

중국 고등학생의 정서지능과 학습몰입의 관계에서 학습동기와 그릿의 이중매개효과

나지문*, 고윤택*, 이창식**

한서대학교 평생교육학과 박사과정*, 한서대학교 사회복지학과 교수**

Double Mediating Effect of Learning Motivation and Grit between Emotional Intelligence and Learning Engagement in Chinese High School Students

Luo Zhiwen*, Gao Runze*, Chang Seek Lee**

Doctoral student, Dept. of Lifelong Education, Hanseo University*,
Professor, Dept. of Social welfare, Hanseo University, Korea**

요약 본 연구는 중국 고등학생을 대상으로 학습동기와 그릿이 정서지능과 학습몰입의 관계에서 이중매개하는지를 확인하는데 연구의 목적이 있다. 자료는 중국의 한 고등학교에서 유의표집한 고등학생 304명을 대상으로 설문조사를 통하여 수집하였다. 수집한 자료는 SPSS PC+ Win ver. 25.0과 SPSS PROCESS macro ver. 4.2를 활용하여 분석하였다. 적용된 통계방법은 빈도분석, 신뢰도 분석, 상관분석 및 이중매개효과 분석이었다. 연구의 결론은 다음과 같다. 첫째, 정서지능, 학습동기, 그릿 및 학습몰입은 모두 정적인 유의미한 상관관계를 보였다. 둘째, 고등학생들의 학습동기와 그릿이 정서지능과 학습몰입의 관계에서 이중매개하였다. 이러한 결과를 토대로 본 연구는 고등학생들의 정서지능만이 아니라 학습동기와 그릿을 활용하여 학업몰입을 증진시킬 수 있는 방안을 제안하였다.

주제어 정서지능, 학습동기, 그릿, 학습몰입, 고등학생, 이중매개효과

Abstract This study aims to determine whether learning motivation and grit mediate in the relationship between emotional intelligence and learning engagement among Chinese high school students. Data were collected through a survey targeting 304 high school students purposively sampled from a high school in China. The collected data was analyzed using SPSS PC+ Win ver. 25.0 and SPSS PROCESS macro ver. 4.2. The statistical methods applied were frequency analysis, reliability analysis, correlation analysis, and dual mediation effect analysis. The conclusion of the study is as follows. First, emotional intelligence, learning motivation, grit, and learning engagement all showed significant positive correlations. Second, high school students' learning motivation and grit double-mediated in the relationship between emotional intelligence and learning engagement. Based on these results, this study proposed a plan to improve high school students' academic engagement by utilizing not only emotional intelligence but also learning motivation and grit.

Key Words Emotional intelligence, Learning motivation, Grit, Learning engagement, High school students, Double mediation effect

1. Introduction

Learning engagement is a prerequisite for academic success. Successful academic achievement can only be achieved through learning engagement. A lot of research has been done on learning engagement. Various technologies for learning engagement are currently being researched, so there is hope for the academic development of learning engagement. However, research identifying the causes of learning engagement is still lacking.

According to previous research, a few studies have been conducted showing that emotional intelligence affects learning engagement. Studies have shown that emotional intelligence and learning engagement have a significant positive correlation [1,2]. However, research has not been conducted on various subjects, and it remains at the level of simply identifying the linear relationship between two variables. Research is needed to determine whether emotional intelligence affects learning engagement through other pathways.

Learning motivation is a variable influenced by emotional intelligence [3], and this learning motivation is a variable affecting learning engagement [4]. It is predicted that learning motivation will mediate in the relationship between emotional intelligence and learning engagement. Therefore, it is necessary to use learning motivation as a mediating variable to determine whether emotional intelligence affects learning engagement through learning motivation.

Additionally, grit, which improves academic achievement, has been reported as a variable that affects learning engagement [5]. It is also meaningful to understand the path that leads to learning engagement. Therefore, based on research results showing that emotional intelligence affects grit [6] and grit in turn affects learning engagement [5], research on the role of grit in the relationship between emotional intelligence and learning engagement to increase learning engagement is also needed.

Furthermore, it is meaningful to study learning motivation and grit simultaneously as dual mediating variables in the relationship between emotional intelligence and learning engagement. This study is more meaningful because it can study the mediating role of learning motivation and grit, respectively, and identify the role of simultaneous serial mediation.

Therefore, to promote learning engagement in high school students, this study aims to provide basic data for enhancing learning engagement by confirming the effect of emotional intelligence on learning engagement through learning motivation and grit.

