

Predictive Factors of Self-control in Contactless Online Learners' Self-determination Motivation: Mediated effect of self-efficacy

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Abstract

This study aims to provide basic data on establishing online learning by identifying the effects of self-efficacy as a medium on factors affecting self-control according to self-determination motivation through contactless online learning due to Covid-19. The research method used SPSS 25 and Sobel test to examine the causal relationship between the spokesmen and 196 middle and high school students in W-city, Gangwon-do. Self-determination motivation has had a significant effect on self-efficacy and self-control, and self-efficacy has been shown to have a significant effect on self-control. Also, Self-efficacy had a partial mediating effect on self-determination motivation affecting self-control. Based on this, fundamental and continuous development of online education programs to promote self-control of online learners is required, and efforts should be made to support learners' capabilities through psychological counseling.

Keywords: Contactless Online Learning, Self-determination motivation, Self-efficacy, Self-control, Mediated effect

1. Introduction

Today, global pandemic phenomena caused by Covid-19 have led to many changes in learning, and elementary, middle, and high schools as well as universities have conducted unprecedented full-scale contactless online classes. Unlike face-to-face class methods, online class design differs in terms of learning paradigms such as class delivery methods, communication methods, and class progression methods, and requires a lot of effort and time for online design [1]. In the case of contactless learners, the learning effect is also expected to be related to the influence of self-control according to self-determination motivation. Self-determination motivators are defined as self-determination if an individual is synced internally and control if an individual is synced externally [2]. According to [3], self-determination motivation is inherently synchronized behavior, recognizing that one has a choice in learning behavior and that the reason for studying also starts with oneself.

Self-control is the ability to self-restraint or appropriate behavior in various environments and situations to achieve long-term goals without anger-induced behavior by mediating emotions, cognition, and behavior [4]. Low self-control individuals may tend to be insensitive, impulsive, physical, and shortsighted to others, leading to a variety of negative behaviors, including poor academic performance, inexperience in social adaptation and lack of problem-solving skills [5]. Self-control acts as an important factor for self-learning, and the higher the

self-control, the higher the self-efficacy level [6]. Self-efficacy is one's cognitive ability to successfully execute and organize a set of actions that can be done to achieve an objective [7]. Students who failed to achieve academic achievement until the end of online learning often had an impact on personal factors or self-efficacy [8].

Therefore, this study establishes the following research theory to identify the degree of self-determination motivation due to self-efficacy parameters of contactless online learning participants, identify relationships between them, explore predictors of self-control, and provide data for developing fundamental and ongoing online training programs.

[Hypothesis 1] The self-determination motivation of the subjects will affect their sense of self-efficacy.

[Hypothesis 2] The self-determination motivation of the subjects will affect self-control.

[Hypothesis 3] Self-efficacy in the subjects will serve as a medium through which self-determination motivation affects self-control.

2. Methods

2.1 Study Design and Model

This study is a descriptive survey study that describes the purpose and purpose of the study and extracts contactless online learners who agreed to the survey into the study subjects and identifies and analyzes them to suit the study purpose. Using this, the research model was designed as shown in Figure 1 to identify the relationship between self-determination motivation, self-efficacy, and self-control among adolescents and to examine the mediating effects.

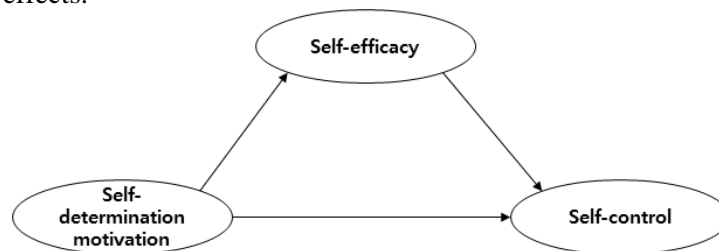


Figure 1. Research Model

2.2. Subjects

This study was conducted on 200 participants in Covid-19 contactless online learning from April 5 to May 14, 2021, for middle and high schools in W-city, Gangwon-do. The size of the sample was determined using the G*Power v3.1 program to determine the sample size for multiple regression analyses, with a significance level of .05, effect size of .15, power of .80, and four independent variables. In consideration of this, three middle schools and two high schools agreed to the research survey were selected and 200 questionnaires were distributed, and a total of 196 copies were finally analyzed except for those with insincere responses.

