

From Technology to Design

A Case Study of Netizen's Perception Toward Dechnology Products

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Abstract. The purpose of this study was to explore new online communities' awareness of and preferences for technology products. By conducting questionnaire surveys on 13 dechnology (a portmanteau word of design and technology) products, this study aimed to understand the preferences and the characteristics of a specific online virtual community—the Internet and technology enthusiasts group. The study results revealed that the Internet and technology enthusiasts believed the products with more prominent utilization of technology should place more emphasis on human-centered connotations in order to earn high ratings. The results also suggested that this particular group of individuals prefer products that elaborate on human-centered concerns and needs, and even satisfy humans' inner desires. In view of the observations aforementioned, it was concluded that the products' features should be thoroughly studied beforehand. Future product designs should base on the demands of specific users, and well-integrated with appropriate technologies. The end result will more closely match the users' needs in the real market. Online communities with specific interests tend to have their own unique insights and ideas about product preferences. They pay more attention to the needs for humane care related to their lifestyles, and use them as inspirations for technology product designs.

Keywords: Dechnology · Cyber/virtual community · Community characteristic · Product preference

1 Introduction

Under the impact of information technology, by both providing functions for relationship building and knowledge sharing on cyberspace, virtual communities already affect our living standards in a certain way, wherein, individual behavior has been intensively changed (Brown 2000). Without the boundary of geography and time consuming, cyber community as a participants-driven world provides a forum engaging members to share their thoughts and interests. As virtual communities are constructed with different attributes and various objectives, interest-based community has common concerns among members and often provides information more involved in certain

aspect which would attract loyal net users plunging into. And from their continuous interactions, it would become a platform where members share consensus and trust.

Since Electronic Commerce and Mobile Commerce have emerged around whole cyber world, enterprises and companies contribute much effort on the ways to dig out their potential customers. The mass markets of previous decades have splintered into smaller market segments or niches, in which companies could focus merely on certain target groups and explore new market opportunities (Dalgic, Leeuw, 1994). Meanwhile, Kelman (1958) claimed that individuals' role and value orientations to a group—conceptually linked to compliance, identification, and internalization, it influences individual's beliefs and changes his/her attitude and intention. Based on this feature, interest-based or subject-based virtual communities with strong public consensus may therefore be an ideal target group or niche market for company, technologists and designers.

Creating a design product or high-tech product to please the whole world is impossible, thus customized-product already became the tendency toward future design. Netizens of virtual community are the group with certain common values and preferences, especially the fans of high-tech interest who are concerned as high technology acceptance. Hence, their insights toward technology and design products might provide critical information to technologists, designers, and companies.

The research objectives of this study therefore are listed as follows:

1. To explore Netizens' perception and preference toward technology + design products.
2. To investigate the relationship between virtual community characteristics and their advocates' (Netizens) preferences.

2 Virtual World and the Hidden Reality

2.1 Cyber Community/Virtual Community

Cyber community is a form of virtual human interaction. This virtual interaction transforms the way people relate to each other and being as a new virtual social relationship. Since Computer-Mediated Community (CMC) with the spatial metaphor is adopted for discourse as thinking of virtual social relations in terms of community. CMC is referred to be place centered, and the cyberspace in it as a place where community can develop and be sustained, and new social and economic relationships can be created (Fernback 1998). On the functional and technical point of view, cyber community is a technologically mediated and persistent environment which supports multiple interaction styles, capability for real-time interaction, and multi-user engagement (Ho, Schraefel and Chignell, 2000). As the term of community is addressed by Cohen (1985) as being symbolically constructed, with the unity of normative codes and values it provides community members with a sense of identity. Rheingold (1993) claimed it as creating “social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace”. Likewise, virtual

communities offer an engaging environment in which people connect, trust, and share real insight mutually (Carver 1999). The uniqueness of virtual communities is that most of their content is member-generated, as opposed to other Internet information which is typically provided by the site provider (Ridings & Gefen 2004; Hagel & Armstrong, 1997). Hence, the definition of virtual community might be concluded as the community on cyberspace which can provide information and transaction within a member-generated and social relationship.

