

Effects of Self-Control and School Adjustment on Smartphone Addiction among Elementary School Students

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ABSTRACT

This study presents an examination of the effects of the sub-factors of both self-control and school adjustment on smartphone addiction among a sample of elementary school students. The study is comprised of 93 5th-grade students from x elementary school located in Seoul, Korea. A descriptive analysis, Pearson's correlation, and multiple regression analysis were performed, and the following two study results are presented: 1) Among the sub-factors of self-control, instant gratification positively predicts smartphone addiction. 2) Among the sub-factors of school adjustment, a student's adherence to school rules negatively predicts smartphone addiction. Based on these results, the implications for preventing smartphone addiction among elementary-school students are discussed.

Key words: Smartphone addiction, self-control, school adjustment, elementary-school students

1. INTRODUCTION

The smartphone has become ubiquitous, with a penetration exceeding 67% of the Korean population [1]. The information and communication environment has been completely altered by the rise of smartphones [24]. Smartphones can offer various multimedia and interactive services by converging voice calls and wireless internet functions. Now, the smartphone has emerged as a new tool to satisfy the needs of individuals, as well as the original text message and voice call functions [11], [12].

However, excessive smartphone use incurs problems such as smartphone addiction with consequent physical, psychological, and social problems. Physical problems include turtleneck symptom and decreased visual acuity, as well as psychological emotional problems including anxiety and nervousness [13]. Social problems include negative interpersonal relationship formation and impeding social development [3].

Smartphone-addicted people suffer anxiety if they lose their phone which leads to difficulties in daily life [6]. Moreover, it is likely to cause a serious addiction problem for students with low self-control [31]. In addition, school

adjustments such as making peer relationships and keeping school rules are also affected by smartphone addiction [10], [30].

In response to this trend, research was recently conducted to investigate the causes of smartphone addiction. However, most of the previous research participants were university students or adults, with very little research conducted on smartphone addiction in elementary school students. Smartphone addiction with elementary school students differs from that with university students.

Based on recent research data from [22], the Ministry of Education in Korea indicated that elementary school students are also addicted to smartphones. In addition, a high smartphone addiction group of teenagers was 2.9 times higher than an adult group based on a survey from the National Information Society Agency in 2013. The smartphone addiction problem of teenagers is more serious than that of adults, which leads to an addiction problem in adolescence. Therefore, smartphone addiction is an important issue in elementary school students and smartphone addiction is highly likely to negatively affect the learning and school life of elementary school students [4]. We need systematic research about factors affecting smartphone addiction

Several factors influence smartphone addiction, but, in this study, we decided to examine self-control [26] and school adjustment [9] through the literature review. Therefore, the purpose of this research was to examine the effect of personal

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self-control and social school adjustment on smartphone addiction in elementary school students in order to find ways to prevent smartphone addiction and develop programs regarding smartphone addiction.

Concrete research questions are as follows:

1. Do sub-factors of self-control (long-term satisfaction, instant satisfaction) predict smartphone addiction in elementary school students?
2. Do sub-factors of school adjustment (learning activities, school rules, peer relation, teacher relation) predict smartphone addiction in elementary school students?

2. LITERATURE REVIEW

2.1 Smartphone Addiction

Smartphone addiction level is a dependence seen among smartphone users and it leads to inconveniences in daily life [6]. In addition, [29] defined that smartphone-addicted people gradually increased smartphone usage time and they felt anxious and nervous when without their smartphone. This research explained that the smartphone addiction concept was different from internet and mobile addiction. It added the differential concept due to the smartphone characteristics on smartphone addiction testing [22]. Thus, smartphone addiction level included internet addiction's common addiction concepts such as withdrawal, tolerance, and difficulty of daily living, while differential concepts were addiction possibility with convenient access rate which touched once, easy portability and accessibility increase due to the push function, and various app and contents. Based on this media characteristic, a smartphone addiction test for adolescent was developed that consisted of 4 sub-factors: difficulty of daily living, virtual world intentionality, withdrawal, and tolerance.

Previous studies reported that high smartphone addiction had trouble with mental health and school life. Even though smartphone addiction can affect student learning [8], [22], little research has been conducted about smartphone addiction in elementary school students.

2.2 Self-Control and Smartphone Addiction

Self-control is defined as the ability to control oneself without any outside power to try to act with the appropriate behavior without seeking instant satisfaction and with thinking about the future [15]. In addition, it also includes the conscious deterrence of undesirable responses [20]. This means that self-control depends on long-term results when making decisions [26]. Based on this, people control their behavior with conscious revision of automated action. This is an important factor in the mobile and on-line environments. Self-control plays an important role in smartphone addiction and prevention [10]. The previous research revealed that the lower self-control, the higher was the smartphone dependency [18]. In other words, those with high self-control are likely to have lower smartphone addiction [5], [11], [18], [19]. For example, it showed that self-control level predicted smartphone addiction negatively with middle school students [18]. In addition, [19] also indicated that lower self-control ability increased the possibility of adolescent smartphone addiction. In detail, instant

satisfaction influenced mobile phone addiction of middle school students and long-term satisfaction only influenced smartphone addiction of female students [16]. In addition, instant satisfaction was a significant predictor of mobile phone addiction with high school students, while long-term satisfaction was not [14]. However, conflicting results were also reported. In the study of [7], self-control was not found to have a significant effect on smartphone addiction with elementary school students. In other words, Instant satisfaction and long-term satisfaction did not predict smartphone addiction. Thus, different results regarding self-control and smartphone addiction have been presented. The present study examined the predictability between self-control and smartphone addiction. Since little research has been conducted on elementary school students, this group was selected as the study participants. The study findings will contribute to finding ways to prevent smartphone addiction in elementary school students.

