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Designer-User Interactions for Innovative Problem Solving: A socio-cultural perspective

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Abstract
In this paper, a model of designer-user interaction as a socio-cultural phenomenon is proposed with the following question: how do the changes in the designer's perspective on the user's physical and social experiences lead to design refinement or design innovation sequences? Adopting Bourdieu's theory of practice as a macro view, we interpret field as rules of action, habitus as modes of action, and practice as situated actions as they exist in the design process. Particularly, this research argues that the changes in the designer's habitus, as a result of newly acquired knowledge from user research, entail innovation of practice and expansion of field. In addition, the concept of boundary object is considered as a micro view to discover how the designer's research activities assist them in acquiring knowledge from various sources, and to translate / transform it across domain boundaries during the process. Two stories of user research projects on retail shopping experience design are presented as empirical evidence.

Keywords: designer-user interaction, design refinement, design innovation, theory of practice, boundary object

Introduction

Design is an activity of '[devising] courses of action aimed at changing existing situations into preferred ones' (Simon, 1969), and designers look for opportunities to innovate from a variety of perspectives. Previous innovation research literature acknowledges the importance of knowledge transfer among all stakeholders participating in the design process (Cruickshank, 2010), because innovative solutions are generated by piecing together all existing solution ideas in a domain, assembling solution ideas across multiple domains, or migrating existing solution ideas to different domains and adapting them (Lehoux & Hivon, 2011). The potential user of the designed artifacts is among the stakeholders who can contribute with various domains of knowledge. Therefore, designer-user interaction has become a central research issue in the areas of user-centered design (UCD), engineering design (ED), participatory design (PD), and management science where designer-user interaction has been demonstrated to be an effective communication process for user knowledge elicitation (Churchman & Schainblatt, 1965; Kensing & Munk-Madsen, 1993; Muller et al., 1992).

In addition to the aforementioned perspective, this study proposes an additional perspective of seeing designer-user interaction as a socio-cultural phenomenon that is a vital component in the shaping of designed artifacts. Designer-user interaction can be viewed as socio-cultural where the communication between designers and users can reveal the different worlds to which they belong, different perspectives they bring, and how their systems of ideas will be influenced by this encounter. Traditional UCD and PD methods have mostly sought to elicit the user's knowledge and requirements to achieve design innovation because an innovative product or service meets most of the requirements. Yet, innovation is more often a solution that overturns the users' and designers' conventional ideas of what a product/service is and how it works than just an aggregation of all solutions to known problems. Thus, designer-user interaction involves opportunities to examine all hidden assumptions that used to be inevitable constraints but can now be overturned with new developments and technologies in the market. In the end, the designer-user interaction will expand the worlds in which they live because their ideas of the product/service can be broadened.

Starting from the opportunities, we ask the following research question: how do the changes in the designer's perspective on the user's physical and social experiences lead to design refinement or design innovation sequences?

In order to address this research question, this study aims to expand the theoretical understanding of how facilitated designer-user interaction leads to design innovation with emphases on:

(1) As a macro view, a model of designer-user interaction that shows the two different types of design sequences, design refinement and design innovation, based on Bourdieu's Theory of Practice (Bourdieu, 1973, 1986, 1998; Bourdieu & Nice, 1997; Bourdieu & Wacquant, 2004).

(2) As a micro view, the designer actions that function as Boundary Objects (Star & Griesemer, 1989) in the process of working with users to assist transferring, translation, and transformation of knowledge (Carlile, 2004) across domains.

The proposed model is supported with empirical data gathered from 20 in-depth interviews with designers whose responsibilities include direct interaction with end users of products/services in their organizations. Based on the collected data, in this study we show the fittest episode of design refinement and design innovation sequences in order

to demonstrate how designer-user interaction can identify a macro structure (reflecting on Bourdieu's theory of practice) and a micro dynamic (reflecting on theory of boundary objects) in the design process.

Literature Review

In this section, we reviewed the following three research topics as a relevant scope to create a model of the designer-user interaction during a design process: (1) the current understandings of the designer-user interaction, (2) the definitions, drives, and the types of product/service innovation, and (3) the characteristics of tangible/intangible artifacts that facilitate design innovation are summarized from the previous UCD, ED, PD, and Management Science literature.

