Internet of Things on Quality of Life: Effects on Social Relationship, Leisure Time and Internet Risk

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Abstract

The purpose of this research is to find out whether internet of things can really improve our quality of life, especially in three perspectives: social relationship, leisure time, and internet risk. Data were gathered from in-depth interviews of 14 people. These 14 people cover 7 different backgrounds. The result shows that the internet of things has both positive and negative effects on these three perspectives and consequently on our quality of life. The research suggests that people should find out a proper way to use this new technology and some prevention measures should be taken to protect its users, especially on personal information and under-aged users. Future research should consider a quantitative method in order to assess an overall opinion about the use of internet of things.

Word count: 127

Keyword: internet of things; quality of life; internet connectedness; social relationship; leisure time; and internet risk

Contents

1. Introduction

At the end of 2008, IBM's CEO Samuel Palisano brought out a new concept -"smart planet" to the whole world. With this concept, IBM wants to restart the economy by applying high-tech intelligence to challenges in energy, transportation, food, water, even health care. A concept was introduced as the fundamental technology with IBM's new ambitions – the internet of things.

Actually, the concept of the internet of things is not a new thing. In 1999 the concept about the internet of things was raised in the original Auto-ID Center of MIT. As we can see from its words, the internet of things is to connect everything around us to the internet, which means everything is a special unit of the whole internet, which means the world will become intelligent. In other words, we can say that the internet of things expands internet and has its own infrastructures, but it still relies on the internet.

In mainland China, the government gives a full support on developing the internet of things. The industry consortium of internet of things was built in Wuxi at the end of 2009, and Premier Wen Jiabao named it as" feeling China". This consortium targets to distribute the internet of things into some main cities in mainland China in the next 5 years. In Japan, a plan named "i-Japan" was made in the middle of 2009. The purpose of this plan is to strive to create a citizen-driven, reassuring and vibrant digital society (IT Strategic Headquarters of Japan, 2009). The plan says that in 2015, the internet of things will be used in three main areas: government management, medical and health, and education. In America, Barack Obama brought the theory --

internet of things expediting economics forward -- after he was installed as the new President of America. Nowadays, the whole world is crazy about the concept named the internet of things.

In IBM's description, the smart planet should be like this: intelligence is being infused into the way the world literally works — into the systems, processes and infrastructure that enable physical goods to be developed, manufactured, bought and sold. That allows services to be delivered. That facilitates the movement of everything from money and oil to water and electrons. That helps billions of people to work and live. With so much technology and networking available, you can enhance everything, you can connect to everything, you can mine for every kind of information for insight, and you can provide every kind of service to other people. Stockholm has used smart traffic systems to cut gridlock by 20%, reduce emissions by 12% and increase public transportation use dramatically (IBM, 2009). To be specific, with the internet of things, we can see the real-time image of Hainan, and hear the real-time audio of the waves when we are sitting in front of a computer in any corner of the world; our refrigerator can send us a SMS to tell us that we are running out of milk, eggs of vegetables; and when we pick up a fruit in a store we can trace the information from the farm through the supply chain to store shelves.

The description makes us feel that the internet of things will help us to increase our quality of life with no doubt. But is it true? Is the internet of things so perfect? How is it about the internet risk, internet addiction, and our social relationship? How will the internet of things affect our lives in these particular parts? Whether the internet will

actually increase our quality of life? These questions will be discussed in this article.

2. Review of literature

2.1 Defining the internet of things

The growth of the Internet is an ongoing process: only twenty-five years ago it was connecting about a thousand hosts and has grown ever since to link billions people through computers and mobile devices. One major next step in this development is to progressively evolve from a network of interconnected computers to a network of interconnected objects, from books to cars, from electrical appliances to food, and thus create an 'Internet of things' (Commission of The European Communities, 2009).

The scope of internet of things applications is expected to greatly contribute to addressing today's societal challenges: health monitoring systems will help meet the challenges of an ageing society; connected trees will help fight deforestation; connected cars will help reduce traffic congestion and improve their recyclability, thus reducing their carbon footprint. This interconnection of physical objects is expected to amplify the profound effects that large-scale networked communications are having on our society, gradually resulting in a genuine paradigm shift (Commission of The European Communities, 2009).

