Analysis of the Effect of The Internet Activation on Students in IoT Environment

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사물인터넷 환경에서 인터넷 활성화가 학생에 미치는 영향 분석

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Abstract　The world is changing rapidly as the Internet spreads and various smart devices appear. High-performance PCs and high-speed communication networks are rapidly spreading in every home, and all kinds of the internet sites are emerging. In particular, the high education enthusiasm of Korean parents adds to this, and the ratio of the internet users among teenagers is exploding every day. In the case of adolescents, most of them use the Internet for online games, indicating that online games are the main cause of the internet addiction. This study was conducted using a questionnaire for male and female high school students using the Internet, and demographic and sociological characteristics were used only as basic data. In this study, as much as parents, students and teachers think, the results of the internet addiction type analysis according to academic achievement in humanities high school students are to be investigated to determine whether internet use has an effect on academic achievement.

Key Words : IoT, Game, Addiction, Education, ICT

요 약　인터넷이 확산되고 다양한 스마트 기기가 등장하면서 세상은 빠르게 변화하고 있다. 고성능 PC와 초고속 통신망이 모든 가정에 빠르게 확산되고 있으며 여러 다양한 종류의 인터넷 사이트가 등장하고 있다. 특히 한국 부모들의 고학력 열광이 여기에 더해져 10대 인터넷 이용자 비율이 날마다 폭발적으로 증가하고 있다. 청소년의 경우 대부분이 온라인 게임에 인터넷을 사용하여 온라인 게임이 인터넷 중독의 주요 원인임을 나타내고 있다. 본 연구는 인터넷을 이용하는 남녀 고등학생을 대상으로 설문지를 이용하여 실시하였으며, 인구 통계학적, 사회학적 특성은 기초 자료로만 사용하였다. 본 연구에서는 학부모, 학생, 교사가 생각하는 바와 같이 인문계 고등학생의 학업 성취도에 따른 인터넷 중독 유형 분석 결과를 이용하여 인터넷 사용이 학업 성취에 영향을 미치는지 여부를 판단한다.

주제어 : 사물인터넷, 게임, 중독, 교육, 정보통신기술

1. Introduction

The Internet world is expanding fast. High-performance PCs and high-speed communication networks are rapidly spreading from home to home and various kinds of the internet sites are emerging. Regardless of age and gender, everyone is talking about the Internet. In particular, the high educational enthusiasm of Korean parents has contributed to the increase in the ratio of the internet users among teenagers.

Internet addicts (high-risk users) who need expert help account for 3.3% of Internet users. In addition, the number of users at risk of Internet addiction (potential risk users) was found to be 11.4%. In addition, among adolescents aged 9 to 19, 4.3% of high-risk users are classified as addiction, and 16% of high-risk users are at high risk of addiction.

In addition, 73.4% of teenagers use the Internet for online games, indicating that online games are a major cause of the internet addiction. We often see the harm of the internet addiction, such as killing a couple of days playing online games in a PC cafe, or falling into a chat and a family breakdown.

In Korea, where online games based on internet connection are considered a sport, internet addiction is regarded as a serious social problem and considered a national crisis. Experts argued that if the smartphone is continuously used during infancy, the brain should strive to balance growth and addiction[1]. The Korean government created the world's first Internet Prevention Center to respond to the problem of Internet addiction, and made it possible for the most addicted youths to receive full financial support from the government[1-4]. As of 2007, the government has established a network of 140 Internet addiction counselling centers in addition to treatment programs in about 100 hospitals[2]. In addition, the Korean government introduced a termination law in 2011, preventing children under the age of 16 from playing online games from midnight[3].

In addition, the Internet is deeply occupied with Korea's world-class Internet infrastructure and the world's second largest Internet user population. However, it is pointed out that social problems caused by the internet addiction are serious dysfunctions and require social measures. Therefore, research for a comprehensive and systematic understanding of youth's use of the Internet will increase the learning effect that can be achieved through the use of the Internet, nurturing internationally competitive talents, and socially protecting and supporting them to grow into healthy citizens. It is a very important and very urgent task to establish policies and support children's education. However, most studies on general internet addiction are conducted in Korea, and the research on the internet addiction according to academic achievement is still insufficient.

The purpose of this study is to examine the results of the internet addiction according to academic achievement in humanities high school students to see if the internet usage is affecting academic achievement as parents, students and teachers think.