Theories and Methods of Designer-User Interaction in the UCD, ED, and PD

The communities of UCD, ED, and PD have long recognized the value of user participation during a design process. Bucciarelli's (1994) concept of *object worlds* demonstrated that people with various backgrounds inhabiting different worlds would see a design object differently. Based on this concept, Lehoux and Hivon (2011) explained the benefits of user participation as a variety of knowledge they bring in because with the knowledge design problems can be reframed or solved from fresh perspectives. Also, Kensing and Munk-Madsen (1993) identified the six areas of user knowledge and relevant participatory design tools and techniques. In addition, many UCD methods and frameworks have been developed for revealing users' unmet needs and addressing them with design solutions. Crabtree (1998) and Lloyd (2000) highlighted the importance of ethnographic research techniques during a UCD process. Owen's Structured Planning method (2001) allows for systematic syntheses of design solutions based on the analysis of the user's activities, functions, and environmental information. Gero's Function, Behavior, and Structure (FBS) model (1990) captures only meaningful user behaviors and optimizes the design process around them.

Language-based communication is a necessary part of the designer-user interaction, but it also imposes many limitations that have been discussed as the concepts of *language-games* (Wittgenstein, 1953/1968; Ehn, 1988), the user's *tacit knowing* (Polanyi, 1966), and the psychological, physical, and cultural distances between the user and the researcher (Gaver et al., 1999). In order to address these limitations, alternative research methods are developed. One approach exploits the materiality of mediating artifacts to facilitate designer-user interaction and includes *Participatory Design Games*, *Cultural Probes*, *Generative Techniques*, and *Behavioral Prototyping* (Brandt, Messeter, & Binder, 2008; Ehn & Kyng, 1991; Gaver, Dunne, & Pacenti, 1999; Poggenpohl, 2002; Sanders & Stappers, 2008). The other approach is seeing the designer-user interaction as a collaborative construction of mutual knowledge with which design problems are defined and solutions are created. This approach shifts the focus from how users' current knowledge is revealed to designers to *how the interaction expands designers' and users' knowledge*. This approach works better for the actual design process where not only solutions but also problems evolve over time (Dorst & Cross, 2001; Suwa et al., 2000). With the second approach, designers and users are encouraged to think beyond the knowledge within a person, department, or problem domain by reframing the current design problem and finding solutions from various domains.

Definitions, Drives, and Types of Product/Service Design Innovation

In the Oslo Manual (OECD, 1997), innovation is defined as “the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organization in business practices, workplace, organization.” Wylant (2008) views innovation as “an abstract process for conceptual problem solving” that is different from invention, because it implies the implementation of the solution in practice while invention does not (Fagenberg, 2003).

Regarding the drives of innovation, many studies recognize the importance of multi-disciplinary collaboration as “innovation occurs at the boundaries between mindsets” (Leonard-Barton, 1995). Hargadon and Sutton (1997) observed how IDEO employees play technology broker roles and exploit a broad range of technological solutions by making analogies between current design problems and past solutions. Carlile (2004) developed a framework of three processes (transfer, translation, and transformation) through which knowledge crosses syntactic, semantic, and pragmatic types of boundaries.

Different types of innovation have been classified with either one-dimensional dichotomy (radical–incremental, continuous–discontinuous) or multi-dimensional categories. Borrowing from previous research, Slocum & Rubin (2008:11) defined radical innovation as ‘innovations that could not have evolved through improvements to, and modifications of, the existing technology’ that ‘[offers] unprecedented performance features […] for significant performance or cost improvements’, while incremental innovations ‘improve upon and extend existing technology’. Cited in the same paper, Henderson and Clark’s (1990) framework adopts two dimensions (core concepts are reinforced–overturned/linkage between core concepts and components are unchanged–changed) to categorize innovation into four types: incremental, radical, architectural, and modular. Among the four, *incremental* innovation preserves the core concepts of existing product/service and the linkage between core concepts and components, while in *radical* innovation the core concepts are overturned and the linkage between core concepts and components are changed.