Linking the physical world with virtual information is a powerful concept (Adelmann, Langheinrich, & Flörkemeier, 2006). The nature of internet of things is complex. First, it should not be seen as a mere extension of today's Internet but

rather as a number of new independent systems that operate with their own infrastructures. Second, internet of things will be implemented in symbiosis with new services. Third, internet of things covers different modes of communication: things-to-person communication and thing-to-thing communications, including Machine-to-Machine (M2M) communication that potentially concerns 50-70 billion ‘machines’, of which only 1 % are connected today (Commission of The European Communities, 2009).

In general, internet of things can help to improve citizens’ quality of life, delivering new and better jobs for workers, business opportunities and growth for the industry (Commission of The European Communities, 2009).

2.2 Quality of life

The internet of things is supposed to improve our quality of life. According to Diener (1984), subjective and objective perspectives are used to explain the determinants of life satisfaction or quality of life. The subjective construct hypothesizes that perceived quality of life is influenced by personality or dispositional factors (e.g., optimism, pessimism, isolation, self-worth, and neuroticism). On the other hand, the objective construct proposes that life quality is affected by environmental or situational factors (e.g., family, job, leisure, neighborhood, community, and satisfaction with standard of living) (Leung, 2009). According to the objective determinants of life quality, people’s quality of life tends to be a direct function of their evaluations of important life domains such as social support, leisure

activities, and standard of living of overall life (e.g., Andrews and Withey 1976; Diener 1984). Satisfaction or dissatisfaction with standard of living is likely to spill over to influence subjective well-being (Leung, 2009).

In order to maintain or have a high standard of living, technologies and innovations have always played a major role in the past (McPheat, 1996). Those great inventions such as printer, electricity, radio, washing machine, air-conditioner, and television have already changed our lives a lot. We cannot imagine what our life will be like when we live without them. The impact of the Internet on society as a whole has been debated continuously since its widespread adoption in the 1990s (Kraut et al. 1998; Nie 2001). Communications media are so fundamental to society that new media forms have the capacity to reshape our work, leisure, lifestyle, social relationships, national and cultural groups and identities in ways that are difficult but important to predict (Leung, 2009).

Extensive qualitative and quantitative evidence also supports the Internet's potential (via home Internet access) to enable informationally disadvantaged or low-income families to experience powerful emotional and psychological transformations in identity (self-perception), self-esteem, personal empowerment, a new sense of confidence, and social standing or development of personal relationships on the Internet (Anderson and Tracey 2001; Bier and Gallo 1997; Henderson 2001). The appropriate use of the Internet in areas such as online news, online forums, and online counseling, etc. can help to promote self-sufficiency, psychological empowerment, lifelong learning, and rehabilitation (Bier and Gallo 1997;

Hu and Leung 2003; Leung and Lee 2005; Wellman and Haythornthwaite 2002). Wright (2000) found that greater involvement with the online community was predictive of lower perceived life stress for older adults. A trend toward decreased loneliness and improved psychological well-being among older adults was observed when e-mail and Internet access was provided (White et al. 1999).

Based on all these researches, it is obvious that the internet of things will affect our life in different ways. On the objective perspective, our social relationship, leisure time will be affect; on the subjective perspective, the internet of things will affect the risk of using internet.

2.3 Leisure time

Bammel & Burrus-Bammel (1992) point out that leisure is a kind of human behavior, and the time we can spend on leisure activities is an important factor affects life quality. From Leung and Lee's (2005) research, we can see that leisure activities can absolutely influence the quality of life. In studying leisure, scholars like to ask whether place-centered leisure activities, which take place in urban parks, or sporting and entertainment venues, contribute more to a person's self-reported quality of life or whether quality of life is primarily influenced by people-centered factors such as social interaction, sense of achievement, and level of satisfaction with one's leisure lifestyle (Leung & Lee, 2005). Social interaction is a central component of leisure activities (Auld and Case, 1997) and the most positive experiences people report are usually those with friends (Csikszentmihalyi, 1997). Lloyd and Auld's (2001) research

indicates that the people-centered leisure attribute, especially leisure satisfaction, was the best predictor of quality of life and place-centered attributes failed to influence life quality.

Using principal components analysis, individual computer activities were combined into three primary factors: Technical, Information Exchange, and Leisure (Swickert, Hittner, Harris, & Herring, 2002). Here, leisure is made up of communication (such as using instant message) and entertainment (such as playing online game and watching movies) use. As internet plays a more and more important role in our daily life and more and more people are addicted to the internet, internet leisure use can also considered as a kind of leisure activities. When the internet of things is distributed to our daily life, more leisure functions will be provided by the internet. How could these online leisure activities and offline activities work together, and what will be changed to our leisure time? Here comes the first research question:

RQ1. How do internet activities affect our leisure time?

