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Examination of an Educational Practice that Prevents and Alleviates Internet Addiction by Increasing Awareness of Internet Use and Addiction in Japanese High School Students

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Abstract

Today's high school students use the Internet for long periods of time. Previous studies show that high school students are more addicted to the Internet than other generations. Thus, the Internet addiction of high school students is an urgent issue. To address this issue, the current study developed an educational practice that increases awareness of Internet use and addiction in high school students. This practice impacted the prevention of and improvement in Internet addiction in high school students. This paper summarizes the methods, results, and discussions on this educational practice.
Keywords: internet addiction, information ethics education, preventive education of Internet addiction, high school students

1 Introduction

1.1 International Comparison of Internet Use and Dependence Tendencies

Lives have become more convenient with the popularity of portable devices that enable the use of the Internet, such as smartphones. Conversely, increasingly longer usage times for such devices and social media have led to issues such as Internet addiction, wherein an individual feels anxious if he/she does not use the Internet continuously, and associated issues in actual society.

The Ministry of Internal Affairs and Communications, JAPAN (2014) used Young20 (Young 1998), a method that determines Internet addiction tendencies, to conduct an online international questionnaire in six countries [1] [2]. The results were compared to analyze the situation in Japan from an international perspective. Young20 is a psychological scale that measures Internet addiction tendencies and was developed by a psychologist named Young of the University of Pittsburgh in 1998. The tool uses a five-point scale (not at all = 1 point, occasionally = 2 points,

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sometimes = 3 points, often = 4 points, and all the time = 5 points) to rate 20 questions on Internet usage. The total points range between 20 and 100, where ≥70 points would be classified as high degree of addiction, 40–69 points as moderate, and 20–39 points as low. This is one of the most widely used methods in the world.

Using the same scale, this study surveyed Internet addiction tendencies based on age and smartphone ownership in six countries (i.e., Japan, the USA, the UK, France, South Korea, and Singapore). Results showed that the age group of 10 to 29 years had the highest number of individuals highly addicted to the Internet and that the degree of addiction decreased with age. In addition, based on smartphone ownership, individuals who owned smartphones tended to be more addicted than those who did not own smartphones. This result was consistent across the six countries. In addition, the survey showed the result of examining Internet addiction based on the purpose of Internet usage. The main content accessed on the Internet included communications (social networking service (SNS)), information gathering and content usage (videos and news), online games (those played via the Internet), and shopping (online stores and auctions). This survey asked what content was the major reason for Internet use and analyzed preferences based on the result. In the six aforementioned countries, the findings showed that users who indicated communication as the reason for Internet use were more addicted to the Internet than other users. In addition, the study analyzed the results based on smartphone ownership in Japan and found that individuals who owned smartphones and used the Internet with communication as the main reason were the most addicted to the Internet.

The results of the aforementioned survey conducted by the Ministry of Internal Affairs and Communications, JAPAN (2014) indicated that smartphone users in all six countries aged between 10 and 29 years and using the Internet primarily for communication were most likely to be addicted to the Internet [1]. Therefore, education that prevents and alleviates Internet addiction in such individuals is necessary.

1.2 Internet Usage and Addiction Tendencies in High School Students

The ratio of individual Internet users in Japan is 79.8%, whereas the average duration of use per day is 112.4 min (Ministry of Internal Affairs and Communications, JAPAN 2019) [3]. The breakdown of Internet use in youths is as follows: elementary school students = 85.6%, junior high school students = 95.1%, and high school students = 99.0%, with the average times for daily use being 118.2, 163.9, and 217.2 min, respectively (Cabinet Office 2019) [4]. In all types of schools, these numbers are higher than the national average, which increased as the age of school programs increased. This trend has been observed since 2009 when "A Survey on the Internet Use Environment by Youths" was launched by the Cabinet Office. The multiple-choice survey focused on Internet use content through smartphones, which showed that communications (89.9%), watching videos (85.2%), and listening to music (78.8%) were popular among high school students [4]. This result is consistent with the international online questionnaire conducted by the Ministry of Internal Affairs and Communications, JAPAN (2014).

