

Developing Idea Generation for the Interface Design Process with Mass Collaboration System

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Abstract. This study is about an Internet-based web service realization to collect data using mass collaboration to put in place Organic User Interface (OUI). As mass collaboration draws attention as a means of collaboration, and its effects are proven, a number of studies have suggested applications and problem-solving skills based on mass collaboration. This study introduces cases of experimenting with mass collaboration, and suggesting an example of system structure design that cares for interaction design.

Keywords: Mass Collaboration, Interaction Design, Organic User Interface.

1 Introduction

1.1 Research Background

The Internet era called web 2.0 has come since the 'dot com bubble' was burst. web 2.0 is a web environment which supports openness, sharing and cooperation technology.[1] Social computing technology representing the web 2.0 era reduces transition costs arising from managing an organization.[2] Social Computing has instantaneity like emails and lays a foundation for community of practice where associated human networks share and reproduce information and initiate the formation of groups, allowing for organized works done as businesses do without the need of traditional groups.[3] Nonaka said that knowledge spiral of knowledge management helps transit of tacit knowledge and explicit knowledge to cause knowledge as a whole to develop via a knowledge spiral in the community. Practical and specialized knowledge like design also can be inherited and evolve by forming a social computing-based community.[4]

Like those of professional designers, works of amateurs participating in Flickr.com and Make.com are purchased by those who are fond of their works.[5] Communities of Practice like LINUX have cases showing that it is possible to develop huge software architecture Operating System (OS), which requires a group as enormous as existing businesses and huge operating costs to maintain such group via an instantaneous communication method and open source.[6, 7] Such participatory sharing is called *Cooperate 3.0*, which is the most advanced form of mass collaboration, classified by knowledge sharing and communication dimension. Cases in this category share and evolve contents sources. [8]

As an example of success based on slight effort of participants, Wikipedia.org shows that a small unit of knowledge participating in totally open contents source can become a gigantic, live, and effective encyclopedia.[7] Keeping this social phenomenon in mind, Bruns called those who create via collaboration in many production units including software as '*Produceage*' and explained that the community without organization creates special products and innovation beyond personalization. Is it possible to apply *Cooperate 3.0* to the interaction design process as well then? [9]

2 Interaction Design Process and Mass Collaboration

2.1 Traditional Design Process

As design methodology belongs to tacit knowledge, hard to systemize literally, it is difficult to generate a generalized definition unlike other field of study. Nevertheless, design methodology has been defined by many researchers in terms of its types, characteristics, and objectives and has a set of common properties.

First of all, projects have established according to design objectives. Characteristics of design process classified commonly by many researchers including Ulrich are 1) defining design objectives, 2) finding and evaluating solutions, and 3) realizing the selected design plan. These design activities require key information for design process.[10] Such information is essential in determining elements to be coordinated to produce a design and divided into two types: Needs Based Information (NBI) and Solution Based Information (SBI). Generally, the SBI for the selection of final design is composed of specialized information and formed by a designer and a skilled engineer who can support him or her. In the event of any problem in this course, the designer and the engineer try to revise the draft design as possible or otherwise solve the problem.

In the meantime, interaction design products require a process of collecting ideas of users and correcting problems, if any, in the design process. Even though the NBI has been collected via questionnaire survey, some have suggested that limits of questionnaire survey prevent a design success. [11, 12, 13] If types of questionnaire and samples are focused on certain population, depending on the method of survey it is hard to collect and obtain appropriate information on how to use a product and share experience. Accordingly, since the 1990s, user observation has been used widely for this purpose, which makes use of qualitative face-to-face interviews of users by the designer. This method requires much time and fewer participants, raising the issue of objectivity. Nevertheless, qualitative data obtained by this method have made a significant contribution to the innovation of design.[14] As concentrated questionnaire and samples began to be relieved to some degree with the help of online culture lately, solutions via active online participation have been explored, but still there is a growing need for a way to collect in-depth information using social computing.

2.2 Characteristics of Mass Collaboration

How does social computing-based design approach work and basically what kinds of functions does it consist of? Prior to establishing a system, we examined

characteristics of shared functions of existing ones. Using Google Scholar, we searched related studies with mass collaboration and crowdsourcing as keywords and collected 16 studies among which six theses were closely related. Focusing on websites introduced in these papers, we found 46 similar websites using Xmarks.com and summarized characteristics of each website in four common keywords as below.