2.4 Social relationship

Psychologists (and most other social scientists) usually explain social relationships as instrumental means to extrinsic, nonsocial ends, or as constraints on the satisfaction of individual desires (Fiske, 1992). As it is reviewed, social relationship is an important object determined the quality of life. Researchers studying the various facets of social interaction in diverse domains have offered explanations of each particular kind of interaction in terms of the particular situational constraints

and unique features of each domain, together with the dynamics of individual personality (Fiske, 1992). The modern paradigms that seek a unified theory of social psychology focus principally on general cognitive and affective processes (Fiske & Taylor, 1991).

Fiske (1992) presents a theory postulates that people in all culture use just four relational models to generate most kinds of social interaction, evaluation, and affect. The relational models theory explains social life as a process of seeking, making sustaining, repairing, adjusting, judging, construing, and sanctioning relationships. Fiske (1992) argues that all domains and aspects of social relations may be organized by combinations of just four elementary models: communal sharing, authority ranking, equality matching, and market pricing. The four basic structures that define the relational models are relatively simple and familiar to most psychologists, because they correspond closely to the four classic scale types defined by Stevens (1946, 1951, 1958). Communal sharing is like a category or set, all of whose elements are equivalent. Authority ranking is a linear ordering in which everyone's rank can be compared with everyone else's. Equality matching is a relational structure in which people can compare quantities and use the operations of addition and subtraction to assess imbalance. Social relationships organized with reference to market pricing are structured like the rational numbers, involving proportions, multiplication and division, and the distributive law (Fiske, 1992).

There are evidences proved that the existence of internet has affected people's social relationship. Early studies of computer-mediated communications

emphasized how their apparent lack of online cues as to offline settings and identities resulted in an impoverished and anarchic a sociality, reflected in poor social order and group efforts (Hine, 2000; Jones, 1995). Nowadays, instant messages, blogs, and social websites, these computer-mediated communication methods are widely adopted by internet users. The perspectives on CMC that focus on disembodiment also raise doubts about the possibility of forming genuine personal relationships through mediated means (Lea & Spears, 1995). CMC, and the internet, offers new opportunities for creating relationships (Baym, 2002). The internet's discussion groups broaden the field of potential relational partners beyond those physically proximate (Lea & Spears, 1995). When we are connected to internet closer by the distribution of internet of things, what kinds of changes will be made to our social relationship? Here states the second research question:

RQ2. How do computer-mediated communication methods, such as instant messages, blogs, and social websites, affect our social relationship?

2.5 Internet connectedness

As the internet of things connects millions of objects to the internet, the information provided on the internet will be million times than now. With all the information, the functions that the internet can provide will be more and more. In this case, we will connect to the internet closer. The study of internet of things should be connected with the study of internet connectedness.

As before, a conventional dichotomous measure and a time-based measure

are used by a considerable amount of internet researchers to define internet connectedness. With these two measures, the importance of other contexts, such as the goals or functions of the Internet (Leung, 2009), are also important variables in conceptualizing. Jung, Qiu, & Kim (2001) devised a multidimensional construct called the Internet connectedness index (ICI) fulfilled the research gap. The ICI is a multilevel and contextual approach for assessing the overall relationship between a person and the Internet, and it encompasses a number of conventional measures such as time, history, contexts, and also goes beyond these to capture the scope, goal, intensity, and centrality of the Internet in one's life (Jung et al. 2001). To conduct an ICI survey can help us learn the relationship between a person and internet use. ICI is a multi-level indicator combined with time-based indicator to understand digital divide (Jung et al., 2001).

The ICI 9 –item composition:

(1) The history of having a computer, which is showing how long a person own a computer; (2) Task scope, which shows what purpose do people use internet to achieve; (3) Site scope, which is trying to find out how many access to internet a person has; (4) Goal scope: six goals are concluded here: 2 understanding: social and self; 2 orientation: action and 2 play goals: solitary and social (Ball-Rokeach, 1985, 1998); (5) Activity scope: "What Internet activities do you participate in other than e-mail?"; (6) Time spent on online activities (not including personal email); (7) Evaluation of personal effects: what kind of effects, positive or negative, did internet affect you; (8) Computer-dependency relations; and (9) Internet dependency, which is

trying to find out whether you can live well without internet (Jung et al., 2001).

