

A Study on the Structural Relationship among Self-understanding, Openness, Self-directedness, Convergence Thinking, and Elaboration of College Freshmen

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Abstract

This study was conducted to investigate self-understanding, openness, self-directedness, convergence thinking, and elaboration in college freshmen, and to investigate the structural relationships between these variables. In addition, the effects of factors influencing the sophistication of college freshmen were investigated, and the mediating effect of openness, self-directedness, and convergence thinking in the relationship between self-understanding and elaboration of college freshmen was verified. The data was collected from 2,860 freshmen who entered college in 2020 using a survey. For the study, data was collected from 2,860 freshmen of K University, and the collected data were analyzed using SPSS 25.0 and AMOS 25.0 statistical programs. As for the analysis method, first, the descriptive statistics were examined, and the correlation between the variables was confirmed. In addition, CFA was performed to verify the validity of the measurement scale, and SEM analysis was performed to confirm the structural relationship and mediating effect among five variables. Based on the results of the study, the following were found. First, it was found that college freshmen's self-understanding had an indirect effect on elaboration through openness, self-directedness, and convergence thinking. Second, as a result of examining the mediating effects of openness, self-directedness, and convergence thinking in the relationship between self-understanding and elaboration of college freshmen, it was found that all three variables are statically mediating. This study provides meaningful implications for what specific efforts should be made at the school level to improve college freshmen's adaptation to school life and academic ability and sets an important criterion for designing and improving college competency-based education for freshmen.

Keywords: Self-understanding, Openness, Self-directedness, Convergence thinking, Elaboration

1. Introduction

It is an important time for college students to find themselves in a variety of values and environments. After entering college, you suddenly experience the freedom and responsibilities that come with it, and your interpersonal relationships expand and diversify. On the academic side, you have to plan and manage yourself, free from passive study methods. Under these various changes, college students are likely to experience considerable embarrassment and confusion about their new environment 38.

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In particular, college students face the problem of having to think about getting a job again at the same time as they enter even if they enter college through intense competition, and they are required to have their major expertise to gain an edge in job-hunting competition. Elaboration is a learning strategy that makes major knowledge meaningful by linking it with existing knowledge. Elaboration can be said to be a core competency that college students must possess to develop their major expertise [15]. For this purpose, first of all, a self-understanding to grasp what they know and do not know, an open attitude to acknowledge and learn what they do not know, and pursue self-knowledge. It can be achieved based on self-directedness, convergence thinking based on what you know, and newly learned knowledge [2][5][9][10][11][12].

Recently, colleges have developed and supported various programs to help new students adjust to school life and improve their major expertise. Through these programs, freshmen develop their ability to adapt to the newly changed college life and experience an environment in which they plan and carry out their lives independently [3]. Therefore, the college freshman program greatly aids in adaptation and success in college life after enrollment, and it provides a lot of support for equipping the professionalism necessary for entering society [20]. However, most colleges have developed and provided various programs to ensure that new students are well-adapted and well-educated, but concerns about the priority of application to increase effectiveness are somewhat insufficient, and it is necessary to find a plan for this [3].

In this study, a study was conducted to find a method that can help establish an effective learning strategy and adapt to college life through self-analysis of college freshmen. To this end, the significance of the mediating effect was verified to find out how self-understanding affects elaboration, an essential competency in college life, and to confirm the causal relationship between openness, self-directedness, and convergence thinking in the relationship between self-understanding and elaboration.

In previous research related to this, Byun and Min [5] [6] analyzed the relationship between elaboration and self-directedness in the process of forming self-understanding, and Kang [13] analyzed self-understanding to improve efficient learning ability of college students. In addition, it emphasized self-directedness and ways to promote convergent thinking skills. Through the analysis results of the research, we intend to provide meaningful implications for reconsidering sophistication with openness, self-directedness, and convergence thinking by selecting and providing the priority of the support program for new students to enhance the elaboration required after entering the college. The research questions to achieve the purpose of this study are as follows.

1. What is the structural relationship between college freshmen self-understanding, openness, self-directedness, convergence thinking, and elaboration?
2. What effect does the self-understanding of college freshmen have on elaboration?
3. What are the mediating effect of openness, self-directedness, and convergence thinking in the relationship between self-understanding and elaboration of college freshmen?