2. Concept and Related Research of the Internet Addiction

Recently, the Internet has become an indispensable existence in our lives due to the development of high-tech technologies such as high-speed internet, smartphones and netbooks. However, with the development, the side effects caused by the Internet are also increasing and a representative example of this is the internet addiction. The term 'internet addiction' was first used by Goldberg, a psychiatrist in 1996. The internet addiction can be defined as a condition in which withdrawal and tolerance for Internet

use arise from excessive use of the Internet, which induces obstacles in daily life[5]. The definition of the internet addiction varies among scholars, and there are no consistent diagnostic criteria. However, if you spend too much time immersing in the Internet and become addicted to something that causes enormous disruption to your daily life, you will develop dependence, tolerance, and withdrawal symptoms, which leads to more and more time to immerse yourself and you feel problems yourself. There is a consensus that even though it is not controlled according to his own will. And the internet addiction is also classified into communication addiction, game addiction and pornography addiction[6].

In addition, the internet addiction is a behavioral disorder that does not resist the impulse, desire and temptation to perform actions that may be harmful to individuals or others. Like drug addiction, withdrawal, tolerance and social and occupational damage are caused. The internet addiction disease was named as withdrawal and more use of the Internet when Ivan Goldberg stopped or decreased the internet use in 1996. It was caused symptoms such as psychomotor agitation and anxiety or obsessive thoughts or fantasies about the Internet. And it was organized by Dr. Kimberly S. Young of the University of Pittsburgh, USA, who devised a self-diagnosis method for the internet addiction. Some oppose viewing this phenomenon as an independent disorder, while others view it as a symptom of impulse control disorder, obsessive-compulsive disorder and depression[6].

When it comes to addiction, it's easy to think of drug addiction like alcoholism or drug addiction. These diseases are associated with substance dependence or substance abuse, and cause perceptual impairment, angular growth impairment, attention impairment, thinking ability impairment, judgment impairment, psychomotor behavior impairment and interpersonal impairment. Recently, the concept of addiction has been applied to a wide

range of behavioral problems beyond the scope of simple substance use[7-15]. In other words, the object of pathological addiction can be anything other than drugs, such as food, exercise, gambling, consumption, work, etc. Recently, the concept of addiction is spreading to the problem of using the Internet, and the debate about whether spending excessive time on the Internet is a new addiction phenomenon that invades the human mind is becoming a focus among psychologists[5-7]. Some scholars have named this phenomenon 'Internet Addiction Disorder', and in addition to this, various names such as 'Computer Addiction' and 'Virtual Space Addiction' are being given. For some, this addiction can develop from the problem of using the Internet to the problem of using computer games.

Psychological and psychiatric official criteria for the internet addiction are not provided, and it is not specified in DSM-IV. However, many scholars argue that this addiction phenomenon, like other substance addiction, is a real disease. The internet addiction, which spends too much time on the Internet or replaces true real relationships with superficial virtual relationships, can also be accompanied by serious psychological distress or functional impairment. Internet addiction disorder can be viewed as a real thing, such as alcoholism or impulsive gambling. It does not cause the same types of physical problems as alcoholism, but warns that it can cause social problems, such as loss of control, cravings and introspection, social withdrawal, marital discord, school failure, excessive financial debt and unemployment, as do other addictions. As evidence of the internet addiction increased day by day, the Internet Addiction Support Group (IASG), a self-help group of people suffering from the internet addiction, was established. The internet addiction disorder is a practical disorder that causes impairment of psychological, social and occupational function. Although there is no

official psychological or psychiatric standard for diagnosis, it is likely to someday become an official standard for diagnosis.

Recently, by many researchers, cyberspace has emerged as a form of technological addiction. Technological addiction is defined as behavioral addiction that includes human-machine interaction, and such interaction includes features that promote addiction tendency, such as sound effects and color effects. In addition, this technological addiction has key elements such as salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. Research on the virtual space called the Internet is becoming more active as it emerges as a new topic in psychology.

In the survey of pathological Internet use (PIU) among college students, those who answered more than 4 out of 13 questions were classified as pathological Internet users. Among the respondents, 8.1% were classified as pathological users, and males(12.2%) were more frequent than females(3.2%). However, surprisingly, the average weekly use time of pathological users was 8.48 hours, which was significantly less than the above studies. As a result of the study, pathological users were using a variety of the internet services compared to non-pathological users, and in order to receive emotional support, they met more people on the Internet, and were addicted to games, gambling. They also showed that they were feeling more loneliness. In another study, many Internet users said that they spend hours daily e-mailing or surfing the web, and in some of these cases, real life was impaired. It is pointed out that people who use the Internet addictively are replacing superficial virtual relationships with real relationships, and this phenomenon is accompanied by clinical pain or functional impairment. In addition, a qualitative case analysis than such a quantitative study can better show the evidence that the internet addiction is real, and a representative example is the case of ruining family life due to excessive use of the Internet.

