

A STUDY FOR PLAYFUL PRODUCT DESIGN

by

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Keywords: playful, product design, functional playful, playful evaluation, interactive design,
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ABSTRACT

Fuzzy things like sensitivity and emotion have been ignored for decades as topics of scientific study and product design. However, more and more studies are focusing on the emotional side of product design.

Highly developed technology, and lack of communication put more restriction and stress in people's lives. Especially today's youth -- the postmodern generation -- have grown up with a large degree of wealth, but still feel lonely. People nowadays try to release their pressure or gain comfort by a moment of pure joy or relaxation.

As far as design is concerned, people have more requirements about products they have -- they are not only looking for the utility side, but also the non-utility side. They are looking for something that could tie them to the product (Norman, 1988).

Play is being studied for satisfying emotional needs and improving interpersonal relationship. It's widely accepted that play means fun and joyful. Recent studies also show the close relationship between mental health and playfulness of adults' personalities. In addition, psychologists are beginning to use play as a standard of testing people's mental condition. But few researchers have worked specifically on the fundamental principles of play and how to apply them effectively to design.

From the perspective of industrial design, there have been a few trails of applying playfulness to the product design, like Alessi's products at the end of the twentieth century. However, most of these trails failed to interpret the word "play". A lot of them address the appearance and form elements, rather than integrating the playful elements into the overall user experience. As designers change their focus from form-giving to human-concerned design, form – giving design without thinking about the functions -- are challenged. And those designs relying only on "cute shapes" quickly become dated.

In the context of this thesis, the playful is deeply studied and translated to design language. Based on the psychological study of playfulness as well as product design language, the criteria is set up and examined. This study is dedicated to bring joyful emotions to user experience, and providing a design approach for creating playful features. For the purposes of this thesis, the terms "play " and "playful" will be used interchangeably.

Keywords: playful, product design, functional playful, playful evaluation, interactive design, emotional features

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GLOSSARY

Aesthetics : This is a branch of philosophy dealing with the nature of art, beauty, and taste, especially with the creation and appreciation of beauty. It is more scientifically defined as the study of sensory or sensorial-emotional values, sometimes called judgments of sentiment and taste. More broadly, scholars in the field define aesthetics as "critical reflection on art, culture and nature(Kelly,1998).

AIBO: The short form of Artificial Intelligence robot, this is the name of the robotic dog pets designed by Sony. These AIBOs are able to walk, "see" their environment via camera and to recognize spoken commands in Spanish and English. The Robotic dogs are considered to be autonomous robots since they are able to learn and mature based on external stimuli from their owner, their environment and from other AIBOs. There have been several different models since their introduction on May 11, 2012.

Blur Building: Designed by Elizabeth Diller and Ricardo Scofidio in 2002, it is the sixth Swiss national exhibition. The centerpiece of it is a suspended platform shrouded in a perpetual cloud of man-made fog, which can host up to 400 visitors. **Playfulness**: The predisposition to engage in playful activities and interactions (Barnett 1991a, b). Barnett (2007) suggested this as a definition: "Playfulness is the predisposition to frame (or reframe) a situation in such a way as to provide oneself (and possibly others) with amusement, humor, and/or entertainment."

BPS: Boredom Proneness Scale. A typical way of assess boredom proneness, which is a tendency to experience boredom. It consists of 28 questions, which can be answered using a true-false response (the original format used) or with a 7-point format from "1" (highly disagree) to "7" (highly agree) used in recent research.

Emotional design: This term comes from Donald Norman's book: *Emotional Design*. It represents the design concept that emotion should be considered as one of the design elements, because emotions can tie users to the products. For example, aesthetically pleasing objects appear to the user to be more effective, by virtue of their sensual appeal. This is due to the affinity the user feels for an object that appeals to them, due to the formation of an emotional connection (with the object).

Grand Theft Auto game: (Abbreviation GTA) It is a series of video games created in the United Kingdom by David Jones and Mike Daily. Later brothers Dan and Sam Houser as well as game designer Zachary Clarke improved and completed the original concept. It is primarily developed by British developer Rockstar North (formerly DMA Design) and published by Rockstar Games. The name of the series is derived from grand theft auto, a term referring to motor vehicle theft. The series has won multiple awards.

Kansei: Japanese word for emotional or affective. In product design domain, it means a design method which aims at developing or improving the products and services by translating customer's psychological feelings and needs into design language.

Product life cycle: These are the stages through which a product or its category pass. Usually, the stages are Introduction, Growth, Maturity, and Decline. However, not all products reach the final stage, some survive and continue to grow.

Psychotherapy: A general term referring to therapeutic interaction or treatment contracted between a trained professional and a client, patient, family, couple, or group.

Rorschach test: A psychological test used to examine a person's personality characteristics and emotional functioning. Showing subjects inkblot images such as those below(Figure 1), tests people's personality characteristics, such as management of feelings of anger or physical harm, interaction, femininity etc.

Semantics: Originally, this term means the study of meaning. In linguistics, semantics is the subfield that is devoted to the study of meaning, as inherent at the levels of words, phrases, sentences, and larger units of discourse (termed texts). The basic area of study is the meaning of signs language or logic. As for industrial design, this term was commonly used to indicate ways in which form, decoration, color, and other visible features of products could communicate additional meaning to consumers and users.

Sony Odo: This term refers to a set of electronic devices designed by Sony company. These devices include video camera, digital still camera, photo and video viewer, stereo headphones et al. All of them are powered by kinetic energy. Users have to move, share or rotate the products before using them. They are designed to teach children the importance of protecting the environment.

TED: The abbreviation for Technology, Entertainment and Design. Founded in 1984, TED is a global set of conferences owned by the non-profit Sapling Foundation. The conferences address a wide range of topics within the research and practice of science and culture, often through storytelling. The speakers are given a maximum of 18 minutes to present their ideas in the most innovative and engaging ways they can. Past presenters include Bill Clinton, Jane Goodall, Malcolm Gladwell, Al Gore, Gordon Brown, Richard Dawkins, Rodney Mullen, Bill Gates, educator Salman Khan, Google founders Larry Page and Sergey Brin, and many Nobel Prize winners.

1. INTRODUCTION TO PROBLEM

1.1 Problem Statement

All work and no play makes Jack a dull boy, All play and no work makes Jack a mere toy.

-- Maria Edgeworth

Play can be observed everywhere, from children to adults, from offices in skyscrapers to neighborhoods. It is an indispensable part of people's lives. Recent studies show that the lack of play may result in health risks as well as negative consequences for social skills (Rubin, 1980). Despite the findings of these studies, few cultures do embrace play as a normal part of adult life. One reason is that play is always thought to be the opposite side of work. And therefore playing is treated as an excuse for not working.

Roger Caillois(1965,2001) has stated that play is a form of pure waste. Caillois' work focuses on subjects like games, play and the sacred. His assertion from half a century ago continues to influence some scholars' thoughts on games and play. The negative attitude toward play exists in many disciplines. If we look at the professional structure of socio-cultural anthropology, the anthropology of play never found a strong institutional footing. However, some researchers have spent considerable time researching the subject Sutton-Smith(1997), who served as president of the Anthropological Association for the Study of Play (founded in 1974; now simply the Association for the Study of Play, an interdisciplinary organization), who is also a play theorist, has spent his lifetime attempting to discover the cultural significance of play in

human life. One of his important guiding principles has been that "any useful definition of play must apply to both adults and children". In the book *Play as Emotional Survival*, Sutton-Smith identifies 308 forms of play and categorizes them into seven rhetorics, or ways of thinking. Thanks to the effort of scholars like Sutton-Smith, people now are beginning to recognize play as an essential element of life.

The relationship between creativity and play is being studied and applied by leading design firms. In the design area, famous companies like IDEO and Frog cultivate a playful environment for their designers. Playful labs were built for their designers to design and test playful product concepts.

While these developments are encouraging, the application of playful feature to design area is frustrating. Of course play has always been considered in the design of toys and games, but it has rarely been applied to products outside these categories. There have been attempts to apply playful elements to products that are not generally thought of as toys. Examples of such product include Alessi's Magic Bunny (Figure 1.1-1), Mr. Suicide and Sony's digital pets (Figure 2). However, as this thesis will show, these products are examples of playful decoration rather than the integration of play into the operation and use of a product.

In order for play to gain broader acceptance and application in the world of product design and use, we must first identify what constitutes a playful product and how its features or playfulness can be assessed and improved.



Figure 1.1-1 Alessi magic bunny



Figure 1.1-2 Sony digital pets

1.2 Need for Study

1.2.1 The problem with current product design

It is now accepted by most designers that both utilitarian and non-utilitarian factors should be taken into consideration into the product design process, for the purpose of giving users better experiences. The exploration of playful features in product design is also supposed to bring pleasant feelings to users.

However, designing playful and pleasant products is not an easy thing. It requires interdisciplinary knowledge from both the psychology and design field. Contemporary design theories such as emotional design and Kansei design do have some studies related to both fields, but not specifically about play. And few researchers work specifically on the fundamental principles of play for the purpose of applying these principles to design. The interdisciplinary study of playfulness from both psychology and design perspectives is missing(Figure 1.2-1). Till now, there has been no universal definition or standard of playful product design.

As a result, while the developments on both psychology play and emotional design are encouraging, the application of playful features to design is frustrating. Play has always been considered in the design of toys and games, but it has rarely been applied to products outside these categories.

Without a thorough understanding of playful, some designers and users nowadays consider cute products as playful products. However, a purely cute shape does not stand for playful. These objects are cute (more like playful decorations), without any detailed functional or user experience consideration. For those “cute products”, the playful features are mis-interpreted

as a kind of shallow visual stimuli and formal decoration, which could not really give users playful or fun feelings. Product design should create a balance between technical- objective demands and aesthetic-emotional factors(Lee et al, 2002).

Playful decoration could be eye-catching. Decorations such as vivid color, unique shapes, and sometimes combine with multimedia do draw people's attention.

However, if these added features do not serve its functionality, or meet users' needs, they will not last long. When the look is not new and fresh anymore, there would be no reason for us to keep those "playful" products.

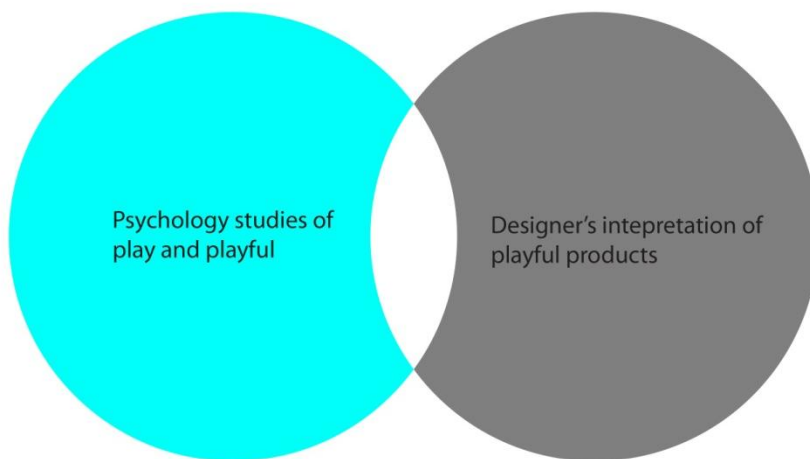


Figure 1.2-1 The “missing” overlap area

1.2.2 The benefits of this research

It is important to understand how to design playful products. From digital products to non-digital utilitarian products, playful features could keep the product fresh for longer period and give people joyful user experiences (Korhonen, 2009). From the perspective of marketing, playfulness would also be an attractive feature to help with selling the product.

This research intended to set up criteria of evaluating playful products, and by discussing how each playful feature relate to the benefits of product design, develop guidelines for product designers to design functional playful products.

1.3 Scope and limitations

In the process of developing criteria for evaluation of playful products and the guidelines intended for development of playful products, this study will focus on adults. And playfulness will be studied mainly from the perspective of product design.

Nokia cell phones: model 7370, 1112 and 6390 will be used as a preliminary test to investigate how to evaluate playfulness in digital products. Kohler faucets and showerhead will be used for physical test. Faucets and showerhead are usually considered to be utilitarian products, so functionalities are usually the main concern. The relationship between playful design language and functionality will also be discussed based on the survey of Kohler products.

The user sample for Kohler products is 40 people, mainly from the northern part of U.S. There are also Chinese and French, as well as people from South America, but relatively few. The sample pool of Nokia cell phone users is around 22 people.

1.4 Study objectives

We all know people play, but why they play as well as how play would be applied to product design are still open questions. The goal of this study is to examine the effectiveness of incorporating playful elements into design language.

Through the review of literature, this thesis is going to analyze and reveal the fundamental elements of play drawn from observable facts. For the purpose of this thesis, the terms “play” and “playful” will be used interchangeably.

This study reviews existing approaches for applying playful elements to product design. Follow-up research has been conducted to evaluate these applications.

The final results are expected to become a method of evaluating what a playful product is and support the conclusion that playfulness would benefit product design.

1.5 Literature review

1.5.1 What does the term playful mean – a universal definition of playful

A quick review of the literature reveals that there is no absolute definition of play and playfulness. Fagen(1995), once described the ambiguous nature of play as the most irritating feature of play. And, as he says, we can feel that “something is behind it(play) all, but we do not know, or have forgotten how to see it.”

According to the Merriam-Webster dictionary, play means “the conduct, course, or action of a game or a recreational activity.” Play could also be used as an objective, as Korhonen (2009) once claimed:“ playfulness is a state of mind rather than an action”. For hundreds of years, different people have tried to understand and interpret the word play, mainly from three perspectives: psychological, biological and social-culture. And playful is usually used as an adjective to describe an approach or attitude containing features of play.

Even though the relationship between play and fundamental biological processes gives us a deep view of play, as a definition or on an application level, the biological view would be too vague and limited (Gordon, 2008). This literature review focuses on the research and definition of play regarding the psychological and social-culture aspects. Some features of play are discussed here:

Pleasure/positive emotional tone: Play is an activity for pleasure (Piaget, 1962). This feature of play is widely accepted by previous studies (Bronfenbrenner, 1979). In his book "*Tom Sawyer*" Mark Twain(1876) said : “work consists of what a body is obliged to do and play consists of what a body is not obliged to do.” In "What is play", Gordon (2008) described play as

a movement which “releases tension in ways that are pleasurable, exposing players to the unexpected, and making transformation possible”

In 2004, Kane, a scholar of play, described play as "an approach to life and work which embraces pleasure". There are different descriptions about the importance of play in human life, but these sayings have one thing in common: Play is something people like to do in their life.

Spontaneous/instinct: In his book *Emotional Engineering*, which is the foundation of contemporary Japanese emotional design, Fukuda(2011) wrote, "Play is an intrinsic quality of human beings".

Similarly, many studies show that play or playfulness is closely related to the maturation of species. Stuart L. Brown(2009), founder of the National Institute for Play, also a pioneer in the research on play, explains that at the basic level, play is "preconscious and preverbal -- it arises out of ancient biological structures that existed before our consciousness or our ability to speak." According to his point of view, play is something we are born with, at its "basic level."

Lindqvist(1995,2001), the scholar who first created playworlds in Sweden, reinterprets Vygotsky's theory of play (1978) to argue that children's play is an early form of the artistic and scientific endeavors of adulthood, and therefore, produces new insights that have intrinsic value for adults and children alike.

Free: Play is defined in the American Heritage Dictionary of the English Language(1992), 3rd Edition as the “the ability to move or operate freely in a bounded space.”To be more precise, the freedom of play is a free movement within a rigid structure (Costello, 2007). Gordon (2008) also similarly states: “The freedom of play is absent in any activity that has

become rigid, unconscious, habitual, or compulsive, even if it started out as play.” In addition, Gordon(2008) observes that ”Play occurs when the player is free from compulsion, and free to risk all the insults and injuries of full participation, such as losing, failing and making a fool of himself.” The situation of ‘kidults’ or ‘rejuveniles,’-- adults who visit Disneyland regularly, collect Care Bears, and attend children’s concerts may be asserting their freedom by casting off the constraints of a work-obsessed culture.” As we know, the Rorschach test (Figure 1.5 - 1) is used to measure mental health; Schachtel (1966) once talked about playfulness and the Rorschach test as follows:

“The freedom to play is an essential... condition for any creative act, including the creative assimilation of the unfamiliar in the expansion of one’s relations to the world.”

Burghardt (2005) proposed five criteria for recognizing play-- one of criteria is that play is free from stress, and is a “relaxed field.”



Figure 1.5 - 1 Rorschach test

No hostility or aggression: “Playfulness entails spontaneous free harmonious movement within and among the parts of the player, whether the player is a chimpanzee, an amoeba, or a

symphony orchestra”(Gordon, 2008). Similarly, Winnicott (1971) described the non-hostility feature of play in this way:”(Play) is the precariousness of magic itself, magic that arises in intimacy.”

Virtual: Except for the four features discussed above, play is also thought to create a virtual world which corresponds to player’s present needs and goals and permits their realization.(Oerter,1999). According to Huizinga(1956), the most important feature is that true play has to exist outside of ordinary life. This is an easy concept to understand. We can take role playing as an example -- we put ourselves in the shoes of someone else, and begins to experience the world from their view of point, the virtual created by our imagination combined with real experience will give us different feelings.

Unexpected result: Games such as pokers, racetracks, and even lotteries are good examples of “the unexpected, a discovery, a new sensation or idea, or shifting perspective”(Brown, 2009).

There are also other ways of sorting or evaluating play features. In “What is Play”, Gordon(2008) concludes that play has an “absorbing, voluntary and pleasurable” nature, which is based on some contemporary research results.

Taking contemporary studies of play into consideration, and also based on the features discussed above, Gordon (2008) concluded the definitions of play in this way:

Play is the voluntary movement across boundaries, opening with total absorption into a highly flexible field, releasing tension in ways that are pleasurable, exposing players to the unexpected, and making transformation possible.

This definition of play covers most of the traditional and contemporary opinions and studies of play. However, there is one important feature here about play which is observed but not clearly defined: Play is something original, or to say in other words, play is closely related to new things. The descriptions like “unexpected”, “virtual”, and “free” are all indicated this feature. Winnicott (1971) even used the term play to mean psychological exploration—doing something new and innovative. Psychologist Handler (1999) described their way of evaluating playfulness for the purpose of measuring mental health, which is based on Rorschach’s test as “Higher playfulness scores would be given to those responses that go beyond more traditional blot description and to those responses that explore new or unusual responses, compared with typical response”(Handler, 2012).

So rolling together all the features of play discussed above, play can be defined in this way: Play is an intrinsic behavior of human beings. Play usually happens with a positive mood tone, it arises from pleasure, confidence, voluntariness and intimacy. Play blurs the boundary between reality and imagination, and takes us out of the restriction of everyday life but still remains part of real life. There are rules of play, which will not restrict the freedom of play. The free spirit of play usually enables us to embrace a new world of creativity and innovation.