The Institute for Information and Communications Policy by the Ministry of Internal Affairs and Communications, JAPAN (2013) published "A Survey on Internet Use and Addiction Tendencies in Youths." [5]. This survey is the same international online questionnaire introduced in the six aforementioned countries and was used to conduct an age-specific

survey in Japan. Similarly, Young20 was used to confirm the degree of impact of Internet use on daily lives. The results were grouped into three categories, namely, high, moderate, and low degrees of Internet addiction, which is similar to those used by the international online questionnaire. The survey compared five groups of youths based on age, namely, fourth to sixth graders, junior high school students, high school students, university students, and adults. The results showed that the ratios of youths with a high degree of Internet addiction were 2.3%, 7.6%, 9.2%, 6.1%, and 6.2% for fourth to six graders, junior high school students, high school students, university students, and adults, respectively. In addition, the ratios for a moderate degree of Internet addiction were 16.4%, 35.7%, 50.8%, 45.0%, and 37.3% for the same groups. Among students, the ratio with scores of 40 or higher (moderate to high degrees of Internet addiction) increased with a rise in grade, where the ratio was highest at 60.0% for high school students. However, this ratio decreased among university students and adults. Based on age, the results indicated that the ratio between moderate and high degrees of Internet addiction was highest in high school students. Thus, the prevention and alleviation of Internet addiction in high school students has become urgent, and educational research is imperative to resolve these.

According to the survey by the Institute for Information and Communications Policy Ministry of Internal Affairs and Communications, JAPAN (2014), students with high levels of Internet addiction were more likely to be dissatisfied with close relationships and social life [6]. Kotera (2013) argued that two-way communication platforms, such as chats, mails, online games, and SNS, promote excessive use of the Internet [7], whereas Katsura and Matsui (2018) proposed that the use of LINE, a type of SNS, was addictive and negatively impacted mental health [8]. In addition, Kawai (2014) mentioned that the more an individual uses social media in relation to friendship, the more others appear to be happy, which results in a low level of satisfaction with friendship [9]. Hashimoto et al. (2011) assumed that a low degree of satisfaction in friendship leads to a high degree of Internet addiction, thus indicating a link between the two aspects [10]. Inagaki et al. (2017) reported that youths addicted to the Internet displayed poor school-life skills, which are important for successfully completing education [11].

Reviewing cases in other countries, Lin and Tsai (2002) surveyed the Internet addiction of high school students in Taiwan [12]. Results showed that among 753 high school students, 88 were classified as having Internet addiction. Compared with those not addicted and using the Internet for only 9 h a week, those who are addicted spent 18 h a week on the Internet. They scored significantly lower than those not addicted in the survey on schoolwork and relationships. Yan et al. (2014) conducted a survey on Chinese students and found that those who are severely addicted to the Internet reported often experiencing high levels of stress in school relationships over the previous 12 months [13]. Jun and Choi (2015) reported that among South Korean high school students, negative emotions, such as depression, anxiety, and inferiority, impact Internet addiction [14].

Given that the school is a place where students stay and interact for many hours, the results indicated a link between communication in school and Internet use/addiction. Thus, this study proposes that discussing and examining Internet use, such as online communication, through direct communication in schools can lead to resolution of issues related to Internet addiction.