2.2 Community Characteristics and Its Present Situation

Virtual community is a real entity that is given meaning by its participants (Baym 1995). Since the content of communication is based upon the self-categorization process and associated perceptions of shared social category membership (Turner 1991), virtual communities have been widely created on different attributes based on intention varieties. Figallo (1998) also described that virtual communities are those where members feel part of a social group, sense a connection with other members, have common values, and have lasting relationships with others (Ridings & Gefen 2004). Namely, perceptions of shared social identity not only can provide members with multiple motivations for communicating but also with a shared cognitive framework that allows the communication to be mutually beneficial and productive (Postmes 2003). Since the content or concerns of virtual communities are driven by the participants, community characteristics therefore could be classified as: interest, relationship, fantasy (entertainment), and transaction (Hagel & Armstrong 1997; Carver 1999; Jones & Rafaeli 2000).

According to the report of “The Analysis of Virtual Communities’ Present Situation” employed by the Marketing Intelligence & Consulting Institute (MIC, Taiwan) (mic.iii.org.tw/index.asp), it revealed that the frequency of usage among internet users achieved 92 % high on “Social Relationship” communities, and 35.1 % on advocating “Interests” communities in 2014. Furthermore, some social media trends forecasted in the coming future commonly include: (1) the physical and virtual/media worlds will be more highly connected; (2) major social networks/communities will battle harder for our wallet than before; (3) commercial transactions on social media/online will increasing strongly; (4) Information on the cyberspace will become customized to our needs (Noff 2011; Holmes 2014).

2.3 Product Preference and the Opportunity of E-Commerce/M-Commerce

MIC (2014) indicated 81 % of internet users would research product reputation on cyberspace and the sequence of the ranking are “Social Relationship” communities (45.8 %), communities with “Discussion Forum” (44.7 %) and “Blog” communities (33.1 %). And to the analysis focused on ages, under 19-year-old internet users (53.2 %) and above 40-year-of-age internet consumers (46.6 %) would research the product reputation mainly relied on “Social Relationship” communities. The users among 20-29

years-of-age (50.2 %) and 30-39 years-of-age (52.2 %) would prefer the information provided from “Discussion Forum”. Meanwhile, it also indicated that 82.7 % internet users always search 3C products and home appliances (36 %) on virtual communities. E-commerce and Mobile commerce indeed exists on the relations between virtual communities and their advocators and the influence is believed getting tremendous.

Since online commerce is becoming more related with our daily life, enterprises pay more concerns focusing on the connection and relationship between virtual communities and their potential customers. Customers however are not blind, they search comments or feedbacks from the experienced user online. Products designed or invented with the purpose of involving technology into human daily life, but they sometimes be found are not acceptable properly to the public. Since preferences could be conceived of as an individual’s attitude towards a set of objects, typically reflected in an explicit decision-making process (Lichtenstein & Slovic 2006), knowing the needs and preferences of certain group is becoming essential to technologists and designers today. “Lead Users” termed by Hippel (1986) are users whose present strong needs will become general in a market place in the future. They are familiar with conditions which lie in the future for most others and can serve as a need-forecasting laboratory for marketing research, and also provide new product concept and design data as well. With this notion, releasing technology and design products to a certain group, especially the group of high-tech acceptance as the lead users, is convinced that can provide practical comments to the design + technology field.

3 Methodologies

In “Dechnology 2014 New Collection,” the Industrial Technology Research Institute (ITRI) attempted to incorporate technology into everyday lives. It divided 41 design products into 12 categories that are closely related to people’s daily lives: life, cook, appliance, detect, home, fitting, assist, traffic, information, leisure, medical, and alert. The ITRI further believed that these 12 categories will continue to play a part in our future lives. The word “dechnology” is a portmanteau word of “design” and “technology.” It was created in hopes of generating more values for technology by utilizing the abundant creative energy of Taiwanese designers (Hung & Huang, 2012). Regarding the development of Taiwan’s design industry, Lin (2009) suggested that the industry is currently enhancing its design energy and values while moving toward the emotional technology design that emphasizes “aesthetic experiences.” This study aimed to investigate whether all of the design products (created by using various resources) presented in the “Dechnology project” were in accordance with the project’s spirit—creating more values for technology by utilizing the abundant creative energy of Taiwanese designers. The characteristics of the design products were examined by three attributes: “the application of forward-looking technologies,” “the demonstration of aesthetic designs,” and “the expression of humane care.”