In this paper, incremental and radical types of innovation will be further explored as design refinement and design innovation sequences with qualitative interview data. In the next section, how tangible and intangible artifacts can facilitate design innovation will be summarized.

The Characteristics of Artifacts that Facilitate Design Innovation

Tangible artifacts play the roles of probes, models, and prototypes in a design process (Hahn, 2009:32). Design prototype as the materialized form of the designer’s intention and action has been studied in the context of design innovation as it allows for representation and transformation of project participants’ knowledge (Carlile, 2002). Prototypes are categorized as conceptual, behavioral, procedural, and appearance types according to the aspects they represent (Chayutsahakij, 2001). Kensing & Munk-Madsen (1993) mentioned that horizontal prototypes that show all intended functions are used at the early stage during a PD process when user requirements are defined, but vertical prototypes are used to show all selected functions in intended final forms in the later stages. Gero (1996) argued that prototypes—representations of the structure of a product/service, how the structure and behaviors are related, and how the structure and functions are linked—facilitate the creative design process; by manipulating prototypes, participants can either add or substitute variables of the current problem and come up with innovative schemas for new products /services.

Intangible actions taken during designer-user interaction should be considered with the same weight because a designer action is also a form of artifact that facilitates design innovation. Rust (2004) describes the value of enactment techniques—acting out behaviors of the future users of a product/service as part of qualitative user research—as the externalization of research participants' tacit knowing. Drama techniques (Brandt and Grunnet, 2000) are widely used as a way of gaining concrete understanding of users and current design problems. Actions taken to show function, structure, or behavior of a product/service are modeling or prototyping with gestures. Actions can be taken as analogies to help the understanding of problems and externalization of designers and users' knowledge. This study argues that designer actions that build mutual knowledge function as boundary objects and shape the design outcomes.

Lessons from the Literature Review

From the literature review, this study recognized the need to see designer-user interaction from a socio-cultural perspective as a boundary crossing activity where the designers and users' current knowledge and perspectives are expanded through interactions with each other. The boundary crossing activity results in shared knowledge building, recognition of relevant knowledge in different domains, and analogical thinking that transforms knowledge in one domain into a solution in another domain. The designer-user interaction as a boundary crossing activity is an intangible artifact that facilitates either an incremental type or a radical type of innovation. A new model of designer-user interaction will be described in the next section.

Theoretical Considerations

In order to build a new model of designer-user interaction, we adopt Bourdieu's theory of practice (Bourdieu, 1973, 1986, 1998; Bourdieu & Nice, 1997; Bourdieu & Wacquant, 2004) and the concept of Boundary Objects (Star and Griesemer, 1989) as frameworks to analyze interactions between designers and users.

Bourdieu's Theory of Practice

Bourdieu's theory of practice explains how an individual who is cultured within a society of conventions and rules forms certain attitudes and perspectives that are revealed in his/her daily practices. In this model, field is 'a series of institutions, rules, rituals, conventions, categories, designations, and appointments […] which produce and authorize certain discourses and activities.' (Webb et al., 2002:42); habitus is 'the values and dispositions gained from our cultural history that […] allow us to respond to cultural rules and contexts in a variety of ways' (Webb et al., 2002:36); practice is produced from habitus and habitus exists in moments of practice. This theory explains how individuals interpret/negotiate the given socio-cultural structures or rules (field), and shape their own perspectives (habitus) in their daily practice in a society.

When applied to the interactions between designers and users during a project, the theory of practice lets us see a design process as series of actions of participating stakeholders. It consists of field as rules of action, habitus as modes of action, and practice as situated actions. The field as rules of action is a collection of ideas; the rules include categorization, hierarchy, and definition of concepts, artifacts, and behaviors considered legitimate by stakeholders. The habitus as modes of action is the various perspectives and attitudes from which stakeholders see current design problems. While habitus is formed from the ideas stakeholders selectively draw from field, it only exists in the stakeholders' situated actions (practice) of representing and co-creating design problems and solutions. Stakeholders become aware of field through the reflexive

process of exploring tangible/intangible artifacts such as design problems and solutions, and underlying habitus.

Regarding the interactions between designers and users, in this study, the authors propose two different design sequences based on the theory of practice: design refinement and design innovation. We see the process of design refinement as reinforcement of current field, habitus, and practice; whereas design innovation is the changes in the field and practice of involved designers and users as they change their habitus during the product/service development.