Social Program based Communication: *presentation of new ideas –both NBI required at the beginning of design process and SBI needed at the stage of problem-solving used existing social network as a tool to discuss in detail information necessary in design process or provided similar functions.*

Common Creation Tool: *Open-source based websites provide shared platform which users can download or common creation tool to share production methods. As a result, users can present and combine excellent designs in detailed aspects such as form and function.*

Instruction: *there were web pages which provide examples and methods in regards to idea presentation, operating rules, and production method, as well as detailed description about structures. Also, forums were available via shared bulletin board. Information was open or provided exclusively in this case.*

Evaluation: *presented design ideas were evaluated in terms of oral statement, sentences, and preferred ideas. Scoring votes were possible, and plugins were provided to post evaluation on Facebook or Twitter.*

Taken together, most activities in the design process can happen online. However, it was hard to examine whether or not design activities were performed consecutively or in a linked manner according to a set of goals. This is because participants simply present their ideas or solve minor problems, but they cannot perform activities in a linked way, as they are not trained to solve a problem in a uniform manner as a designer does. With reference to design activities, there are three major modules. This is the case not only in design methodology but also in the innovation process. (See Figure)

Among websites mentioned above, some make use of design process in a broad meaning, and they are divided into two categories; one category consists of open source websites that contribute to the production of contents, and the other category covers websites for the purpose of customizing or modifying a product by reflecting ideas of participants in the substantial design process.

These websites serve as a platform to produce contents via participation or share existing contents and initiate new contents on a separate convenient platform. As one of the *Collaboration 3.0* type websites, Wikipedia.org, for example, allows participants to read contents and produce new contents using Media Wiki, a PHP-based web language platform.[8] Another example includes skin of well-known blogs or open platform-based program Firefox and its Plugin. iPhone App of Apple is a good example, too. These websites are characterized by the utilization of existing design process models to use a practical program available in the computing environment. Although they are applied to the CSCW (Computer Supported Cooperative Work) only, they also can be used to other design process in the future, as predicted by Bruns.[9]

In addition to websites promoting participation of users, we collected theses reporting web-based user participation with the following characteristics:

A. Excellent in collecting needs of users

Generally, theses based on participation of the public have been written with an expectation of collecting needs of users seamlessly. Participation of users was found to be far more effective in collecting needs of users than existing method, as expected.

B. Easy to generate contents from collaboration

We also found cases using collaboration such as crowdsourcing-based translation or word-processing. Clearly, these cases indicate that user participation is helpful quantitatively rather than qualitatively.

C. As specialized as professionals

In regards to design ideas, public participation ratio is high. Some experts point out that there are many different views and innovative ideas presented which they did not predict.

D. Difficult to guarantee the quality of users' opinions

Despite advantages mentioned above, problems were raised: most of the opinions presented by users were similar or in-depth results were not generated. As more people participated, more cases were found useful for design, but with lower frequency.

E. Success dependent on participants

Attitudes of participants were considered problematic. Frequent problems include unfaithful attitude or inappropriate logic, which led to unnecessary works in design process.

Literature research showed that most theses viewed collecting ideas and discussion online as highly positive. In particular, the NBI necessary at the initial stage of design consisted of various ideas from many users, and a number of studies have reported that their participation was very active. However, the SBI to realize ideas in design process was reported as extremely low. More important, this type of information is required by designers and engineers in the design process and a core technology for survival features of designers in that this piece of information is provided by trained designers only. [15]

Interestingly, Hagen claimed that NBI could be solved by social computing in the development of software, and SBI by open-source method. He claimed that software development is underway in many successful web-based services using "Iterate It" and "Emerge It" for SBI and "Source It" and "Open It" for NBI. Some suggest that even realization most difficult in product design is also possible through collaboration when circumstance permits.[16]

3 Implementation

3.1 Design Object

Traditionally, design activities have been defined as behaviors of professional designers to develop a set of processes to produce a product or service in line with the

goals of stakeholders and thereby make a design. In addition, design activities can be summarized into Goal Definition, Solution Suggestion, Prototyping (Modeling) and Evaluation, and Implementation.

For Organic User Interface (OUI), its concept has been defined, but still it is necessary to collect activities of users and analyze most ‘desired gestures’ for concrete realization, because it is useful to use natural bare hand activities in order to develop interface gestures fit to ‘mental model of user’ most important for interaction design. Comprehensive user participating survey and design proposal are necessary to examine what activities can be used for the OUI and what is the most applicable deformation-based interface to prevent problems arising when engineers and interface realize an interface from their own perspectives. In this respect, the author believe that this topic can help users directly propose a prototype of an interface via collaboration and, in turn, researchers realize it, which is likely to work for better OUI construction. As a result, a system can be installed according to characteristics of activities by design activities and processes.

The system realizes the following:

Suggestions on bare hand gestures fit to WIMP-based interaction previously presented by users are received. (texts, questionnaires, video clips, photos, etc.)

A list of collected bare hand gestures is presented for preference evaluation.

Examples of flexible media are reviewed, and suggestions on ‘products to apply’ are received.