To further explore the relationship between the proportions of the three product attributes provided by a specific online community and their preferences for the products, the more representative and preferable items were prescreened. The study was conducted in three stages.

Stage one: The 20 products that received the highest ratings and preferences on the expert questionnaires for “Dechnology 2014 New Collection” were used as control samples for comparison with the online community’s preferences.

Stage two: A second questionnaire survey was administered using the three attributes (ABC)—“the application of forward-looking technologies” (A), “the demonstration of aesthetic designs” (B), and “the expression of humane care” (C). Ratings on the ABC attributes of all products were obtained through the second survey. They served as the references for the distribution of the products’ attributes.

Stage three: Based on the analytical results of the data obtained in the previous two stages, 11 products were chosen as study objects by two criteria—1) having two attributes that ranked in the top 20 on the ABC survey while also being selected as the top 20 on the experts’ questionnaire survey, and 2) having one attribute that ranked in the top 20 on the ABC survey while also being selected as the top 10 on the experts’ questionnaire survey. The items of a commercialized product (as presented in Q2) and a worst product selected by the experts (as presented in Q4) were also included to validate the accuracy of the retrieved questionnaires. A total of 13 products (as listed in Table 1) were used on the Google forms for online questionnaire survey.

Table 1. The 13 design products used in the questionnaires

						
Q1	Q2	Q3	Q4	Q5	Q6	Q7
						
Q8	Q9	Q10	Q11	Q12	Q13	

This questionnaire survey targeted netizens who were familiar with the use of technology and possessed specific preferences as research subjects. Other than animation games and model toys, most of the netizens who participated in the survey also had a strong interest and passion for forward-looking technologies. In addition, these netizens responded and reacted enthusiastically to technology-related information shared on the Facebook fan pages. Hence, this study targeted these netizens as research subjects in order to understand the feelings and preferences of the Internet and technology enthusiasts for Dechnology design products.

This study conducted frequency distribution analysis on the ABC attribute ratings and the product preference ratings of the 13 products retrieved from the survey subjects’ questionnaires. The ABC attributes were also used for the regression analysis on product preferences, in order to understand the relationship between the Internet technology enthusiasts’ preferences and the products’ attributes.

4 Results

A total of 127 subjects participated in the Internet questionnaire for the 13 products. There were 120 copies of valid questionnaires. Fifty-five percent of the research subjects were under the age of 25 and another 34 % were between the ages of 26 to 35 years. In regard to the gender ratio, 86 % of the subjects were male, which reflected that the Internet technology enthusiasts' community was mainly composed of male members. The majority of the community's core members were under 35 years of age.

The questionnaire divided the subjects' interests and hobbies into nine attributes—technology knowledge, aesthetics and arts, humane care, animation games, political issues, film and television, sports, leisure and travel, and model toys. On average, the participants were interested in the attributes shown in Fig. 1. The majority of the participants favored model toys, animation, and technology. This corresponded to the originally targeted population of Internet and technology enthusiasts who were familiar to technology and products. Judging from the three attributes of technology knowledge, aesthetics and arts, and humane care, the results revealed this age group to be most concerned about technology knowledge. Next to that were aesthetics and arts as well as humane care.

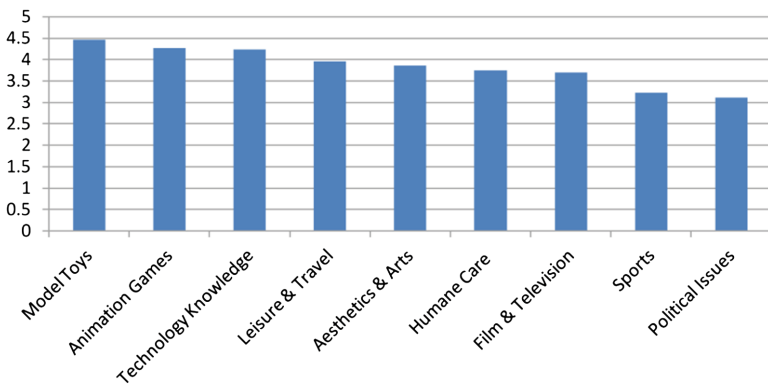


Fig. 1. The distribution of research subjects' nine attributes

This study targeted netizens who were interested in science fiction comics, animations, and model toys as research subjects, because a certain percentage of them were also Internet and technology enthusiasts. As the authors of this study began managing science fiction blogs that shared related reviews and information since 2008, and established the Pihiko Studio Facebook fan page in 2013, a number of loyal netizens who shared common interests and hobbies have gathered together. They continued to participate in the discussion and information exchange, and they turn out to be the core members of this study who actively participated in filling out the questionnaires.