Observable features of play					
Pleasure/positive emotional tone	Spontaneous/instinct	Free	No hostility or aggression	Virtual	Unexpected result
Piaget(1962); Bronfenbrenner (1979).	Fukuda(2011); Lindqvist(1995, 2001.2003)	Schachtel (1966); Costello(2007); Gordon(2008); Burghardt(2005)	Oerter (1999); Winnicott(1977)	Oerter(1999); Huizinga(1956)	Brown(2009)

Figure 1.5-2 The observable features of play

1.5.2 The importance of play

A search of a new work-play relationship

From the initial discussion of playful features, there might be a misunderstanding that play is not related to work or functionalities. Historically, the term “play” gives rise to the association of words like “pastime”, “not working”, “uselessness” or “pointlessness”(Huizinga, 1956). And in scholarly areas, there has been a long discussion of topics such as "Will play slow down the working pace?" "Should adults have the right to play?" Once in history the hypothesis that play is useless became the mainstream of play theory. As Beynon et al.(1980) puts it: “When we are at play we ought to be at play. There is no use trying to mix the two.”(Beynon 1980; Fleming and Spicer, 2004, p. 78; Hunter, 2010),Schachtel (1966) This point of view was expressed over fifty years ago and still affects some of the scholarship and research today.

However, we are now living in a work-obsessed environment. Long working hours and overwhelming working loads are the symbols. According to BBC news in May, 2012, due to the recent international financial crises, the unemployment rate is increasing. As a result, those who still have a job have to work longer hours. In South Korea, average annual hours worked per person have reached as high as 2,193 hours a year, which is about ten hours a day if they take weekends off. Long working hours does not only happen in Korea, but in the U.S, where a job like software engineering, "rarely ends at 40 hours, and sometimes reaches 80"(Carolyn et al., 2010).

More and more research has been conducted to reveal the positive factors of play. Contemporary scholars of play are working actively on how to take advantage of play for the

purpose of better working efficiency, improved interpersonal skills as well as enhanced creativity. Brown (2009), also encourages us not to engage in the work-play differential, but try to incorporate play with the real world and apply play to work.

Rampell(2010), has reported in the New York Times on long working hours, after conducting a survey of highly paid American workers. The survey found that 21 percent of them --mostly men--said they worked at least 60 hours a week under highly stressful conditions. The report concludes that longer working hours also means lower working efficiency.

Play is closely related to people's mental health.

In 20th century, psychologists and scholars of play (Harlow, 1971, 1973; Piaget, 1962) have emphasized the importance of playfulness in the development of psychological health.

Other researchers have stated the importance of this relationship differently. “The opposite of play is not work, it is depression,” asserted Brown et al. (2009), “No humor, no flirtation, no games, no fantasy. Try to imagine a culture or a life with play and the thing that is unique is that we are designed to play throughout our life time.”

Brown(2009) was following up with a case in Texas Children's Hospital. The case involved a child who suddenly recovered from congenital disorder. The recovery surprised Brown, because the sign of recovery was preceded by a smile. Even though the lab test showed no improvement that day, the next day, the data indicated that the patient was recovering. Brown subsequently interpreted the smile as more than just a facial expression of "relief from discomfort," but "a play signal." "Ivan's first visible sign of returning health was a invitation to

play" (Brown., et al., 2009), and the smile appeared almost a full day earlier than the positive results of lab test.

After that, the author studied a wide variety of people, "from murderers to businesspeople, socialites, scientists, artists, and even Nobel Prize winners." He focused on their personal "play histories." (Brown, et al., 2009). After reviewing all these cases, their play, childhood and even adulthood, the author came to the conclusion that the lack of play in childhood may leads to crimes in adulthood.

According to the Rorschach test, there is a health benefit when play is featured prominently in the personal identity of individuals. These individuals show greater awareness for and acceptance of their own emotions, and are more skilful at expressing their feelings in appropriate ways. They also pursue intellectual stimulation, avoid exposure to harmful chemicals and drugs, and engage in behaviors that promote the health and welfare of their broader social community. Other characteristics of self-schema for play were positively associated with exercise, self-examination, recent and current health descriptions, and the number of primary care visits to physicians during the previous 12 months. Discussion focused on the potential stress-buffering effect of play in our lives.

Play is of vital importance in social interaction.

Winnicott (1971) claims that play leads to group relationships, and he also thinks play is a “transitional object” which would help babies or young people cope with separation. According to an ethnographic project conducted in Poland and the USA in five different high-tech companies, findings reveal that "programming for fun" plays an important role in software engineers' workplace culture and is a form of reinstating the social status in the occupational hierarchy (Carolyn, 2010).

Brown et al. (2009) think play informs our social constructs. If we want to belong, we should practice in social play, a by-product of the play scene. Related research on the function of playground equipment also indicates that play is a way for kids to learn lessons about group interaction and build up relationships, which is thought to be the early stage of adult social network, according to Brown's theory(2009).

Other examples can be seen from Rough and tumble play, Sergio(2007) claims that it develops our social, cognitive, emotional and physical traits. In his TED (Technology, Entertainment and Design) lecture, Brown(2008) also listed games as spectator play, ritual play, imaginative play, among others, as examples of play that can improve interpersonal relationships.

Play is important in the creative process.

Pruyser(1987) once precisely described the relationship between play and creative:”Creativity requires both a playful attitude and skill at play.”Similarly, a large number

of animal and human studies support the hypothesis that play behaviors foster thinking and creative skills (Smith et al, 1985).

The famous design firm IDEO, which has an extensive track record of work on playful interactive projects, believes in "play as a way of innovation". They have applied it to the overall design process. The following are quotes about playful innovation from the IDEO website:

"Enabling playful creativity within an organization can lead to a flood of innovation. In our 'Play to Innovation' projects and workshops, we rely on practical techniques and academic theory to develop new structures and processes that foster creativity and creative confidence."

The freedom feature of play is of vital importance in creative actions, since it blurs the boundaries between different fields and encourages people to explore and assimilate the unexplored psychology field. As Handler (1999) puts it:

“Play contrasts not with seriousness, but with repressiveness, [with] too-narrow goal directedness and regimentation, and with conventional concepts of efficiency. In the encounter with the Rorschach inkblots, free play is a condition for a rich, varied, and personally meaningful experience and interpretation of the blots. “

Tim Brown, the CEO of innovation and design from IDEO, gave a lecture in TED in 2008. The lecture was entitled “Serious play,” and it ranked in the top 20 TED lectures. In this lecture, he talked about the relationship between play and creativity. The famous quote describing the relationship between play and creative says it is “not an ‘either/or’, it’s an ‘and’.” ” You can be serious and play" also comes from this lecture. He explained fear, like fearing of judgment from our peers, is the main factor preventing us from expressing our "wild ideas". The

freedom of play makes people feel secure, and willing to express ideas, which leads to better solutions. On the other side, playful building is a "powerful way to learn", and role playing is an excellent way to sense how users feel about products. Based on these opinions, Tim Brown asserts that play combined with seriousness creates creativity.

Brown's (2009) class at the Stanford Design School investigates the state of play and its importance in creative thinking. Brown encourages us play in the corporate world and apply play to creative work.

It's worth mentioning that architects also realized the importance of playfulness and applied the playful concept in architecture design.

1.5.3 The application of playfulness in different areas

Play and psychology therapy

Play is now being accepted as a way of psychological treatment and mental health evaluation, and is thought to be an important element in psychotherapy. Winnicott(1971) described psychotherapy as an “overlap of two areas of playing”. The two areas are those of patient and the therapist. And he also described psychotherapy as “two people playing together.” Winnicott’s theory of psychological therapy is widely accepted. Psychologists like Russ(1995) also talked about the application of play in psychotherapy similarly.

One of the examples of play used as psychology treatment is sandplay. It has been used to deal with mental problems with various populations, including those with posttraumatic stress disorder (e.g., Coalson, 1995), children with traumatic brain injury (e.g., Plotts, 2008), and individuals with substance abuse problems (e.g., Marcello, 2008).

Similarly, Marianne (2007) described the role of playfulness as a “possible stress-moderating influence-a dispositional resiliency factor-on adolescent well being”. He studies applying playfulness to relive mental stress, and concludes that playfulness would be promising in this way.

On the other hand, playfulness is also set up as a standard of assessing mental health. Handler(1999) used playfulness as an indicator of psychological health. Based on the Rorschach test method, he measured the reaction of subjects by the level of playfulness. He claims that the benefit of playful assessment versus the standard Rorschach test execution is to give the therapist “valuable information about the patient’s future propensity to be playful”(Handler, 1999).

Play and design process

In 2008, a conference called "Serious play" was held in ACCD(Art Center College of Design), where representatives from top design companies such as: IDEO, Frog, and other companies, as well as scholars of play stated their opinions regarding play. This conference contained cutting-edge and influential studies of applying play to product design and was of great success. From that conference, we know that some of the successful applications of play to the design area so far include:

Role playing is being used to experiment with non-physical designs such as health-care services, educational settings, and so forth. We should take role-playing more seriously (as children do). Role playing is important for putting ourselves in the shoes of the end users, and looking at the world and experiences from their point of view. Role playing is an empathizing tool.

As adults, our old habits are hard to break, as well as our way of thinking, which may restrict our way of thinking. Kids can inform our outlook on creativity by looking at exploration, building and role playing, T. Brown (2008) explained, “forgetting the adult behaviors that are getting in the way our ideas.” As Kelley founded the idea of IDEO based on friendship, T. Brown reminded us that it is this friendship that yields true play, allowing us to check our fear, embarrassment and defenses at the door. As Finger Blasters littered the stage, we rekindled a youthful playtime spirit.

Lang, a designer with science background, forced us to question our basic understanding of a most ordinary material: paper. Lang’s appreciation of the discipline of origami leads him to

reinvent and revolutionize the practice. Much of his design work translated natural things like insects and animals into interesting design language. As he puts it succinctly, “things that you pursue because they are fun turn out to have practical applications, it might even save a life, which is pretty cool.”

In serious play conference, 2008, the reluctant architect, E. Diller of Diller Scofidio + Renfro design studio, demonstrated how we should embrace and incorporate our atmosphere, allowing it to inform our built environment. As she says, "There is something essential about architecture that is about play, beyond just keeping the rain out." One example of play is Diller's No Smokers Project in Amsterdam, where smokers unite via dedicated columns of air and interconnectivity through the internet where smokers can share where are the best places to share a drag. The Blur Building (Figure 1.5 -1) can hardly be understood as a conventional building. “It's not about space, closure or skin,” Diller points out, “rather it's all about screwing around a little bit with your expectations of the dominance of vision and the ability to operate through your visual sense.” Diller also embraces atmosphere in a forthcoming project combining the essences of Venice -- water from canals and espresso - to create the best, most atmospheric, cappuccino for the upcoming Biennale. And then Boston's Institute for Contemporary Art creates a wall of water to incorporate the site's historic importance, editing Boston Harbor, and you can just, atmospherically, get lost in the digital work you are in.

As we can see from the summary of the Play conference, there are certain ways of play and certain features of play we could apply to product design in order to design successful playful products.



Figure 1.5-3 Blur Building

2. IN-DEPTH ANALYSIS OF PLAYFUL ELEMENTS AND ITS APPLICATION IN PRODUCT DESIGN

In the literature review, we took a quick glimpse at the observable features of play and overall applications. A close look at those definitions and applications makes us think deeply about what exactly play is and why we play. On the other side, not all the features of playfulness would be applicable for product design, taking the utilitarian factors into consideration. As far as product design is specifically concerned, we have to figure out the underlying fundamental elements of play and set up design criteria for playful products based on that.

2.1 Analysis of playful elements for the purpose of industrial design applications

In the article “Understanding playful user experience through digital games,” through study video games, Korhonen(2009) discussed playful elements which could be applied to product design. Related research could also be found from game researchers, media artistes and designers.

Based on the study of video games as well as a review of previous theories of playful elements, Korhonen(2009) thinks the elements of play could be summarized as: Creation, Exploration, Discovery, Difficulty, Competition, Thrill, Captivation, Sensation, Sympathy, Simulation, Fantasy, Fellowship and Subversion ,Nurture, Completion, Sadistic, Submission, and

Suffering. By adding elements such as Thrill and Suffering, Korhonen is trying to distinguish playful from playful pleasure, indicating a playful experience is not always pleasant.

We appreciate Korhonen giving us an objective view of fundamental playful elements. However, Korhonen's opinion has its limitations. From the perspective of product design, unlike games, rational side such as utilitarian properties or product functions, which are supposed to make tasks easier and product manipulation less error-prone, should be taken into consideration. Game elements such as suffering would obviously go against the basic principles of product design, thus that element should not be incorporated. When we take a look at existing playful product designs, not all the elements that make people feel playful would be applied to product design. And also, for the purpose of getting a clearer and obvious result when sorting and comparing playful products, certain elements should be grouped together in categories.

Examining the theories based on playfulness allows the researcher to develop his own. We can find a more simplified and approachable playfulness model developed by Garris et al (2002): "Fantasy, Control, Rules, Sensory stimuli, Mystery, Challenge." Fantasy, control and rules can be seen in many product designs, since they "define the boundaries inside which the user needs to act with the product" (Korhonen, 2009).

It would be difficult to match each element with an equivalent observable feature, because all these elements weave together and form play. For example, the observable features of pleasure could be seen as triggered by all these six elements, especially fantasy, sensory stimuli and challenge. The following discussion focuses on the relationship between the six elements and their applications.

Fantasy: Fantasy coordinates with the observable feature of play “virtual” (Figure 1.5-1), and it is defined by Malone and Lepper (1987) as “an environment that evokes mental images of physical or social situations that do not exist.” Vygotsky(1978) stated that sometimes our desires cannot be fulfilled in real life, so play composites these desires by imagination and imitation, which means fantasy. Thomas and Macredle (1994) have noted that one key characteristic of games is that participants’ actions have no impact on the real world (they describe this as a “world with no consequences”). Fantasies facilitate focalization of attention and the self-absorption that occurs when users become immersed in game activity (Driskell & Dwyer, 1984). Vygotsky(1978) explained that because there are a lot of desires we cannot fulfill at once in real life, play being used to create a desirable and fantastic world to compensate for the unfulfilled desires.

Control and rules: Control is “an exercise of authority or the ability to regulate, direct, or command something.” For example, in play, a tool with better performance would give people more feeling of control or powerful use (Korhonen, 2009). In Korhonen’s research on digital games, the players stated that they want to be more powerful to gain more control and confidence. And in Grand Theft Auto game, the control feeling can come from the good performance of a car.

Within certain situation and time, rules in play actually replaced the rules we usually have to operate in daily life (Caillois, 1961). The rules of a game also include how we reach goals within the game. Rules attribute to the playful feature “freedom,” giving help with setting up a boundary between the real and virtual, and release us from constraints of ordinary life.

There is also an action-feedback mechanic inside play rules, so even if we know how to play in advance, the result varies depending on how we act in play.

Control and rules are obvious play elements but are complicated for product design.

Sensory stimuli: This term means a disruption of the stabilities of normal sensations and perceptions. The main focus of sensory stimuli in product design is still on visual stimuli, such as bright colors, cute shapes, or fresh look.

Mystery and challenge: The last two elements, mystery and challenge are not usually intentionally considered for product design. However, these two elements could be interesting new areas for product design. The variation of these two elements in product design greatly affect the subtle balance between the level of playfulness (more emotionally related) and the efficiency of functionality.

Even though these “six elements” can be found in some products -- we can see some products containing some of these elements -- they are not systematically and intentionally applied. This thesis will examine, in part, whether or not these principles have validity for the design of products.

2.2 Playful product design

Through the study on the fundamental elements of play, it is now safe to say that a product containing elements like Fantasy, control, rules, sensory stimuli, mystery and challenge could be judged as being playful. But before setting up the standard of playful product design, the six elements have to be evaluated and translated into design language.

As mentioned before, fantasy, control and rules exist in interactive products or product interface, and forms rules for regulating the way users interact with products (Korhonen, 2009), and they can all be easily understood and directly translated to product design language.

Fantasy-futuristic: Fantasy could be easily understood, but if directly used to describe a product, it might be vague and misleading. There is a word in design language that matches with the features of fantasy-- futuristic. It also contains elements of “not real” and “situations that are not part of normal experience”.(Garris et al, 2002)

Mystery-curiosity: Directly using the form “mystery” to describe product design might be confusing. A similar word would be curiosity. Garris et al(2002), states that curiosity is a similar concept to mystery. Following Berlyne(1960), Garris et al. he described two types of curiosity: sensory curiosity and cognitive curiosity. Sensory curiosity means the interest evoked by novel sensations, which is similar to sensory stimuli, and cognitive curiosity represents a desire for knowing new things. He also discussed the difference between mystery and curiosity: according to Garris et al, mystery is “enhanced by incongruity of information, complexity, novelty, surprise and violation for expectations, (Garris et al,2002; Berlyne, 1960), incompatibility between idea and inability to predict the future(Garris et al,2002; Kagan, 1972),

and information that is incomplete or inconsistent(Garris et al,2002; Malone & Lepper, 1987).”

In shorter words, mystery stimulates curiosity, but has more unpredictable and uncontrollable factors, and so is a more complicated form of curiosity. So even though mystery is a “external feature of the game itself”, there is a doubt of its application in product design. As I mention above, there is a subtle balance between the level of playfulness (more emotionally related) and the efficiency of functionality effected by the level of mystery and challenge. Should this form be replaced by curiosity? That is the question to be discussed in the follow up research.

Sensory stimuli: As for this element, visual stimuli are still the mainstream and are widely applied in design area. Vivid color and cute shape all belongs to Sensory stimuli, such as Alessi magic bunny (Figure 1.1-1). However visual stimuli are just one element of playful, that’s partly why products with only unique shapes are not really playful.

Some potential applications of sensory stimulus are being developed, using senses such as smell, which is currently being ignored. Kara (2009), a material scientist from IDEO, conducted a set of product design experiments dedicated to apply sensory stimuli to product design in an innovative way. There are some interesting outcomes from that project, such as the smellbell (Figure 2-2). Unlike normal doorbells which use the auditory sense, the smellbell uses the olfactory sense to remind user of their guests coming. To do so, the doorbell would assign a unique fragrance to each one who rings it. And gradually different scents would fill up the house. The reason behind that is “scent can trigger memories” (Kara, 2009), which smartly attaches our motions to this product.

There is one coffee shop inside the American Club (which is the best hotel in Sheboygan area). They have one special kind of straw made from paper, and they also have regular ones.

