

The Effects of Self-Regulated Learning on Career Decision-Making Efficacy through Positive and Negative Attitudes in the Fourth Industrial Era

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Abstract

As the environment changes become more complex, learners should establish the learning strategy for the 4th industrial era and the post-COVID-19, also change. This paper focuses on the importance of self-regulated learning. Through this learning strategy, learners will form more positive attitudes and reduce negative attitudes toward the 4th industrial era. This attitude change will lead to an improvement in learners' career decision-making efficacy as a sense of future efficacy. As a result of the study, it was demonstrated that self-regulated learning improves career decision-making efficacy through the mediating effect of positive attitude formation toward the fourth industry. This article emphasizes the necessity of self-regulated learning as a valid learning strategy for the new era. The effect of self-regulated learning is explained as an improvement in attitude toward the future and a sense of efficacy. Through this learning strategy, learners' future performance could be improved.

Keywords: *self-regulated learning, career decision-making efficacy, attitude toward the fourth industrial era, learning strategy, learner's performance*

1. Introduction

Today's society is changing into the post-Covid 19 and the 4th industrial era. These changes are accompanied by online classes, learning about 4th industrial technologies such as AI, and lectures using 4th industrial technologies such as big data [1, 2]. As the educational environment changes, learners' learning strategies also need to change. A more active attitude of learners is required to adapt to a new environment and secure flexibility for change. Environment adaptation, flexibility, and performance-oriented learning can be achieved through an active attitude rather than the existing passive learning attitude. In this regard, learners' self-regulated learning plays a role in improving educational performance in new and changing situations [1, 3, 4]. Students with self-regulated learning form a more positive attitude toward the future and tend to adapt better to various learning environments. When switching from face-to-face lectures to online lectures, learners who engage in self-regulated learning can more easily adapt to the online environment and motivate themselves. Even when there is no clear answer to the change to the 4th industrial age, learners who engage in self-regulated learning set goals for themselves and strive to adapt to this change [1, 5]. Expectations are a person's subjective probability of what will happen in the future. This expectation can be divided into the expectation of future results and the expectation of oneself in the present [6]. Self-efficacy, which is the expectation of the future and one's own competence, is the core of motivation and is a very important factor in improving the

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performance of workers and learners [5].

This study explains the effect of self-regulated learning on career decision-making, as well as the mediating effect of attitude toward the 4th industry as an expectation for the future. Learners who engage in self-regulated learning set future goals for themselves and strive to achieve them. Since this attitude can have a more positive impact on the future, self-regulated learning will influence the formation of a more positive attitude towards the change to the 4th industrial age. This positive attitude will have a close relationship with learners' efficacy for the future. Efficacy in career decision-making is the degree to which one believes in one's own competence in preparing for a future career [1]. Therefore, learners who have a positive attitude toward the future, such as the 4th industrial age, will have a high sense of efficacy for career decision-making related to the future. This paper emphasizes the importance of self-directed learning, and explains the process of having a positive attitude rather than a negative attitude towards the future through this role, and having a sense of efficacy for the future through this. Self-regulated learning is an effective learning attitude that can create positive expectations for the future and oneself. The purpose and significance of the study is to emphasize the importance of self-regulated learning as a way to improve learners' performance in order to prepare for the anxiety of the 4th industrial era, new paradigms such as online education, and the future, and to explain the process that affects performance.

2. Literature review

Self-regulated learning is a very important research topic in the area of human learning that improves learners' performance [7]. Individual learners can take the initiative in their own learning without the support of others. Self-regulated learning consists of learning potential, self-concept, learning strategy, motivation, social learning and related concepts [8]. Self-regulated learning means to learning, which students' self-produced behaviors, thoughts and results, that are oriented to achieve individual purposes. Self-regulated learning involves an active rather than passive attitude, goal-oriented behavior, and self-effort to achieve goals [7, 9]. Attitude is related to an individual's preference for a particular object. An individual can perceive a specific object more positively or negatively. The 4th industrial era is accompanied by new technologies such as AI, big data, IoT, and 3D Printer. The change to the 4th industrial era means a new era of creativity and convergence using these technologies. Therefore, the attitude towards the 4th industry means a positive or negative attitude towards the 4th industrial age and changes to this era [1].

Self-regulated learning involves commitment to one's future goals. People with this disposition have autonomy in the process of achieving goals and believe that they will achieve them [7, 9]. These people who have a positive attitude about future goals will also form a positive attitude about the future, such as the 4th industry. A self-regulated learning strategy forms a positive attitude and leads to high performance [10]. So, people with self-regulated learning tendencies will form more positive attitudes in the 4th industrial age, and conversely, negative attitudes will decrease. Based on these relationships, the following hypotheses were established.

H1. Self-regulated learning will have a positive (+) correlation with positive attitudes in the era of the fourth industrial revolution.