With these nine items, it is easy to find that internet of things will connect us to the internet closer in these ways: more and more task can be done by the internet of things; more and more access we will have in our life; more and more activities will be provided and can be done by the internet of things; finally, it will make us rely on the internet more than we do now. With these items, it is also easy to find out whether people are addicted to the internet or not.

Anecdotal reports indicated that some on-line users were becoming addicted to the Internet in much that same way that others became addicted to drugs or alcohol which resulted in academic, social, and occupational impairment (Young, 1996). Internet addiction is considered as a mental disease caused by the misuse of internet. As the internet of things connects us to the internet closer, how will it affect the internet addiction? The third research question is here:

RQ3. With the internet of things, whether the phenomenon of internet addiction will be widespread?

2.6 Internet risk

German sociologist Ulrich Beck declared that risk is the main feature of modern societies. Risk is a construction, which means that we have to deal with the perception of risk rather than an objective feature of the world. If a construction is public and is part of a common knowledge, this could be analyzed as a result of public communication: we know what others know only if we take part at the same

communicational exchange. So risk perception could turn into a common view of the world, if this knowledge is communicated (Bucher, 2002). As it is effects on people's mental condition, it is another important object that determines our quality of life.

As people contribute more and more activities online, the risk of using internet is increasing, such as leaking personal information and exposing to inappropriate content. These risks may affect our use of internet. Considerable research has examined the impact of risk on traditional consumer decision making (Taylor, 1974). The lack of consumer confidence in information privacy has been identified as a major problem hampering the youth of e-commerce (Malhotra, Kim, Agarwal, 2004). According to Lenhart, Lewis, and Rainie's (2001) research, in America, 60% of all online teens have gotten an email or instant message from a perfect stranger. Millions of people have joined social networking sites, adding profiles that reveal personal information (Dwyer, Hiltz, and Passerini, 2007). Privacy within social networking sites is often not expected or is undefined (Dwyer, 2007). Mitchell, Finkelhor, and Wolak's (2003) research showed that a considerable number of youth said they were very or extremely upset, suggesting a priority need for more research on and interventions directed toward such negative effects.

The internet of things will provide us more accesses to the internet, and more content will be provided on the internet. Whether these different kinds of risk will be increased when the internet of things is distributed to our life? The following states the fourth research question:

RQ4. How does the use of internet of things affect the internet risk?

Besides these main factors, there are some other factors of the internet of things may affect our quality of life. How all these factors of the internet of things will affect our quality of life in general, here comes the fifth research questions:

RQ5. In general, in what way the internet of things affects our quality of life?

3. Methodology

As the internet of things is not a common thing in our daily life for now, doing a survey research is not a good idea for this research. It is impossible to explain to everyone what internet of things is when doing the survey research. It is too time consuming, and maybe not everyone can understand this new concept. With this situation, in-depth interview is much more suitable.

The interview started by explaining what the internet of things is, and then asked them these research questions. After that, some deeper questions were asked according to their answers to the research questions.

In order to get a comprehensive understanding about these research questions, eight kinds of informants were selected to be the interviewees for this research:

(1) An expert of the internet of things, who should know this technology well and have a clear mind of what the advantages and disadvantages are about this technology.

(2) A psychologist who concern about the factors which affects the quality of life.

(3) An internet addict, as internet is a very important part in his/ her life which he/ she cannot live without.

(4) A normal internet user. For this person, internet is only a normal tool for him/ her, he/ she does not have a strong dependency with the internet.

(5) A young child's mother, who is able to use the internet but not that familiar with it. Whether what this interviewee concern about the child will affect their attitude about these questions may be interesting.

(6) A people who hate internet. For this people, he/ she must know internet well, but he/ she thinks that the internet has only negative effects on his/ her life, so this person choose not to use internet and does not like internet at all.

(7) A teacher. This people must be an internet user, and this person's concern about his/ her students may give us some special opinions about these questions.

(8) A high school student, as a person who do not have much time to spent on the internet, but still has a strong willing to use the internet, his/ her opinion may be different from others.