Although studies on the internet addiction have been recently conducted in Korea, many studies have not yet been conducted when compared to studies abroad. One example is the case of the Internet addiction test for 533 peoples with extensive computer experience. Among the 20 questions, those who indicated in more than 10 items were classified as the internet immersed, 21 as the internet immersed, and 279 as non-indulged. As a result of the study, the Internet immersed group was found to be more depressed and impulsive than the non-immersed group, but there was no difference in sensory pursuit and social discomfort.

For those who visited the web while surfing the web and those who listened to cyber lectures, the characteristics of those who use the Internet addictively and the factors that induce addictive behavior were searched. As a result of the study, the greatest factor influencing the internet usage time was found to be personal self-efficacy in virtual space, and low self-control was found to have the greatest amount of explanation as a factor influencing addictive use of the internet. After controlling the usage time, it was found that the efficacy of interpersonal relationships in real life best explained the addictive use of the Internet, and it was said to be the most important variable as a prerequisite for the addictive use of the Internet. In addition, the importance of variables affecting addictive use of the Internet varies with age. Self-control and interpersonal efficacy in the real world tend to increase with age, whereas interpersonal efficacy in virtual spaces varies with age.

3. Internet Addiction Types and Analysis

3.1 Research Subject

This study surveyed adolescents attending a

local high school. Sampling was carried out on a total of 192 cases of adolescents in the local high schools by sampling in three schools. Of these, 174 cases were analyzed, excluding 18 cases with lush responses. The demographic and sociological background of these survey subjects is shown in Table 1.

〈Table 1〉 Demographic and Sociological Characteristics of Survey Subjects

Division	Contents	N (%)
School	Humanities	174 (100%)
Residence	Big city	58 (33.3%)
	Small cities	58 (33.3%)
	Rural Fishing Village	58 (33.3%)
Internet usage period	〈 1 year	5 (2.87%)
	〈 2 years	3 (1.72%)
	〈 3 years	15 (8.62%)
	〈 4 years	36 (20.68%)
	over 4 years	107 (61.49%)
	non-response	8 (4.59%)
Average usage time per day	〈 1 hour	1 (0.57%)
	〈 2 hours	4 (2.30%)
	〈 3 hours	106 (60.91%)
	〈 4 hours	18 (10.34%)
	over 4 hours	35 (20.11%)
	non-response	10 (5.75%)
Main place of use	School	3 (1.72%)
	Friend's house	2 (1.15%)
	PC cafe	16 (9.20%)
	House	133 (76.44%)
	non-response	20 (11.49%)

As a result of examining the demographic characteristics of the surveyed subjects, based on the total number of 174 respondents (gender-integrated survey), the number of people living in the same area was equally taken into account in consideration of regional differences. 8.62% said they were more than 2 years and less than 3 years. Those with more than one year and less than two years were 1.72%, and those with less than one year were 2.87%. About 30.45% of the respondents answered that they spend more than 3 hours a day, 60.91% said they spent more than 2 hours, and less than 2 hours said 2.87%. The most common place where people use the Internet is at home, with 76.44% and 9.20% for

PC cafes. School was 1.72% and friend's house was 1.15%. The reason why the survey was selected as a humanities high school student is that the humanities high school students, rather than vocational high school students, use the Internet as the main means of leisure use while they are experiencing a lot of stress related to their studies.

This test consists of 40 questions to screen Internet addiction. The Korean Internet Addiction Self-Diagnostic Test Questionnaire was developed by the Ministry of Information and Communication. Each item is graded on a 4-point scale from 1 to 4 points, with a total score ranging from 40 to 160 points. According to the standards suggested by the Ministry of Information and Communication, 88 points or less are general users, 89~103 points are potential risky users and 104 points or more are high-risk users. The internet addiction is defined as 'the phenomenon of having withdrawal and tolerance for the use of the Internet, which causes disability in everyday life' and as a sub-element, it is the daily life disorder, reality division disorder, positive expectation, withdrawal, immunity and virtual interpersonal orientation. Seven types of deviations were calculated.

The internet addicts suffer from "daily life disorders" such as friction with their families, poor eyesight, irregular lives and poor grades. In addition, people experience "forbidden phenomena," such as "reality barriers", which make them feel as if they are not using the Internet, "resistance", which is more satisfying when they do more. The survey, called the "K-scale", allows the internet users to be categorized into one of three categories: high-risk users, potential-risk users, and general-use users, based on a score of 40 questions.

3.2 Result and Analysis

First, as a result of factor analysis by type of the internet addiction, as shown in Table 2,

87.36% of the respondents were classified as normal Internet users, potential risk users were 9.20% and high risk users were 3.45%. Appeared in%. In sub-type factors, daily life disorders (26.43%), reality-divided disorders (18.39%), and positive expectations (20.60%) were more addictive than other factors. This shows that 82.17% of all respondents said that the Internet use period was more than 3 years, indicating that the longer the Internet use, the more difficult it is to distinguish between virtual and real spaces. The low deviation rate of 4.59%, which is lower than other subtypes, suggests that adolescents' the internet use does not flow so negatively. Other similarities are forbidden (10.35%), virtual interpersonal orientation (10.34%), and tolerance (12.07%).