H2. Self-regulated learning will have a negative (-) correlation with negative 4th Industrial Revolution attitudes.

Self-efficacy refers to beliefs or expectations about one's competence that one will be able to perform and complete a specific task [6]. Self-efficacy for a particular object can be seen as one's own belief in one's ability to perform that object well. Thus, career decision-making efficacy can be defined as an individual's belief that he or she will be able to make career-related decisions well. The concept of efficacy in career decisions is not limited to a particular career path. It can be seen as the belief that an individual can successfully carry out own overall career or career [11]. Career decision-making means that an individual makes effective and efficient decisions regarding his or her career development. Thus, career decision-making efficacy can be defined as the belief or expectation of an individual's ability to successfully carry out career decision-making [12].

Self-efficacy in determining a career involves both preparation for a person's various career paths, and the

process of entering and adjusting to these careers [13]. Self-regulated learning and self-efficacy are closely related. Self-efficacy is necessary for self-regulated learning to be successful. In addition, people with self-regulated learning can have autonomy and self-efficacy at the same time [14]. Therefore, the career decision-making efficacy of individuals with self-regulated learning tendencies may be high. This means a significant relationship between self-regulated learning and self-efficacy. Thus, the following hypothesis was established.

H3. Self-regulated learning will have a positive (+) correlation with career decision-making efficacy.

Efficacy can be enhanced through positive experiences, such as experiences of success [6]. In addition, a positive attitude towards a particular target can increase efficacy. A positive attitude leads to positive expectations for the future, and through these expectations, a sense of efficacy can be increased [15, 16]. Expectations are subjective probabilities of things that will happen in the future [17]. Efficacy is the expectation of one's own competence [6]. So, people with a positive attitude towards the future, such as the 4th industry, have a sense of efficacy both in the future and in the present. will have a higher sense of efficacy in making decisions about their future careers. Therefore, people with self-regulated learning tendencies have positive expectations for the future, such as the 4th industry, and through this, career decision-making efficacy can be improved. Therefore, the following hypotheses were established.

H4. A positive attitude in the era of the Fourth Industrial Revolution will positively (+) mediate the relationship between self-regulated learning and career decision-making efficacy.

H5. Negative attitudes in the era of the Fourth Industrial Revolution will negatively (-) mediate the relationship between self-regulated learning and career decision-making efficacy.

3. Research design

Measurements of individual variables were made with operational definitions based on previous studies. All questionnaires were configured with a Likert 5-point kurtosis.

Self-regulated learning is a process in which learners plan, set goals, organize, monitor, and evaluate their studies on their own. Through self-directed learning, learners acquire information or skills including subjectivity, spontaneity, and instrumental perception. The measurement of the questionnaire consisted of six items, such as "I tend to set goals and study on my own," "I tend to study while controlling and managing myself," and "I have no difficulties in learning on my own." [7, 9].

Attitude is an individual's positive or negative feelings or perceptions toward a particular object. Attitude toward the future is an individual's positive or negative perception of the future. Therefore, the 4th industry attitude means an individual's positive or negative attitude toward change and adaptation to the 4th industry era, which is the future. The measurement of the survey was 7 items of positive attitude, "The 4th industrial technology is valuable to me", "I want to learn about the 4th industrial technology", "The 4th industrial technology needs to be used to improve performance" climbed and composed And the negative attitude is 6 items, "I don't think the 4th industrial technology is helpful to me", "The 4th industrial technology will have a negative impact on my work or job", "I am afraid to use the 4th industrial technology." and so on [1, 18].

Self-efficacy refers to beliefs or expectations about one's ability to perform and complete a specific task Career decision-making efficacy is a belief in career decision-making competency, which means an individual's sense of efficacy in making their own career decisions. Career decision-making efficacy can be defined as the belief or expectation of an individual's ability to successfully make a career decision. The questionnaire consists of 17 items such as "I can find information related to my career well", "I can choose a job that suits me among various jobs", and "I know what I need to achieve my career goals". [12].

211 college students participated in the survey. By gender, there were 115 males (54.5%) and 96 females (45.5%). Regarding grade, 3rd graders accounted for the most with 114 students (54%), 4th and 2nd graders accounted for 38 students (18%), and 1st year students accounted for 21 students (10%), measuring career-related variables such as career decision-making efficacy. It is judged as an appropriate ratio for The contents related to this are shown in the following Table-1.