2.3. Research Tools

The self-determination motivator utilizes [9]'s integrated revision of the SRQ-A and [10] scales, which [11] re-modifies as identified/integrated regulation and intrinsic regulation factors, with a total of 12 questions (Cronbach's $\alpha=.723$). Self-efficacy was developed by [12] and used by [13]. The measure has three sub-factors: confidence, self-regulation efficacy, and task difficulty preferences, totaling 28 questions (Cronbach's $\alpha=.807$). Self-control was reconstructed by [14] and used by [15], referring to the scales of [16], [17]. The question consists of a total of 28 questions with four sub-factors: impulsivity, task completion, egocentricity, and temperament to be angry (Cronbach's $\alpha=.744$). The research tool is on the Likert 5-point scale from 1 point

"Not at all" to 5 points "Very Yes".

2.4. Analysis Methods

The collected data were analyzed using the SPSS/WIN 25.0 program, with frequency and percentage, mean and standard deviation, skewness and kurtosis according to the general characteristics of the subject, and differences in variables were analyzed as t and ANOVA. The correlation of variables was handled by Pearson's correlation, and the predictors of control were treated by multicollinearity diagnosis and multiregressive analysis. Finally, a three-step mediated regression was performed to verify the mediated effect in the relationship between the variables, and the significance test of the mediated effect was conducted by Sobel test.

3. Results

3.1 Descriptive Statistics and Mean Difference Analysis of measured variables

Each variable by the gender of the subject had a statistically significant difference (p<.001), as shown in Table 1. The school year showed statistically significant differences in identified/integrated regulation (t=3.2, p<.01), which is a self-determination motivation subvariant, but no significant differences in the remaining variables. The normal distribution conditions of the measurement variables were met.

Table 1. Descriptive statistics and mean difference analysis of variables(N=196)

Variables	Skew	Kurt	Gender		t	Grade		t
			Male (n=68)	Female (n=128)		Middle school (n=122)	High school (n=74)	
			M±SD			M±SD		
1	-.76	-.71	3.27±.59	3.89±.43	-7.7***	3.78±.54	3.51±.59	3.2**
2	.25	-1.66	3.31±.39	3.73±.43	-6.8***	3.54±.44	3.65±.49	-1.6
3	-.30	-1.00	3.25±.41	3.51±.26	-8.1***	3.43±.29	3.40±.42	1.6
4	-.70	-.24	3.30±.33	3.65±.19	-4.8***	3.56±.24	3.49±.37	.48

p<.01, *p<.001

1. Identified/Integrated regulation, 2. Intrinsic regulation, 3. Self-efficacy, 4. Self-control

3.2 Correlation Matrix for Measured Variables

The correlation between the measurement variables of the subject is shown in Table 2. Each variable showed a significant correlation at the significance level of .05. The higher the self-determination motivation, the higher the self-efficacy and self-control (p<.001). Self-efficacy and self-control (r=.80, p<.001) showed a significant correlation, indicating that the higher the self-efficacy, the higher the self-control.

Table 2. Correlation Matrix for Measured Variables

Variables	Self-determination motivation			
	1	2	3	4
S.d.m	1. Identified/Integrated regulation	1		
	2. Intrinsic regulation	.51***	1	
3. Self-efficacy	.70***	.78***	1	
4. Self-control	.80***	.69***	.80***	1

***p<.001

3.3. Self-control Predictors and Mediated Effectiveness Verification

As a result of conducting mediated regression analysis and Sobel test to find out the mediated effects of self-efficacy, there was no problem with multicollinearity. The biggest predictor of contactless online learners' self-control was 63.8% explanation of self-control through identified/integrated regulation ($\beta=.485$, $p<.001$), and the addition of intrinsic regulation ($\beta=.227$, $p<.001$) increased 11%, with 74.8% explanation of self-control. Furthermore, variables have been shown to have significant effects on each other in all phases. All subfactors of self-determination motivation have been shown to have a significant effect on self-control, indicating a partial mediating effect <Table 3>.