1.3 Behavioral Improvement through Awareness of Internet Addiction

The transtheoretical model (TTM) is a theory on changing problematic behaviors (Prochaska 1997) [15]. This model is a health behavior theory that is globally respected because it understands health problems, such as smoking and drinking in people who are addicted to nicotine or alcohol, and promotes changes in behavior. With this theory, Sakai and Shiota (2018) examined the prevention of and improvement in Internet addiction. Children who are in "precontemplation" of TTM assess themselves as "unlikely to become addicted to the Internet." Thus, these children are not trying to change their behavior because they are not interested in Internet use and addiction [16]. According to a report by the Institute for Information and Communications Policy, Ministry of Internal Affairs and Communications, JAPAN (2013), "one is often unaware whether they are 'addicted to the Internet' or not, and the present scales with many subjective questions have limitations." The institute also pointed out that "objectively, they are unable to control the amount of time spent online." [6] In other words, it describes the difficulty of subjective awareness of one's Internet use and controlling the amount of time spent online. Sakai and Shiota (2018) discussed the importance of awareness among students in preventing and improving Internet addiction [16]. The authors defined "being 'aware' of Internet addiction tendencies" as "accurately recognizing one's Internet use compared with others of the same age group and its impact on their own bodies and lives." In contrast, being unaware of Internet addiction tendencies was defined as "the lack of objective understanding of one's Internet use and not accurately recognizing its impact despite experiencing it on their bodies and in their lives." In other words, a method for approaching students who are unaware yet confident that they use the Internet appropriately should be examined. Based on these definitions, increasing awareness in students that continuing the current usage can lead to Internet addiction or that they are already addicted to the Internet can lead to the prevention of and improvement in Internet addiction tendencies. As such, this study deems that education that enables awareness of Internet use and addiction in users will be effective.

Few studies aim to prevent and improve Internet addiction through the computer science department curriculum in high schools (Tsuruta and Nojima 2015; Inagaki et al. 2016) [17] [18]. Furthermore, practical studies that aim to increase the awareness of Internet use and addiction in high school students are lacking. Therefore, this study aims to develop lectures that prevent and improve Internet addiction tendencies by increasing awareness of Internet use and addiction in high school students and examine its effect. To achieve this goal, this study referred to the previous literature and examined the types of lectures that will promote awareness of Internet use and addiction. Next, based on such an examination, we developed a lecture for high school students and carried out a discussion. To examine the result of the lecture, we browsed the comments of students with regard to changes in awareness of Internet use and addiction and highlighted how the duration of Internet usage changed as a result.

2 Development and Practice of Lecture Promoting Awareness of Internet Addiction

2.1 Lecture Promoting "Awareness" of Internet Addiction

This study examines a lecture that promotes awareness of Internet use and addiction in students and prevents/improves Internet addiction. Many lectures on Internet addiction have been taken as information ethics education, and many students undergo a simulation of problems. Previous studies included chat experiences with "real name" and "anonymity" (Toda et al., 2010) [19] and a role-play of "LINE ostracization (by a group in SNS)" (Nakano et al., 2013) [20]. In addition, Nishikawa et al. (2016) showed that curriculum based on experiences was more effective in information ethics education for improving the recognition of information ethics than case studies [21]. Such trouble simulation practices are independent learning methods in which students make decisions. Lectures using trouble simulation frequently examine responses where students are either victims or perpetrators. However, as discussed in this study, if we deal with problems with individual Internet usage, then Internet addiction requires no simulation. The reason behind this notion is that the awareness promoted by simulation-based lectures is awareness of risks of potential future problems, which differs from awareness of current problems, which is the aim of this study. In other words, students should become aware of Internet use and addiction as a current problem and find solutions.

What kind of a lecture is effective in making students aware of the present problem? Sugaya (2007) reported that as learners in information literacy education monitor their learning activities, they organize reasons and causes for their inabilities, thus "clarifying problems to be solved" with their power [22]. In terms of learning about Internet addiction, examining one's Internet use and understanding it as a personal problem can enable the students to clarify the problems to be solved. However, students may deem themselves immune to Internet addiction problems. The reason for this notion is the different recognition from others. For example, students who are unaware of excessive Internet use may have a different idea of excessive use than others. To promote awareness in such cases, students must be made aware of differences in recognition and should objectively recognize their situation. Sakai and Shiota (2018) argued that designing a situation in which learners can discuss in relation to themselves instead of proposing educational materials and documents as topics of discussions is important [16]. In this manner, learners are given an opportunity to review their character. Therefore, we assume that even students who are unaware of Internet addiction can be encouraged to become aware of their Internet addiction by examining Internet use and holding discussions with other learners.