4.1 The Comparison of the Design Products' Attribute Ratings

As shown in Table 2, product Q13 (Medical HMD) received the highest score in terms of attribute A, which was “the application of forward-looking technologies.” This product was highly praised in the category of forward-looking technologies by the research subjects as it demonstrated virtual reality technology and was perceived as a high-tech product by the online community. The product that earned the lowest ratings on attribute A was Q2 (Sheathing Fabric Pot). While being a commercialized product, Q2 earned low ratings due to a lack of direct associations with the research subjects’ lives as well as a lack of room for imagination. On the contrary, product Q13 had more connections with the science fiction plots that exist in video games.

Table 2. The ranking of the three attributes and the preferences

RANK	1	2	3	4	5	6	7	8	9	10	11	12	13
A Ratings	4.22	4.13	4.13	4.12	4.09	4.02	4.01	3.93	3.89	3.89	3.83	3.7	3.7
A Products	Q13	Q7	Q10	Q12	Q5	Q6	Q11	Q8	Q4	Q9	Q3	Q1	Q2
B Ratings	4.01	3.97	3.94	3.86	3.78	3.71	3.65	3.61	3.41	3.3	3.3	3.28	3.28
B Products	Q6	Q10	Q8	Q7	Q1	Q3	Q11	Q12	Q13	Q4	Q9	Q2	Q5
C Ratings	4.32	4.27	4.23	4.13	4.13	4.12	4.11	4.08	4.01	3.91	3.64	3.56	3.34
C Products	Q11	Q8	Q7	Q4	Q10	Q5	Q13	Q12	Q6	Q9	Q3	Q2	Q1
Preferences (%)	11.52	11.28	10.09	9.40	8.48	8.18	7.86	7.80	5.45	5.36	5.36	4.94	4.29
Preferred Products	Q8	Q7	Q6	Q10	Q11	Q3	Q4	Q2	Q1	Q12	Q13	Q5	Q9

Having received the highest ratings on attribute B, “the demonstration of aesthetic designs,” product Q6 (Portal) was merely ranked as the 19th on the experts’ questionnaire survey. This result suggested that while the research subjects were often regarded as geeks who only care about technologies, they were actually concerned about the atmosphere of the interior space and the quality of living life as they spend a lot of time indoor working on computers. This explained their high ratings of product Q6. The product that ranked lowest on attribute B was Q5 (Dual Ray Desk Lamp)—a wearable high-tech caring device. It received unfavorable reviews as its design was unable to highlight the high-tech feel.

In regard to attribute C, “the expression of humane care,” product Q11 (Health Travel Band) won top spot. The reason might be that the subjects felt especially warm and considerate after understanding its assistive functions for outdoor travels. The product paid extra attention to the online community’s inner feelings. Most of the general public regards Internet and technology enthusiasts as “loners” who live or spend time alone. In reality, this particular online community still had the need for humane care. What set them apart from the ordinary people was that they needed more assistance and caring from making connections with the public. The product that earned the lowest rating on attribute C was Q1 (Chinese Cake Steamer). Having little connection with the research subjects’ lives, the product’s main appeal—suitable for

families of two to four people—in turn highlighted the life experiences that the online community was unfamiliar with. The product turned out as something that the Internet and technology enthusiasts' community found to be the most insensitive and even heartbreaking product.

4.2 The Comparison of Preferences

The questionnaire showed that the product with the highest level of preference was Q8 (Sipproperly; sit properly). Based on the ABC attribute results, it was revealed that the product ranked second on attribute C, third on attribute B, and relatively lower as the eighth on attribute A. In addition, the technology of Q8 was not the most advanced among all products. Typically, chairs are regarded as an object that is closest to people's everyday life. Furthermore, what an Internet and technology enthusiast needs when he/she uses a computer every day is a comfortable chair. As a result, Q8 became the Dechnology product with the highest level of preference in this study. To the research subjects, the product with higher preferences must meet their intuitive desires and provide them with the comfort and sense of belonging needed in their daily lives.