In the sequence of design refinement, or incremental innovation, the core concepts and the linkage between core concepts and components are preserved (Henderson and Clark, 1990). In this sequence, designers and users' current practice of designing and using the product/service, developed from their field and habitus, is reinforced: field influences habitus and habitus influences practice.

Yet, in the sequence of design innovation, or radical innovation, the core concepts are overturned and the linkage between core concepts and components are changed (Henderson and Clark, 1990); Designers and users change their perspectives towards design problems and solutions (habitus). As a result of the change, the course of actions (practice) and how the product/service works and what constitute feasible solutions (field) are changed from newly acquired knowledge and perspectives. The design innovation sequence takes a different cycle from that of design refinement: changes in habitus influence practice and field.

The idea of design refinement and innovation sequences will be illustrated further with case studies. In the next section, how designer-user interaction functions as a Boundary Object (Star & Griesemer, 1989), leads to either direction of the two sequences, and characterizes synthesized designed artifacts in the end.

Theory of Boundary Objects

For designer-user interaction, tangible/intangible artifacts can function as effective boundary objects, which afford the discovery of meanings, definitions, and understandings between stakeholders in separate social worlds, different social groups, and multiple social actors. The original term refers to artifacts designed to mediate and translate different perspectives of all amateur and professional participants in a museum project. Three types of boundary objects are identified in the research literature so far: objects—repositories, database, and parts of libraries, models—standardized forms and methods for problem solving across different functional settings, and maps—representations such as Gantt charts, process maps, and workflow matrices (Star and Griesemer, 1989). Carlile (2004) expanded this definition and viewed intangible knowledge as a boundary object when it is shared as common knowledge among project stakeholders and let them see how one's domain-specific knowledge is different but dependent on the others'.

What makes an effective boundary object, as Bergman et al. (2007) argued, are the following four conditions: they inhabit several social worlds; they satisfy the institutional requirements of each social world; they are weakly structured in common use; and they are strongly structured in local use. Carlile highlighted how a boundary object 'establishes a shared syntax or language for individuals to represent their knowledge', 'provides a concrete means for individuals to specify and learn about their differences and dependencies across a given boundary', and 'facilitates a process where individuals can jointly transform their knowledge.' (2002:451–452)

The authors hypothesize that designer actions can function as boundary objects that lead to the design innovation sequence if they support stakeholders to (1) share and represent their knowledge in communicable forms for other stakeholders, (2) find commonalities, differences, and dependencies between each person's knowledge, and (3) make analogies for each person's knowledge to transform it from one domain to another. Such actions will encourage stakeholders to think beyond the limit of each person's individual knowledge. The world they experienced/understood will be expanded and their perspectives from which they view current design problems (habitus) will be changed. Expansion of field—individual participants' conventional understanding on how the product/service should work—follows when the stakeholders start to see alternative ideas. Subsequent practice of developing product/service reflects the changes in habitus and field.

A Model for Design Refinement and Innovation Seqeunces

Drawing from theoretical backgrounds, this study proposes a model of designer-user interaction that leads to design refinement or design innovation sequences shown in Figure 1. In this model, a design process is viewed as a socio-cultural phenomenon wherein participating stakeholders become aware of field as rules of action and habitus as modes of action with which they participate in practice of shaping designed artifacts. Not only do they become aware of relevant implicit rules, assumptions, and perspectives, but they also have the opportunities to evaluate, examine, and expand them for design innovation.