However, even though these two kinds of straw were put next to each other, way more people would choose the paper one since it gives them different sensory experience of the texture.



Figure 2-1 The smellbell

As a conclusion of the sensory experiments she conducted, Kara worked with Bone(2009) to write a book called *I miss my pencil* (Bone & Johnson, K, 2009). It won a 2009 IDEA Gold award and is a successful exploration of sensory stimuli related to product design. But as far as function is concerned, there should be more trials and errors before it is widely applied.

Challenge: Similar to mystery, there are different levels of challenges. Malone and Lepper(1987) claimed that individuals want the difficulty of challenge to be an “optimal level”, which should not be too difficult nor too easy. To do so, some games set up different difficulty levels. Similarly, in product design, the complexity of the coffee machines in Starbucks is different from what people usually have at home, and the cooking equipment in a five-star hotel would be more complicated than what normal people have. Another example can be seen in an airplane control panel (Figure 2-2).

Many people might think the control panel of airplane to be too complicated, but not the pilot.



Figure 2-2 Complexity of an airline control panel

So for product design, challenge should be controlled to the desirable level, fitting in with different people's needs.

Control - confidence of usage: Control could be translated into “confidence of usage” from the designer’s perspective. The word control presents a feeling of power. A “more” functional product usually gives users more feelings of control. Moreover, it can be additional functions, higher- technologies as well as some other method to get things done more easily. Designs containing interaction factors usually fit into this category.

Rules: Rules are of vital importance in game or digital interactive product design.

Commonsense rules structuring our daily behaviors (such as human beings cannot fly, drivers should not speed) are suspended in virtual world of play, which gives people a fun feeling. Inner goal structure also leads to an enhancement of the motivation to use the product. For product design, rules could set up functionality as their goal, and playing while getting the job done could “trigger great attention and motivation” (Garris et al,2002). There is also an action-feedback mechanic inside play rules, which is now widely used in interactive or interface design. For example, Sony Odo(Figure 2.2 - 1) created a set of eco-environment digital devices including digital camera, photo and video viewer, and stereo headphones et al. Users have to turning cranks, moving parts and use their bodies to generate energy before using. The rule of interaction regulates how we realize the functionalities of the products.



Figure 2-3 Sony Odo

After discussing the six playful features and their potential applications in product design, the criteria of playful could be concluded as this chart bellow:

	Fantasy	Rules	Control	Sensory stimuli	Mystery	Challenge
Description	something not real	The mechanic inside play, containing goals and feedbacks, motivation trigger	An exercise of authority or the ability to regulate, direct, or command something A feeling of powerful	A disruption of the stabilities of normal sensations and perceptions	Enhanced by incongruity of information, complexity, novelty, surprise and violation for expectations	Difficulty in an “optimal level”
Translate to design language	Futuristic	Way of manipulating or interact with the product	Confidence of usage	Visual aesthetics; Texture feelings; Smell and multi- media	Curiosity (cognitive)	Difficulty of usage, complication of functionality

Figure 2-4 Criteria of playfulness

2.3 Evaluation of existing playful products

Existing playful product on the market could be categorized into several basic sorts, according to the way of being playful.

Existing products analysis:

Visually “cute”: use visual stimuli, such as Alessi products. Alessi is probably one of the first companies whose products are widely accepted as cute.

Interactional playful: Use the rule from games, such as proker, racetracks, and even lotteries (unpredictable results) to create a new way of manipulation or indicate the final functionality purpose.

Playful utility products: Borrow rules or way of manipulation from game, and create new way of use. Sony Odo is one of the examples.(Figure 2-2)

Psychological interesting products: Products gives psychological hint. They contain certain visual stimuli, as well as cognitive stimuli. They can encourage imagination and curiosity. Users interact with the product in psychological level, for the most part. Product such as Bubble Tank (Figure 2.3-1) and Whale vase (Figure 2.3-2) are such examples. Both of them have simple functions, but they encourage you to imagine: Will the tank fall down? What’s the part under the surface look like?



Figure 2.3-1 Bubble Tank

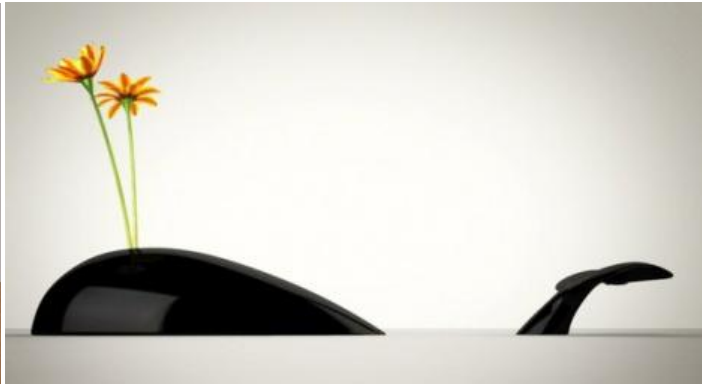


Figure 2.3-2 Whale vase

Based on the theory of six elements explored above, the playful features of products listed above can be evaluated.

	Fantasy	Control	Rules	Sensory Stimuli	Mystery-Curious	Challenge
Visually cute	X			X		
Interactional playful	X	X	X	X	X	X
Playful utility products	X	X	X	X	X	X
Psychological interesting products	X			X	X	X

Figure 2.3-3 Existing products analysis based on the six playful elements.

The analysis shows, visually cute and psychological interesting products, failed to integrate the playful elements to both the aesthetic and function attributes, are not really playful. On the contrary, interactional playful and playful utility products, with balanced visual stimuli and functional consideration, are qualified as playful.

3. THE BENEFITS OF PLAYFUL FOR PRODUCT DESIGN

When reviewing the features of play, no direct connections could be found between play and functions. Even though there are certain applications of play, the interesting thing is that play itself is not goal or function orientated. In other words, the applications all seems like by-products of play. There is also some research that discuss this the interesting situation: “The performance of the behavior is not fully functional in the form or context in which it is expressed; that is, it includes elements, or is directed towards stimuli, that do not contribute to current survival”(Korhonen, 2009; Burghardt, 2005), which means play does have purpose and function outside itself, and players might not realize that when they play. Piaget(1962) also thinks it is a mis-reading of play as “an activity for pleasure,” instead he translates play as immediate realization for desires or needs while work as a mediate realization. In Burghardt’s(2005) words, work is a delayed benefit. Fagen(1981) also states play is a functional behavior to develop, practice, or maintain physical or cognitive abilities and social relationships, by combining behaviors outside the primary context.

As for product design, the interesting concept above could be interpreted as: even though playful features have no obvious functional purpose, they could actually be functional, or we might be able to interpret them as play disguised.

3.1 Fun theory and its related experiments

Fun theory is a set of experiments sponsored by Volkswagen, dedicated to see if fun would be the easiest way to change people's behavior for the better.

One of the famous experiments is the Piano staircase (Figure 3-1). The testing group asked themselves a question: "if they could get more people to choose the stairs by making it fun to do?" (Piano Staircase) To test it, they made a piano staircase right next to the escalator. When users step on it, each stairs acts as a key of piano (making the sound of the relevant note), and by stepping on the keys differently, users could "play" different music. The result is interesting -- According to the video, 66% more people than normal chose the stairs over the escalator after the music interaction equipment was installed.

Other experiments includes: the deepest garbage bin (Figure 3-2)--a trash can designed to sound like the deepest bin in the world; Bottle bank arcade machine (Figure 3-3)-- turning recycling into a video game-like challenge (Merchant, 2012). They all show similar results: fun equipment is more attractive to users. It is hard to say how long those fun effects would last, but there is definitely great potential in applying playful elements to product design, and making the product more attractive to people.



Figure 3-1 Piano staircase



Figure 3-2 The deepest garbage bin



Figure 3-3 Bottle bank arcade machine

3.2 Utilitarian and non-utilitarian properties

Both utilitarian and non-utilitarian properties are important to product design. Utilitarian properties are usually accepted as the functional properties of product. The International Standards Organization (ISO) defines usability as "the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environment" (ISO/TR 16982:2002).

In contrast, non-utilitarian properties are related to the feelings and emotions we have toward a product. It is commonly accepted that non-utilitarian properties can increase pleasurable feelings (Korhonen, 2009).

Contemporary studies of design suggest taking both utilitarian and non-utilitarian properties into consideration, because a good balance of both properties would bring users a pleasurable experience.

3.3 How non-utilitarian properties would benefit product design

Hauge-Nilsen (2000) proposed the "pleasurable cake" (Figure 3.3-1) as a frame of good performance products. And he believes products that fit in with the elements listed in the "pleasurable cake" can give user pleasurable feelings. From the chart, we can see both utilitarian and non-utilitarian properties benefit product design, even though they are of differing importance.



Figure 3.3-1 The pleasurable cake

Designers such as Norman(2003), suggest increasing product values by increasing the pleasure features in products because, he think a pleasurable user experience is important in product design.

According to Norman's (2002)study, even though function is the main factor deciding how long users would like to keep the product, appealing shape is usually the one that gives user the impulse of buying products. A good design not only communicates function, but emotion as well.

3.4 How playfulness would benefit product design

Even no similar theories have been proposed before to connect “pleasurable cake” with “six playful elements”, when comparing these elements of “pleasurable cake” with the “six fundamental playful elements”, several elements in common can be found. For example, sensory stimuli can serve the purpose of good touch or feeling, rules and control could be applied to good usability, et al. I believe applying playful elements to the design of products will, over time, can establish a connection between the pleasurable cake and playful products.

Playful could provide benefit for both utilitarian and non-utilitarian properties. The six elements of play fit in with most of the attributes of pleasurable. When comparing six elements with “pleasurable cake”(Figure 3.3-1), the control element fits in with “be in control”; rule fits in with “good construction”, as well as “good usability”; sensory stimuli fits with “good touch/feel” and can help with “good aesthetic”; curiosity and challenge fits with “good entertainment/feedback”. In contrast, good quality and safety relies more on engineering executions, rather than design.

Play could stimulate users emotionally. It can arouse users’ curiosity, attract them to interact with the product, and give them a better user experience, according to the comparison,

4. CASE STUDY AND USER RESEARCH

4.1 Preliminary test of Nokia users

4.1.1 Methodology and Goal

The goal of this survey is a preliminary test of the benefit of playful design. For this research, questionnaires in digital format were sent out by emails. Products to be tested in the questionnaires are Nokia 7370, 1112, 6290 (Figure 4.1-1).



Figure 4.1-1, Nokia 7370, Nokia 1112, Nokia 6290

These three cell phones were chosen, if compared by applying the six elements, they are of different playfulness (Figure 4.1-2).

Nokia 7370

	Strongly disagree	1	2	3	4	5	Strongly agree
Fantasy					4		
Control/confidence of use					4		
Rules					4		
Sensory Stimuli						5	
Curiosity					4		
Challenge					4		
Overall playfulness							25

Nokia 1112

	Strongly disagree	1	2	3	4	5	Strongly agree
Fantasy		1					
Control/confidence of use				3			
Rules			2				
Sensory Stimuli			2				
Curiosity		1					
Challenge		1					
Overall playfulness							10

Nokia 6290							
	Strongly disagree	1	2	3	4	5	Strongly agree
Fantasy			2				
Control/confidence of use					4		
Rules				3			
Sensory Stimuli				3			
Curiosity				3			
Challenge			2				
Overall playfulness							17

Figure 4.1-2 The pre-evaluation of Nokia 7370, 1112, and 6290 by applying the six elements

Evaluated by the six playful elements, Nokia 7370 is more playful than Nokia 6290, and Nokia 1112 is low in playfulness. The difference lays in the swivel feature, which adds more control and interaction to the cell phone.

The questionnaire is comprised of the following questions:

1. Among these cell phones, which one gives you strongest impression? Why?
 - A. 7370
 - B. 1112
 - C. 6290

The goal of this question is to test if sensory stimuli contribute to products' playful feature. Visual stimuli disrupt normal sensations and perceptions, and leave people strong impressions. Since sensory stimuli come before rational thinking, I put this question in the first place.

2. Among these cell phones, which one do you think still looks fresh and innovative?
 - A. 7370
 - B. 1112
 - C. 6290
 - D. None of them

This question tests for fantasy. Fantasy is something futuristic and new, as analyzed before. Since these cell phones have been in the market for more than five years, some people might think all of them are dated.

3. Which cell phone do you feel is more functional and have better control?
 - A. 7370
 - B. 1112
 - C. 6290

This question tests for control elements. Product with more functions could give people better feeling of control.

4. Which one is actually easier for you to operate?
 - A. 7370
 - B. 1112
 - C. 6290

This question tests for the challenge element. It indicates the difficulty of usage.

5. Which cell phone looks more fun to use?
 - A. 7370
 - B. 1112
 - C. 6290

This question requests the overall evaluation of which one is more playful.

6. Which one makes you feel more curious about when they were launched?
 - A. 7370
 - B. 1112
 - C. 6290

This examines the curiosity element. It makes people try the product, and try to figure out how it works.

7. Which cell phone would you spend more time to interact with/ operate it the most? How do you like it?
 - A. 7370
 - B. 1112
 - C. 6290

This question tests for the rule element, since rules stand for way of manipulating or interact with the product.

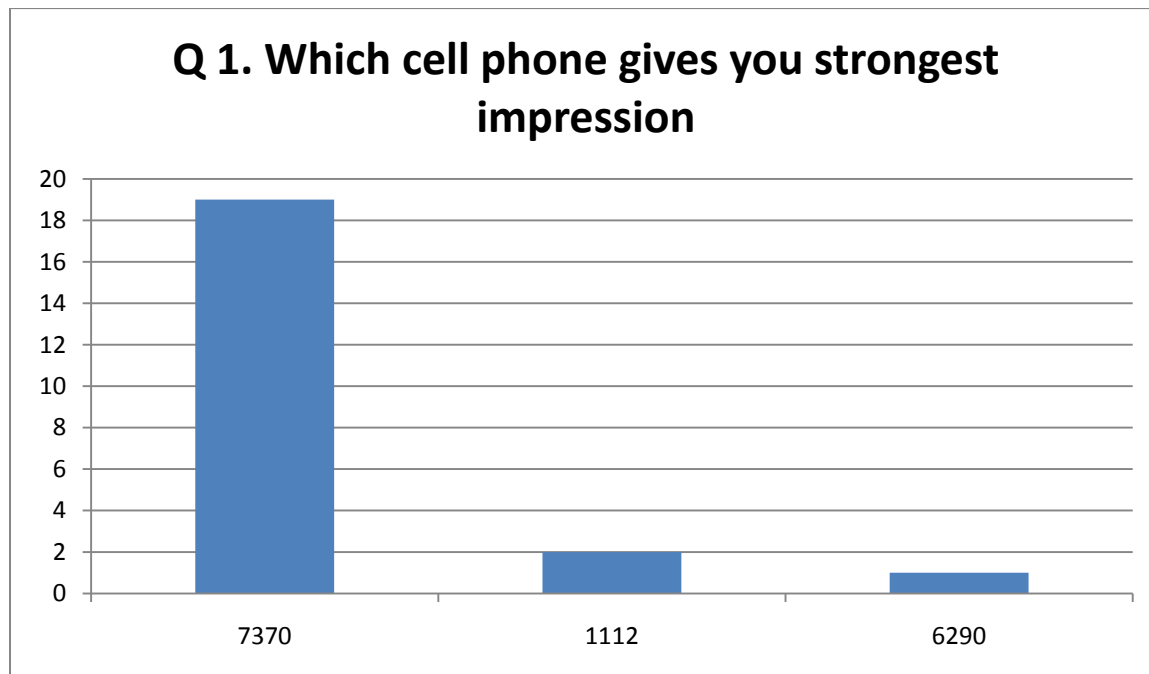
8. If you would choose one of the one of these cell phones, which one would you choose?
Why?

This one is overall testing for which cell phone do the users like better, and the question would reflect if playful phones are valued.

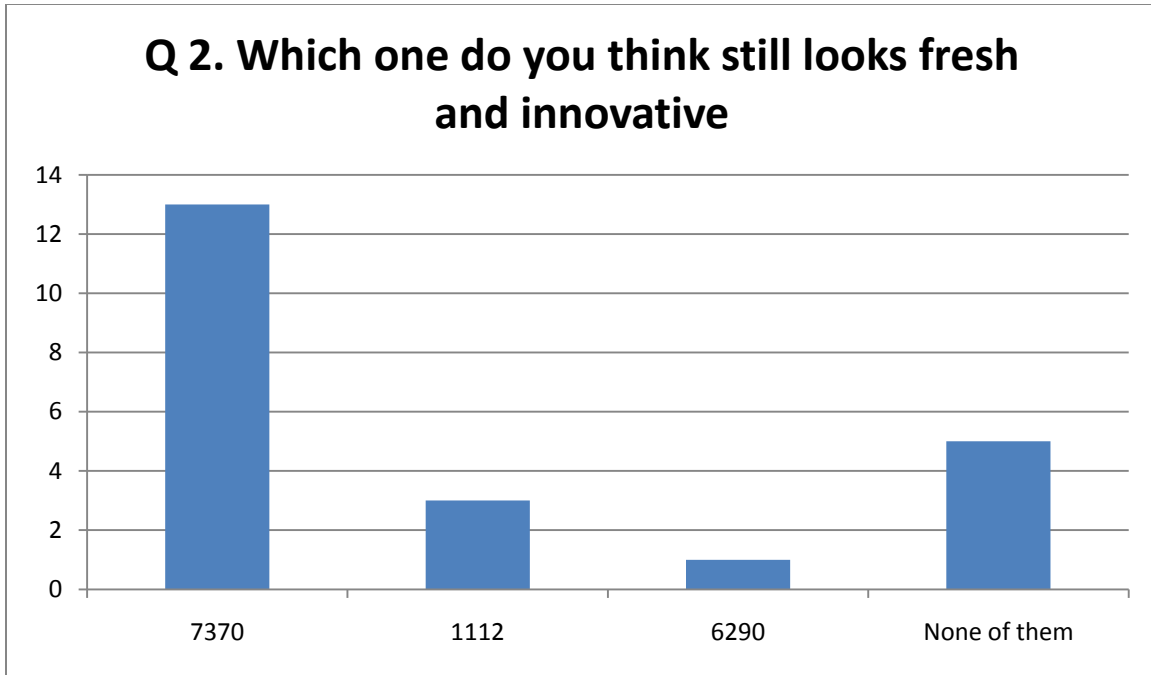
4.1.2 Data analysis

They were answered by a total of 22 respondents, ages from 20 to 25 (Self reported).