After the selecting procedure, seven groups of people were selected. The internet hater or who does not use internet at all is hard to find. Nowadays, internet has already been a very indivisible part of our life, once people know what internet is, it is hard for them to stop using it, not even to mention hate it. In fact it is possible that this kind of people exists in our life. But because of the limitation of research time, the only option is to give up looking for this kind of people. For the other seven groups, for

some, there are more than one interviewee were selected; for others, there was only one interviewee. All these people were found in my own social network. Due to the limitation of my relation network, the number of members in different group is different. All the interviewees were interviewed separately even they were classified into one group. The profile about these interviewees is listed here:

(1) The internet of things experts: Expert A is a student majored in Logistics. He studied some core technologies of the internet of things in university. He is now in Holland. He uses internet for about 8 hours a day for searching information and watching movies and news. Expert B is the manager of Quick Response Code department of a big computer technology company in mainland China. He travels a lot around the world for his business. He uses internet for about 10 hours every day for his work and leisure activities.

(2) Psychologist: an institutor in a big psychology research institution in mainland also has a doctoral degree in psychology. His research direction is about how different factors affect our social behavior. He used to teach in universities in Australia and Singapore. He uses internet for about 10 hours per day, for academic searching, chatting with friends and families, checking emails and watching news.

(3) Internet addict: this interviewee was found by using the ICI scale. He is a student who is studying in UK now. Internet is the most important thing in his life. He uses internet to get in touch with his family and friends in China. The internet is the only source for him to get information about the outside world. Internet is also the main

source for him to get knowledge. He said that without internet, he does not know how to finish all his homework at all. He spends about 16 hours online normally.

(4) Normal internet users: For normal user A, internet is only an entertainment tool for him, he only spends about 2-5 hours online every day. In his point of view, what internet can apply us, the other tools can also do. So internet is only an optional tool, without internet, he can also live on. Normal user B uses the internet about 8 hours every day. He uses the internet because his work requires it. After work, he seldom uses the internet.

(5) Young children's mothers: for these mothers, their children are all about 10 years old. For children in this age, they start to know what internet is, and start to use it. Mother A has no internet access at home, she only use internet when she is working. She uses internet for about 6 hours per day. Her work requires the internet, and she also uses internet to get information, shopping, and communicate with other parents. For mother B, She and her son are both internet users. She uses the internet as a tool for communication and entertainment. Her son loves to play online game very much. For the mother, she uses internet about 8 hours per day. For her son, only about 1 hour is permitted for him to use the internet on average. Mother C is an administrative staff person in a company, except work enquiries, she only uses internet for 1 hour a day. She only uses the internet to get news. Mother D is an officer in a company, she uses internet for about 5 hours a day. Following the news on stock market is the main purpose for her to use internet. Mother E is an officer in a government department. She uses

internet only about 2 hours every day. The main purpose for her to use the internet is to communicate with other mothers.

(6) Teacher: she is a university teacher in Beijing, who has both engineering and fine art background. Now she is teaching both engineering course and art course in her university. She has lots of foreign friends and lots of her former students are now studying abroad. She uses internet for about 5 hours every day. Internet is a communication tool and a main source to get information for her.

(7) High school students: student A is an 18 years old student studying in a high school in Beijing. She spends about 5 hours online per day. She uses internet to do shopping, communicate with others, and share thoughts with her friends. Student B is a 16 years old girl studying in a high school in Australia. Her hometown is Fujian. She uses internet for about 2 hours every day. The main purpose for her to use it is to talk to her friends.

4. Findings

4.1 Effects of internet activities on leisure time

Research question 1 is about to find out the effects of internet activities on leisure time. Interviewees' answers can be classified into three categories. Some of the mothers, teacher and experts said that internet activities are already a part of our leisure activities; online activities will not affect their offline activities. With internet, they just have another choice in their leisure time.

Normal internet users, high school students, and the internet addict all agree

that internet really improve our leisure activities. Normal user A said that we can search for information about the place we want to go and the things we are going to do. It helps us to make decision about where to go and what to do. As we know more about the place and things, we can save time from doing things and going to place that we do not like. As before, we may not know much about things and places, so we may pay lots of money and time on things we do not like and it made us feel upset. But now, it helps us to save time and money, and improve the quality of leisure activities. The internet addict also pointed out that in UK, there is not many choices for them to do in leisure time. As they do not want to go to bar or pub, they can almost just stay at home and watch TV or read book. But now, with the internet, they can do lots of things in their leisure time, playing online game, watching news, chatting with friends, etc. For these reasons, the internet really does great help in improving our leisure activities.