Interestingly, the product with the lowest level of preference—Q9 (IRB; UNFLIP IRB)—ranked fourth on the experts' questionnaire survey. The product's overall ABC attribute rankings appeared to be mediocre at best. The low ratings might be due to the lack of association between the product's appeals and the research subjects' demands and preferences. The indifferent styling and high-tech feel also contributed to the product's low level of preference. On the other hand, Q7 (Urban Traveler Personal Water Purification Bag) that ranked second on the preference survey and Q11 which earned highest ratings on attribute B were both outdoor travel related products. This explained that the Internet and technology enthusiasts do not only participate in indoor activities. They might simply feel uncertain about the outside world due to their cautious nature, which in turn contributed to their positive evaluation of the products that care about their inner needs.

After reviewing the retrieved questionnaires, it was revealed that over half of the research subjects were young people under 25 years of age who were familiar with the use of Internet. Their choices of products were very different from those of the older experts. As the research subjects were unable to actually use these products and make the judgments, the products' ability to arouse the subjects' interests can be observed from the disparate opinions of the experts and the research subjects. Product Q4 (Touch Handlebar) that was rated by the experts as the worst product did not receive the lowest rating on the subjects' questionnaires. On the other hand, product Q9 (IRB; UNFLIP IRB) which earned expert praise bored the subjects and received poor preferences. In the book *Emotional design*, author Donald A. Norman suggested that the consumers would be delighted to use a product—even if it's not the best of its kind—as long as the product can generate pleasurable feelings. This explains that the Internet and technology enthusiasts, owing to their preferences for Gundam models with strong styling and technological knowledge, relied on their instincts and preferred styling as references when making judgments about the products. Comparing with the experts' preferential evaluations, the online community placed a greater emphasis on the depth and the taste of designs.

4.3 The Comparison of Preferences and Design Attributes

This study further analyzed and discussed the relationships between the netizens' levels of preferences, forward-looking technologies, aesthetics designs, and humane care. All four items showed significant positive correlations ($p < 0.001$) with each other and the correlation coefficient reached 0.77. Using the level of preference as a dependent variable and forward-looking technologies, aesthetics designs, and humane care as independent variables, the regression model of the level of preference constructed by multiple regression analysis is as follows:

$$\text{Preference} = -0.020 - 0.154 (\text{forward-looking technologies}) + 0.091 (\text{aesthetics designs}) + 0.095 (\text{humane care})$$

$$\text{Adj. } R^2 = 0.69, P < 0.01$$

From the correlation coefficient of the ABC attributes and the level of preference, it was concluded that there was significant correlation between attribute A and C—the r value reached 0.771, suggesting the two attributes were highly correlated). This regression equation can be explained as people who gave attribute A high ratings also provided high credits to attribute C. The influence of attribute A in the regression equation appeared to be negative. The possible reason was not because A represented a technology with negative influence; rather, it was more likely that the significant correlation between A and C influenced the preference together. The F test in the analysis of variance (ANOVA) has reached a significant level ($F = 6.4527$) and the R Square reached 0.685. This suggested that when using the ABC attributes to estimate the preference, the explained variation reached 68.5 %—a relatively high level. It was then concluded that to the Internet and technology enthusiasts' community, technology is not the most critical influential factor when judging the preference for a certain product. Instead, the subjects would appreciate a product if its technology can connect with the subjects' needs—or even satisfy their inner desires—and is of stylish appearance. This can be confirmed by the high preference ratings for the chair, which was associated with the subjects' life experiences. Most online community members spend a significant amount of time in front of the computer and long for a beautiful and comfortable computer chair, which is a distinctive and reasonable choice. On the other hand, the experts' selection focused on the depth and the taste of the design concept. In the study result, it was suggested that the Dechnology products should not only have intimate connections with human lives but also pay more attention to the demands of the certain users.

