

# Effects of Smartphone Addiction Prevention Program on Smartphone Addiction Tendency and Self-Control of Children using Local Children's Centers

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*Abstract The current research takes those children using local children's centers as subjects of research, and aims to identify the effect of preventive education programs for smartphone addiction on their addiction and self-control. SPSS version 22.0 for Windows was used for data analysis to develop kinder teacher treatment play therapy for kindergarten children. Among nonparametric statistical methods, the Mann-Whitney U Test and the Wilcoxon Singed-Rank Test were conducted. The results of this study are summarized as follows. The analysis of the subjects' smartphone addiction found that the educational program did produce a significant difference. Second, it was also found in the examination of the preventive educational program on the subjects' self-control that a significant increase was obtained in all the 6 factors of thoughtfulness, task tolerance, resistance against temptations, emotional control, friend-related control and teacher-related control. This study shows that it is expected that further researches would follow with a group of lower-class elementary students and ordinary children to come a more generalized conclusion.*

**Keywords:** Smartphone Addiction Tendency, Self-Control, Local Children's Center

## I. INTRODUCTION

Local children's centers basically provide children with a variety of programs in such areas as education, culture, protection, and emotional support. Often, some of the programs are customized for them by taking the characteristics of local communities and local residents[1].

It is also true that most of the after-school programs in the centers are limited to tutoring, meals(dinner), computer classes, literacy skills, learning guidance for Chinese characters and fine arts[2]. Concerns, thus, about the necessity for a wider variety of welfare programs have been raised to keep up with children's personal and social changes [3].

Media addiction is one of the hot topics in the field. A set of media including internet, games and smartphones, often referred to as 'the other parents', now exert an enormous amount of influence on child development[4]. To take an example, a portion of potential risk group in terms of the use of smartphones was reportedly 10.7 % for those in early

childhood, which is a 6 % increase from the previous year[5]. What makes us concerned and troubled might be that this figure is greater than that for adults. It seems clear that voices of concern about children's addiction to smartphones should now be taken more seriously.

In general, children's addition to smartphones is closely related with low self-respect and self-control, and high depression and impulsiveness[6,7]. Many children using local children's centers, due to problems resulting from financial difficulty, are more likely to be present-focused and impulsive, and, thus, to experience depression, helplessness and negative self-image[8]. It was also reported that poor living conditions and low family bond would lead to low self-respect of those children using local children's centers and, as a consequence, to higher risk of smartphone addiction[9].

In sum, such environmental characteristics of children using local children's centers call for more attention from society than other ordinary children, and education programs should be provided to prevent them from turning into risk group of smartphone addiction and to train them to use smartphones with discernment [10]. Attempts have been made to develop and carry out such preventive programs for ordinary children, but few programs have targeted children using community children's centers.

The current research, thus, takes those children using local children's centers as subjects of research, and aims to identify the effect of preventive education programs for smartphone addiction on their addiction and self-control.

## II. METHODS

### A. Research Participants

The present research started with purposive sampling of a group of subjects, who are in the 4th to 6th grade using local children's centers located in the cities of Asan and Cheonan in Choongnam Province. We identified a group of 24 children as belonging to potential risk group (42-44 points). The subjects were classified into an experimental group of 12 children and a control group of another 12 children. The educational program lasted for 8 weeks between Oct. 10, 2018 and Dec. 1, 2018.

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**B. Research Tools**

Adolescents' addiction to smartphones adopted the self-evaluation scale developed by [5] to measure smartphone addiction. The tool, mainly used for teenagers, consisted of 15 items in 4 categories: 5 items for problems in daily life, 2 items for virtual world-oriented, 4 items for abstinence syndrome, and 4 items for task tolerance. Each item was measured on a 4-point Likert scale. Cronbach  $\alpha$  was obtained at .896.

Scale for self-control adopted [11] self-control scale developed to measure self-control of pre-schoolers. The scale consists of a total of 43 measurement items in 6 categories: 12 items for thoughtfulness, 9 patience for tasks, 7 for resistance against temptation, 6 for emotional control, 4 friend-related control and 5 for teacher-related control. The items were measured on a 5-point Likert scale. Cronbach  $\alpha$  was obtained at .903.