Table 1. Demographic

content	classification	frequency	%	content	classification	frequency	%
gender	Male	115	54.5	affiliation	social science	98	46.4
	Female	96	45.5		humanities and arts	23	10.9
grade	freshman	21	10.0		IT engineering	23	10.9
	sophomore	38	18.0		bio, health	30	14.2
	junior	114	54.0		other	12	5.6
	senior	38	18.0		no response	25	11.8

4. Empirical analysis

In order to secure the validity and reliability of the questionnaire, an exploratory factor analysis and a reliability analysis were conducted through Cronbach's α , respectively. In Table-2, as a result of the validity analysis and reliability analysis, each variable had a factor loading of 0.4 or higher. In addition, all eigenvalues were presented with a value of 1 or higher, and KMO was .897, securing validity. As a result of the reliability analysis, the reliability of all variables was secured, from positive 4th industrial age attitude .879 to career decision-making efficacy .931.

Table 2. Exploratory factor analysis

Variable (Cronbach's Alpha)	item	component			
		1	2	3	4
career decision-making efficacy (.931)	c1	.657	.170	.215	-.180
	c2	.728	.100	.239	-.045
	c3	.740	.067	.186	-.094
	c4	.620	.054	.294	-.108
	c5	.705	.069	.245	-.159
	c6	.796	.116	.010	-.020
	c7	.601	.212	.162	-.062
	c8	.700	.109	.113	-.061
	c9	.603	.087	.141	-.081
	c10	.609	.114	.138	-.066
	c11	.680	.011	.260	-.040
	c12	.721	.184	.142	.026
	c13	.503	.228	.166	-.021
	c14	.623	.011	.253	-.007
	c15	.673	.184	.088	-.039
	c16	.593	.136	.042	-.025
	c17	.620	.127	.131	.034
positive attitude (.879)	p1	.155	.788	.036	-.130
	p2	.134	.786	.049	-.190
	p3	.177	.708	.049	-.169
	p4	.024	.627	.224	-.106
	p5	.228	.724	.060	-.163

	p6	.186	.752	.022	-.174
	p7	.248	.678	-.023	-.160
negative attitude (.907)	n1	-.079	-.361	-.051	.741
	n2	-.091	-.194	.013	.772
	n3	-.100	-.304	-.022	.760
	n4	-.109	-.122	-.002	.843
	n5	-.014	-.086	-.141	.837
	n6	-.044	-.104	-.083	.829
self-regulated learning (.909)	s1	.292	.093	.774	-.073
	s2	.228	.080	.813	.034
	s3	.340	.075	.737	-.058
	s4	.275	-.021	.806	-.087
	s5	.317	.128	.766	-.036
	s6	.227	.072	.743	-.079
KMO= .897 (sig=.000)	Eigen value	8.164	4.314	4.252	4.126

Table-3 shows the results of descriptive statistics and correlation analysis. It has been proven that there is a significant negative (-) correlation between negative 4th Industrial Revolution attitudes and all variables including positive 4th Industrial Revolution attitudes. It was found that self-regulated learning had a significant positive (+) correlation of .234 with positive attitudes in the 4th industrial era. Accordingly, hypothesis 1 was supported. In addition, it has been proven that there is a significant negative (-) correlation of -.438 between self-regulated learning and negative attitudes in the Fourth Industrial Revolution. Based on these results, hypothesis 2 was supported. In addition, all other variables were found to be significantly correlated with each other.

Table 3. Descriptive Statistics and Correlations

	Mean	Std. Deviation	1	2	3	4
1	3.926	.718	-			
2	2.209	.928	-.438**			
3	3.607	.907	.234**	-.163*		
4	3.768	.678	.396**	-.214**	.558**	-

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

1= positive attitude, 2= negative attitude, 3= self-regulated learning, 4=career decision-making efficacy

[Talbe 4] is the result of a regression analysis that verifies the effect of self-regulated learning on career decision-making efficacy and the mediating effect of positive attitudes in the 4th Industrial Revolution era in the process. It was found that self-regulated learning had a significant effect on career decision-making efficacy ($\beta = .558$). This coincides with the value presented in the correlation, and hypothesis 3 that self-regulated learning will have a positive (+) correlation with career decision-making efficacy was supported.

Next, as a result of analyzing the mediating effect of the positive 4th Industrial Revolution attitude, the β value of the independent variable decreased from step 1 to step 2 (.558 to .493), and R^2 increased by .075. This explains the partial mediating effect of the attitude in the era of the fourth industrial revolution, and the F value is significant, and the mediating effect is verified as a result of the Sobel test. In addition, as a result of Bootstrap, both lower and upper were positive, indicating that there was a mediating effect. Based on these analysis results, hypothesis 4 was supported.