The research problems are as follows. First, what is the correlation between major variables? Second, do learning motivation and grit dually mediate in the relationship between emotional intelligence and learning engagement?

2. Theoretical background

2.1 Relationship between emotional intelligence and learning engagement

Emotional intelligence includes the ability to evaluate and express one's own and others' emotions, the ability to regulate emotions effectively, and the ability to use emotions to achieve and plan one's life [7]. Individuals with high emotional intelligence are better able to regulate negative emotions, making it easier to develop appropriate coping skills for problem situations and protect themselves from depression and anxiety [8].

Learning engagement is when learners actively participate in learning activities by investing time and effort in the goal of academic development, such as understanding learning and mastery of knowledge and skills [9]. Learning engagement is a strong internal motivation factor that allows one to focus on learning and is reported to induce long-term learning motivation [10]. College students who experienced learning engagement increased their academic achievement and their sense of satisfaction and accomplishment imp-

roved during the learning process [11].

When examining the relationship between emotional intelligence and learning engagement, a study on gifted elementary school students showed a high positive correlation between emotional intelligence and learning engagement [12]. In a study targeting college students, there was a statistically significant correlation between emotional intelligence and learning engagement. In particular, among the components of emotional intelligence, except for understanding other people's emotions, understanding one's own emotions, utilizing emotions, and controlling emotions were all significant variables predicting learning engagement [2]. High levels of emotional intelligence influenced childcare teachers' effective teaching behavior throughout their educational lives, allowing them to engage in educational activities with a more positive and proactive attitude [13]. As a result of reviewing previous research, emotional intelligence was closely related to learning engagement.

2.2 Mediating effect of learning motivation

Motivation is said to be a kind of psychological force that causes and maintains human behavior [14]. Learning motivation can be broadly divided into intrinsic motivation and extrinsic motivation. Intrinsic motivation is the motivation for studying as a goal in itself, and extrinsic motivation is the motivation for studying as a means to the final goal [15] is also called instrumental motivation. Students with high levels of intrinsic motivation were found to enjoy facing academic challenges and show curiosity and interest in learning content compared to students with low levels of intrinsic motivation [16]

Previous research was reviewed to determine whether learning motivation plays a mediating role in the relationship between emotional intelligence and learning engagement. First, looking at the relationship between emotional intelligence and learning motivation, looking at the effect, in a study on elementary school students,

there was a significant positive correlation between emotional intelligence and learning motivation [17]. Both emotional intelligence and learning motivation have a positive relationship when students adapt well to school and live well [3]. Therefore, emotional intelligence and learning motivation have both similarities and relationships.

Next, considering the relationship between learning motivation and learning engagement, learning participation motivation is a factor that has a positive impact on learning and refers to the internal state in which the learner wants to voluntarily and actively participate in learning. The higher the learning participation motivation, the higher the learning engagement. It also increases [4]. Among learning motivation, goal-oriented motivation variables were said to have a significant impact on learning engagement [18].

Emotional intelligence affects learning motivation, and learning motivation affects learning engagement, so learning motivation is predicted to play a mediating role in the relationship between emotional intelligence and learning engagement. It sought to verify the mediating role targeting Chinese high school students.

2.3 Moderating effect of grit

Grit refers to the power of passionate persistence, the power to carry out the goal one wants to achieve, and the ability to steadily advance toward that goal for a long time even in the face of difficulties, adversity, and slumps [19]. People with high grit did not deviate from their goals even without positive feedback, and their school grades were predicted more highly than their IQ [20].

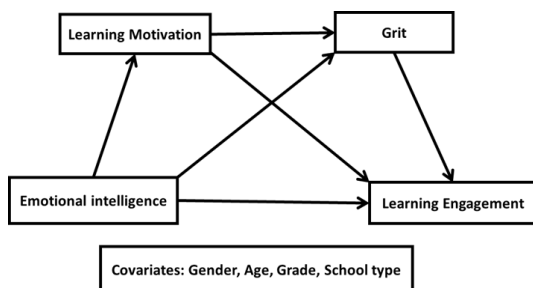
Previous research was reviewed to determine whether grit mediates the relationship between emotional intelligence and learning engagement. Emotional intelligence was found to be a variable that had a significant effect on grit. The group that participated in the emotional intelligence program for elementary school students had higher grit than the group that did not parti-

cipate [6]. There was a significant relationship between emotion regulation, which is a sub-factor of emotional intelligence, and consistency of interest and persistence of effort, which are sub-factors of grit [21]. On the other hand, looking at the impact of grit on learning engagement, grit played a mediating role in the relationship between positive emotions and learning engagement in a study targeting Chinese high school students [5]. Additionally, in a study targeting Korean learners of Chinese, Kyrgyz, and Thai nationality, grit was found to have a significant positive effect on learning engagement [22]. Therefore, grit was predicted to mediate in the relationship between emotional intelligence and learning engagement, and a study of grit among Chinese high school students was conducted to verify the mediation effect.