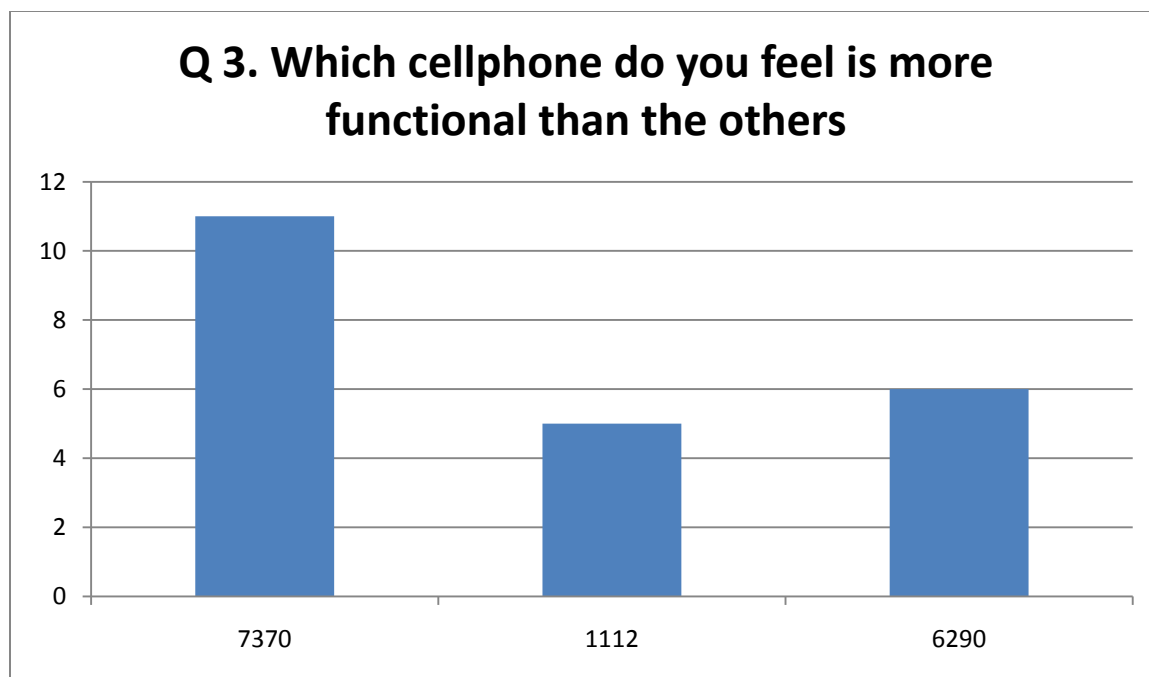
Most of them have the experience of using Nokia cell phones.



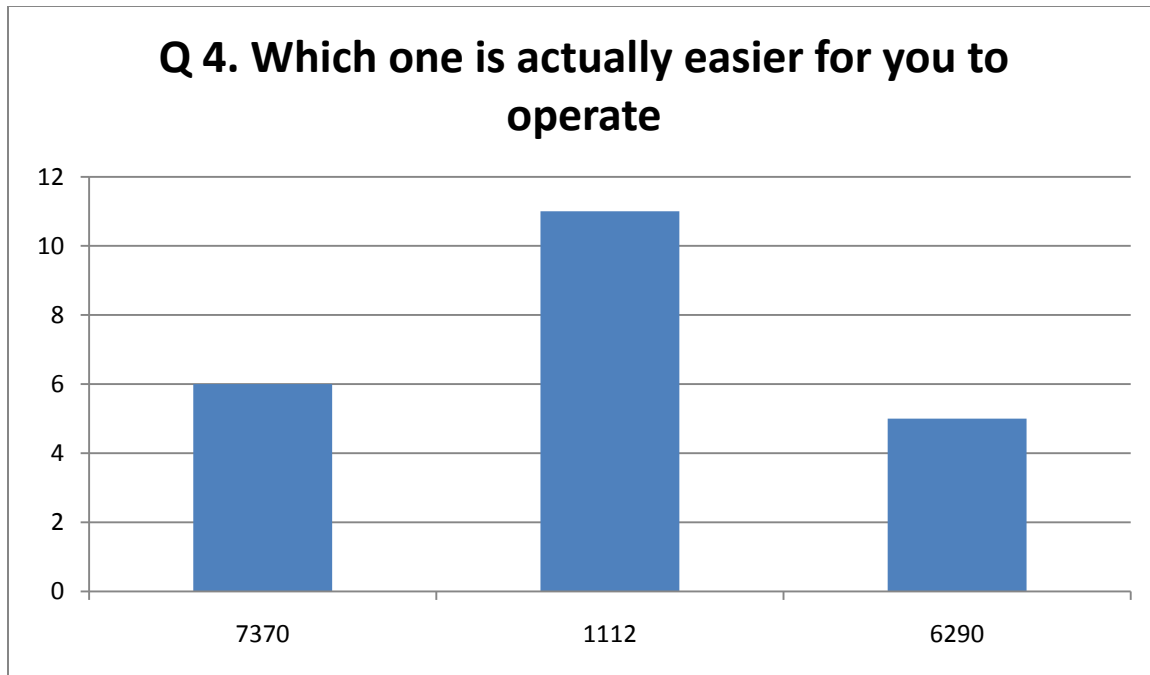
The answer shows that Nokia 7370, the most playful one according to our survey, also has the most sensory stimuli according to users' opinion. It gives user a deeper impression of the product, and is more attractive to users.



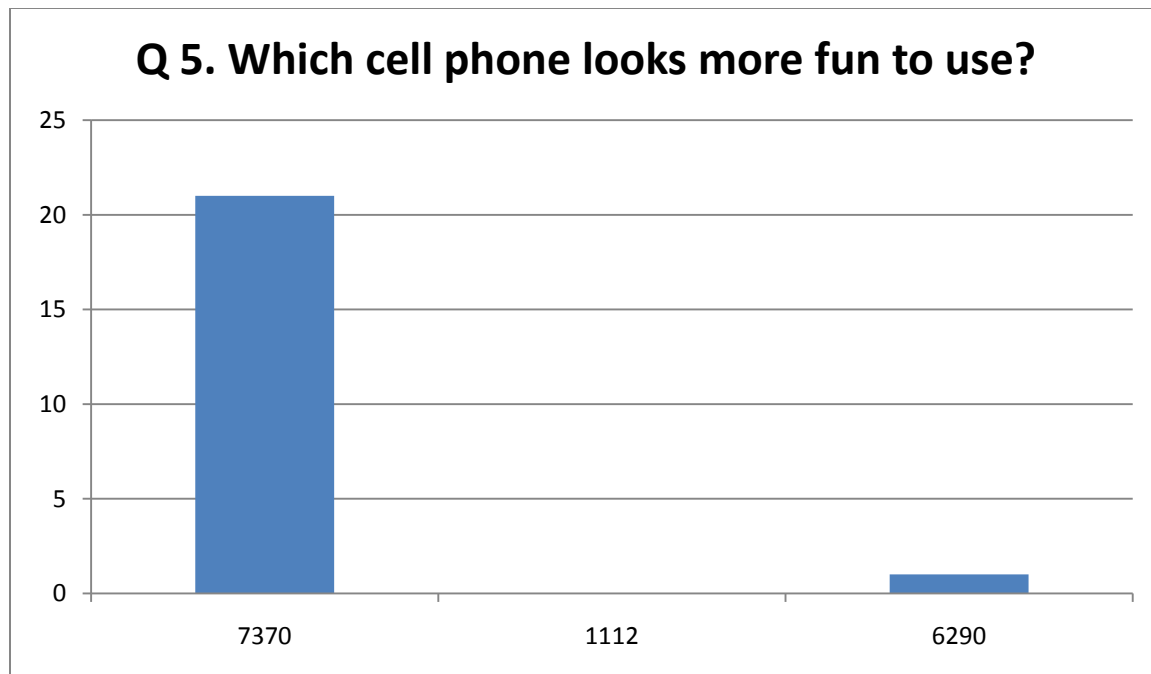
Most people think 7370 still looks fresh compared with others, even though some think none of them are fresh anymore. But if we connect the background that Nokia 7370 has been on the market for more than five years and the life cycle is usually one to two years for cell phones according to a previous side survey of Nokia 7370.(see Appendix 1), we might conclude that playful might keep the product fresher longer.



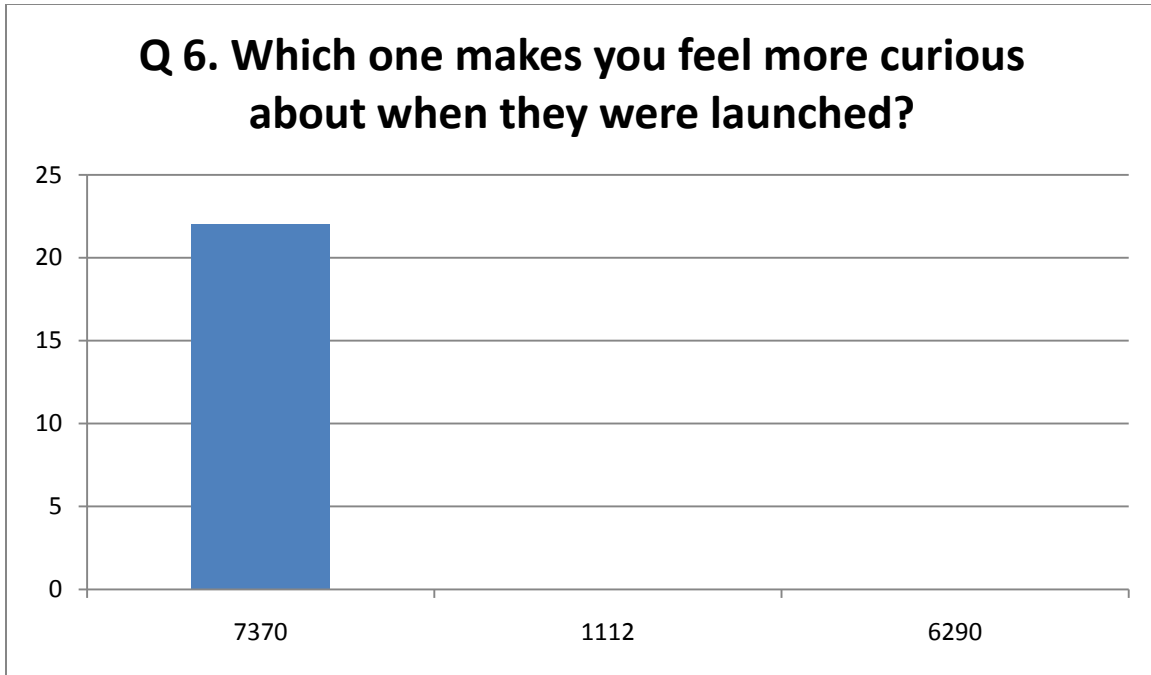
50% of the subjects think Nokia 7370 is the most functional one. The subjects chose Nokia 7370 among the others think swivel feature added extra functions to the product, and make them feel it have more control power. However, some subjects also responded that even though the swivel features added functionality, it is not related to the main function of cell phone at all. These responds indicate that the playful element, control, should attach to the main purpose of the functionality. So for follow up researches, I would choose playful products whose control element is more related to the main or original functionalities of the product. Except that, the question should be more precise regarding “control” than just describe the idea it as more functional.



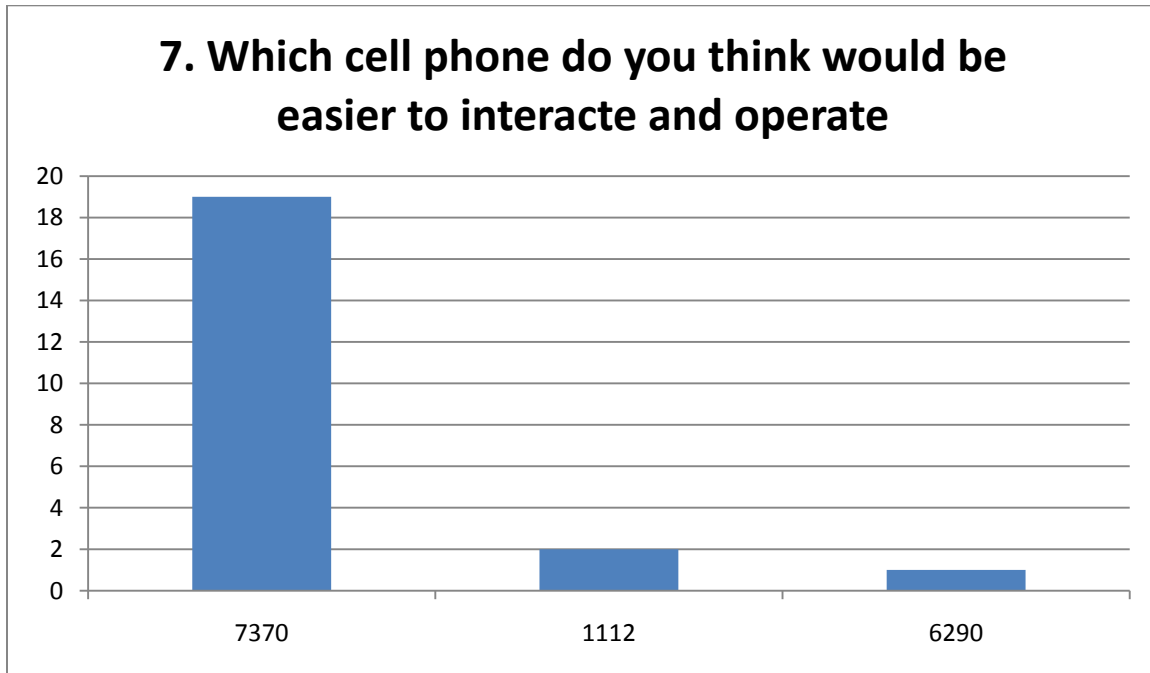
Since most of subjects have experience of interacting with Nokia cell phones, most of them can give direct answers about which one is actually easier for operate. The result does not quite fit in with the Likert scale analysis. Again, it indicates that the playful feature should fit in with the functionality purpose in a practical way.



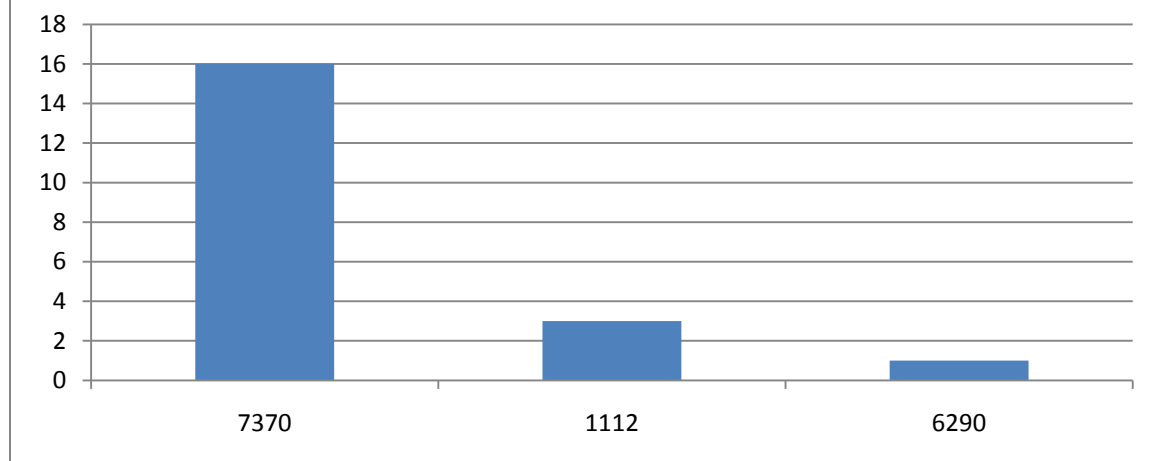
Looking at the answers regarding which phone is more fun, the results show that most people think Nokia 7370 is more fun and playful than the others, which means the overall evaluation or feelings of playful among users fit in with the way we evaluate how playful the product is by the Likert scale.



As can be seen in the results for question six, all respondents think 7370 has the curious element.



8. If you would choose one of the one of these cell phones, which one would you choose?



Looking at the questions seven and eight together, most people would choose to use the playful phone compared with the others. As for explaining why to question 8, answers are like :“7370, it's easy for me to operate and its appearance is beautiful. It's more important that it makes me feel more curious than others when it was launched and it's more functional.” “7370. I like it because of impressive appearance.”” 7370, I like the colorful pattern in, and I like the way it rotates, it seems have more function than the other two.” 7370 since it is not rigid from appearance, considering colorful body, delicate texture and romantic background.

This result shows that even though the playful one, —Nokia 7370 does not rank the best in functionality, but user would still choose it, which means, playful have some values in addition to functionalities. Related to the pleasure cake analyzed before, the reason might be that

playful could bring user pleasant feelings during the user product interaction, provide more values to the end users.

Note that the rule and control elements should be incorporate to a moderate level, instead of its maxim. Due to the problem caused by over complexity.

4.1.3 Conclusion

For the preliminary, 22 answers from participants (ages from 20 – 25 years old, as self-reported) has been collected. Through this test, the six elements of playful have been evaluated and verified. Potential benefits of playful have been explored as well.

Comparing these three cell phones, most subjects think Nokia 7370 is more playful than the others. Among the six elements, most of the participants think the most playful one – Nokia 7370 fits in with the description of fantasy, sensory stimuli, curiosity, control and rule elements, the only exception is challenge. As this thesis discussed before, the challenge elements – which is an indication of the complexity or difficulty – should be controlled in a desirable level, neither too difficult nor too simple. This point of view will be tested and verified in later research.

At the end of the survey, most subjects expressed that they would choose Nokia 7370 among the three. All three cell phones: Nokia 7370, 1112 and 6290 are all released in 2005, and none of them are smart phones. However, Nokia 7370 is more accessible than Nokia 1112 in today's cell phone market. There are few websites that we could buy Nokia 1112 and 6290 anymore while Nokia 7370 is still accessible in many websites. Mainstream online stores such as Amazon are still selling Nokia 7370, rather than 1112. Besides, the reviews of Nokia 7370 shows that Nokia 7370 still gets high evaluations. Many began to use it when it is launched and still use it today.

As a conclusion of this survey, the six elements theory fits in with users' feeling of playful for the most part. However, the result of the question based on challenge element

indicates that we might use challenge element more carefully—it should be controlled in a desirable level.

4.2 User Research conducted in Kohler Design Center

4.2.1 Goal and anticipated outcome of this research



Figure 4.2-1, Carbon faucet and flipside showerhead.

The goal of this survey was to examine the six playful elements in product design, and further explore the relationship between playful and functionalities. This research used the Carbon faucet, flipside showerhead and some other showroom products from Kohler. How the six playful elements can be applied to product design will be tested in the research. The value of playfulness would be further discussed and compared with pleasant user experience.

