as sets, so that the interface to achieve a personalized layout rendering.

- Categories: virtual apparel fitting room should allow users to clothing, accessories, footwear can be replaced by a variety of categories can choose replacement, to achieve the purpose of customized services.

- Try record: virtual dress fitting room should be able to display the test through the commodity icon.

- Product-related message marked: virtual dress fitting room should be able to display products related message marked. Such as providing product item name, product number and the commodity price, color, style, product number, price and provide richer information for consumers, and the annual monthly list can choose to be with and watch.

- Panoramic view: virtual dress fitting room should be to provide a 360 ° viewing, but no significant multi-interface design Icon design this watch feature, you must prompt the user when the mouse to drag to the model block, only will trigger the 360 ° viewing performance, resulting in the characteristics of the interface can not be play.

C. Sample observations and interviews by measured by operating a virtual fitting room

Subject to a virtual fitting room operations, and focus group interviews for the operating status of the subjects, and finds out the advantages and disadvantages to analyze and further understand cognition on the user's heart to understand the users attitude, viewpoints, and view results of its analysis:

The most basic function maximum limit must select the system configuration good clothing preview users to select only the coat do personalized with the preview button icon labeled unclear, and must spend time looking for the pause and play the Settings button, the preview can not bemulti-angle viewing clothing, resulting in less control and flexibility, easy to produce the feeling of fatigue and boredom caused by the user in the use of virtual fitting room. However, if the physical interface design more beautiful, and the background music off, and better able to construct a complete shopping scenarios, and can reduce operating time, product-related message marked affect the operating performance, and most users do not know the test wearing preview Support mouse drag to view 360 ° function, this feature can not play.

It was informed that the virtual fitting room interface design, graphical user interface for the use of multi-icon, provide the appropriate icon and text, so that the user operation, a different mode of thinking and provide different instructionpaths. And increase the use of auxiliary operations and sound to the use of background music to the future increase in purchasing situations. Provide real-time preview function allows users to local preview the image of the optional products; and able to use aids, zoom around, restore the function of auxiliary viewing. Thinking about how to add additional functionality, For example, the user can in accordance with its characteristics designed to meet the individual personality of the model, or integrated email, community service, virtual dressing room towards the more diversified forward.

Observation and interviews, the use of virtual fitting room without professional web operations knowledge and experience, that is, self-Quick, and many of the subjects said that this virtual fitting room, its interface and functionality design, although there might not be perfect, Department to be improved to achieve the purpose of the fitting room to try on the clothing of the whole.

D. Principles of Application of Interactive Clothes Design

The above interactive clothes are used as objects of analysis with narratological methods and the mode of cultural codes to study the approaches of design plan making for garment makers. In that, besides the basic elements in clothing, man-machine environment, cultural characteristics and story patterns that carry symbolic cultural significance are also considerations that should not be overlooked.

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From the angle of text analysis, expression through interactive design is conveyable. From analysis of examples of interactive design of future clothes, this study has concluded on the six following application principles:

- Cultural characteristics: Diversified sense of value and toleration and appreciation of multiple cultures should be integrated in a garment maker's aesthetic to display different possible lifestyles to arouse resonance from consumers.

- Language deduction; Language deduction varies with the plot of the story. It should be fully demonstrated in the design process for the profundity of emotional expression to stand out.

- Cultural codes: The formation of interactive performance is closely related to the particular local cultural features at the time. It takes a sharp sense of perception and keen sight for the designer to get a grasp of the cultural pulsation, which is also an important element for distinguishing different cultures.

- Cognitive expression: Emotional expression is important in interactive design. It is especially obvious with cognitive expression. In action, physical and mental developments are particularly important; while in interaction, the goal is to pursue sensory satisfaction.

- Story patterns: Regardless of the mode or expression or application of cultural emotion materials, the purpose of the integration of culture and story is to make the interactive design feasible and human.

- Epochal significance: Besides reflecting the character of a brand name, the value of the story of the brand name has the purpose of convincing consumers and improving business image in order to establish cultural associations and meaning for the brand name.

Culture is a form of story. It is the result of accumulation and succession. Only through the story will the emotional elements in interactive design be expressed, and only through the story is it possible to realize the perception toward the environment in interactive design. This study tries to construct the model factor of the cultural element in interactive design – story, and use "telling" stories through language presentation to help designers to find the right emotional expression for the product. Simultaneously, narrative therapy approaches are employed to help designers learn to listen closely to users and communicate with them.

V. CONCLUSION

In this study, it has been discovered that the concept of story, is pervasive in all cultural levels. In addition, stories are used to convey the cultural communication elements in interactive design, as well as to reflect new thinking for future clothes. If we can cherish the text contexts from our forebears, acknowledge the connection and influence of stories and designers' use of emotional thinking and language expression fused in the "narrative design model" to increase the significance of a product, as well as fully utilize story contexts and narrative therapy, it not only will help our search of design

elements for products but can also upgrade the cultural connotation of a product to meet the sensory demands of users.

Design of interactive clothes has a strong impact on future clothes. It not only will adequately demonstrate concepts for future clothes but can also carry influence equal to that of fashion aesthetic in the future or even affect social, economic performance and reshape people's sense of value toward clothing aesthetic. In other words, the interactive design of different garment makers has become a unique way of communication in garment culture from now on.

Through expression of text contexts in different examples of interactive garment design process, this study explains that the character and image of a brand name can be established through story manifestation. Cultural contexts can be brought to every corner in life to guide the lifestyles of consumers and reflect on users' experience through interactive design. Thus, the user, cultural context and the environment will interact with one another to achieve the "story" effect of interactive design.

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