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TOWARD KANSEI ENGINEERING MODEL IN SERVICE DESIGN: INTERACTION FOR EXPERIENCE IN VIRTUAL LEARNING ENVIRONMENT

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Abstract

Service design is an emerging trend shifting from product design era. Internet provides effective and efficient service media reaching customer at the exact time. Online media has become social network providing wide opportunity for business, pleasures, and education. This study is focusing on applying kansei engineering model for service design in virtual learning environment (VLE) as learning is concerning with experiencing the process. Various virtual world studies discover that VLE can provide powerful experience in learning. On the other hand, learning styles and learning space potentially enhance experiential learning. Experiential learning theory defines learning process as transformation process from experience to knowledge. Experience is one of important element in service design principle. In addition, experience can be engineered by utilizing kansei engineering approach. Therefore, experience can be designed and engineered to achieve knowledge as service result. This study expected can guide service designers and learning curriculum designer in designing effective experiential learning method. The model developed from the analyzing and reviewing literature shows that kansei engineering can be utilized in experiential transformation process into knowledge and also in service in learning theory context. .

Keywords: Kansei Engineering, Service Design, Experiential Learning Theory.

Introduction

Service is new frontier in business, as providers expand and extend their core propositions to embrace and explore new opportunities. It is about experience as a whole package including expectation, needs, feelings, atmosphere, and environment. Design thinking takes into consideration those whole packages. Fundamental concept of service design is similar with product design concept. The difference between them only takes place on the form, where service is an intangible object. Customer expectation and experience are the focus of service and product design. Kansei engineering, which has been developed in Japan, is an 'affective engineering" method to translate feelings and impression into form of product. This user-driven method has been proven can provide quality product that design feelings into product. This paper is transferring, adapting and extending Kansei engineering method to immaterial products.
Virtual environment becomes the trend exchanging the web 2.0. The environment is promising to provide experience for the user better than web 2.0. Second life, built by Linden Lab, provides online learning such as e-mail and instant messaging. One of the virtual environments is Second Life. Numbers of universities and education organizations open their Second Life URL. Furthermore, many researchers have been performed in the context pedagogical. Some early research suggest that virtual world, in particular Second Life, may provide pedagogical advantages for specific learning styles and learning groups and for particular subject areas (Slator, Chaput et al. 2005; Bradshaw 2006; Roussou, Oliver et al. 2006; Community 2007).

Service Design

In a service oriented business, high quality customer service is becoming a key differentiator for any kind of organizations. In order to keep customer loyalty high, fully content and committed services need to be useful, usable and desirable. Proactive service development directs to significant and strategically essential innovation value creation. Service design strategy determines the customer satisfaction and sales. High customer satisfaction will motivated the employee that is followed by improvement in productivity and efficiency. Service design is useful for any category of services.

A service is not just what customer get. It is a matter of how they get and how they feel about it. Organization created something that customer willing to pay. Customer may be internal or external; if external, the term consumer (or end user) will be used for clarification purposes. Some services consist of a single process, e.g.: dry cleaning. On the other hand there is service consist

of multiple services linked together. AT each process, transactions and interaction occur. The transactions typically consist of an input, procedures, resources and resulting output. The resources, such as people, machines, and the procedures, can be documented, learned or digitized in software code. Thus, it is an experience per se. Design thinking takes into consideration the whole services experience packages, there are needs, expectation, feelings, atmosphere, and environment. Like product service can be designed. Phillip Kotler define service as any activity or benefit that one party can give to another, that is essentially intangible and does not result in the ownership of anything. Its production may or may not be tied to physical product. Service

On the other hand design is a process to create value for people. According to Stefan Moritz, service design helps to innovate (create new) or improve (existing) services to make them useful, usable, and desirable for clients and efficient as well as effective for organizations. It is a new holistic, multidisciplinary integrative field. In addition, service design is the application of established design process and skills to development of new services. It is a creative and practical way to improve existing services and innovate new ones.

Relationship between organization as service provider and customer is separated by service interface boundary (Figure 1). In this boundary customer employ certain process or procedure represents by touchpoint. This point is a customer journey to experience the service. Efficient and effective customer journey will let service user to draw image toward the service their encounter.