⟨Table 2⟩ Survey of User Groups by Type of Internet Addiction

Factor	General User Group	Potentially Risky User Group	High Risk User Group
	Number of students(%)	Number of students(%)	Number of students(%)
Daily life disorder	128(73.56)	7(4.02)	39(22.41)
Reality divided disorder	142(81.61)	25(14.37)	7(4.02)
Positive expectations	138(79.31)	12(6.90)	24(13.7)
Forbidden	156(89.66)	8(4.60)	10(5.75)
Virtual interpersonal orientation	156(89.66)	9(5.17)	9(5.17)
Deviation	166(95.40)	3(1.72)	5(2.87)
Tolerance	153(87.93)	14(8.05)	7(4.02)
Total	87.36	9.20	3.45

The main characteristic implied in Table 2 is that the longer the Internet is used, the more difficult it is to distinguish between virtual and real spaces. It is also that youth's Internet use is not so negative that it is fearful. However, considering that normal social activities may be hindered by excessive Internet use, it seems desirable that Internet use time should be within a limited range.

It was found to be lower from rural area to small and medium-sized cities and big cities, and the potential risk users were higher from rural area to small and medium-sized cities and big cities. On the other hand, high-risk users were found in the same rural area as well as in small and medium-sized cities and big cities. However, the fact that the initial symptoms of poisoning were relatively higher in urban areas (20.69%) than in rural areas (6.90%), indicating that the proportion of high-risk users may increase due to students in urban areas. This is analyzed as a factor in that rural areas have lower living standards and relatively less cultural benefits than urban areas, so Internet-based activities are less than urban areas.

This is attributed to the fact that urban areas have lower living standards and receive less cultural benefits than urban areas.

⟨Table 3⟩ Internet Addiction Status by Region

Division	General User Group	Potentially Risky User Group	High Risk User Group	Remark (Number of students)
	Number of students(%)	Number of students(%)	Number of students(%)	
Big city	49(84.48)	7(12.07)	2(3.45)	58
Small, medium cities	51(87.93)	5(8.62)	2(3.45)	58
Rural area	52(89.66)	4(6.90)	2(3.45)	58
Total	152(87.36)	16(9.20)	6(3.45)	174

Next, as a result of the actual status of the internet addiction by subtype according to the region, the daily life disorders are shown in Table 4. In everyday life disorders, rural areas (32.76%) showed higher symptoms of the internet addiction than small and medium cities (20.69%) or big cities (25.86%). Most of the students in big cities do self-study after regular school classes or attend private academies. Therefore, they do not have much time to use the Internet. On the other hand, it was interpreted that students in cities, including towns and villages, were more exposed to the possibility of using the Internet due to fewer opportunities for using private academies and self-study in schools.

〈Table 4〉 Distribution of Daily Life Types by Region

Division	General User Group	Potentially Risky User Group	High Risk User Group	Remark (Number of students)
	Number of students(%)	Number of students(%)	Number of students(%)	
Big city	43(74.14)	2(3.45)	13(22.41)	58
Small, medium cities	46(79.31)	2(3.45)	10(17.24)	58
Rural area	39(67.24)	3(5.17)	16(27.59)	58
Total	128(73.56)	7(4.02)	39(22.41)	174

4. Conclusions

This study analyzed the differences in academic achievement according to the subtypes of the internet addiction factors for high school students under the premise that the Internet use of adolescents will affect their academic achievement. As a result, about 13% were potential and high-risk users, indicating a high risk of addiction related to the internet use. It should be seen that the longer the period of the internet use and the time of day use, the higher the proportion of risk users. On the other hand, the percentage of adolescents who use the Internet at home was high because their parents had no knowledge of computers or were less interested in supervising their children's Internet use. In addition, it was found that students with low academic achievement in connection with the internet use do not set their minds on certain tasks, so even if they use the Internet excessively, they cannot perceive the obstacles in their daily life. Therefore, it can be seen that the addictive use of the Internet acts as a negative influence factor in daily life.

This study was conducted by convenience sampling in a situation where the preceding studies related to the internet addiction and academic achievement were insufficient. As the subject of this study was only for 6 students in the 1st and 2nd grades of a humanities high school, there was a limit to clarifying the relationship between academic achievement and internet addiction.

Considering these points, systematic follow-up studies targeting various groups should be followed in order to generalize the results of this study.
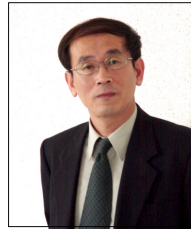
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