4.2.2 Method description

Based on the research result for Nokia cell phones, a survey was developed for subjects that interacted with actual products. Utility products were chosen for this portion of the research. The chosen products were faucets and showerheads – products generally considered to be utilitarian. Questions were modified to fit the existing product features.

Research on Karbon faucets was conducted in Kohler design center, which is a public place of displaying Kohler products, customers would come to design center, comparing the products before the make the purchase decisions.

Observations, interviews and questionnaires are the methods used for this research. Printed out questionnaires will be delivered to subjects and were collected once after being filled up.

Subjects include the workers in Design Center as well as customers of Kohler products. Opinions of workers in Design will be collected in the form of informal interviews. Formal surveys including interviews, questionnaires, and field observations will be conduct in the Kohler Design Center.

Research on Kohler products happens in two zones. In zone one (Figure 4.2-2), faucets are fully functional and can delivery water, there are eight faucets, four on the left have no extra functions, counted from the left, the fifth one to seventh, have pull down functions, and the last one, Karbon, have the most position controls. Matter black is relative new compared with silver color of chrome finish. Interviews were conducted in this zone. While in zone two (Figure 4.2-3), only position adjustments are available.

Similarly, the survey of flipside showerhead happens in shower display zone (Figure 4.2-5). Each showerhead is displayed in separate showroom and is fully functional – users can both adjust the positions of the showerhead as well as the way it deliveries water.

People working in design center, including front desk personals and cleaners, would be asked some questions about the products, for ten minutes each person.

Then users would be observed when they are looking at and trying the products, records were made of their behaviors toward the products. Then follow-up questions would be asked in interview format, each interview take about 15 to 20minutes.



Figure 4.2-2 Faucets display zone 1

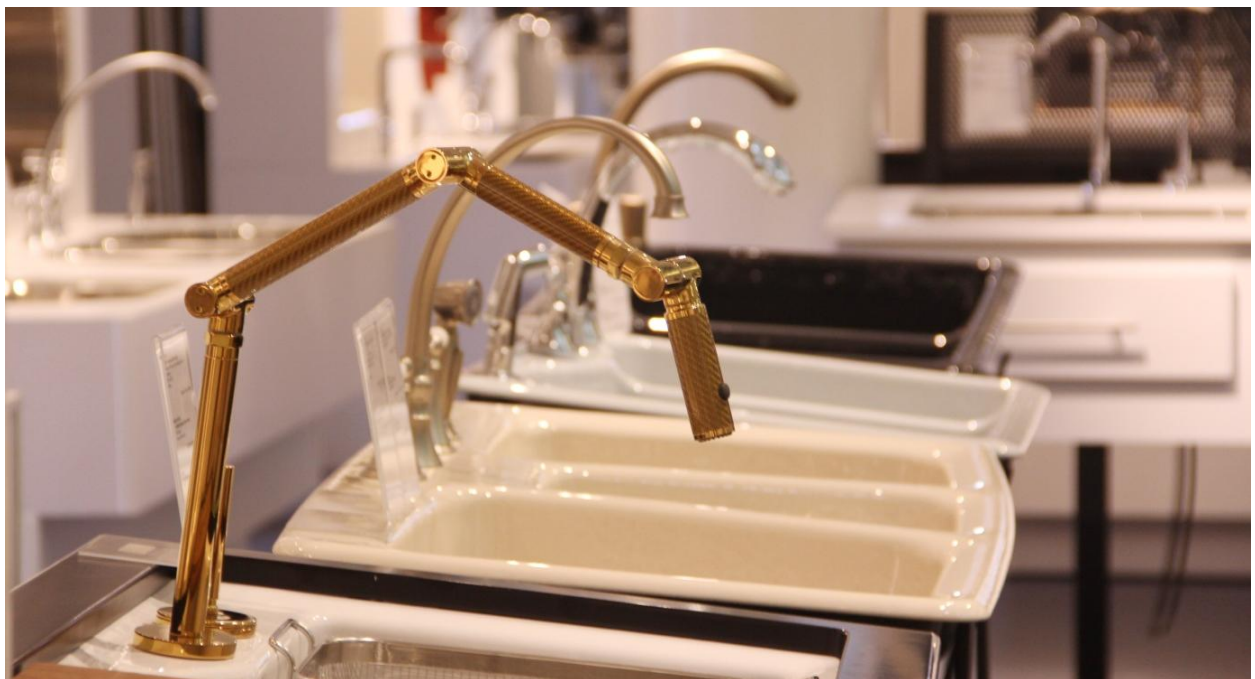


Figure 4.2-3 Faucet display zone 2


Name	Torq®	Parq®	Essex®	Purist®	Simplice®	Forté®	Elate™	Karbon
Additional features	N/A	N/A	N/A	N/A	Pull-down	Pull-out	Pull-out	Height and position adjustment; Unique shape; Karbon material
								

Figure 4.2-4 Faucets list



Figure 4.2-5 shower head display zone

Each playful element of these faucets can be evaluated in a likert scale from 0 to 2 as the chart showing below (0 stands for the product does not have such feature, 2 stands for the product fits in with this feature quite well. 1 means for certain degrees, the product have such feature). and the overall playfulness could be calculated.

Playfulness of faucets in Kohler Design Center								
Name	Torq®	Parq®	Essex®	Purist®	Simplice®	Forté®	Elate™	Karbon
Fantasy	0	0	0	1	1	1	1	2
Control/confidence of use	1	1	1	1	2	2	2	2
Rules	0	0	0	0	1	1	1	2
Sensory Stimuli	1	1	1	1	1	1	1	2
Curiosity	0	0	0	0	1	1	1	2
Challenge	0	0	0	1	1	1	1	2
Overall playfulness	2	2	2	4	7	7	7	12

Figure 4.2-6 Faucets playfulness evaluation

According to this chart, Karbon has the highest playfulness level, the ones with pull-down or pull-out features are next to it, and are of the same playfulness level. Purist is in between playful and non-playful ones—Torqu, Parq, Essex, Purist, faucets with basic water delivery functions.

The questionnaires are designed in two levels. The first level is an overall feeling which users' have about the faucets, the other is a more detailed feeling analysis. The questions are as following:

Q 1. Among these faucets, which one catches your first attention, Why?

By asking question 1, I was trying to test if the product (Karbon faucet) contains visual stimulations. Because stimuli come first when we observe things, it's usually the first strong impression objects give to us, and is instinctive. So I put this question in the first place to get more real and original feedback. A by-product of question is that the answers would also show if a playful product would be more attractive.

Q 2. Among these faucets, which one do you think is the more special and innovative?

Question 2 tests for fantasy element. Since the users might misunderstand the adjective word of fantasy, words such as futuristic and innovative are used to describe it.

Q 3. Which one do you think makes you feel more comfortable or confident to control?

Question 3 tests for the control element. As discussed before, usually the more functions the products have, the more control people would feel about the products. There are three kind of faucets here according to the functions they have: the basic one, the one have pull-down features, and multi-position adjustments.

Q 5. Do you think this one if fun?

Test to see the overall product definition is playful or not, and also guide people to look at the Flipside showerhead and Karbon Faucet.

Q 6. Do you feel curious when first saw the product?

This question tests for curious element.

Q 7. Do the Karbon faucet provide an easier way (or an indication) for operating (rule)?

This question tests for “rule” elements, which stand for way of manipulating or interact with the product as far as product design is concerned.

Q 8. How do you feel about this flip-side shower head emotionally & physically (sensory stimuli)? Does it recalls something familiar in your memory?

Q 9. Would you feel too complicated to operate the flip-side shower head? Do you still like/dislike? Test about challenge.

Q 10. Which one would you buy if they are of similar price? Why?--To see if they would choose playful one based on similar functionality

Questionnaires of flip-side showerhead are similar to Karbon faucet. And there are three kinds of showerhead in display: The flip-side shower head; the dial one; and basic one.

There are three kinds of showerhead there, sorted by the functions, one just have the basic functions of letting water turns on and off, one have dial feature so users can spin the rim of the showerhead to change the water mode, and the last one have flip feature so users can change the water mode by flip it.

4.2.3 Overall Observations

During my time of survey, I walked between the faucets zone and showerhead zone. Almost each time I go back to the faucet zone, the Karbon changed to another position. Some people hold the faucet, and pretend they are using a speaker(Figure 4.2 -7).



Figure 4.2-7 Overall observation

4.2.3 Feedback from workers in Design Center

There is only one cleaner working for the Design Center, 30-40 years old, female, she worked there for about 17 years. Four people work in front desk, all female. Informal interviews with the cleaner as well as two of the front desk have been conducted.

According to the feedback from the people work in the front desk of design center, most customers would stop in front of Karbon faucet, both in zone 1(Figure 4.2-1) and zone 2(Figure 4.2-2). No matter if they like the faucet or not, they would usually try it. The feedbacks usually go to two extremes, they either really like it or hate it.

There are usually more young people asking for Karbon faucets, but there are also some people 60-70 year old really like it. According to the front desk, one woman, around 70-year-old, express strong likeness of Karbon faucet, and come to design center, go to front desk, directly ask for Karbon faucet.

“This is through me,” claimed the front desk,” she loves it so much, and saying it’s so special and want one.” And she also looks for a sink matches with the faucets.

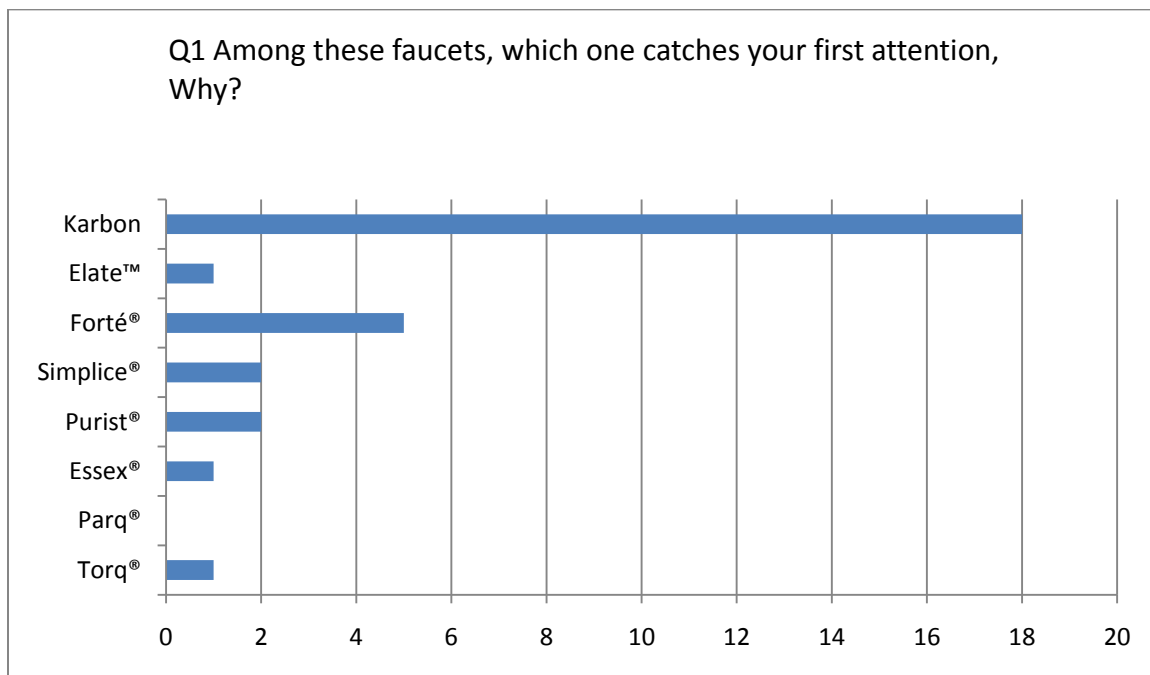
“I showed her the little problems we have with the faucet, but she said it’s not a big deal and she don’t care”

According to the cleaner -- who works in design center every day, and cleans up the stains once after customers leave -- there are a lot of customers play with Karbon faucets, turning the joints, and change the positions. And she feels really surprised when she first saw Karbon faucet, because it is too special, almost like a speaker. Personally, she is not a big fan of Karbon, because she feels the Karbon faucet is too tight for her. But she thinks it is special and unique.

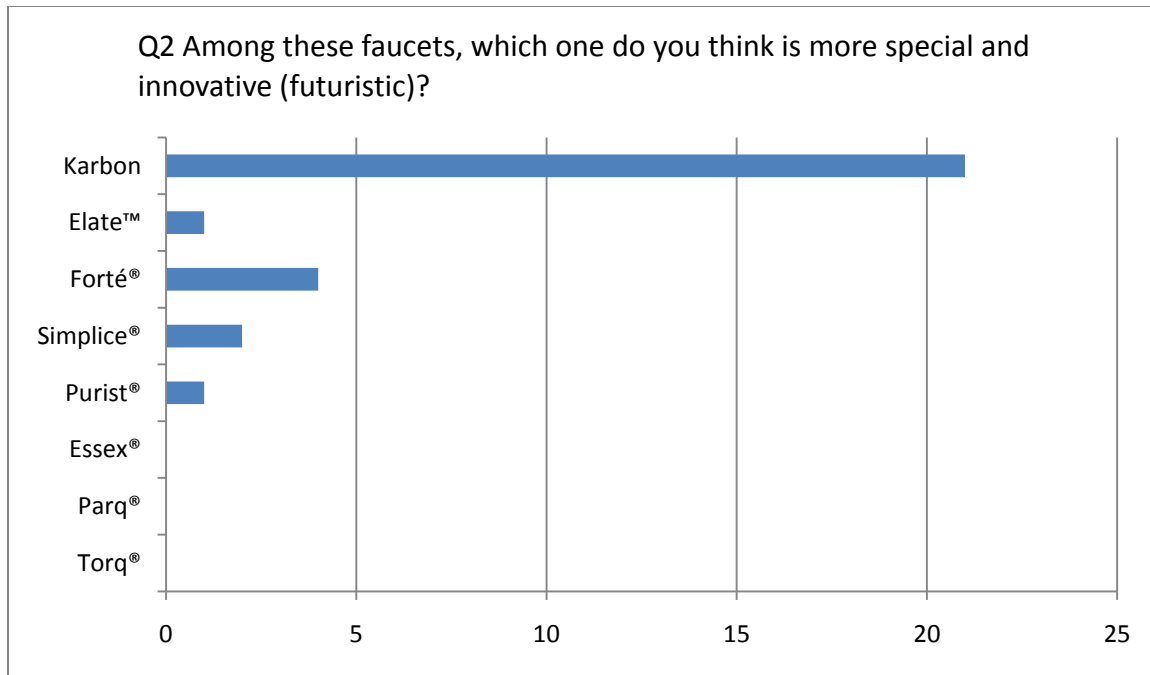
As for showerhead, the cleaner in Kohler design center reflects that she has to clean up the floor in front of flipside showerhead more often than the others. She stated that two of all the showrooms have to be cleaned more frequently, and the showroom with two flip-side

showerheads are the worst. She thought that is because more people are playing around with the flip-side shower head.

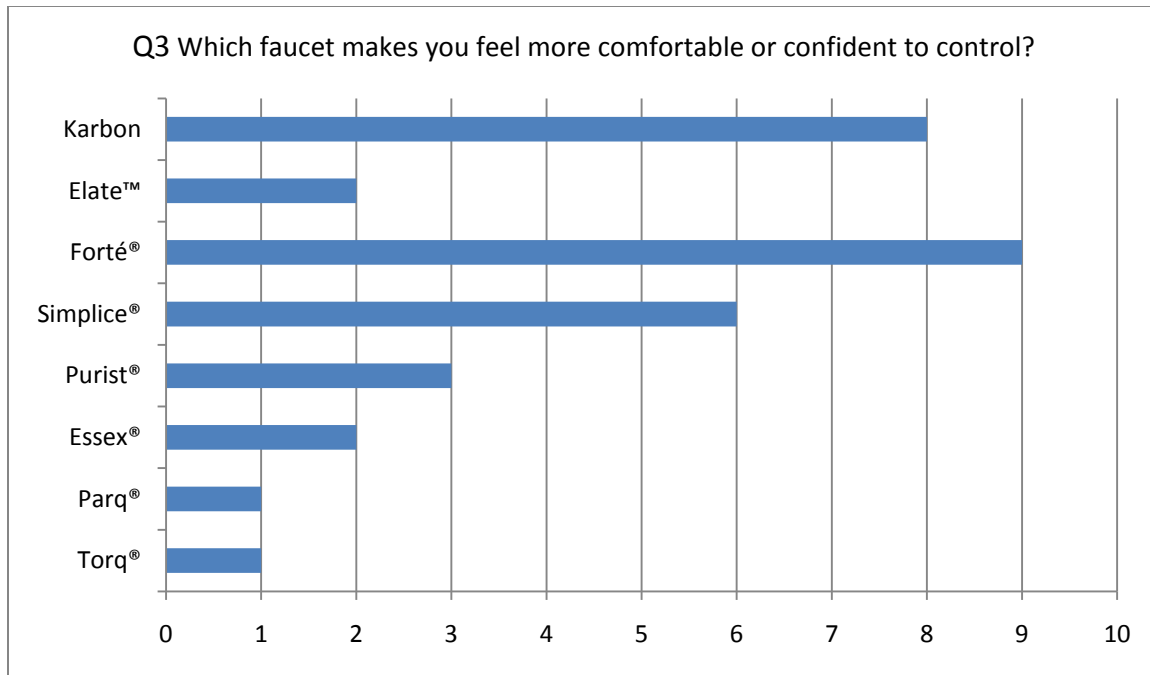
4.2.4 Data analysis of Karbon Faucet



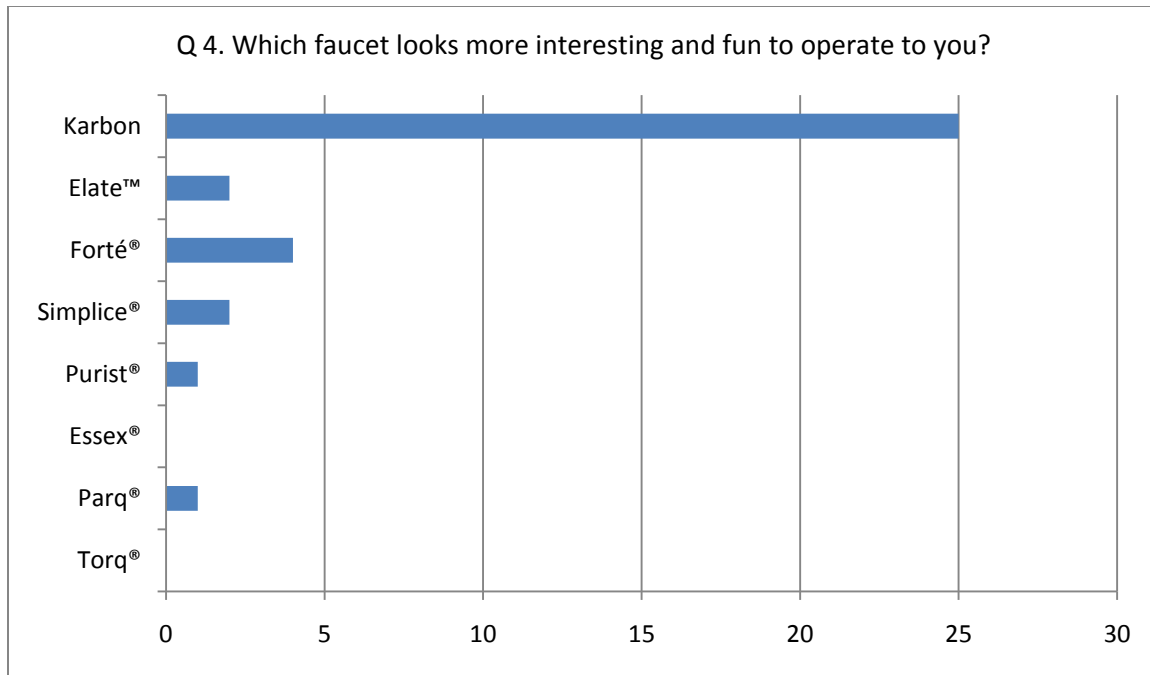
The result of first question fits in with the “playfulness evaluation” result(Figure 4.2-3). Most people think Karbon—to be the most playful one according to the evaluation—is more attractive or eye-catching. And the ones with pull-down or pull-out features also get some attention. There might be certain aesthetic preference, but there is no doubt playful features are eye-catching.