As such, the conventional lecture style in information ethics classes that examines simulation scenes is not considered to be sufficient in terms of promoting the awareness required by the study. A lecture that promotes awareness of Internet addiction, which is the goal of this study, should be considered a lecture that enables examination from both sides, that is, clarification of the problem to be solved by oneself and different recognition from others. Such a lecture can promote awareness of Internet addiction in learners, which we intend to develop.

2.2 Outline of the Practice

As discussed above, we developed a lecture practice that promotes "awareness" of Internet addiction, which is the goal of this study. We assumed a lecture to be taught in a high school computer science department and prepared a four-part curriculum (50 minutes each). We assumed this curriculum as a practice that promotes awareness of Internet addiction in this study and took a lecture.

During the first session, we had students input their Internet use duration and provided the data back to students. In a previous class, students were given a form to record the duration of their Internet use. Items to be recorded included time spent on the Internet, SNS, smartphones, portable games, and non-portable game consoles. "Internet," as an item to be recorded, refers to the total time the Internet was accessed, regardless of the device used. This means that the duration of "SNS" and "smartphone" use overlaps, but students were asked to record both. For example, if a student spent three hours online accessing SNS using a smartphone, he/she recorded three hours for each item. Students recorded their hours every night before going to bed. Among high school students who were the subjects of this study, 309 out of 314 (98.4%) accessed the Internet using their smartphones. This result is consistent with the survey result from the Cabinet Office (2019): "97.5% of high school students access the Internet using smartphones [4]." In other words, most high school students accessed the Internet using smartphones. Under such circumstances, when surveying the duration of Internet, SNS, and smartphone use by students, we instructed students to use functions of apps or smartphones to record the duration rather than using their own subjective assessment. Students input the record for one week into a spreadsheet, calculated the daily average, and submitted the result to their teachers. At this point, we had students predict and summarize their own Internet usage tendencies and the tendency of the entire class. Table 1-1 shows an example. Many students mentioned gender-based differences in the prediction, where male students were expected to spend more time "playing games," whereas female students would be "using SNS." In this example (Table 1), student A represents a typical result for male students, while student B represents female students. Teachers removed any personal data from usage duration data collected from the entire class and returned the class-wide data back to the students. As homework, students were asked to write a report that analyzes two points—"class-wide Internet usage tendencies" and "comparison of one's own Internet usage tendencies and others"—based on the data provided. Students were also told that they would present their report during the following class.

During the second session, students analyzed the duration of their Internet use using spreadsheet software. Many students obtained their average duration of usage based on conditions such as the entire class and genders and compared them with their own usage. The goal was that "problems to be solved would be clarified" for each student or the entire class through these analyses. Students were encouraged to communicate with students in the same group in performing these tasks. This was to provide an opportunity to learn how others feel about Internet usage, which should result in awareness of their "difference perspective" from others. Functions of smartphones and apps were used to record the duration of smartphone usage. This was because even if students thought "this is about how long I use my smartphone," their subjective assessment and the actual duration were likely to be different. Actually, the subjectively assessed durations were shorter than the durations obtained from the functions of smartphones and apps. In other words, many students used smartphones for long periods of time even if they thought they did not. This also led to awareness of a "different perspective." Finally, data obtained from the analysis were summarized in a table and a graph for clarity. This step was to make the in-

formation easier for others to understand. However, the goal was not limited to that. By preparing tables and graphs, students would be able to "identify problems to be solved" for themselves.

During the third session, students prepared and submitted a report that answered items one to five (Table 1) based on the table and graph prepared by the analysis. Based on this report, students prepared a presentation. By writing the report, students were to "identify problems to be solved" for themselves as they examined their own Internet usage and addiction.