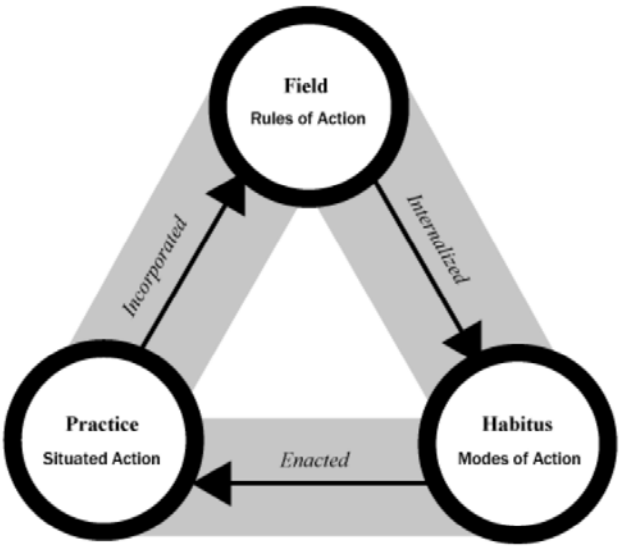

Figure 1

Model of Designer-User Interaction Interpreted with Bourdieu's Theory of Practice

Regarding the research question, the changes in designers' understandings of users' physical and social worlds that lead to design refinement or design innovation sequences, the authors suggest the following distinctions: First, in the design refinement sequence, designers reinforce the current core concepts and components of the product/service. Design problems are framed within the conventional definitions of the product/service. Project stakeholders' field, habitus, and practice are maintained. The field in which the design problems and all relevant social conventions reside is reflected upon their habitus, and the habitus manifests itself in the practice.

Second, in the design innovation sequence, significant changes happen in stakeholders' perspectives (i.e. habitus as modes of action) on design problems and requirements. Although designers usually moderate the significant changes, the changes are the result

of enlightening interactions among stakeholders. The knowledge shared from one domain and adapted to another domain encourages stakeholders to re-examine what they have considered as unchallengeable or inevitable (i.e. field as rules of action). Design problems reframed from new perspectives often lead to structural changes in the core concepts and components of the product/service. Both the design problems and solutions evolve in practice as stakeholders' field is expanded and habitus is reformed.

Regarding the design innovation sequence, the authors hypothesize that designers' attempts are made to (1) question what stakeholders have considered normalcy and commonality (i.e. field); (2) impart their knowledge in various domains that can broaden stakeholders' field; (3) moderate analytical thinking on how the knowledge interrelates among various domains, as well as pertains to current design problems; and (4) facilitate analogical thinking to adapt design problems and solution ideas from one domain to another based on newly acquired knowledge. Such designer actions enable changes in habitus that trigger subsequent changes in field and practice. The proposed model will be further explained with empirical data in the next section.

Two Stories of Designer-User Interaction in Retail Service Design Projects

Based on the proposed model (Figure 1), this section presents two stories of designer-user interaction regarding retail service design projects. The stories elucidate field, habitus, and practice involved in the act of commerce, and how the designer's habitus is reinforced and leads to a refined design solution (Figure 2), or evolved and leads to an innovative design solution that redefines the idea of commerce and thus expands field itself (Figure 3).

Data Collection and Analysis Methods

In this study, twenty in-depth interviews were conducted with user experience (UX) designers. Interviewees were recruited from UX designers in the telecommunication industry and design consultancies, with consideration of their experience in B2C service design. All participants have responded to the authors' email invitation. The interviews were semi-structured and lasted for 45 to 90 minutes. Stories of the designers' activities and interactions with users were collected. Interview data were analyzed with the Grounded theory approach (Strauss & Corbin, 1990) in two stages: first, the preliminary coding stage revealed the structures of the projects, recurring themes, interesting moments, and unique interactions with users. Second, the axial coding stage revisited the themes found in the first round of coding and determined relevant patterns (Boyatzis, 1998). From the data, the authors found that two shopping service design projects exemplified the case of design refinement in which current concepts and component structures of the product/service are maintained, and the case of design innovation where new concepts and structures are explored, following Henderson & Clark's (1990) framework.

Be the Customer: The Story of Design Refinement

In 2010, Alpha (pseudonym) Telecom & Communication conducted a qualitative research study with an ethnographic approach to devise effective face-to-face promotion strategies for the sales of their new broadband Internet product. The competition in the Internet product market was deepening and diversifying, and Alpha UX designers were all well aware of their biggest competition, Beta (pseudonym) Telecom, had successfully increased subscriptions via multi-channel promotion such as face-to-face promotion events in addition to online promotion activities. The Alpha UX designers decided to try

face-to-face promotion events as well at a local grocery store, but instead of a traditional approach (e.g. setting up a booth at one corner and handing out ad brochures to approaching customers), they wanted to make it a more relevant and useful experience for the shoppers. To gain inspiration, the Alpha UX designers planned a new research technique: Be the Customer. They went to the grocery store and became shoppers to learn about the shoppers' needs, goals, activities, and challenges during the process. Be the Customer was a particularly insightful observation opportunity to the male members of the team as they were less interested in and less experienced in grocery shopping in general.