**C. Data Analysis**

The collected data was analyzed by using the statistical program of SPSS 22.0 version. A nonparametric statistical method of Mann-Whitney U test was used in order to test the homogeneity of demographic characteristics of the two groups under investigation and to validate the effectiveness of the preventive educational program. Wilcoxon Signed Rank Test, in turn, identified the differences between the pre- and post-test of smartphone addiction and self-control of the experimental and control groups.

**III. RESULTS**

**A. Test of Homogeneity**

Wilcoxon signed rank test is more powerful than sign test when paired two group's difference verification.

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{N-1}}} \quad (1)$$

Mann-Whitney U test is used because of simplification of test.

$$U_1 + U_2 = n_1 n_2 + n_1 n_2 + \frac{n_1(n_1+1)}{2} + \frac{n_2(n_2+1)}{2} - (\sum R_1 + \sum R_2) \quad (2)$$

$$n_1 n_2 + \frac{n_1(n_1+1)}{2} + \frac{n_2(n_2+1)}{2} = \sum R_1 + \sum R_2 = T \quad (3)$$

so,

$$U_1 + U_2 = n_1 n_2 \quad (4)$$

Table 1: Inter-group homogeneity in smartphone addiction and self-control

group	N	average rank-su	Mann-Whitney U	z	p		
smartphone addiction	Experimental	12	13.04	156.50	65.500	-.382	.703

	Control	12	11.96	143.50			
self-control	Experimental	12	11.21	134.50	56.500	-.896	.370
	Control	12	13.79	165.50			

The average ranks of the experimental and the control groups were 13.04 and 11.96, respectively, which indicates that no significant difference was found between the two groups as shown in Table 1. What it means would be that addiction to smartphones was found at a similar level and that, as a consequence, inter-group homogeneity was identified.

In a similar vein, statically significant difference was not found in terms of self-control between the two groups, which also means that inter-group homogeneity was identified before the program went into effect.

**B. Effect of the preventive program on reduction of the children's addiction to smartphones**

The differences in smartphone addiction of the experimental group between before and after the intervention of the program as shown in Table 2.

Table 2: Differences in smartphone addiction between before and after the intervention of the program for the experimental group

Exp. Group(N=12)	N	average rank	rank total	z	P	
smartphone addiction	negative rank <sup>a</sup>	12	6.50	78.00		.002
	positive rank <sup>b</sup>	0	.00	.00	-3.062**	
	equal <sup>c</sup>	0				
posttest - pretest	total	12				
problems in daily life	negative rank <sup>a</sup>	12	6.50	78.00		.002
	positive rank <sup>b</sup>	0	.00	.00	-3.070**	
	equal <sup>c</sup>	0				
posttest - pretest	total	12				
virtual world-orientedness	negative rank <sup>a</sup>	8	5.38	43.00		.014
	positive rank <sup>b</sup>	1	2.00	2.00	-2.448*	
	equal <sup>c</sup>	3				
posttest - pretest	total	12				
abstinence syndrome	negative rank <sup>a</sup>	11	6.00	66.00		.003
	positive rank <sup>b</sup>	0	.00	.00	-2.956**	
	equal <sup>c</sup>	1				
posttest - pretest	total	12				
task tolerance	negative rank <sup>a</sup>	12	6.50	78.00		.002
	positive rank <sup>b</sup>	0	.00	.00	-3.072**	
	equal <sup>c</sup>	0				
posttest - pretest	total	12				

\* p<.05 \*\* p<.01 a. posttest<pretest, b. posttest>pretest, c. posttest=pretest



The results of the analysis of the differences in smartphone addiction of the experimental group found 12 cases of minus signs and no positive sign. The average rank, when the result in the posttest was smaller than that in the pretest, was obtained at 6.50, and it was 0.00 when larger. The contrast was statistically significant at the level of  $p < .01$ . Thus, it can be assumed that the preventive education program exerted a positive influence and helped reduce their addiction. Here, a negative number indicates that smartphone addiction in the posttest was less than that in the pretest. Moreover, the differences in smartphone addiction between the posttest and the pretest were not insignificant for the control group. This clearly supports the conclusion that the education program was effective in reducing the subjects' smartphone addiction.