Ideas on whole new type of OUI-based products are presented.

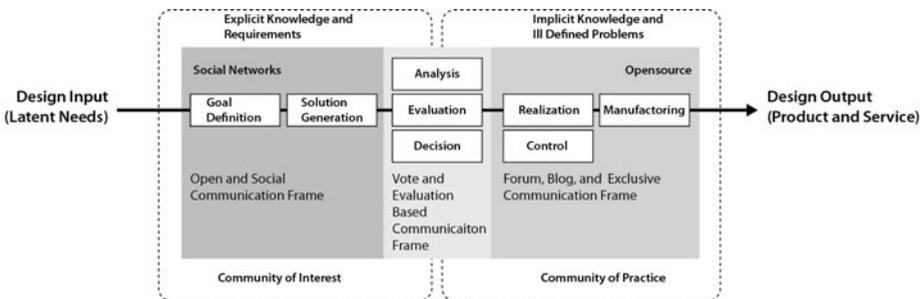


Fig. 1. Figure of the Design System

3.2 Expected Problems of System and Alternatives

Many studies reported cases where general users participated in design process and presented better problem perception and solutions than designers do. Nevertheless, such design ideas were found to have problems at the stage of implementation. While professional designers can suggest the direction for production with specialized views in the process where ideas are concretized through various experience, most ideas of users were fragmentary and minor, inclined to solve problems from their own views. In other words, participants were found to be helpful for the NBI, but not so for the

SBI necessary for actual implementation. To address this problem, we propose paper as a tool of basic prototyping for implementation. Paper is easy to find, has been used in previous studies on key gestures of OUI, and is suitable to suggest gestures without actual implementation.

Things were similar in other websites where collaboration was used to solve problems. Only four communities discuss the SBI among 46 websites found by the author. The fact that hobby-like works are shared only in these communities shows that participating in the SBI is relatively difficult. Therefore, requiring proper level of technology or making difficult technology easy via system is expected to promote mass collaboration for design. In this study, we expect that this problem will be solved by using paper prototyping.

Another problem was that perception and participation in design issues varied qualitatively among participants. Shirky explained this problem as power function.[3] He pointed out that 75% of open source software uploaded at Sourceforge.org is not downloaded. This means that although those who undergo professional design training also take part actively in design process via mass collaboration, the number and the quality are unlikely to be uniform. Surowieki also emphasized that voluntary participation and mature judgment as well as freedom of participants are required to allow participants to determine successful collective intelligence at 'Wisdom of Crowds.' However, many regulatory problems including vandalism expected in design process have been neither found nor discussed academically yet.[17]

Any model to solve this problem should have a convenient interface that allows easy communication so attract a number of users into the system. Shirky suggests three keywords for practice for the revival of mass collaboration at the beginning. [3, 17] This means incessant communication with participants and active supports from the designer rather than experiment. Therefore, instead of making a new system for experiment, existing system which is linked to communities with many users is more appropriate for this study. In this study, we used a system provided by Ning.com that supports communities professionally. Although it is not free, Ning.com provides individual blogs easier to customize and flexible to link to community channels, Facebook, and Twitter, compared to free open tools. It is also easy to construct polls and surveys for design evaluation.

Thirdly, we should think about how to reward participants properly. A series of design process have various instruments for financial profits. For example, Intellectual Property instruments or patents are a right claim for bother designers and businesses to get legal protection. However, the only profit from sharing of design contents including software is emotional satisfaction. Baldwin et al. explained profits of these open innovation groups by emotional satisfaction from contribution, the desire to learn more, and upgrade of status within the community.[18] Therefore, certain design topics maximize emotional satisfaction of participation beyond such non-capital situations, and there is a need for a study on artificial devices for this purpose. In this study, we made efforts to help participants think that they were making a contribution to technical development for the future. No sample was developed, but participation of users would serve as an idea on samples. Feedbacks were continuously given about the prototype produced as a result of implementation of the study.

4 Conclusion

Mass collaboration-based design approach is still at its embryonic stage. Community of practice consisting of non-expert members in specialized areas suffers from many problems such as incomplete opinions or prototype, but helps find specialized information necessary to solve problems with design realization. Currently, most of the social network services used by many people have developed successful interface via lots of failures and repetition by means of quick open-beta, reducing errors over time. To prevent failures of websites, error-correcting costs must be paid, and participation of various people is used to save such costs.

This study examined whether recent trends have an effect on design process by collecting and investigating websites providing mass collaboration-related services and related literature and then developed a common model to install a website fit to an OUI project. It will take time to determine if this study is successful or not, but in case that a large-scale study is necessary to develop a user-friendly interface, approach like this is more likely to be effective and efficient than existing ones.

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