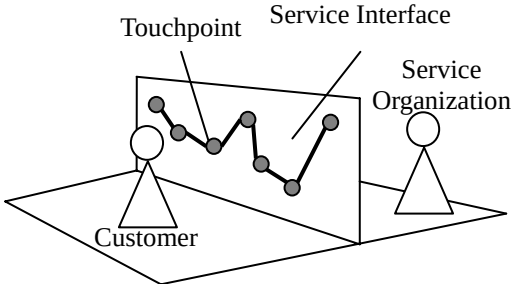


Figure 1. Service Interface

Kansei

Kansei is Japanese word which develops from "kan" and "sei". In Japanese expression of Kansei is difficult to translate. It means approximately total emotions; however, it does not explain all of its aspect. The combination of these two words can be interpreted as sensitivity, sensibility, feeling, or aesthetics (Schütte and Eklund 2005). Nevertheless, the definition of kansei, based on papers of international conference proceedings and academic journals, actually are still not unified. They are all close to each other. According to them, Kansei can be describe as follow (Lévy, Lee et al. 2007):

- Impression and sensitivity
- A Japanese [word] which corresponds to sensitivity of affection
- It includes several meanings on sensitive recognition, such as "human senses", "feelings", "sensitivity', and "psychological reaction".
- A Japanese term, seems very similar to the English idea of "experience design" and "emotion".

Kansei is usually described as a mental function, and more precisely as begin a higher function of the brain (Harada 1999). Kansei engineering is introduced to design community by works of Mitsuo Nagamachi on "Emotional Engineering", and Kenichi Yamamoto (President of Mazda Automotive Corporation), who used this term for the first time in 1986 (Lévy, Lee et al. 2007). Since the introduction of this method in Michigan University, Kansei Engineering is developed further by academician and industrial field. Therefore, several companies such as Mazda, Sharp, Wacoal, designed successful products by applied Kansei Engineering method. Kansei Engineering is "first and foremost a product development methodology, which translates customer's impressions, feelings and demands on existing products or concepts to design solutions and concrete design parameters. Secondly, it shows how Kansei is translated into design" (Schütte 2005).

Kansei Engineering Concept

The intention of Kansei Engineering is to produce a new product based on the consumer's feeling and demand (Nagamachi 1995). In order to achieve the aims, there are four points refer to this technology:

(1) How to induce and grasp the consumer's feeling (Kansei) regarding the artifact in terms of ergonomic and psychology,

(2) How to identify the design characteristics of the product from the consumer's Kansei,

(3) How to build Kansei Engineering as an ergonomic technology, and

(4) How to adjust product design to the current societal change of people's preference trend.

As an answer to those Kansei's purposes three styles of Kansei Engineering methodology

are classified as follows (Nagamachi 1995):

Type I means category classification from zero-to nth-category,

Type II uses the computer system,

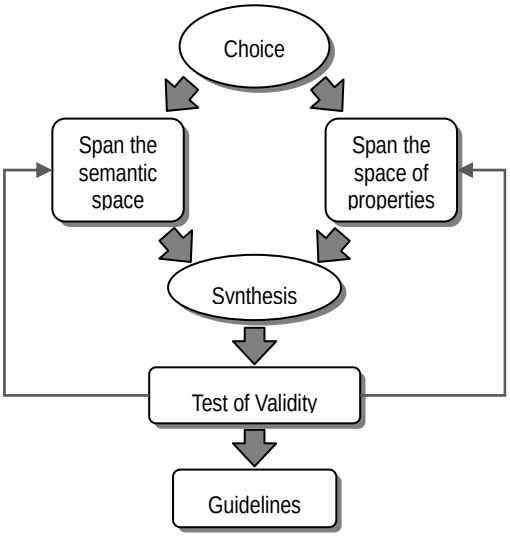
Type III utilizes a mathematical model to reason the appropriate ergonomic design.

Incorporating customer requirement and needs into product development process has become main focus in quality engineering. Various methods in product development have been invented to identify accurate customer requirement in product design. Kansei Engineering is the first method which involves emotion as an input in the product design process. Kansei Engineering doesn't have particular words in English; however, it can be interpreted as sensibility, feeling, or aesthetic. The main purpose of Kansei Engineering method is to help designers make decisions and emphasize on the design elements which make the product better suit to human feelings.