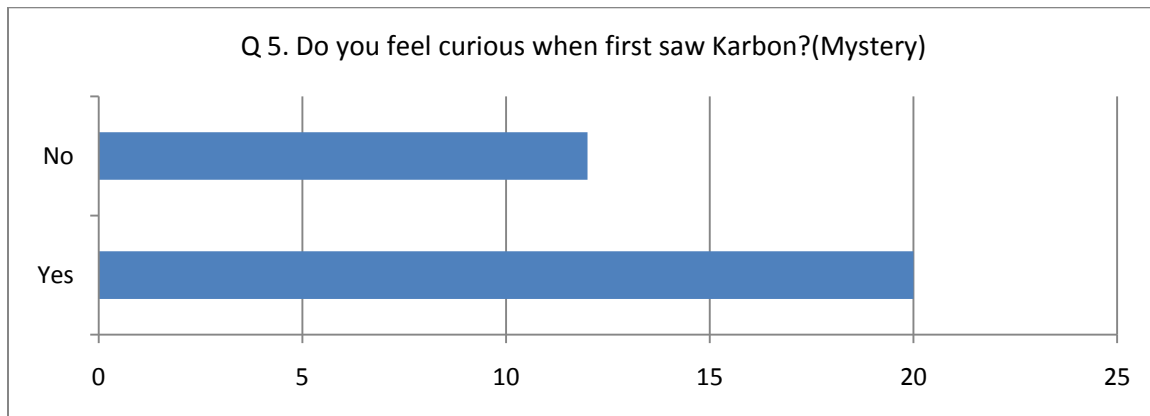
The result of this question also approves that people gives high evaluation of fantasy on playful products. Subjects would use words such as “futuristic”, ”special”, ”unique” to describe their feelings towards Karbon faucet.



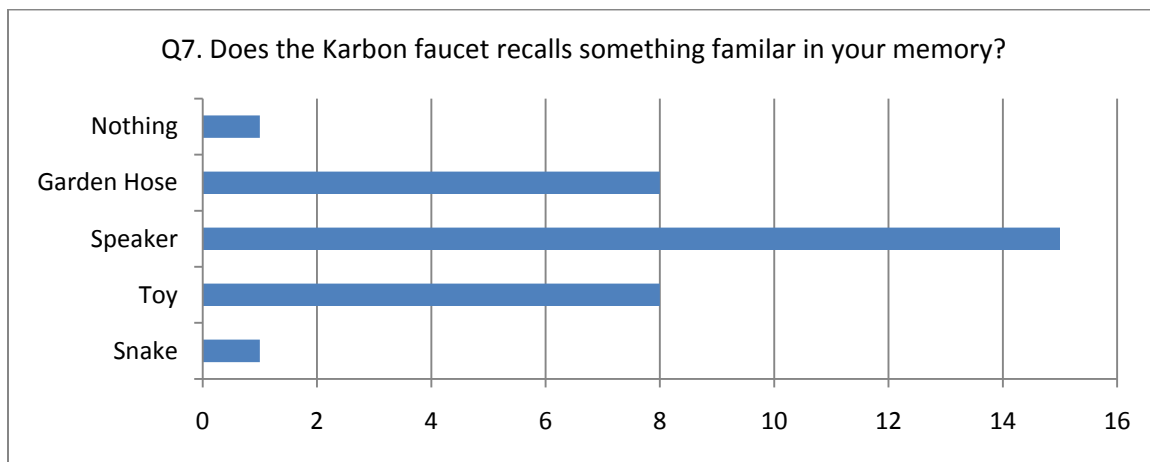
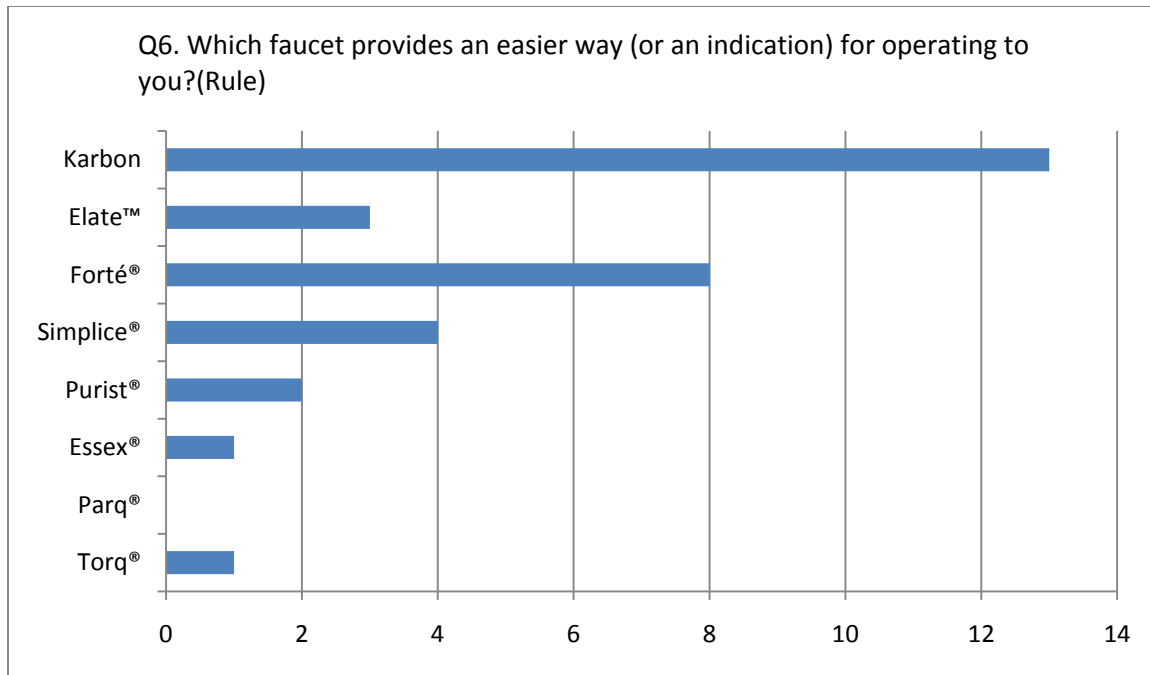
Karbon does not ranking the highest in control element, even though it has more position controls than the others. Instead, Forte with pull-down features get the highest ranking. Some subjects explain the reason like "Karbon is a little too much", or "it functional, but not as practical as Forte" et al. The survey did not exclude or identify people by age, nonetheless, some differences in response were identified in this questionnaire, most of the young people, ages from 20-25 think Karbon give them more confidence to control, while elders think Karbon is a little too complicated. This result indicates control element should be controlled in a desirable level, based on the requirements of users.



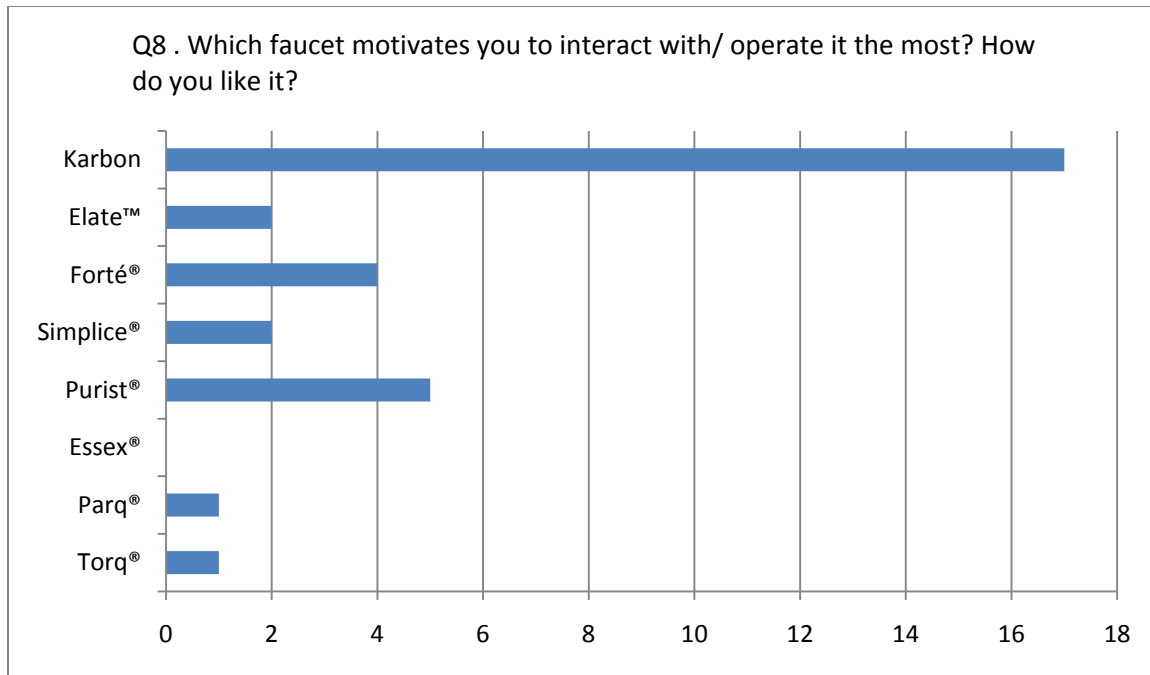
This question tests for the overall evaluation of playfulness of the products. The result of this question fit in with playfulness evaluation likert scale.



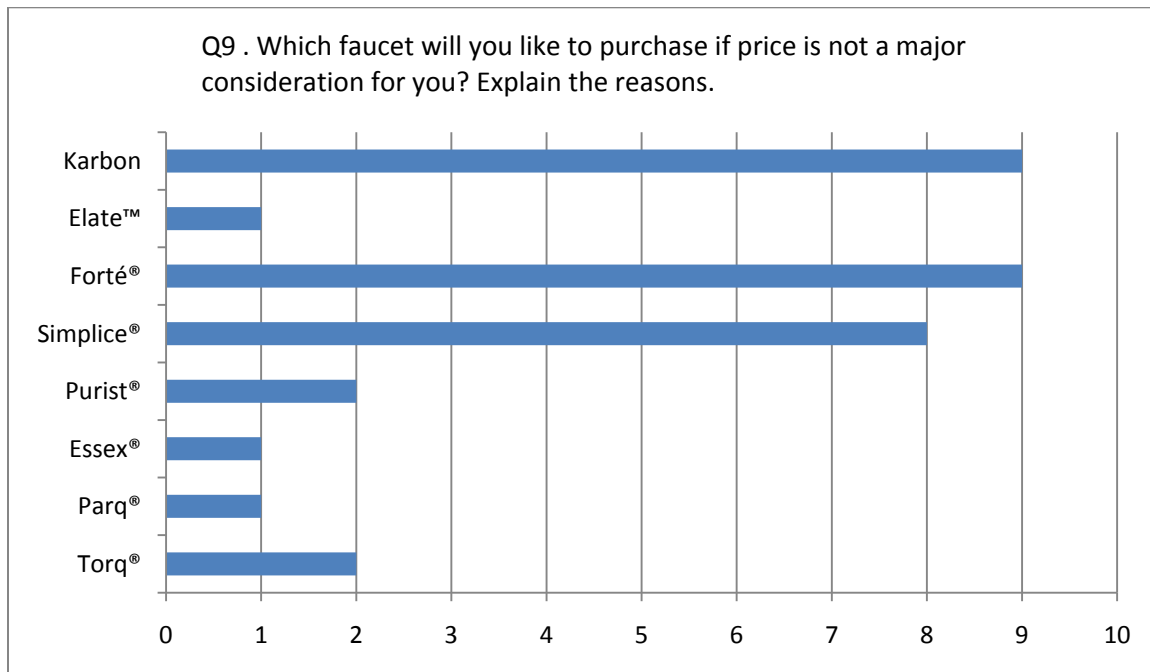
Subjects are curious about how Karbon works, because they think it's new and different. And want to figure out how to use it.



Subjects think Karbon faucet looks like a speaker or toy. Based on the knowledge of how to play with the toy, they would easily get how to use the faucet.



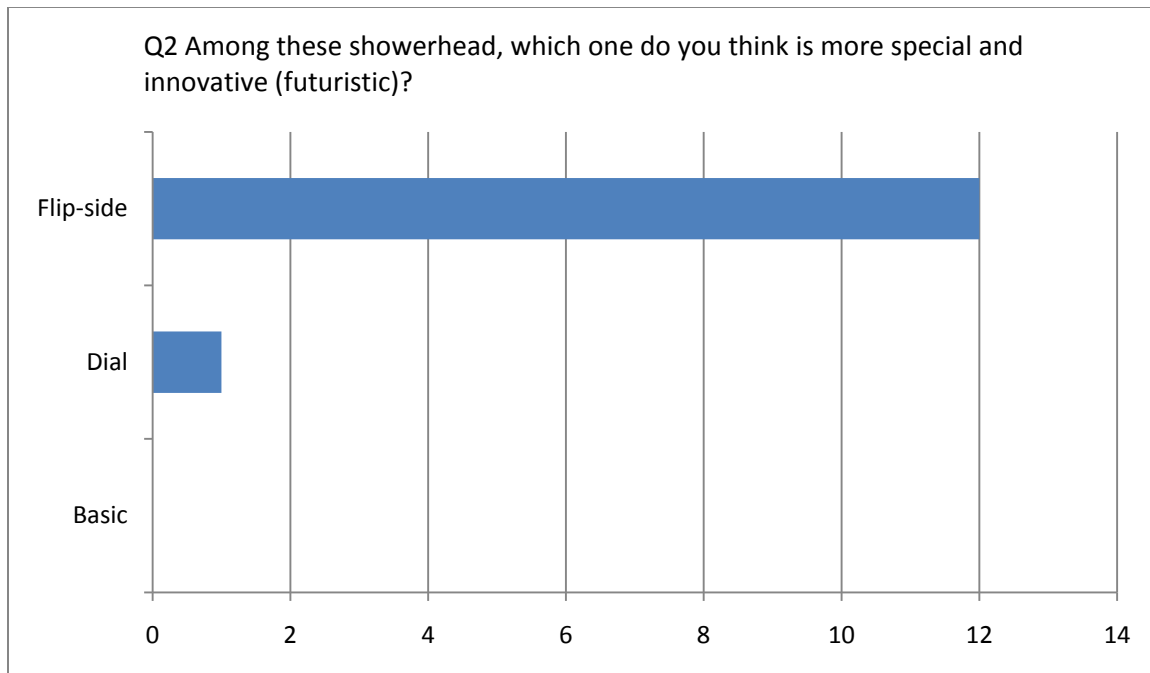
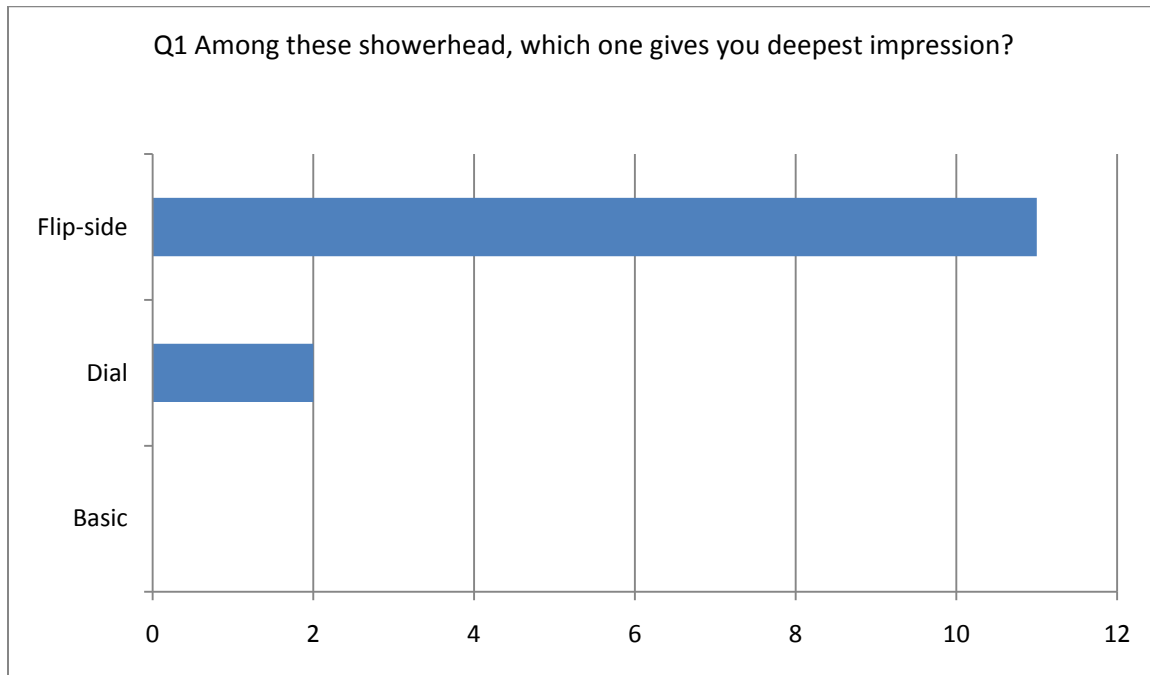
This results also fit in with the observation. People would spend a more time to try and play with Karbon.