2. Theoretical background

2.1. Self-understanding

Self-understanding refers to the degree of understanding an individual's characteristics such as one's abilities, values, physical conditions, and environmental constraints [4]. In addition, by inducing them to think about what kind of consequences their thoughts and actions will have in their future lives, they play the role of a compass that suggests a desirable direction of life

[5] In other words, the self-understanding of college students By accurately understanding this, the ability to adapt to the problems faced by reality through sufficient self-understanding is strengthened, and objective insights and understanding of the tasks to be solved in the future are obtained [6].

2.2. Openness

Openness indicates the degree of liking for intellectual stimulation, change, and diversity, and rather than genetic, it appears as a result of family environment, education, and social background. People who score high in openness can expect to show a higher concentration on a given task without avoiding the challenge. There is little reluctance to new experiences or innovations, so it is rich in imagination and culture, is creative, curious, and has intellectually sensitive characteristics [7]. This personal disposition is a relatively stable personal trait that is distinguished from others and is generally expressed as an openness consisting of intelligence, cognition, creation, imagination, culture, and inquiry. Openness can be assumed to make an active effort to balance one's skill (capacity) and challenge level, and it can be expected to show a higher concentration on a given task [8].

2.3. Self-directedness

Due to the inner psychological characteristics of learners who seek autonomy and self-responsibility, self-directedness appears in various aspects of daily life with an open attitude and progressive behavioral tendency [9] Self-directedness actively leads to learning. It refers to the psychological characteristics that the learner possesses internally, such as the learner's attitudes, values, and competencies [11][12]. Regarding self-directedness, Kang [13] stated that the learner has the self-confidence and activeness as an efficient learner, an open learning attitude, and the ability to learn autonomously'. In other words, it can be said to be a concept to recognize the learner as an active learning subject.

2.4. Convergence thinking

Convergent thinking is the ability to form the basis of the higher-level thinking process to discover the core principles of the problem. In addition, humanities convergence can be said to be a very important ability for the pursuit of happiness and values of human beings living in the present and the future, starting from the essential meaning of human beings and their society, and knowing the meaning and value of human living as human beings [10]. In the end, convergence thinking refers to the ability to create new problems based on field expertise and humanities literacy and to approach them in a wide variety of ways to solve problems by considering the underlying cause and the entire context [14].

2.5. Elaboration

In the process of learning, college students appear as a concept of elaboration to enhance learners' understanding and memory through adding, reasoning, or reorganizing various meanings to all learning contents [21]. Elaboration means that learners fully process the meaning of learning materials by mobilizing various methods during the information processing process. Elaboration also allows and facilitates recall by reasoning and reconstruction by providing additional retrieval channels in the cognitive process [15]. This helps the learner to first grasp the relationship and importance of the parts of the learning

content in the overall context and provides a way for the learner to study only to a level of complexity that is appropriate and meaningful to the learner during a given period.

3. Research method

3.1. Data collection

Before the data collection, the subjects were informed of the purpose and procedure of the study, the confidentiality of the contents of the response, and the right to withdraw from the study. After that, the questionnaire was distributed and data were collected. The survey did not contain any sensitive personal information that could identify the participant, and the data collected was kept in a restricted location for confidentiality purposes.

The subjects of this study were freshmen at K University located in Seoul, KOREA, and a total of 2,860 people participated in the questionnaire, and the collected data was notified in advance and used for analysis after obtaining consent. [Table 1] shows the general characteristics of all study subjects.

Table 1. General features

Characteristics Category	Category	Number of Cases	%
Gender	Male	1,464	51.2
	Female	1,396	48.8
Major	Humanities and Social Sciences	1,105	38.6
	Science and Engineering	1,229	43.0
	Arts and Physical Education	526	18.4
Total		2,860	100

3.2. Variable measurement

3.2.1. Self-understanding

Self-understanding is a concept that includes internal and external factors that influence various decisions required in college life. In this study, to measure the self-understanding of college freshmen, the research tools of Park and Han referred to Im et al [4][6]. A total of four items were selected as measurement tools, such as 'I know what I like' and 'I know what's good about my personality (Cronbach $\alpha=.725$).