Schutte (2005) composed kansei engineering model to design feeling into product design (Figure 2). In this model, product can be described from two different perspectives: the semantic description and description of product properties. These two descriptions each span a kind of vector space. These two space have a relation which is analyze in the synthesize stage identifying which product properties evokes which semantic impact. Depart from this stage, it is possible to conduct validity test, including several types of post hoc analysis. The results of synthesis stage, both vector spaces are updated and synthesis stage is run again. When the iteration is satisfactory, the model can be built describing how the Semantic Space and Space of Product Properties are associated.

Choosing the domain. Choice of domain stage is selection of target market, market niche, and specification of new product. According to this information, product samples are collected representing the domain. In other words, this stage defines the domain and find representatives (product, drawing, samples, etc) covering as big as possible part of the domain.

Spanning the semantic space. The semantic space is the theoretical construction referring to C. E Osgood in the early 50ies (Osgood, Suci et al. 1957). His research question whether the way American citizen perceived political propaganda depended on semantic description. Utilizing semantic scale method it is possible to determine whether and to what content a verbal description is or acts as a sign for certain objects. Spanning the semantic space conducts by collecting number of words that describes the product in question as first step from available source such as literature, commercial, interview, opinions, etc. Then, categorize those words by selecting that are having the highest impact on human's mind. Technically this can be done by conducting pilot study and making factor analysis or applying affinity diagram. Those words then combined with the unique image of the product that distinguishes the product from other competitors.



Spanning the space of (product) properties. This space is a description of product properties from the engineering point of view. The properties will be linked to the Kansei Words identified from semantic space. Example: if the product was candle, therefore, the product properties will be color, diameter, burning time, high, etc. Tools such as Pareto Diagram to classify the highest frequencies of product properties can be applied.

Synthesis. This stage is the most important pace in this Kansei Engineering Model. The unique of this step is connecting the product properties space with semantic space. The difference to other method is the data gathered from the customer and evaluated mathematically. This decreases inaccurate result since there are no subjective interpretations. Numbers of non mathematical and mathematical tools have been developed connecting product properties and semantic space, they are: Linear regression (Ishihara 2001), General Linear Model (GLM) (Arnold and Burkhardt 2001), Quantification Theory Type I (QT1) (Komazawa and Hayashi 1976), Neural Network (Ishihara, Ishihara et al. 1996), Genetic Algorithm (Nishino, Nagamachi et al. 1999), and Rough Set Analysis (Nishino, Nagamachi et al. 2001).

Test of Validity and Iterations. At this point of the Kansei Engineering Model it is possible to by using (Weinreich 1958) idea about semantic space. The idea is applying factor analysis from the data gathered and compares the results with Kansei Words delivered from Semantic Space. Among

those words, it is possible to filter the words along with product propserties that have no effect on Kansei. It is feedback to the Semantic and Product Properties Space.

Guidelines . When the validity stage provides satisfaction result, the data from the synthesis model can be presented as guidelines. This guidelines are function depending on the product and predict the kansei score for a certain word:.

$$y_{kansei} = f(\text{product properties})$$

Virtual World

The vast growing of available internet connection assembled it as social interaction media. Millions of people access the internet establish friendships, buy and sell things, and also form large social networks and organizations. The shifting from Web 1.0 to Web 3D make it possible to create virtual space where people can do activity toward virtual things, such as trading virtual properties and assets.

Virtual world is a place where people "co-inhabit" with millions of other people simultaneously. Virtual worlds are not just games, as there are no levels, no scores, and there is no "game over". They exist in real time where individuals communicate, cooperate and collaborate with each other, like in real world. It can be assumed that the behavior of the users is very similar to real world behavior (Fetscherin and Lattemann 2007).

Users represent by avatar, build a business, establish a social club, marry a partner, or travel to exotic locations with other avatars. They use virtual money to purchase property, giving rise to realistic, integrated economies as more users participate in the Virtual Worlds. In some cases there is even a real exchange rate between the virtual money and a real currency as it is the case with Second Life (SL) with the Linden Dollar.

Recently there are many notable SL's challenges competitors, including Active Worlds, There, and newcomers such as Entropia Universe, Dotsoul Cyberpark, Weblo.com, Red Light Center, and Kaneva. The following tables comes from Oz (2005)[1] compares three of the most discussed, well known, and well-established Virtual Worlds along various dimensions.