Designers identified four opportunities for approaching shoppers in the preparation, selection, acquisition, and checking out steps. First, during the preparation step, before people enter the store, they were observed going back and forth between their cars and the shopping cart corral, or searching their pockets as they needed coins to deposit to use the cart. For some customers, finding the right coin was a significant challenge. Secondly, during the selection of merchandise step, some shoppers appeared to wonder how to pick fresh produce. Third, the acquisition of merchandise was rather quick and easy for customers who walked in with shopping lists, whereas it was a more time consuming task for the others. Lastly, during the check out step, some customers had to buy plastic bags for their purchases while others brought their own bags.

The Alpha UX team took advantage of these four opportunities and prepared four promotion items: a printed ad of Alpha Broadband Internet with a coin attached, the same ad printed with a blank shopping list, the ad with grocery shopping advice, and plastic bags with the ad. In the promotion event, shoppers gladly accepted promotion items as the items were relevant to their context. The promotion was very well received, so the local grocery store even suggested to continue it for several more days.

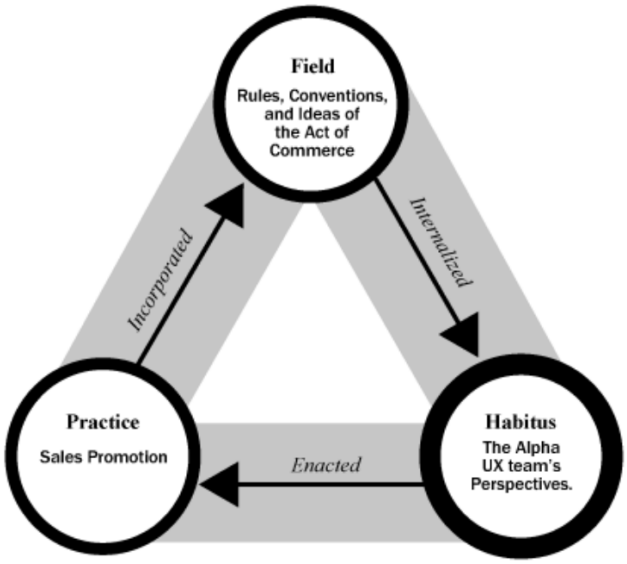

Figure 2

Habitus in Case 1 refers to the Alpha UX team's reinforced perspectives on the act of sales promotion, especially face-to-face promotion strategies. With Be the Customer research session, the Alpha UX team gained more knowledge on the act of grocery shopping, and their idea of an effective promotion strategy was concretized with the shoppers' four challenges transformed into four contextual opportunities for face-to-face communication.

As Figure 2 represents, the Alpha UX team's approach shows the case of a refined promotion design based on the designer's newly acquired knowledge of the grocery shopping process and shopper needs. The idea of taking advantage of the grocery shoppers' unmet needs was gained from Be the Customer research through which the Alpha UX team witnessed the difference between their rather abstract understanding of

the grocery shopping experience and the real and concrete challenges. In relation to the proposed model, this is a case of design refinement as field (the rules, conventions, and ideas relevant to the act of commerce), habitus (acknowledging the effectiveness of multi-channel promotion activities from their past experience and the competition's success), and practice (sales promotion) are ultimately maintained, but the design team's habitus is reinforced with a novel approach (making the promotion activity relevant to the user's context for better reception).

Ethnographic Design Approach: the Story of Design Innovation

In 2008, Gamma (pseudonym) IT Solution designed and implemented a new grocery shopping service for Delta (pseudonym) department store supermarket. The service is targeted to residents in the X district (a suburban residential area): most of them are in their 20-30's, newlyweds or working couples, work in downtown, and have very little time for grocery shopping thanks to their long commuting distances. Therefore, the Gamma system designers conceptualized a new service concept of receiving the users' shopping orders over the Internet on Delta's online shopping mall and delivering groceries to their homes within two hours.