3.2.2. Openness

Ahn [18] adapted and validated NEO Five-Factor Inventory (NEO-FFI), a shortened test of NEO-PI-R developed by Costa [17] to measure the openness of college freshmen has been modified and supplemented to suit the purpose of this study. A total of three items were adopted as measurement tools, such as "I have a lot of imagination" and "I value artistic experience and beauty" (Cronbach $\alpha=.840$).

3.2.3. Self-directedness

This study defines self-directedness for college freshmen as the ability to take the lead in a series of processes that set and implement specific plans to set and achieve life goals by

themselves, evaluate the results, and reflect them in the next plan to measure this, the tools of Lee et al [19] were modified and supplemented to suit the purpose of this study. A total of four items were selected as measurement tools, such as "I believe that I can plan my own life" and "I proceed with my plan" (Cronbach $\alpha=.749$).

3.2.4. Convergence thinking

To measure convergence thinking, which means the ability to produce necessary knowledge creatively by recognizing the relevance between various major fields or various interests, the tool of Kim [20], which composes the items in the dimension of recognition, was modified and supplemented to fit this study. A total of six items were selected as measurement tools, such as 'I think I need the ability to integrate various fields' and 'I think all disciplines are connected' (Cronbach $\alpha=.900$).

3.2.5. Elaboration

This study is a study on the tools of Yang [22], who constructed the items by seeing elaboration as an 'a' strategy to deepen and expand the depth and breadth of the meaning of information by adding something else to new information or associating it with other things that are already known'. It has been modified and supplemented to suit. A total of 7 items were adopted as measurement tools, such as 'Try to understand in relation to what you have already learned when studying new content' and 'Think about whether the subjects you are leaabouted to each other' (Cronbach $\alpha=.890$).

3.3. Data analysis

SPSS Statistics 25.0 and AMOS 25.0 statistical programs were used to analyze this study. In the analysis process, first, the general characteristics of the survey subjects were examined, and the mean, standard deviation, skewness, and kurtosis were obtained to confirm the characteristics and normality of the main variables. Second, the correlation between variables was confirmed. Third, Confirmatory Factor Analysis (CFA) was conducted to verify the validity of the constituent concepts of each measurement scale. Fourth, a structural equation model analysis was conducted to verify the direct effect of college freshmen's self-understanding on elaboration or indirect effects through openness, self-directedness, and convergence thinking. Finally, the direct effect, indirect effect, and total effect between variables were examined, and the significance of the mediating effect was verified by bootstrapping to explain the causal relationship between the variables.

4. Research Results

4.1. Technical statistics

To find out the general trend of latent variables, mean, standard deviation, minimum value, maximum value, skewness, and kurtosis were calculated and presented in [Table 2]. It was confirmed that the standard skewness of all measurement variables was ± 2 or less, and the standard kurtosis was ± 7 or less, forming a normal distribution.

Table 2. Descriptive statistics

Variable	Average(M)	Standard Deviation(SD)	Minimum value	Maximum value	Skewness	Kurtosis
Self-understanding	3.970	.654	1.00	5.00	-.452	.607
Openness	3.731	.681	1.00	5.00	-.337	.370
Self-directedness	3.358	.671	1.00	5.00	.042	.335
Convergence Thinking	4.076	.555	1.00	5.00	-.420	.444
Elaboration	3.706	.619	1.00	5.00	-.371	1.073

4.2. Correlation analysis

As a result of analyzing the correlations between variables, all correlations showed low positive correlations from .190 to .327 ($p < .01$). Since the correlation coefficient between the variables was analyzed to be less than 0.4, it was judged that there was no multicollinearity.

Table 3. Correlation analysis

Variable	1.	2	3	4	5
1. Self-understanding	1				
2. Openness	.284**	1			
3. Self-directedness	.218**	.190**	1		
4. Convergence Thinking Power	.199**	.209**	.219**	1	
5. Elaboration	.327**	.211**	.228**	.289**	1
** $p < .01$					

4.3. Measurement model verification

Confirmatory Factor Analysis using the covariance matrix was conducted for the sub-questions that constitute each variable used in this study. As a result of the analysis, it was calculated as $\chi^2 = 1911.011$, $df = 242$, $CFI = .901$, $NFI = .889$, $TLI = .877$, $RMSEA = .049$, and it was found that it satisfies the criteria of fitness for analysis. In addition, as a result of analyzing Constituent Reliability (CR) and Average Variance Extraction index (AVE) to confirm convergent validity, it was confirmed that all CRs were 0.7 or more and AVE was 0.5 or more. Next, as a result of verifying discriminant validity according to the method proposed by Fornell and Larcker (1981), the AVE values of all constituent variables are within the range of .506 to .538, and the square value of the correlation coefficient between latent variables is .036 to .107. It was judged that the discriminant validity was secured within the range.