Even normal user B agreed that the internet activities can improve our quality of leisure activities; he also said that online activities have some negative effects. The time we go out for physical exercise may be shortened by the online activities, and the time we spend on getting touch with the real world is also shortened. On this point, the internet activities do some harm to our physical and mental health. According to mother B and mother D, the harm that internet does to us is not just like this. For mother B, her son is addicted to online game. If she does not pull her son out of the computer, he will never leave it. His addiction to online game really has some negative effects on his study. For mother D, she found out that it is hard for her to find

some friends to go out with after the internet is adopted by all her friends, which makes her no choice but to stay at home to spend her leisure time with the computer.

Without surprise, all of them agreed that online activities will cut down the time we used to go out with friends or families. The psychologist said that the real feelings we get from our daily life may be replaced by those virtual feelings we get from the internet, which might be the reason why we choose to stay with the internet instead of going out.

4.2 Effects of instant messages, blogs, and SNS on our social relationship

The second research question is about to find out the effects of instant messages, blogs, and SNS on our social relationship. All of the interviewees agreed that internet can help us to extent the social circle and keep contact with old friends. Mother A said that nowadays, everyone is busy with their works and families, which made it impossible to talk on the phone for long time or going out frequently. The internet addict said that it is weird to make phone call to every friend to just say hi every day. But with the internet, sending people, who we do not see often, messages to say “hi” is very normal and also natural and comfortable. In this way, it is easy to keep contact with friends. High school student A said that, on SNS, we can find schoolmates whom we have lost contact in many years. The psychologist pointed out another advantage about this kind of communication -- the cost is very low on both time and economic directions. The mother A also mentioned that on the internet, there are communities for parents. On the communities, they can share experiences

and information with each other. They also hold activities sometimes for their children to make friends outside their own schools.

Some of them also mentioned some special functions about blogs. High school student A said that blog is a place where she can release her pressure by saying things that she may not say in the real life. All these things will only know by people she wants them to know by setting the authority of the articles. Mother C and the internet addict both mentioned that blogs are also a source for them to know about information. By following some famous people or organizations' blogs, you can know everything happen in the world and people's comments about these events without searching for them in purpose. But normal user A pointed out that copyright becomes a serious problem on blogs. To protect content providers' right is very important.

On the point of whether we can have in-depth communication on the internet, interviewees have different positions. Both the normal users and all of the mothers believed that they cannot have any in-depth communication online. Mother D said that without seeing each other, it is hard to know whether this conversation is truthful and reliable. Lots of people may just walk through the conversation without being found by the others, so it makes the in-depth communication very hard to get from the internet.

On the contrary, experts, psychologist, internet addict, teacher and high school students all believed that in-depth communication is very possible to achieve on the internet. After the studying of their background I found that all of these people have

oversea studying experience or have lots of oversea contacts. Those people who have the opposite opinion all have no oversea background or do not have many friends oversea. The reason that they have these two kinds of opinion might be related to their background. As the international call is very expensive, so it is impossible for people to make phone calls when we want to talk to someone. When we want to see someone, it is also impossible to just buy a flight ticket to see each other right at that moment. According to these reasons, the internet becomes a very important channel for people to communicate with friends in different places. Time and expense are the main reasons. As they have no choice but using the internet to communicate with others, their habit of communication is changed. They are getting used to using internet to communicate, so the in-depth communication becomes very possible for them. For other people, as it is easy for them to make phone call and meet their friends, internet is only the optional choice for them. As the importance is lower for these people, their habit of communication is not changed. The traditional communication channel is still their first choice. This is the reason that they feel that it is hard to get in-depth communication online.

4.3 Effects of internet of things on internet addiction

Then third question asked about the effects of internet of things on internet addiction. Most of interviewees believed that the phenomenon of internet addiction will not be widespread. They believe that people have lots of work to do in their daily life, the time they can spend on the internet is very limited. Mother A, mother C, and

mother E said that internet is only a tool for them; they do not use it until it is necessary for them to use it. All of them believed that self-possessiveness can help them to stay away from internet addiction.

On the contrary, psychologist, normal user B, internet addict, mother B and mother D all believed that the phenomenon of internet addiction will be widespread. Mother B and mother D said that some of the people around them are internet addicts, and the number is increasing. They pointed out that with the internet of things, the internet can provide more functions to users. With the internet, we can get every kind of information and we can also control the physical things via the internet, which makes us to rely on internet instead of our own memory and feelings. These are reasons that we cannot live without internet. In the near future, internet might be an indivisible part of our life just like tap water and electricity.