During the fourth session, students presented their reports to their own groups. Subsequently, the group freely asked questions about the presentations and discussed their opinions on their Internet and game usage. By listening to others' opinions, students were to understand "different perceptions" of Internet addiction and addiction itself. This was followed by students submitting written comments about the curriculum (Tables 1 and 6.). Based on the comments, teachers confirmed that students were able to "identify problems to be solved" and understand a "different perspective" regarding Internet usage and addiction, and they assessed whether it was a lecture that promoted "awareness."

2.3 Putting the Lecture into Practice

The developed lecture was given to 314 students in their third year of public high school (165 male students and 149 female students) in June 2018. The present curriculum takes a total of four hours. Students were already aware of how to prepare a presentation and a report, perform analysis using spreadsheet, and use the Internet. The lecture for this study and the lectures before and after the lecture were taken by the first author.

The characteristics of the present practice were that by analyzing one's own duration of Internet usage, students could "identify problems to be solved" for themselves. By comparing these results with others, they could understand a "different perspective." In this manner, this curriculum promotes "awareness" of Internet addiction. Whether students actually gained "awareness" was confirmed from reports and comments. We predicted that by becoming "aware," students would spend less time using the Internet, SNS, smartphones, portable games, and non-portable game consoles after the curriculum. To examine this prediction, we had students record the duration of their usage for the same items two weeks after the curriculum to confirm any changes.

Table 1. Questions and Examples of Students' Answers

1. Let's predict the usage tendencies of the class.
Student A (male) Male students spend more time using the Internet. This is because they play more online games. **Student B (female)** Female students spend more time using the Internet. This is because they are on SNS more.
2. What were the types of data used to confirm the prediction and results?
Students A and B Overall usage is longer in male students. Male students play games, while female students use SNS for a long period of time.
3. What does data say?
Student A Once you start playing a game, it is easy to play for a long time. However, as SNS has an objective, its use is limited. It is difficult to decide the timing of SNS use on your own unlike games since other people can send you messages. **Student B** Since SNS is not used unless there are new posts by yourself or others, its duration would not be as long as games.
4. What are your thoughts on errors in predictions and results?
Student A As predicted, male students had longer duration of usage. Games are difficult to stop once started. For example, if you beat an enemy, a stronger enemy shows up right away, and the game goes on forever. This trend is a characteristic of online games. Since SNS has a purpose, you can limit its usage. Maybe men are more easily addicted to games. **Student B** Duration of use was longer for men than women. However, women spend longer time using SNS and think about SNS even if they are not using it since they look forward to updates. So, although women use it for a shorter period of time, it cannot be said that women are less addicted than men who use it longer.
5. What did you think about your Internet usage and the comparison of your Internet use to overall data?
Student A I use the Internet longer than the class average. This is because of games. I set the usage time, so I thought it was fine. But since I now know that I use it longer than the other students in the class, I will reexamine my usage. **Student B** I use the Internet for a shorter time than the class average. However, I look forward to SNS updates by others and reactions to my own updates, spending a lot more time thinking about it than others. I should make an effort to limit it by turning off notifications when I am studying, and so on.
6. Please tell us your opinions of this curriculum.
Student A I was concerned about my Internet usage, so I thought I was using it properly. But comparing it with my friends in the class by preparing a graph made me realize that I use it longer, so I hope to make improvements. It wasn't just me playing games too much, so my friends and I plan to reexamine our usage. **Student B** Using the data and graph made my usage clear. Comparison with others and presentations showed me that in some ways, other people were similar to me, while in other ways, they were very different. I liked that I was able to talk to my friends about our Internet usage going ahead.

3 Results of the Practice

3.1 Comments about "Awareness" of Internet Addiction

The lecture that promotes "awareness" of Internet addiction, which is the goal of this study, allows for an examination of the self from two perspectives: "identification of problems to be solved" and "different perspective" from others. Therefore, when students' report and comments provided at the end of the curriculum mentioned "identification of problems to be solved" and "different perspective" from others, we assumed that students gained "awareness" of Internet addiction. Out of 314 students, 306 submitted reports and comments.