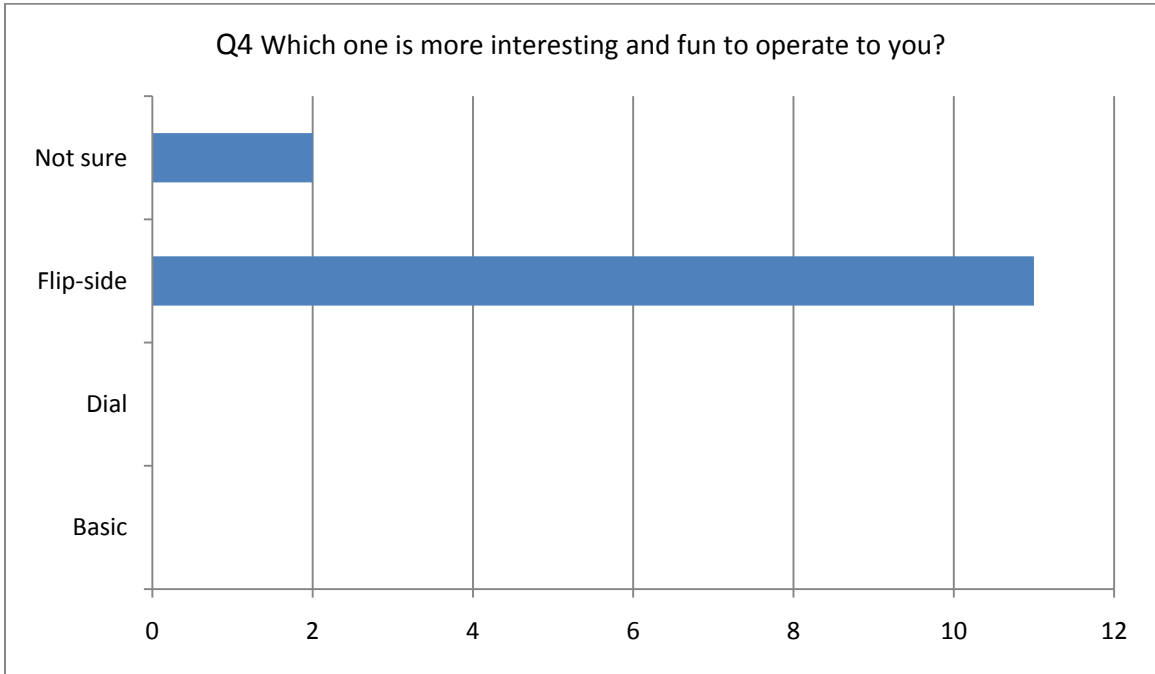
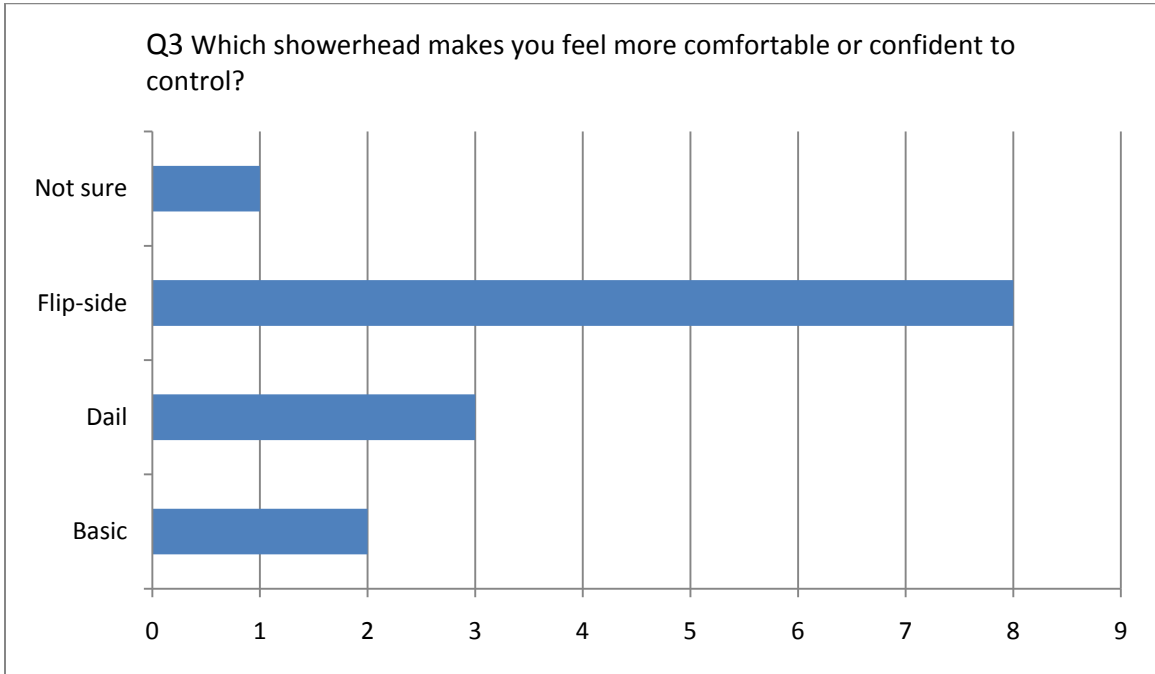


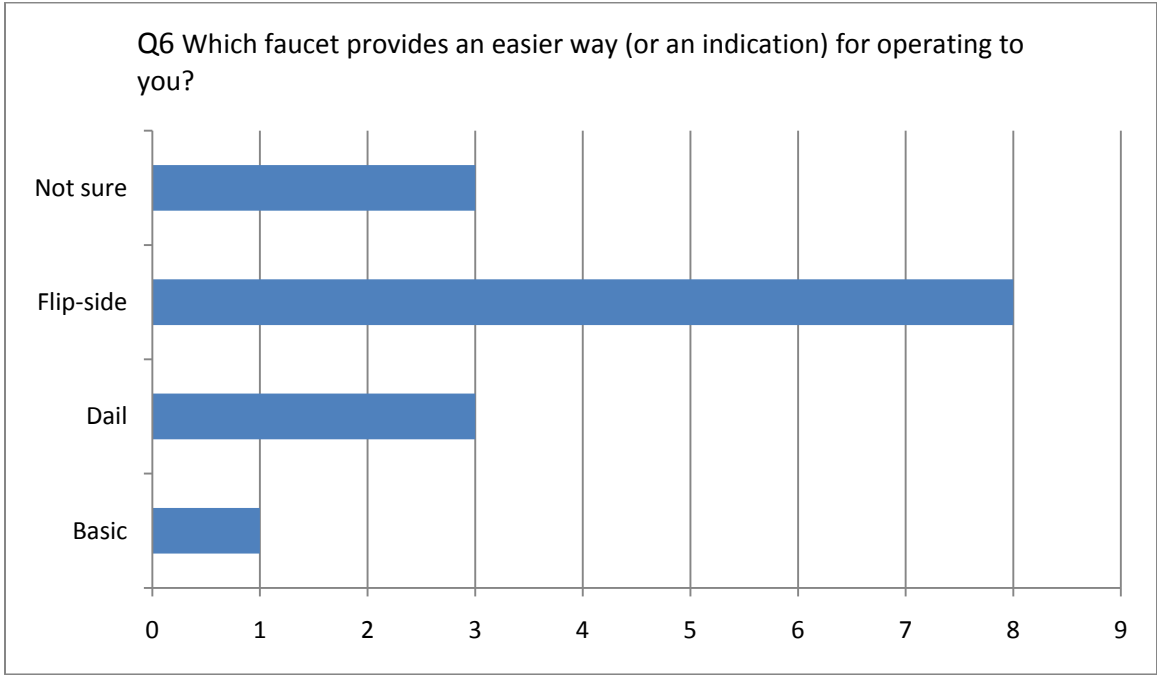
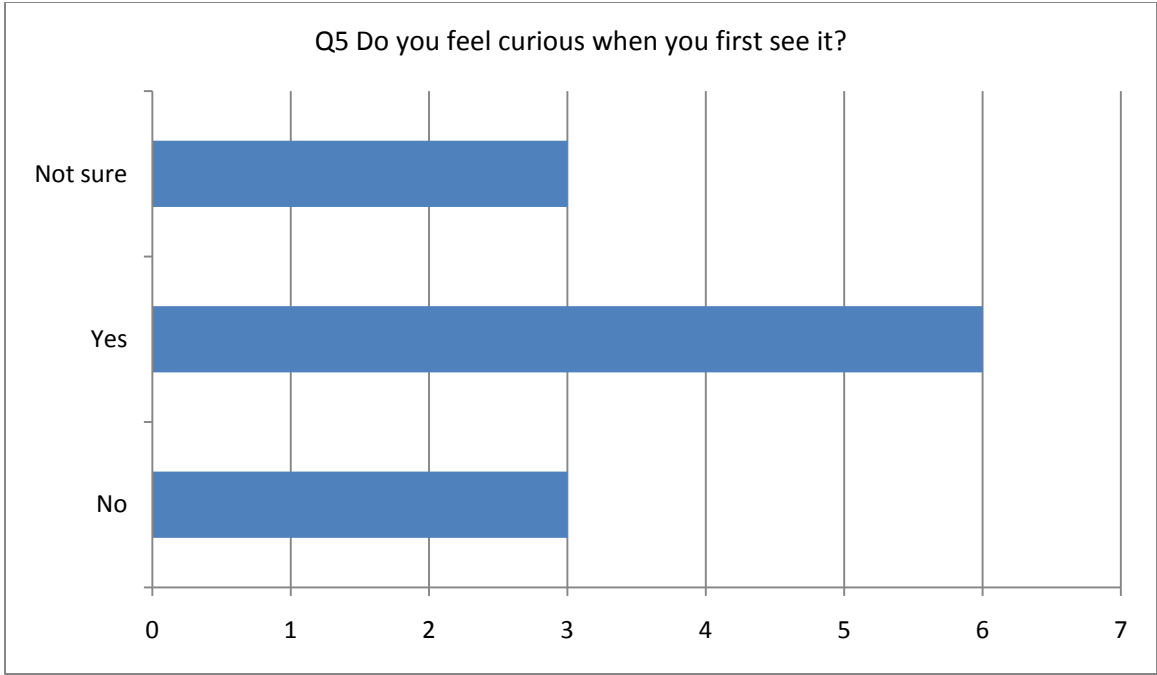
Still, most young people would choose Karbon while elders may think it's a little too complicated.

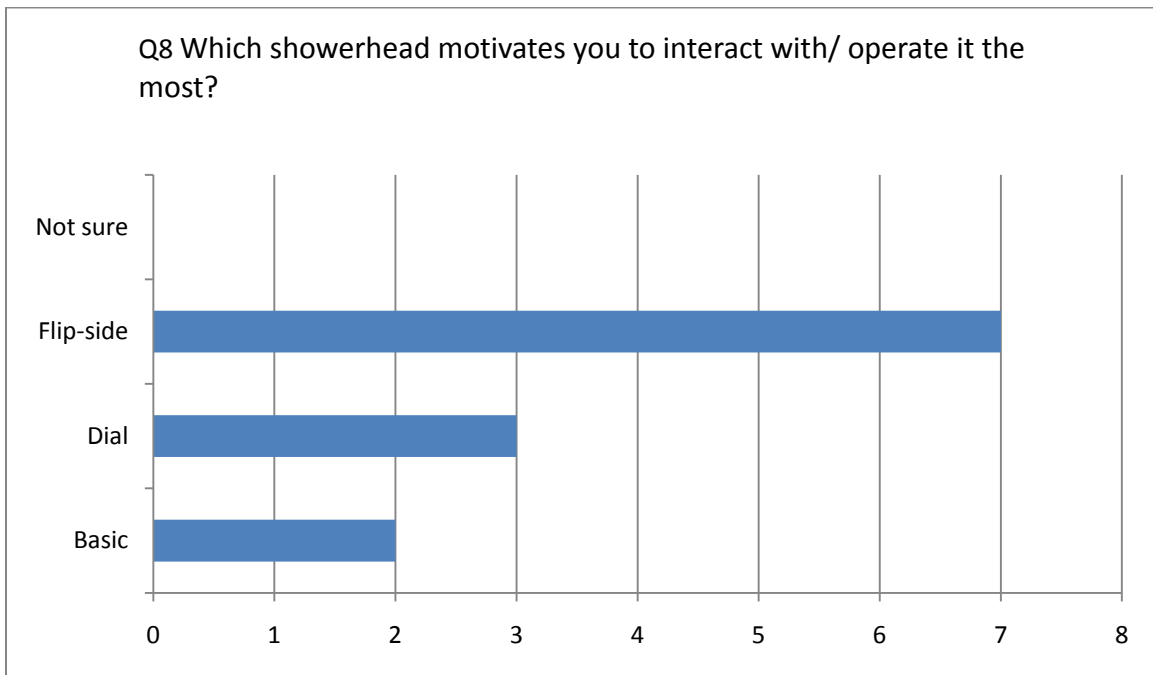
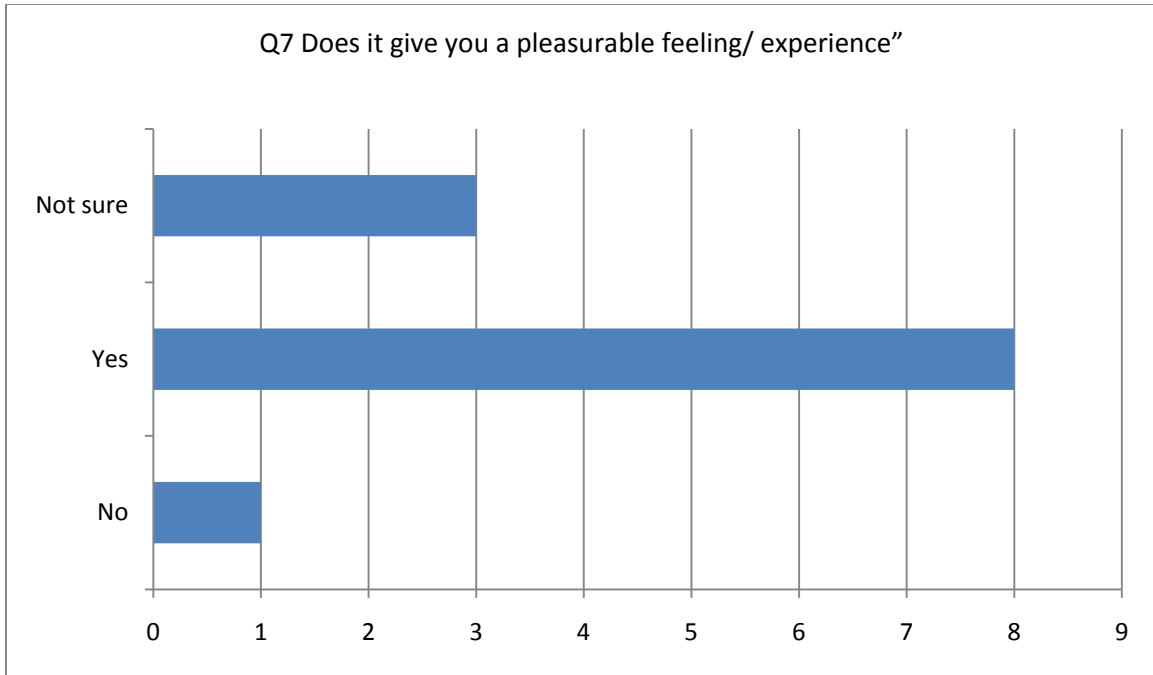
The result shows most customers think Karbon faucet is eye-catching(stimuli), futuristic(fansy), make people curious, encourages interaction, and commonly accepted as playful. However, the opinions about level of challenge various. According to the survey, customers older than sixty tend to think it's "a little too much", "it would be good for the younger generation, but I am old". While teenagers and young people shows strong interesting and likeness of Karbon faucets.

4.2.5 Data analysis of Flipside showerhead











The result of survey on flipside showerhead shows that most of people admitted it's new and playful. Comparing with the six elements, they think the flipside showerhead fit in with all the six elements – fantasy, control, rule, sensory stimuli, curious and challenge. Different from Karbon faucet, the test for challenge and control elements is more successful on flipside showerhead: most subjects think it's more functional even though they do not actually uses all those functions. The explanation for that is most subject think Karbon faucets is more complicated than they expected, while flip-side showerhead, with high evaluation of playfulness, is easier to use. This proves the hypnosis that the control and challenge elements of playful, should be controlled in certain level.

5. RESEARCH ANALYSIS

5.1 From the perspective of end users

According to the results of research in Kohler design center, playfulness could catch people's first attention and stimulate their interest. Users would naturally become curious and interesting toward playful product. In this way, it is easier for them to accept the product and the functions attached to it. The plenty of interactive features in high-tech device is one of the proofs.

Well designed playful product also serves its function better, and help people to complete the work in a pleasant way.

According to the feedbacks from Nokia swivel users, we can see that a high percentage of users still think that Nokia 7370 looks new, compared with the other cell phones without any playful features which are also launched in 2005. Most of users in this survey choose Nokia 7370 among 1112 and 6290, because they think it looks "different", "not that dated" and "fresh". This result indicates that product with playful features do have the value of maintaining the freshness of products. In addition, the selling conditions and reviews online, show that Nokia 7370 have longer life cycle compared with other basic phones.

From the standpoint of users, it's a common sense that they want to purchase more valuable things with the same price. This value could be instant value like high technologies, but

could also be long time values like emotions and the playfulness described in this thesis. With longer freshness, the products are kept longer, which invisibly increases the value of products.

According to the interview about the flip-side showerhead, most people feel really surprised to see the price, and they think it should be more expensive than the other showerhead. Which indicates they tend to think products with playful features are more valuable.

5.2 From the perspective of industrial designers

As designers, we want our designs to be noticed and remembered, in a good way. Affected by the “cute products”, designers and users mistook playful design language as something shallow and not functional. The study of this thesis makes a distinction between “cute products” and playful product. According to the analysis before, cute products only fits in with one feature of playful—visual stimulation, and failed with the other five. Therefore, they are not really playful products. Real playful products do serve the purpose of catching attention, but they are also functional.

According to the designer of Karbon faucet, when he first came up with the idea, there were not too much concern about the appearance. The original idea is a new way of control and delivery water. Again, it approves that playful is not a shallow form-giving process.

There are different aesthetics designer could use to interpret playful in products design, but the inner features of these playful products are similar—they are something new and special.