The psychologist said that, the internet addiction may not be a mental disease in our real life. As internet does not harm most of internet addicts' life, so it cannot be a mental disease to most of them. Most of interviewees all agreed with this opinion. They felt that internet addiction is different with gambling addiction or drug addiction. The only result of gambling and drug addicts is harming their families and physical health. For internet addicts, most of them just use it in the leisure time; their regular life is not damaged by it, so what they felt that it is not a mental disease. But to those addicts, for example online game addicts, they play games day and night, forget to sleep, eat, work and study, internet addiction is absolutely a mental disease for them.

4.4 Effects of internet of things on internet risk

The fourth research question is set to find out the effects of internet of things on internet risk. Some of interviewees said that they do not worry about the internet risk. The psychologist said that he does not worry about his personal information being known by others. He believes that with the internet of things, more and more people can know about his research easier, and there is one more way he could use to do his research. High school student A and the internet addict both believed that as more information goes public, people can get what they need much easier.

But the majority interviewees are worried about the risk. All mothers mentioned that how to keep their children away from bad information online is the thing they are concerned about most. Mother A said that in order to keep the risk to the minimum, she has no internet access at home. Mother B said that she has to sit right beside her son when he is using the internet in case that bad information will be viewed by her son. All of the interviewees believed that there must be some efficient way to keep bad information away from children, and this mission should be set as the top priority.

Some of the interviewees also worry about the security of personal information. Mother C and internet addict both mentioned that with the internet of things, as we have an easy access to any kind of information, our personal information can also be violated easily. When personal information is leaked, the person who steals information may use it for any purpose. Our own life may be harmed, and people around us may also be harmed. Meanwhile, it will make us feel very uncomfortable when our activities are known by everyone. Normal user B said that, for now, if the

information in our computer is stolen by others, all we lost may just be some files. In the future, if the password of our computer is lost, the damage may be very huge, out of our imagination.

4.5 Effects of internet of things on quality of life

The fifth research question is set to find out how internet of things affects quality of life in general. All interviewees believed that the internet of things will improve our quality of life. With the internet of things, we can get more and more information through the internet quickly. Information from different sources can help us to make the right decisions. We will not make wrong decisions which caused by the lack of information. The internet addict also pointed out that the safety of food and medicine is a serious problem in mainland China. Lots of accidents which caused by the sub-quality food and medication products have already caused people's attention about this problem. With the internet of things, the whole manufactory and transportation procedure can be supervised by the public, so the chance that we buy these unqualified products will be decreased. It will also be a good chance for the government to solve this problem.

But some interviewees also said that with the large amount of information applied online, we may more and more rely on the internet, the time we communicate offline may be decreased. Expert A pointed out that the ability to select information is also become a problem for internet users. The psychologist also said that the difference of this ability may affect the status, ways, and the level of our life. People

have strong ability of information selecting may have a better life than before, but people's life may also be a mess if they do not have this ability.

Expert B also pointed out another problem, when the internet of things is distributed to our life, the world will be intelligent. In the intelligent world, many works can be done by computers. As a result, many people may lose their jobs to the computer. For these people, their life quality is really harmed by the internet of things. He said that there is no doubt that the internet of things will be distributed to our life, with this trend, people have to train themselves to get used to the new life. People must have the ability to survive in the new world.

5. Conclusions and discussions

Obviously, internet fulfilled our leisure time. With the internet, we have more choices on how to spend the leisure time, such as watching movie, playing online game, and talking with friends. It will be very helpful for disabled people because it is very inconvenience for them to go out. For normal people, the internet is also helpful for their leisure time as the internet can satisfied all their needs. The internet addict pointed out that the internet can give lots of information that we cannot reach before. For bloody, violent, or pornographic content, people may feel hesitant, or have no ways to look for before. But now, with the internet, we can get these kinds of content much easier. The internet helps us to fulfill our desires. In mainland China, lots of information is blocked by the government, people have no way to reach them from the traditional media. Internet provides them a great chance to know what they want

to know. As the internet can fulfill our gray desire and the need for information, the internet really improves the quality of leisure time.