2.3 School Adjustment and Smartphone Addiction

School adjustment is defined as the feeling of satisfaction with rationally solving an individual's desire in a subject, class activity, extra-curricular activity, etc., and having harmonious relationships with teachers and peers [20]. In addition, this is a process to cope with stress based on school class, peer relation, and school environment in a balanced way [27]. If they lose the balance, students feel negative emotions such as anxiety, dissatisfaction, and tension [25]. During elementary school, students learn about peer relations through school life, while also developing sociality and learning various social skills.

In a previous study, the results showed that school adjustment was a predictor of smartphone addiction [9]. 'From the 'effects of depression scale, interaction anxiety and school adjustment on cellular phone addiction of teenagers' study described that school adjustment is an explanatory variable of mobile addiction[8]. In addition, having low school adjustment was associated with higher mobile phone addiction of high school students. Students responded that school regulation about mobile phone usage was normal [16]. Furthermore, sub-factors including school rules and peer relations were also observed to predict smartphone addiction with elementary students [7]. However, in another study, peer relation was only predicted significantly on smartphone addiction with high school students [8]. Thus, different results regarding the sub-factors of school adjustment and smartphone addiction have been presented. Few comprehensive studies have been conducted using various variables. Therefore, in this study, self-control was used as a variable of individual life, and school adjustment as a variable of social life to find the effects on smartphone addiction in elementary school students.

3. METHODS

3.1 Participants and Procedure

The survey sample comprised 116 5th grade elementary students from Seoul, Korea, of whom the 23 students who indicated that they didn't have a smartphone were eliminated. The remaining 93 subjects for analysis comprised 45 male

students (49%) and 48 female students (51%). A self-report survey was utilized in this research.

SPSS was used in the data analysis. First, the average and standard deviation of the related variables were determined. Correlation analysis was conducted to analyze relations between smartphone addiction and the factors included in self-control and school adjustment. Finally, multiple regression analysis with the stepwise method was applied to examine the predictability between the independent and dependent variables.

3.2 Measurements

3.2.1 Smartphone Addiction: To measure smartphone addiction, the questionnaire developed by [23] was employed. The smartphone addiction scale for youth was developed based on the internet addiction and mobile addiction scale. It was used to test 3816 students in Korea, from elementary school to high school students. This scale satisfied the criterion related validity and construct validity. The survey used herein consisted of 15 questions on a 4-point Likert scale. The sub-factors were difficulty of daily living (5Q), withdrawal (4Q), tolerance (4Q), and virtual world intentionality (2Q). The total Cronbach's α in this research was .92 and Cronbach's α of difficulty of daily living was .98, of withdrawal was .96, of tolerance was .98, and of virtual world intentionality was .98. Higher scores on the smartphone addiction scale indicated higher smartphone addiction.

3.2.2 Self-Control: Self-control was measured using the questionnaire developed by [22], which was based on the research of Gottfredson & Hirschi (1993). Higher scores indicate higher self-control. The survey consisted of 20 questions measured on a 4-point Likert scale, and included sub-factors of long-term satisfaction (10 questions) and instant satisfaction (10 questions), with Cronbach's α for these sub-factors of .96 and .95 in this study, respectively.

3.2.3 School Adjustment: School adjustment was measured through the questionnaire developed by [19], which consisted of 20 questions measured on a 4-point Likert scale. The sub-factors included learning activities (5 questions), school rules (5 questions), peer relationship (5 questions), and teacher-student relationship (5 questions). The Cronbach's α of learning activities in this study was .63, and the Cronbach's α of school rules was .85. Peer relationship and teacher-student relationship obtained Cronbach's α scores of .90 and .97, respectively.

4. RESULTS

4.1 Descriptive Statistics among Self-Control, School Adjustment, and Smartphone Addiction

The mean scores and standard deviations for the study variables and sub-factors are listed in <Table 1>. Mean score of smartphone addiction was 1.82($SD=.383$), mean score of long term satisfaction was 2.97($SD=.478$), mean score of instant satisfaction was 2.02($SD=.534$), mean score of learning activities was 2.97(1.88), mean score of school rules was

3.28($SD=2.32$), mean score of peer relation was 2.88($SD=2.13$), mean score of teacher relation was 3.34($SD=2.51$).