This manuscript is focusing on Second Life as an example of Virtual Worlds. According to collected data data of Linden Research's Grid Status, an analysis of Residents Online (RO) and Total Residents (TR) was performed for every hour for the period between August 2006 and March 2007. The daily of average of RO quadrupled from 6,000 to 24,000. This growth was correlated (coefficient of 0.75) and total residence grew twice as fast from 450,000 to 4 million. Forecasts using fitted second-degree polynomial trends projected a daily average of 150,000 residents online and 25 million total residences by March 2008.

One of application of virtual world is providing learning style and space in digital world. can be identified based on following features (Dillenbourg, Schneider et al. 2002):

A Virtual learning environment is a designed information space

A Virtual learning environment is a social space: educational interactions occur in the environment, turning spaces into places

Analyzing Interaction for Experience in Virtual Learning Environment

Experiential learning theory provides conceptual theory in transforming experience into knowledge through learning process. Experiential learning theory formed by six proposition (Kolb and Kolb 2005) that developed by prominent 20th century scholars who gave experience a central role in theories of human learning and development – notably Hohn Dewey, Kurt Lewin, Jean Piaget, William James, carl Jung, Paulo Freire, Carl Rogers and others . The propositions are as follows:

(1) Learning is best conceived as a process, not in terms of outcomes. The quality of learning is determined by the process. It needs an interaction between learner and ecology of learning system. In the context of learning in virtual world, the learning interaction is different with learning in virtual world. Student and teacher are in the same level, since the avatar may be different with physical appearance with the representative. This situation bring forward the issue regarding level and ethic in cultural context. How the academician deals with ethic issues? How user from various study culture adapt to the virtual environment? What the tutor/teacher do to maintain the similar level between student and teacher in the virtual learning environment.

(2) All learning is relearning. Learning process should become facilitator to draws out students' beliefs and ideas about a topic so that they can be examined, tested and integrated with new, more refined ideas. It is a notion that learning process basically are seeing, listening, memorizing. Learner has original beliefs and perception toward particular knowledge and skill. Through process, all experience in learning, student is obtaining new knowledge, then, compare-connecting- conflicting-adding with original knowledge they have. In this context, it needs to understand the effect of learning process in virtual world compare to the

[1] Source: http://oz.slinked.net/comparechart.php

real world. Since, the interaction between tutor and learner in real world so obvious so that tutor may identify the lack of understanding among student through learner behavior. On the other hand, student study in virtual world by following the teacher action in explaining theoretical knowledge. The atmosphere teacher created is important to bring student involve in understanding the knowledge. Learning atmosphere in virtual world is limited by computer graphic and user can perceive the environment through eyes. Therefore, virtual environment designer should consider about interactive design of virtual world that support learning atmosphere.

(3) Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world. Driven factors of learning are conflict, differences, and disagreement. Those factors should solve by discussion where people involve together then brainstorming their opinion for solution. Interaction among learners or learner-tutor develops discussion's atmosphere support. In the real world, the environment quickly creates and academician can involve immediately. In virtual world, user bridge by desktop tools (such as computer screen, keyboard, and mouse) that develop the gap in interaction. The way to closing the gap should support by the technology aspect which focus on supporting the swift of the discussion flow in virtual world.

(4) Learning is a holistic process of adaptation to the world. Not just the result of cognition, learning involves the integrated functioning of the total person – thinking, feeling, perceiving, and behaving. This proposition describe clearly that environment play important role in learning process. Adaptation as one process in learning should accomplish quickly to achieve efficient and effective learning result. Virtual learning environment provide unlimited environment as long as computer coding can support it. The gap in interaction with virtual world environment limited by how the user presence and immersion in the virtual environment. Their presence and immersion determine how experiential learning process can transform experience into knowledge.

(5) Learning results from synergetic transactions between the person and the environment. In Piaget's terms, learning occurs through equilibration of dialectic processes of assimilating new experiences into existing concepts and accommodating existing concepts to new experience.

(6) Learning is the process of creating knowledge. Experiential Learning Theory proposes a constructivist theory of learning whereby social knowledge is created and recreated in the personal knowledge of the learner. This stands in contrast to the 'transmission" model on which much current educational practice is based where preexisting fixed ideas are transmitted to the learner.

Above analyses describes that virtual have potentiality in delivering experience in learning. Serious game has been designed to help student in experiencing the learning encounter and let them educated, trained, and informed. In addition, interaction between user and environment is the important factor in creating ambient to support learning process. Therefore, in the future, virtual world as learning environment may be intensively use collaborates with learning activity world.

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