### C. Effect of the preventive education program on self-control of the subjects

Wilcoxon Signed Rank Test intended to examine the differences in self-control ability between the pre- and post-test obtained the following results shown in Table 3.

Table 3: Differences in self-control between before and after the intervention of the program for the experimental group

Experimental (N=12)		N	average rank	rank-sum	z	p
self-control	negative rank <sup>a</sup>	0	.00	.00		
	positive rank <sup>b</sup>	12	6.50	78.00	-3.065*	.002
	equal <sup>c</sup>	0				
	total	12				
thoughtfulness	negative rank <sup>a</sup>	0	.00	.00		
	positive rank <sup>b</sup>	12	6.50	78.00	-3.069*	.002
	equal <sup>c</sup>	0				
	total	12				
task tolerance	negative rank <sup>a</sup>	0	.00	.00		
	positive rank <sup>b</sup>	12	6.50	78.00	-3.074*	.002
	equal <sup>c</sup>	0				
	total	12				
resistance against temptations	negative rank <sup>a</sup>	0	.00	.00		
	positive rank <sup>b</sup>	12	6.50	78.00	-3.069*	.002
	equal <sup>c</sup>	0				
	total	12				
emotional control	negative rank <sup>a</sup>	0	.00	.00		
	positive rank <sup>b</sup>	12	6.50	78.00	-3.062*	.002
	equal <sup>c</sup>	0				
	total	12				

friend-related control	negative rank <sup>a</sup>	0	.00	.00		
	positive rank <sup>b</sup>	12	6.50	78.00	-3.070*	.002
	equal <sup>c</sup>	0				
	total	12				
teacher-related control	negative rank <sup>a</sup>	0	.00	.00		
	positive rank <sup>b</sup>	12	6.50	78.00	-3.074*	.002
	equal <sup>c</sup>	0				
	total	12				

\*\*  $p < .01$  a.  $\text{posttest} < \text{pretest}$ , b.  $\text{posttest} > \text{pretest}$ , c.  $\text{posttest} = \text{pretest}$

All the 12 cases marked positive (+) values. The average rank was 0.00 when the data in the posttest was smaller than that in the pretest, while it was 6.50 when larger. The difference was found statistically significant at the level of  $p < .01$  as shown in Table 3. Again, therefore, it can be concluded that the preventive education program was effective in helping enhancing the subjects' self-control. Here, the result in a positive sign indicates that the subjects' self-control was higher in the posttest than in the pretest.

The control group, on the other hand, did not show statistically significant difference between the post- and the pretest, which also supports our conclusion that the preventive education program would help enhance the self-control of the children under discussion.

## IV. DISCUSSIONS AND CONCLUSION

First, the analysis of the subjects' smartphone addiction found that the educational program did produce a significant difference, as expected, in all the factors of problems in daily life, abstinence syndrome, tolerance and virtual world-oriented. Significant changes in daily life problems and tolerance, which may well be related with self-regulation ability and impulsiveness, could result from letting them go through the stage of increasing self-control. It might be assumed that explanation of the side effects and adverse effects of overuse of smartphones aroused their attention and led to such positive changes.

Second, it was also found in the examination of the preventive educational program on the subjects' self-control that a significant increase was obtained in all the 6 factors of thoughtfulness, task tolerance, resistance against temptations, emotional control, friend-related control and teacher-related control. Such a result might indicate that a greater level of seeking long-term satisfaction would lead to a lower level of smartphone addiction.

In other words, a higher level of self-control can be closely related with a higher level of resistance against temptations and impulsiveness, which would eventually lead to planning and controlling the use of smartphones.

To conclude, the present research found that the preventive education program would help the children under discussion improve their self-control, better face a variety of other possible problems at home or school than smartphone addiction and grow as responsible members of society with desirable character.

Based on the findings of the research, a few suggestions for future researches are worthwhile to note. A small size of samples and regional limitation make it hard to come to a generalized conclusion. The post-test was conducted right at the conclusion of the educational program. That is, we have not identified long lasting results and effect of such programs. Moreover, a variety of other factors including depression, stress, school life, and/or parenting behavior must be taken into consideration in future researches. Finally, it is expected that further researches would follow with a group of lower-class elementary students and ordinary children to come a more generalized conclusion.

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