The number of students who "identified problems to be solved" regarding their own Internet use and addiction was 274. These were students who made comments that could be classified into the following three categories: (1) their long duration of use being a problem, such as "through the survey, I realized that I spend longer time than I thought" and "I thought I was using it for a long period of time, but graphing it made it clear how long it really was"; (2) the manner in which they use the Internet is the problem, such as "I don't use it that long, but I am always thinking about SNS," "I spend a lot of time on games, and it surprised me how much time I was spending each day," and "I didn't think I was using it that long, but I am using apps on my smartphone for many purposes, and I wasn't doing things that actually need to get done"; and (3) being aware of addictive tendencies and wanting to make improvements, such as "I am addicted to the point where I need to have my phone near me all day, so I want to make improvements" and "I have my phone on me all day, and have been wanting to do something about it." Comments about their own Internet use and problems with addictive tendencies were considered "identification of problems to be solved."

One hundred and eighty-one students became aware of having a "different perspective" from others in terms of their own Internet use and addiction. Students were considered aware of a "different perspective" when they made comments that would be classified under the following three categories: (1) their use being longer than others or becoming aware of it, such as "I thought my use was normal, but I realized I use it much longer than others" and "I became aware that I play games much longer than others"; (2) becoming aware of differences from others in terms of their Internet use, such as "I paid attention to responses on SNS, but I realized some people didn't pay attention" and "I have more apps on my phone than others, using it longer and more often"; and (3) becoming aware of their own addictive tendencies being worse than others, such as "other people had set time, but I was using it all the time and never thought about setting time limit" and "I realized I want to be on my smartphone all the time much more than others." Comments about different perspectives from others were considered being aware of a "different perspective" from others.

When these comments were made, we considered that students became "aware" of Internet use and addiction through "identification of problems to be solved" and based on having a "different perspective" from others.

3.2 Overall Comparison of Duration of Usage Before and After the Practice

We compared the record of usage between before the lecture and two weeks after the lecture (Table 2). Surveyed items included the duration of Internet, SNS, smartphone, portable game, and non-portable game console usage. Each usage duration was the daily average and was calculated five days in the week (Monday to Friday) or two days on weekends (Saturdays and Sundays). Items that were not divided into weekdays and weekends included average use over seven days. "Internet use" means use of all devices that use the Internet, such as smartphones and computers. "SNS use" means only SNS use. "Smartphone use" refers to the time when any app is being used on smartphones. For example, if a student is online to access SNS using a smartphone, time is added to each item. Therefore, it is possible to compare the duration of usage between weekdays and weekends, but the duration for the Internet, SNS, and smartphone cannot be compared simply. We compared the duration of use before and after the practice. Since the number of students using portable games and non-portable game consoles at the time of the summary was small (36 and 35, respectively), only these students were considered subjects for these items. Internet use during weekdays and weekends and SNS use during weekends decreased after the lecture, but there was no significant difference in SNS use during weekdays. Duration of smartphone, portable game, and non-portable game use significantly decreased.

As such, other than weekday SNS use, weekday and weekend Internet use, weekend SNS, smartphone, portable game, and non-portable game use showed significant decreases after the lecture.