Table 4. The Mediating Effect of Positive Fourth Industrial Revolution attitudes in the relationship between self-regulated learning and career decision-making efficacy

	Dependent: career decision-making efficacy					
	step 1			step 2		
	β	t	Sig	β	t	Sig
mediating: positive attitude	.558	9.728	.000	.493	8.819	.000
				.281	5.036	.000
R^2	.312			.387		
ΔR^2				.075		
F	94.643 (sig=.000)			65.520 (sig=.000)		
Sobel test	2.862 (p<.01)					
Bootstrap (sig=.001)	95% sig=(.001)					
	Lower			Upper		
	.129			.400		

Tablee-5 is the result of a regression analysis that verifies the effect of self-regulated learning on career decision-making efficacy and the mediating effect of negative attitudes in the 4th Industrial Revolution era in the process. As a result of analyzing the mediating effect of negative attitudes in the Fourth Industrial Revolution, the β value of the independent variable decreased slightly (from .558 to .538). R^2 increased by .015 and all F values were found to be significant, but there was no change in the significance of β value. Although the bootstrap result showed that both lower and upper were negative, there was a mediating effect, but a significant mediating effect was not verified in the result of the Sobel test. These results mean that the negative 4th industrial age attitude does not have a clear mediating effect. Therefore, hypothesis 5 was not supported.

Table 5. The Mediating Effect of Negative Fourth Industrial Revolution attitudes in the relationship between self-regulated learning and career decision-making efficacy

	Dependent: career decision-making efficacy					
	step 1			step 2		
	β	t	Sig	β	t	Sig
mediating: negative attitude	.558	9.728	.000	.538	9.329	.000
				-.126	-2.187	.030
R^2	.312			.327		
ΔR^2	-			.015		
F	94.643 (sig=.000)			50.571 (sig=.000)		
Sobel test	1.614 (p=0.107)					
Bootstrap (sig=.040)	95% sig=(.004)					
	lower			upper		
	-.181			-.007		

This study explains that self-regulated learning can influence attitudes toward the 4th industrial age and through this, career decision-making can be improved. As a result of the study, it was proved that self-regulated learning is an important leading factor in the 4th industrial era. Learners with a self-regulated learning attitude form a more positive attitude toward the future, such as the 4th industrial age, and do not have a negative attitude. This attitude will affect positive expectations for the future and performance improvement, as well as satisfaction with the current situation and performance improvement.

It was also found that self-regulated learning has a direct effect on career decision-making efficacy. Self-regulated learning is a learning strategy that sets goals, motivates, and produces results. Learners who engage

in self-regulated learning have faith in their own capabilities even when making decisions about their future careers. Therefore, self-regulated learning can be said to be an effective learning strategy that can improve performance such as positive attitude and sense of efficacy.

In addition, this study verified the mediating effect of attitudes in the 4th industrial era. As a result of the empirical analysis, it was found that learners who engage in self-regulated learning have a positive attitude toward the 4th industrial era, and through this, the career decision-making efficacy increases. Although the negative attitude toward the 4th industrial era did not show a mediating effect in the relationship between self-regulated learning and career decision-making efficacy, it was proven that there was a significant relationship between learning strategy, attitude, and efficacy.

5. Conclusion

The implications of the study results are as follows.

Self-regulated learning is necessary for learners preparing for the future. This learning attitude has a significant impact on preparing for changes to the future such as the 4th industry and achieving high performance. It is necessary to improve learners' self-regulated learning capabilities through various supports such as home education and school education. In addition, learners need to recognize the importance of self-regulated learning and make efforts to have this attitude. Like the concept of self-leadership or empowered leadership, when learners have the autonomy to make their own decisions, they will be more motivated and able to create results, and will adapt flexibly to environmental changes.

Like previous research results, career decision-making efficacy is a factor directly related to performance. Efficacy can be enhanced through the experience of success [6, 19]. Students' sense of efficacy will be enhanced if educational institutions provide them with opportunities to make career decisions and support them to succeed. Through providing these opportunities, continuous and future-oriented performance improvement of learners will be achieved.

Attitude toward the 4th industrial era will affect various performance-related variables including career decision-making efficacy. In order to have a more positive attitude in the era of the 4th industrial revolution, support is needed in the educational process, at home, and at school. This attitude will bring positive results both now and in the future.

Limitations and Future Research Tasks

First, the role of self-regulated learning and attitude is explained as a way to increase the efficacy of career development decision-making. In order to emphasize the importance of these variables, more diverse antecedent variables that can improve career development decision-making efficacy will need to be studied. For example, it is necessary to identify the influence of teacher leadership, school support, and educational programs that enhance efficacy.

Furthermore, in the case of educational programs, a time-series study that suggests that students' sense of efficacy can change before and after education will be possible.

Second, the importance of attitude toward the 4th industrial era is emphasized. In addition to the self-regulated learning presented in the study, research on variables that can have a positive or negative effect on attitudes should be conducted. Experiences of success, quality of education, personal character and values may influence this attitude.

Third, this study explains the relationship between self-regulated learning and attitude. It's not just that they have a self-regulated learning attitude, people with this disposition may have positive expectations for the future or have characteristics of learning new things. Therefore, it is necessary to verify the mediating effect of new variables that explain the process in the relationship between self-regulated learning and attitude formation.

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