The positive effects of internet also can be shown on our social relationship. From those SNS, such as Facebook and Renren, we can find our old classmates whom we lost contact for a long time. With instant message, it is easy for us to talk to our friends and keep contact with them with a very low cost of time and expense. From blogs, we can share our feelings with others, to know someone deeply, and get news easily without searching for them. Using the webcam and headset, we can see and talk to people from a long distance without going out. Of course, the cost is also very low. Expense, time and distance cannot be a problem and an excuse that we lost contact with someone. The internet helps us to get in connect with the whole world. Even the internet has many merits the offline social activities still cannot be replaced. Online and offline social activities have different functions, so it is hard to tell which one is better. Nowadays, both of these two kinds of communication methods are necessary for our social relationship. We have to balance our time for these two methods. When we can start to balance our life for both online and offline communications, the internet will give us positive effects on our social relationship.

But the internet actually caused some problems. Internet addiction is the most well-known one. During the research, an interesting thing is that people have different definitions about the internet addiction. As the internet addiction is quite different from drug addiction and gambling addiction, people have some problem of finding out whether they are addict to the internet or not. Most of them define internet addiction

as how much time they spend on it. But the psychologist said that, as the internet has no big negative effects on your daily life, you cannot call it addiction. No matter whether it is addiction or not, a truth that we cannot ignore is that we rely on the internet more and more than before. When the internet of things is distributed to our life, it will be in every corner of our life. At that time, more and more functions will be provided by the internet. Even most people believe that they have the self-control ability and they have things more important than using the internet, the internet will spread into our life, and we may use it every minute. The most horrible thing is that it will become a part of our life gradually and we do not even notice that.

As the internet of things is adopted by us, the information on it may do both positive and negative impacts on our daily life. It may help us to know things around us better; it will also help us to make better choice. On the contrary, it gives our children more chances to reach information that they should not reach in their own age, such as violent and pornographic information. For adult, there are more chances for bad guys to get personal information about us. Some prevention measures must be taken to protect our children and ourselves. Self control ability is also very important here. When internet of things is spread around our life, the lure may be more than now. How to keep ourselves away from them is a very important. Internet of things is just a tool for us, it is supposed to improve quality of our life if we use it in the right way. If we use it in the wrong way, the damage to our life will be huge and out of our imagination.

As the expert B always mentioned during the interview, everything has two

sides. One is positive, the other one is negative. How it affects our life depends on the way we use it. It is obviously that the internet of things may help us to improve our quality of life in some way, but if we cannot use it in the right way, it will also harm our life. Just like cars to our life. With cars, our life becomes more and more convenient and cars also help us to save lots of time. But on the other hand, the environment is damaged by the tail gas produced by cars, and cars also caused lots of traffic accidents which takes lots of human lives. In the micro aspect, riding bicycle or walking are ways of doing exercise, with cars, people lost a normal way of doing exercise, and it causes the bad situation of people's physical health. But these are the wrong ways we use the car. If we can use cars properly and carefully, the environment will not be polluted so badly, and people's lives will not be taken by accidents. If we can use some of the time we saved by using cars to do exercise, our health condition will be much better. Actually the demerits cannot be the reason we give up a new technology. What we should do is to find out a proper way to use it.

6. Limitations and suggestions for future research

As the internet of things is still in the research phase, only some functions are applied in some special areas, such as logistics, so it is impossible for everyone to know what the internet of things is. In fact, lots of people do not know or even have never heard the internet of things. This research acquires an explanation about what internet of things is at the beginning for every respondent, it makes the qualitative research a better research than quantitative research. According to this situation, a

quantitative research is impossible to be conducted.

Compared with quantitative research, only very small amount of people is interviewed in this research, the result cannot represent the whole population. As some of the interviews are taken face to face, their answer may be affected by the interviewer. According to the limitation of time and social relationship, an internet hater has not found. As this very important category is missing from this research, the objectivity and representativeness of this research should be questioned. The numbers of people from different groups are different is also a limitation here. This difference is caused by the researcher's limited social network. According to this, the findings from different groups may not be equal. Those groups which have only one or two interviewees may not be representative. For groups have more interviewees, they may be more representative.

When the internet of things is distributed to every part of our life, a quantitative research will be possible. Data can be more representative and objective. Also people from different background should be included in the research. From this research we can see that people have different background may have different point of views at the same problem. A qualitative research will be recommended after the quantitative research. Different focus groups of different background can help the researcher to get in-depth understanding of their point of views.

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