For the idea, the Gamma designers felt they needed a completely new approach. Typically a grocery shopper goes through steps of researching, browsing, collecting, paying, and transporting food items. While Gamma's previously built e-commerce solutions are designed as separate subsystems of each step packaged as one in the end, the new service idea requires an integrated solution of online and offline components: The online catalog/order/payment system should be designed considering seamless flow of transaction data between subsystems. The offline components of retail space layout, human shopping agents, and delivery arrangement after payment should be optimized for fast collection and delivery of groceries. For inspiration, Gamma designers conducted a qualitative study using a variety of ethnographic techniques. From the data gathered, designers observed several issues to address, including the discrepancy between online store product categories and offline store product layout that may cause significant delay during the item collection.

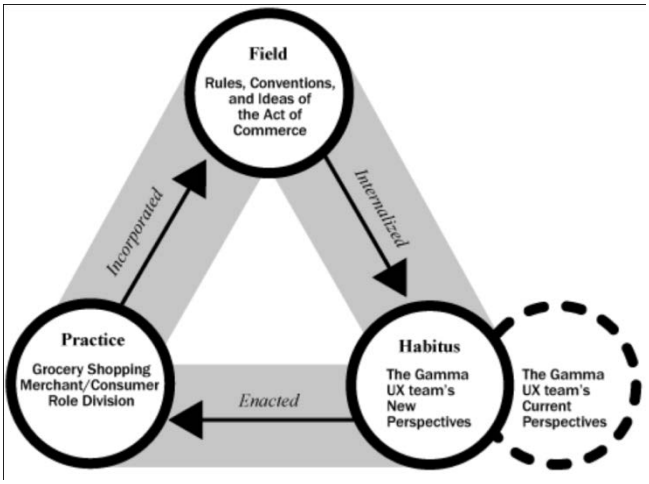

Figure 3

Habitus in Case 2 refers to the Gamma system designers' evolved perspective on the act of grocery shopping. The Gamma UX team gained new knowledge on the current practices of commerce, as well as the challenges that X district residents are facing, with ethnographic research activities as a boundary object. The solutions from other E-commerce domains were transformed as a solution in the domain of grocery shopping, by questioning the conventional merchant and consumer role division.

Through the research activities, designers conceived the initial design idea and identified three key components. First, pickers are human shopping agents who pick up internet-ordered items on behalf of their customers. Second, Delta's offline supermarket product categorization is made congruent to Delta's online product categories, as well as Delta's offline supermarket layout is optimized for the picker's efficient item collection. They also improved grocery bagging procedure to minimize delivery damage. Third, the online system was designed to seamlessly pipe the customer's order, payment, and collection information for all involved parties, providers, seller (i.e. Delta), pickers, and carriers. Delta's new service successfully delivered groceries to X district residents within two hours.

Figure 3 illustrates the Delta grocery service as a case of design innovation: in relation to the proposed model, field (the rules, conventions, and ideas relevant to the act of commerce) is expanded with the addition of a new form of grocery shopping, which was made possible when Gamma designers changed their habitus (a perspective on the concepts of grocery shopping, retailer, and customer), and redefined practice (the changes in the retailer and customer roles). Through research activities as boundary object, Gamma UX team was able to see how the solution in one domain (Internet shopping in general) can be transformed for the problem in another domain (grocery shopping), and expanded the knowledge of retail service, retail space, and IT system design along the way.

Implication and Conclusions

This paper highlights the socio-cultural aspect of the designer-user interaction during a design process, and proposes a model for design refinement and design innovation sequences. The application of the model to two case studies shows the strength of this model: it encourages both designers and users to question what they have been considered normal social practices, and to find innovation opportunities not from the visible features on the surface but from the hidden and implicit assumptions at the base. The designer-user interaction as a boundary crossing activity invites them to share and see their knowledge in various domains on an abstract level to make it easy to transfer, translate, and transform across domains. As problems understood on an abstract level can be matched to a broader range of solutions, there are more opportunities for innovation. Future studies will seek further elaboration of the model supported with more cases of empirical data.

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