Table 3. Multiple regression analysis for Self-control predictors

Stage	Model	B	β	SE	t	R ²	F
1	I/Ir → S.e	.248	.412	.026	9.46***	.730	260.64***
	Ir → S.e	.424	.567	.033	13.02***		
2	S.e → S.c	.690	.798	.037	18.47***	.637	341.09***
3	I/Ir → S.c	.253	.485	.025	9.96***	.638	341.92***
	Ir → S.c	.147	.227	.036	4.12***		
	S.e → S.c	.243	.281	.058	4.22***		

· Independent variable: Identified/Integrated regulation (I/Ir), Intrinsic regulation (Ir)
 · Mediating variable: Self-efficacy (S.e)
 · Dependent variable: Self-control (S.c)
 ** $p<.01$, *** $p<.001$

In addition, the Sobel test was conducted to verify the significance of the mediated effect as shown in Figure 2. After entering and calculating the standard error ($SE_1=.029$, $SE_3=.057$) of the non-standardization coefficients ($B_1=.647$, $B_3=.208$) of steps 1 and 3, it was confirmed that the mediated effect of self-efficacy was significant.

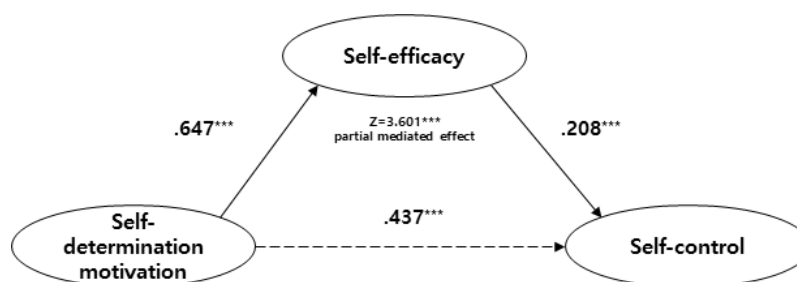


Figure 2. Sobel test

4. CONCLUSION AND DISSCUSION

This study aims to understand the self-determination motivation, self-efficacy, and self-control level of participants in contactless online learning, identify the relationship between these variables, explore the predictive factors of self-control, and find out the parametric effects of self-efficacy.

The gender of the study subjects showed statistically significant differences in identified/integrated control, intrinsic control, self-efficacy, and self-control. The school year showed statistically significant differences

only in identified/integrated regulation. This is in line with a prior study [18], [19] of self-determination motivation and self-efficacy among middle and high school students.

Sub-factors of the subjects' self-determination motivations for all showed significant correlations between self-efficacy and self-control. Although the subjects are different, they are similar to prior studies [20] that studied the relationship between self-determination motivation and self-efficacy. This means that the higher the self-determination motivation, the higher the self-efficacy and self-control.

Regression analysis to find out the predictors of self-control in contactless online learners showed that self-determination motivation sub-factors identified/integrated regulation and intrinsic regulation were the most significant variables, and statistically significant effects on self-efficacy and self-control. Self-determination motivation and self-efficacy account for 76.2% of the self-control variables, which were both statistically and significantly influential. This is in line with a prior study [21] that studied predictive factors in self-control.

Self-determination motivation in contactless online learners has been shown to have a static effect on self-control in part by mediating self-efficacy. In other words, the higher the self-determination motivation, the greater the self-efficacy effect on self-control. In this regard, it has also been verified that it is a significant influence medium in prior studies [22] that have recognized various effects through self-efficacy as a medium. These results suggest the need to explore ways to enhance self-efficacy in terms of learning and are significant that follow-up research should be conducted in a way that can increase self-control among online learners.

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