4.4. Structural model verification

The fitness of the structural model was verified using the maximum likelihood estimation method (ML) to find out the structural relationship between the variables. Analysis result $\chi^2 = 1855.624$, $df = 244$, $CFI = .926$, $GFI = .946$, $NFI = .916$, $TLI = .917$, $RMSEA = .048$, $RMR = .038$, calculated based on the criteria for each index. In view, it was confirmed that the model of this study fits the data well and is a good model that reflects reality.

The structural model parameter estimation and significance verification results of this study are presented in the following [Table 4].

Table 4. Structural equation modeling analysis

Relational variable			Standardization factor(β)			Non-standardization factor(B)		
			Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect
Self-understanding	→	Openness	.418	.418	-	.482***	.482	-
	→	Self-directedness	.281	.219	.062	.317***	.247	.070
	→	Convergence Thinking	.152	-	.152	.129***	-	.129
	→	Elaboration	.163	-	.163	.154***	-	.154
Openness	→	Self-directedness	.147	.147	-	.144***	.144	-
	→	Convergence Thinking	.256	.226	.030	.190***	.168	.022
	→	Elaboration	.276	.190	.086	.226***	.155	.071
Self-directedness	→	Convergence Thinking	.203	.203	-	.154***	.154	-
	→	Elaboration	.216	.167	.049	.181***	.139	.042
Convergence Thinking	→	Elaboration	.243	.243	-	.268***	.268	-
***p<.001								

4.5. Discussion

The purpose of this study is to investigate the structural relationship between college freshmen's self-understanding, openness, self-directedness, convergence thinking, and elaboration. To this end, self-understanding, openness, self-directedness, convergence thinking, and elaboration was investigated in college freshmen, and the structural relationship and mediating effect between variables were verified. Through the analysis results, it was confirmed that a new college freshman can truly understand self in college life, and based on this, openness, self-directedness, and convergence thinking can be used to develop the Elaboration competency required in college life.

5. Conclusions

The role and responsibilities of college are changing with the development of society and technology. This means that it is no longer difficult to cultivate creative talents with the existing college education methods. Therefore, this study assumes self-understanding, openness, self-directedness, convergence thinking, and elaboration as essential competencies required for college freshmen as variables of this study and analyzes the structural relationship. I was looking to see if I could. The main analysis results of this study are as follows.

First, as a result of analyzing the structural relationship through the five variables assumed in this study, it was confirmed that the self-understanding of college freshmen does not directly affect elaboration, but indirectly through openness, self-directedness, and convergence thinking.

Second, the self-understanding of college freshmen does not directly affect elaboration. Therefore, freshmen first understand themselves, openness to learn new things from their

surroundings, self-directedness to lead their own university life, and convergence thinking to synthesize various information and knowledge and find solutions to problems so that they can achieve elaboration capabilities.

Third, openness, self-directedness, and convergence thinking statically mediate the relationship between college freshmen's self-understanding and elaboration. Therefore, college freshmen are required to have openness, self-directedness, and convergence thinking based on self-understanding, and to achieve elaboration, an essential competency for college life.

In this study, freshmen who entered the college through the fierce competition for entrance examinations experience true self-understanding after entering the college and based on this, openness, self-directedness, and convergence thinking have been established to achieve elaboration, which is an essential competency required for college life. I empirically revealed the structural relationship. These results suggest that colleges need to consider priorities of self-understanding, openness, self-directedness, convergence thinking, and elaboration in providing various programs that are practically helpful to freshmen. In addition, since the ability to elaborate is difficult to achieve in a short period, related programs need to be organized into a systematic and long-term curriculum. Lastly, this study has limitations in generalizing this result in that the study was conducted only for freshmen of K University located in Seoul, KOREA. Therefore, if the subsequent research includes various universities in the research scope, I think that more meaningful and richer research results can be obtained.

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