After comparing the design products with the regression equation obtained in this study, it was found that Q7 was the product that fit the regression equation the most. Consequently, by reviewing all of the Dechnology products with the regression equation, it was discovered that the products considered to have more extensive utilization of technology also received higher ratings on the level of humane care. On the other hand, the products that only placed an emphasis on technology earned relatively lower ratings on the preferences, which can be most well-demonstrated by the differences between the products of Q7 and Q13. This illustrated how technology must be human-centered in order to exert its potentials. As Lin (2014) suggested, the more advanced technology becomes, the more emphasis should be placed on humane cares. The goal of all new century designers is to eliminate the gap between users and

high-tech products by “embracing new technologies and incorporating human factors.” From this study, the needs of the Internet and technology enthusiasts can be understood. The Dechnology products, while being created based on the idea of demonstrating new technologies, revealed the characteristics shown by the different user communities. The sooner the users’ demands are incorporated into the designs the more feedbacks and accolades can be received from the users, resulting in more popular products being created.

5 Conclusion and Suggestion

To understand the characteristics of the Internet and technology enthusiasts’ community, the research subjects of this study were mostly young online community members under 35 years of age. Other than liking the themed model toys in the blogs established by the researcher of this study, most of these subjects were interested in animation, video games, and technological knowledge. In regard to the three attributes—technology knowledge, aesthetics and arts, and humane care—it was revealed that the subjects placed the greatest emphasis on technology knowledge, followed by aesthetics and arts and humane care. From the results of the questionnaires, the subjects’ preferences for the Dechnology products were obtained and analyzed for regression equations. It was revealed that the subjects cared the most about how technology can be utilized in human lives—especially the parts that are most relevant to themselves. If the products were able to deliver the senses of comfort and belonging that the subjects needed in their daily lives, they will provide positive feedback and show their preference for the products—even when the subjects were animation, comics, and technology enthusiasts. The result confirmed that all designs are created for human-centered demands; as technology becomes more advanced, more attention should be placed on the values of human beings, and more emphasis should be placed on humane care (Lin, 2014).

From the regression equation analyzed in this study, it was concluded that technology is not the most critical influential factor when the Internet and technology enthusiasts’ community judged their preferences for a particular product. Instead, the subjects would appreciate a product if its technology can connect with the subjects’ needs—or even care about their inner desires—and supplemented by stylish appearance. When designing products, in addition to utilizing technological advantages and introducing aesthetic design elements, designers should also create products that consider human needs. Depending on the level of how close the products’ humane care attributes are to the users’ needs, the ratings of user preferences might be significantly varied. It was suggested that the Dechnology products should not only have closer connections with human lives, but also pay more attention to the demands of specific user populations. The greatest advantage of Dechnology product was to establish close relationships between technology and users.

In the ITRI data, the 41 Dechnology products were divided into 12 categories that were closely related to people’s daily lives. The present study results discovered that there were no significant relationships between the preferences for the product and these 12 categories. On the contrary, the preferences reflected the characteristics of the

research subjects. In the book *Democratizing Innovation* by Eric von Hippel (2005), it was suggested that user' demands for customization will increase in the long run. Future product designs will be based on the demands of particular users and integrated with the appropriate technologies. The end result will more closely resemble the needs of real users in real markets. It is recommended to incorporate users' or potential customers' opinions into the design process during the early stage of design. Their demands should be understood so that the required technologies can be applied to the design, resulting in the increase of users' preferences for the products and the designs' advantages.

Owing to the limits of both time and subjects, this study was unable to conduct a more comprehensive analysis research. As the subjects of this study were Internet and technology enthusiasts' community, the result suggested that online community with specific hobbies have their own opinions and demands regarding the product preferences. The product design, therefore, should focus on humane care and needs while incorporating technology and aesthetics approaches—to serve as recommendations for technology product design. As the manufacturing methods change over time, consumers no longer solely pursue products that are inexpensive and produced in mass quantities. They want products that are custom-made and satisfy the individual's unique demands. The progress of the Internet has resulted in more online users and online communities with different characteristics. In this study, the research subjects were limited to followers of the blogs established by the researcher. If big data can be incorporated and analyzed in the future, more online communities' user experiences can be understood and products that fit the specific users' characteristics can be designed. This is the future goal for designers who create innovative product designs in this new era.

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