Table 2. Average Duration of Online Devices and Services (Minutes)

	Before practice		After practice		*T* value
	Average	*SD*	Average	*SD*	
Internet use during weekdays***	284.5	166.9	251.4	154.4	3.56
Internet use during weekends ***	358.2	194.3	304.1	163.3	5.98
SNS use during weekdays	77.8	83.6	68.8	94.9	1.63
SNS use during weekends**	106.5	111.8	85.6	93.8	3.43
Smartphone use**	228.6	128.6	206.4	115.3	3.48
Portable game use***	57.6	57.9	18.1	26.1	4.12
Non-portable game console use***	110.0	86.9	44.6	72.4	5.26

*** $p < .001$, ** $p < .01$, * $p < .05$

4 Discussion

Sakai and Shiota (2018) point out the importance of "awareness" in students to prevent and improve Internet addiction [16]. In this study, we developed a lecture that promotes the prevention of and improvement in Internet use and addiction through "awareness" and put it to use. The lecture that promotes "awareness" of Internet use and addiction, which is the goal of this study, allows for examination from two perspectives: "identification of problems to be solved" for themselves and having a "different perspective" from others. Through this line of thinking, we discuss whether students became "aware" of Internet use and addiction based on changes in the duration of their Internet use, reports, and their comments about the lecture. We also discuss whether there was any improvement in the actual Internet use through this lecture that promotes "awareness."

There were 274 students who "identified problems to be solved" in terms of their own Internet use. In their reports and comments, there were many references to becoming aware of their own excessive use through preparation of the table and graph. One hundred and eighty-one students became aware of having a "different perspective" from others in terms of their own Internet use. There were many comments about becoming aware of different perspectives about Internet use and addiction by comparing their own with others' Internet use to prepare the report, such as noticing that there are differences in the manner of usage duration. There were also comments about different perspectives based on the different manner of use, even when the duration was the same, which was discovered through presentations and communication with others in the same group. They examined the impact of excessive Internet use on studying and their bodies and daily lives caused by factors such as lack of sleep. There were comments such as "We were able to discuss how to use the Internet in the future." Based on these results, we assume that many students reached "the state of 'awareness' in terms of Internet use and addiction."

Next, let us discuss the improved behavior of students based on the actual duration of Internet use. In the survey taken two weeks later, the duration of use had significantly decreased. However, there was no obvious impact on weekday SNS use in the survey results. The reason for this is that a certain level of SNS use was necessary in school, such as communicating among students. For today's high school students, it is a normal activity to communicate through SNS, and it may be difficult to think about reducing time for this. A survey on the specific use of the Internet via smartphones by high school students and an examination of its relationship with Internet addiction are necessary, which has become our future challenge.

In this study, we examined the development and effects of a lecture that promotes "awareness" and prevents/improves Internet addiction in high school students as part of their school education. Students who were "confident of appropriate use" believed that "Internet use and addiction" were not related to them, putting them in "a state of unawareness." In such a case, even if risk and fear of Internet addiction are presented in a traditional teaching method, they would think that "this is not my problem," and this would not lead to prevention and improvement. However, as in this practice, when "students became appropriately aware of their own Internet use upon considering their usage in comparison to other people of the same age group and its impact on their health and daily lives," prevention of and improvement in Internet addiction were noted.

5 Conclusions

Over the last several years, portable devices that allow Internet use, such as smartphones, have become popular, drastically changing the lives of high school students. To survive in such an information society, students are required to appropriately use smartphones. However, instructing on appropriate use is ineffective for students who feel that "they are fine," as they are confident of their appropriate use. We assumed that teaching them to become "aware" that they may be "using too much" or may have "addictive tendencies" would be effective, and we developed the present lecture and discussed its practice and effects. The results showed that the present lecture can make students "aware" of Internet addiction and have a certain level of impact on the prevention of and improvement in Internet addiction. Meanwhile, since we did not have a control group that received a regular lecture on Internet addiction, we cannot determine whether the reduction in the usage duration was a result of "awareness." Furthermore, since we did not assess Internet addiction tendencies before and after the lecture, we cannot confirm the changes. These are future challenges. It is possible that each student might perceive "Internet use" differently, leading to a potential difference in the result. To avoid such a situation and survey students' Internet use in more detail, we need to classify "Internet use" in a finer manner. These can also be considered as future topics to be examined.

We consider this study an opportunity to examine how lectures on prevention of and improvement in Internet addiction should be and plan to continue our development of lectures that suit the situation of students.

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