On the other side, designers want our designs to last long. Time is also widely accepted by designers as a standard to evaluate if a product is “good” or “bad”. From the analysis above, playfulness can serve this purpose. Playfulness gives users the feeling of longer freshness, even time passes by, the basic functions are changing with the development of technology, there are still something about playful links people to the products they have.

5.3 From the perspective of manufacturers

Playful products are attractive, the results of all these three surveys all indicate such conclusion. According to the research on Karbon faucets, no matter whether people like it or not, the admitted it’s the most eye-catching and interesting one. In addition, all the young people in this survey—younger than 30 years old, especially teenager, love it.

Eye catching will definitely be helpful to sell a product. It might not be sufficient to form a purchase point, but would open more chances for getting users to engage with the product.

Playful design language can also make the function easier to understand, according to the judgment about the flipside showerhead such as “it(the product) speaks for itself”, “I don’t need a brochure(to illustrate the function)”.

Norman(2002) puts that:“When simple things need pictures, labels, or instructions, the design has failed.” On the other hand, if complicated things needs no pictures, labels, or instructions because of thoughtful design, it’s a successful design. From this point view, playful could be applied to high-tech product design, the function of which is usually more complicated.

Long lasting features might not seem as beneficial for the purpose of selling. However, it would be helpful to build up the loyalty of a company. The unique, and specialty would distinctive the product from the others. It could be iconic product of a company, like Karbon faucet.

6. CONCLUSION

This paper presented the framework of playful product design, based on the theory of pleasurable experience presented by Korhonen et al(2009). Through the study of playful elements on design products, the criteria have been simplified and developed to six playful elements, which is being verified and applied for product design in this thesis. In order to validate the six playful elements theory, experiments are conducted through online research for Nokia cell phones (preliminary test) and interviewing Kohler costumers (physical test which the human—product interaction is revolved).

As a conclusion to this preliminary test, the six playful elements – fantasy, control, rule, sensory stimuli, curiosity as well as challenge have been tested. Except the challenge element, all the other elements fit in with users' feeling towards playfulness. According to the respond, challenge is should be controlled to moderate level – neither too difficult nor too easy. This point of view is proved in later researches on Kohler products.

As far as the physical test of Kohler products is concerned. The result shows most customers think Karbon faucet is eye-catching(stimuli) and futuristic(fantasy); they are curious about it, and would like to interact with it. The Karbon faucet is commonly accepted as playful. However, the opinions about the level of challenge vary. According to the survey, customers older than sixty tend to think it's "a little too much". "It would be good for the younger generation, but I am old" one of the participants said. While teenagers and young people show strong interesting and likeness in Karbon faucets. Later research on Flip-side showerhead verifies the issue about the level of challenge – it should be controlled in a desirable level.

Another purpose of this paper is to find out other benefit of playful products. In addition to the benefit mentioned before, playful design also brings long time freshness, according to this research.

The researches I conducted indicates the connection between playful products and pleasant feelings. Further researches can focus on establishing the connection or relationship between the “pleasurable cake” to the application of playful elements.

Even no similar theories have been proposed before connecting “pleasurable cake” with “six playful elements”, when comparing these elements of “pleasurable cake” with the “six fundamental playful elements”, several elements in common between pleasurable cake and playful elements can be found. A comparison between the pleasurable cake and playful elements is made as following:

Comparing the pleasurable elements with elements of playful

Pleasurable elements	Safe	Good construction	Be in Control	Good aesthetic	Good Touch, feeling	Good quality	Good usability
Elements of playful	Rules/Control	Rules	Control	Fantasy	Sensory stimuli		Rules/control

Figure 3.4-1 The comparison of pleasurable cake with six playful elements

Also a related research about Nokia 7370 has been conducted to test the prolonged freshness of playful product. Nokia 7370 is new and fresh compared with the other cell phones introduced about the same time, which would prove that playful features would keep the fresh feeling of products longer. The result is positive, with 82.4% subjects thinking Nokia 7370 looks fresher than the other ones launched in the same year. And 88.2% of users would choose Nokia 7370 among the three cell phones investigated (Nokia 7370, Nokia 1112, Nokia 6290). Because they think it's "special", "not that dated", "fresher", and "different".

However, playful design can keep the freshness of the product last longer, which is also shown in the result of a related experiment (See Appendix 1). The life cycle of the product might be extended by apply playful elements.

The benefits of applying playful design elements to products are beyond our expectation and should be considered by the designers and the manufacturers during the development design process.

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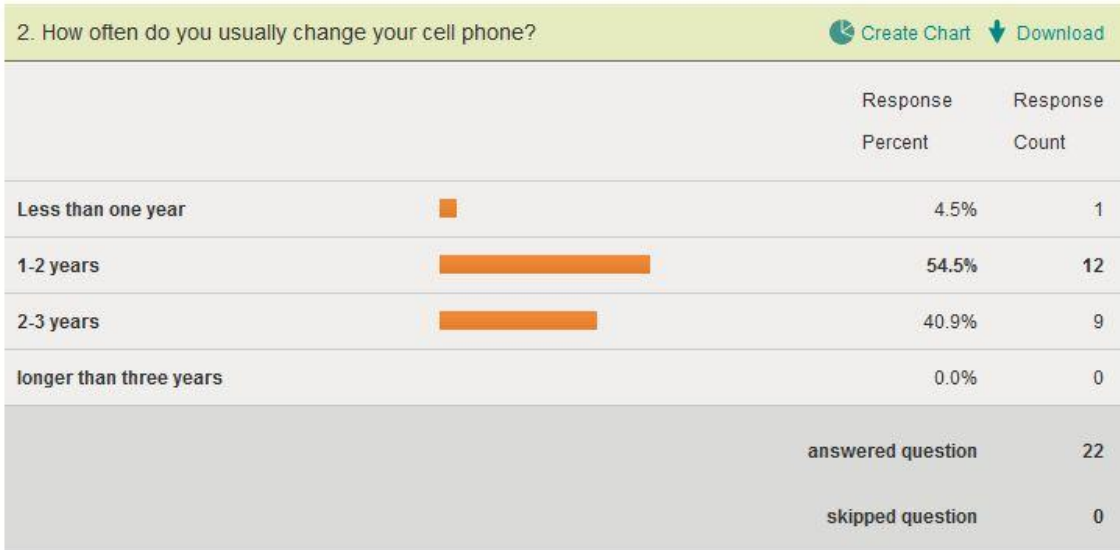
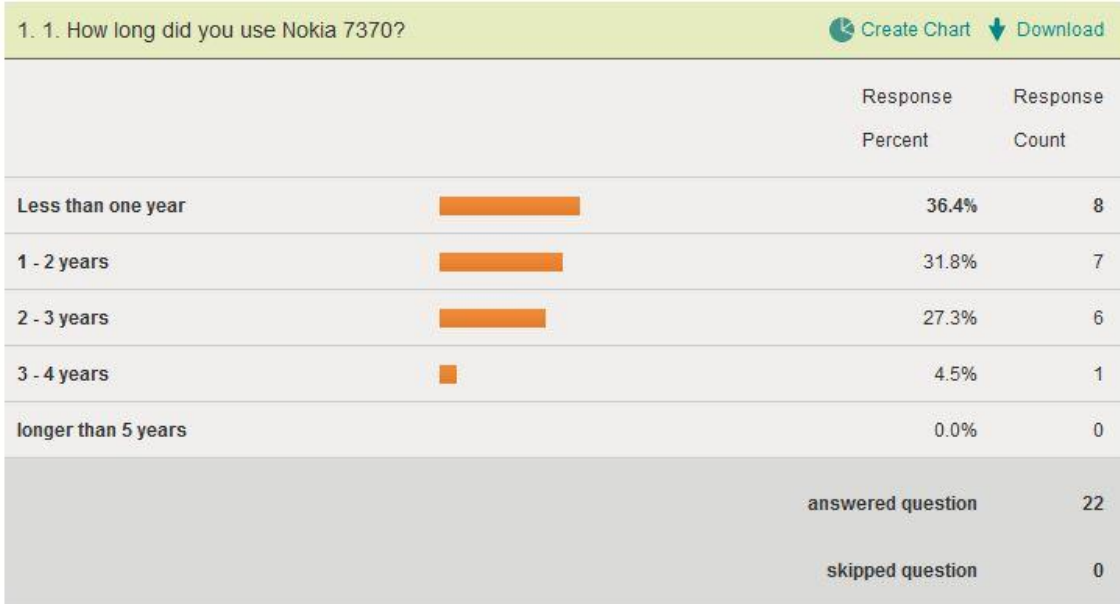
Appendix 1

Side online survey of Nokia 7370 users

Response Summary

Total Started Survey: 22
Total Finished Survey: 22 (100%)

PAGE: 1



3. Do you still keep it home?		Create Chart	Download
		Response Percent	Response Count
Yes		63.6%	14
No		36.4%	8
		answered question	22
		skipped question	0

4. (If yes to Q3) Why?		Download
		Response Count
		Show Responses
		12
		answered question
		12
		skipped question
		10

It may be of value.

10/24/2012 1:06 AM [View Responses](#)

I still use it some time and I don't know the right way/place to recycle it.

10/23/2012 9:07 PM [View Responses](#)

Don't feel comfortable throw away used stuff.

10/23/2012 8:22 PM [View Responses](#)

Don't know how to deal with it.

10/23/2012 8:15 PM [View Responses](#)

It is hard to sell used phones and it is waste of money to throw them away

10/23/2012 1:07 PM [View Responses](#)

Still have values

10/23/2012 9:01 AM [View Responses](#)

it looks better than others lol

10/23/2012 9:07 PM [View Responses](#)

It looks nice.

10/23/2012 8:22 PM [View Responses](#)

The color is special. And is not that dated.

10/23/2012 8:15 PM [View Responses](#)

. It looks fresher and the screen is larger. Actually I do not like the keyboard. The most important thing for the customer is the function and using style.

10/23/2012 8:12 PM [View Responses](#)

The other two are too normal and dated. 7370 still look kind nice

10/23/2012 8:08 PM [View Responses](#)



It's different




10/23/2012 7:53 PM [View Responses](#)

5. Compared with the cell phones launched in the same year, do you think it still looks fresh and interesting?

[Create Chart](#) [Download](#)

		Response Percent	Response Count
Yes		86.4%	19
No		13.6%	3
		answered question	22
		skipped question	0

6. Do you still want to have swivel features on you cell phone?		Create Chart	Download
		Response Percent	Response Count
Yes		27.3%	6
No		72.7%	16
		answered question	22
		skipped question	0

7. If you would choose one of the following cell phone, which one would you choose?		Create Chart	Download
		Response Percent	Response Count
7370		81.8%	18
1112		13.6%	3
6290		4.5%	1
		answered question	22
		skipped question	0

8. (To Q7) Why?		Download
		Response Count
		Show Responses
		19
		answered question
		19
		skipped question
		3

8. (To Q7) Why? Download

	Response	Count
Hide Responses 15		
<div style="display: flex; justify-content: space-between; align-items: center;"> Responses (15) Text Analysis My Categories (0) </div>		
GOLD FEATURE: Text Analysis allows you to view frequently used words and phrases, categorize responses and turn open-ended text into data you can really use. To use Text Analysis, upgrade to a GOLD or PLATINUM plan.		Learn More Upgrade »
Showing 15 text responses		No responses selected
It have some features.	10/24/2012 5:57 AM	View Responses
It looks good	10/24/2012 5:52 AM	View Responses
It looks better	10/24/2012 5:46 AM	View Responses
It's special	10/24/2012 5:45 AM	View Responses
It's a better design	10/24/2012 5:44 AM	View Responses
Better than the other two	10/24/2012 5:43 AM	View Responses
answered question		15
skipped question		2

Appendix 2

Questionnaire of Karbon faucet

Fantasy, control, rule, sensory stimuli, mystery, challenge

1. Among these faucets, which one catches your first attention, Why?(Test for visual stimuli of playful product)
2. Among these faucets, which one do you think is more special and innovative (futuristic)?(Test for the Fantasy element)
3. Which faucet makes you feel more comfortable or confident to control?(Test for the control element)? Which one is actually easier for you to operate?
4. Which faucet looks more interesting and fun to operate to you? (Test to see the overall product definition playful or not, and also guide people to look at the Flipside showerhead and Karbon Faucet)
5. Do you feel curious when first saw the product?(Mystery)
6. Which faucet provides an easier way (or an indication) for operating to you?(Rule)
7. Does it give you a pleasurable feeling/ experience"
8. Which faucet motivates you to interact with/ operate it the most? How do you like it?
9. Which faucet will you like to purchase if price is not a major consideration for you? Explain the reasons.

Appendix 3

1. Among these showerhead, which one catches your first attention, Why?(Test for visual stimuli of playful product)

2. Among these showerhead, which one do you think is more special and innovative (futuristic)?(Test for the Fantasy element)

3. Which showerhead makes you feel more comfortable or confident to control?(Test for the control element)? Which one is actually easier for you to operate?

The flip-side shower head

The dial one

The one has only one way of delivery water.

4. Which showerhead looks more interesting and fun to operate to you? (Test to see the overall product definition playful or not, and also guide people to look at the Flipside showerhead and Karbon Faucet)

5. Do you feel curious when first saw the product?(Mystery)

6. Which showerhead provides an easier way (or an indication) for operating to you?(Rule)

7. Does it give you a pleasurable feeling/ experience"

8. Which showerhead motivates you to interact with/ operate it the most? How do you like it?

9. Which showerhead will you like to purchase if price is not a major consideration for you? Explain the reasons.

Appendix 4

Interview 1:

Subjective 1: 30-35, male, job: quality control.

Q.1 Hi, among those faucets, which one catches your first attention?

The “Flip-side showerhead”, I saw it in product catalogue before I came here, and is really interested in it.

Q. 2 What makes you interested in it? The control or the look?

The way it flips(he opened the door, and begin to try it), yeah, that’s unique, and handy. The look is special as well.

Q. 3 Comparing all the showerheads here, which one do you think is more special kind futuristic?

The flip-side.

Q.4 Do you feel curious when first saw the product ? Did you want to try to figure out how it works?

No, it’s really obvious of how to use it. It speaks for itself.

Q. 5 Then do you feel this showerhead is more interesting and fun to operate compared with the others?

Yeah, this one is much fun, and it’s clever.

Q.6 Which one makes you feel more powerful or confident to control? Do you really use so many controls at home?

This one(point to flipside showerhead). Actually I don’t use four controls. I only used two water ways, the massage and the regular. What I have at home is the dial one here(point to another one), and most of the time, I don’t change the settings. But this one makes you curious. I can image people trying it for fun, they will try until they understand it. Then they will think about functions.

Q.7 Does this showerhead provide an easier way for you to operate?

Yeah. It's quite handy. But I feel the water pressure is not strong enough.

Q. 5 Does it give you a pleasurable feeling/experience.

(Thinking) It's definitely fun to use.

Appendix 5

Interview 2:

Subject 2: 50-60 years old, male, come with wife.

Which one is your favorite here? Why?

I like this #7, it looks different.

Then how do you think about this (point to Karbon)

This is a different faucet. It's very new modern looking, and has new material (touch the faucet), fiber glass?

Do you think this one is more fun or playful?

No, I think it looks hard to clean, looks like getting dirty very easily.

What's your job?

Chef.

So you don't like all these joints?

I don't think it's attractive at all.

This is neat, the joystick (trying it), which is hot or cold?

(After playing for a while) En, it's neat, I think this is cool.

Appendix 6

Interview 3:

Subject : An old couple, the husband is a plumber. 60~70 years old. When I approach them, they are looking at the Karbon faucet, trying to change it into different positions, and they look kind interested in it.

Q1: Hi, I saw you playing with the karbon faucet, does it catch your attention?

Yes, we saw some introduction from Kohler, and it looks special.

Q2: Do you like it? Why?

F: Actually not. It looks like garden hose. But the texture of the golden one is kind interesting.

M: It's beautiful, but it looks won't last long. You know, I want something would stay in my house longer than 5 years 10 years.

Q3: What makes you think this is fragile?

M: So many joints and connections.

Q4: Do you think the way it adjusts height and change directions of water coming out is playful?

M: No, I don't think so. It makes the faucet look fragile.

F: We had a sidespray at home, I prefer a sidespray, it's same function much simpler.

Q5: Would you buy it? Why?

M: No, it's too expensive.

M(still interested in it): does it sell well?

Me: The husband is actually kind into it, while his wife is not.

But the new way of gesture control actually scared him, which is supposed to be the playful part.

Appendix 7

Interview 4:

Subject: 40-45 years old, Female, come with husband.

Which faucet here catches your first attention?

The Karbon one, it's unique(begin to try Karbon faucet)

Does it recall something familiar in your memory?

It actually looks like timber toys. The ones you can move different parts and joints. That is cool.

It's functional, but not as functional as No.7. But the nice thing is you don't need to hold it there when you are filling a pot with water.

.....

(When they leave, husband talk to his wife:

You can use it as microphone

Yes, I should do that)



Appendix 8

Interview 5:

Subject: A girl 20-25 years old, come with two other boys, looks cheerful, open different doors to see the showerhead.

Questions:

Q. 1 Which showerhead here catches your first attention and what catches your attention?

The flip showerhead, and the “flip” catches my attention.

Q. 2 The three ways of control: dail, flip, and no control, which one do you think give you more comfortable and confident to control.

The flip showerhead, it's has a lot ways of delivery water.

Q. 3 Which showerhead provides an easier way for operating to you?

The flip one, you don't need brochure for it, it's really obvious how to use it.

Q. 4 Do you think it makes you feel have more controls or more confident to control?

Definitely.

Q.5 How would you describe the look of it?

It's modern, no, more futuristic than modern, yeah, it's futuristic. I like it.

Q. 6 Does it give you a pleasurable feeling/ experience?

Yes.

Q. 7 Would you possibly buy it?

Let me see the price. Oh, is it that cheap, I thought it would be more expensive. Yeah, I would buy one. Is that really the price?

Appendix 9

Interview 5

A couple, cheerful, 40-45 years old. The wife answered the questions.

Q 1. Which one of these faucets catches your first attention and why?

The Karbon. It's maybe not my favorite, but it's eye-catching.

Q 2. Among these faucets which one do you think is more special and innovative (futuristic)?

As for innovative, I have to say Karbon, it's contemporary and futuristic.

Q3 Which faucet makes you feel more comfortable or confident to control?

No.7 probably. The little pull down function is nice.

Q 4. Then do you think Karbon is a little bit too complicated for you?

No, It's functional but not as functional No.7 I think.

Q 5. Which one would you buy if price is not an issue?

No 7 I think. Karbon is cool for younger generation, but seems too contemporary for us.