Table 1. Results of descriptive statistics

(n=93)			
Variable	Sub-factors	M	SD
Smartphone addiction(SA)		1.82	.383
Self-Control (SC)	Long term satisfaction(LS)	2.97	.478
	Instant satisfaction(IS)	2.02	.534
School Adjustment (SAJ)	Learning activities(LA)	2.97	1.88
	School rules(SR)	3.28	2.32
	Peer relationship(PR)	2.88	2.13
	Teacher relationship(TR)	3.34	2.51

4.2 Correlation Analysis among Self-Control, School Adjustment, and Smartphone Addiction

Correlation analysis was conducted to investigate the relationships among self-control, school adjustment, and smartphone addiction. Based on Table 2, there were significant correlations between the variables. However, no significant correlations were found between instant satisfaction-learning and learning activity, smartphone addiction and peer relationship, instant satisfaction and peer-to-peer relationship, or instant satisfaction and teacher-student relationship.

Table 2. Correlations among smartphone addiction, self-control, and school adjustment

(n=93)							
variable	LS	IS	LA	SR	PR	TR	SA
LS	1						
IS	-.326**	1					
LA	.368**	-.065	1				
SR	.562**	-.226*	.315**	1			
PR	.375**	-.058	.329**	.297**	1		
TR	.415**	-.114	.517**	.488**	.371**	1	
SA	-.270**	.329**	-.268**	-.344**	-.173	-.225*	1

* $p < .05$. ** $p < .01$

4.3 Effects of Self-Control and School Adjustment on Smartphone Addiction

To address research question 1, step-wise regression was conducted on the effects of the sub-factors of self-control in predicting smartphone addiction. The results of regression analysis showed that instant satisfaction had a significant influence on smartphone addiction ($\beta = .329, p < .01$). The results are listed in Table 3.

Table 3. Regression of sub-factors of self-control in smartphone addiction

(n=93)						
Criterion variable	Predictor variable	B	β	t	P	F
						R^2 (adj. R^2)
SA	IS	.024	.329	3.321**	.001	11.027 (.098)
	LS		-.182	-1.762	.081	

** $p < .01$

Analysis was also conducted to examine which sub-factors of school adjustment (learning activities, school rules, peer relationship, teacher-student relationship) predicted smartphone addiction. The results of regression analysis showed that only school rules was a significant predictor of smartphone addiction ($\beta = -.344, p < .01$).

Table 4. Regression of sub-factors of School Adjustment in smartphone addiction

Criterion variable	Predictor variable	B	β	t	p	F	R^2 (adj. R^2)
SA	SR	-.057	-.344	-3.495**	.001	12.212	.118 (.109)
	LA		-.177	-1.727	.088		
	PR		-.077	-.748	.456		
	TR		-.075	-.661	.510		

** $p < .01$

5. CONCLUSION

This study investigated the sub-factors of self-control and school adjustment for the prediction of smartphone addiction. In the process, 93 surveys were analyzed with correlation and step-wise regression analysis in SPSS. The results were as follows.

First, we investigated the effects of the sub-factors of self-control on smartphone addiction in elementary school students. Among the sub factors of self-control, instant satisfaction positively predicted smartphone addiction, which is also supported by the results of previous research [14]. In other words, those who seek instant satisfaction are more likely to be addicted to smartphone than those who seek long-term satisfaction. Therefore, to prevent smartphone addiction, we should adapt self-control programs to increase self-control. In addition, we should reform the class environment such that it increases self-control at school.

Second, we investigated the effects of the sub-factors of school adjustment on smartphone addiction in elementary school students. School adjustment was negatively correlated with smartphone addiction. In other words, students who have high school adjustment have low possibility of smartphone addiction. In detail, keeping school rules negatively predicted smartphone addiction. This result supports those of a previous study [17], which means that learners who keep school rules are likely to use smartphones more reasonably, and which negatively predicts smartphone addiction. The school rule variable was the most influential factor on cellphone addiction in elementary school students [29]. Therefore, we should develop an educational program to intensify school adjustment. For example, we can give training sessions to teachers during vacation and activate a smartphone addiction program.

In this study, we set self-control as a personal variable and school adjustment as a social variable to examine the predictability of smartphone addiction of elementary school

students. Finally, we found that instant satisfaction and school rules significantly predicted smartphone addiction in elementary school students. This research gives us guidelines and strategies which could help develop a smartphone addiction prevention program.

This study had several limitations. First, the participants were 5th grade elementary school students in Seoul, Korea. Therefore, it is difficult to make generalizations about all elementary school students. Further research needs to examine smartphone addiction with students of various ages. Second, a self-report survey was used in this research. To overcome problems of objectivity and untrustworthy answers, etc., further qualitative research methods such as interview are needed. Third, other learner characteristics such as psychological variables may also be important in understanding smartphone addiction. Further research is needed to investigate the effect of personality on smartphone addiction. Finally, we should find a way to enhance the behaviors of seeking long-term satisfaction [2] and keeping school rules to prevent addiction.

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