3. Methods

3.1 Research model

To confirm whether learning motivation and grit dually mediate the relationship between emotional intelligence and learning engagement, model number 6 of the SPSS PROCESS macro proposed by Hayes [23] was applied, and the research model was set up as shown in Figure 1. We attempted to control high school students' gender, age, grade, and school type, which affect the mediating and dependent variables.



[Fig. 1] Research model

3.2 Participants and data collection method

The Guangdong region in China was purposively selected as the study area, and the subjects of the study were high school students. The purposive sampling method was applied to the sampling of the survey subjects. Data was collected through an online survey from March to April, 2023. Excluding insincere responses, the total number of subjects used in the final analysis was 304. Those surveyed were 44.1% male and 55.9% female. By grade, 43.1% were first graders, 28.0% were second graders, and 28.9% were third graders. The school type was public at 19.1% and private at 80.9%.

3.3 Research tools

3.3.1 Emotional intelligence

The emotional intelligence scale in this study used the scale developed by Mayer and Salovey [24] and compiled by Warih et al. [25]. This scale is designed to measure emotional facilitation of thinking and emotional degree of control such as “When I am faced with obstacles, I remember times I faced similar obstacles and overcame them.” and “Some of the major events of my life have led me to re-evaluate what is important and not important” and consists of a total of 17 questions. The measurement was done on a 5-point Likert scale, with higher scores indicating emotional intelligence. In this study, the reliability of this scale, Cronbach’s α , was suitable at .875.

3.3.2 Learning motivation

The learning motivation scale in this study used the scale compiled by Warih et al. [25]. This scale is designed to measure Success motivation, Test anxiety, Self-responsibility, and Requirement levels such as “Do you want to be the first in your class?” and “Do you want to be praised by your teacher when you achieve good grades in the exam?” and consists of a total of

12 questions. The measurement was done on a 5-point Likert scale, with higher scores indicating Learning motivation. In this study, the reliability of this scale, Cronbach's α , was suitable at .782.

3.3.3 Grit

The grit scale in this study used the short grit scale developed by Duckworth and Quinn [26] and used by Hwang and Lee [27]. This scale is designed to measure long-term passion and perseverance such as "Setbacks don't discourage me" and "New ideas and projects sometimes distract me from previous ones" and consists of a total of 8 questions. The measurement was done on a 5-point Likert scale, with higher scores indicating grit. In this study, the reliability of this scale, Cronbach's α , was suitable at .726.

3.3.4 Learning engagement

The learning engagement scale in this study used the scale compiled by Barragan et al. [28]. This scale is designed to measure learning engagement such as "When I get up in the morning, I feel like going to study" and "At my study, I feel that I am bursting with energy" and consists of a total of 17 questions. The measurement was done on a 5-point Likert scale, with higher scores indicating learning engagement. In this study, the reliability of this scale, Cronbach's α , was high at .937.

3.4 Data analysis

The data was analyzed using SPSS PC+ Win. Ver. 25.0 and SPSS PROCESS macro Ver. 4.2. For data analysis, frequency analysis, Cronbach's reliability, and Pearson's bivariate correlation analysis were conducted. Model 6 of the SPSS PROCESS macro was performed to analyze the dual mediating effect. For the verification of the dual mediating effect bootstrap method was used.

4. Results

4.1 Correlation between main variables

As a result of Pearson's bivariate correlation analysis, emotional intelligence was significantly related to learning motivation ($r=.465$, $p<.01$), grit ($r=.301$, $p<.01$), and learning engagement ($r=.474$, $p<.01$). Learning motivation also showed a positive correlation with grit ($r=.294$, $p<.01$) and learning engagement ($r=.614$, $p<.01$). Grit and learning engagement also showed a positive correlation ($r=.336$, $p<.01$). There was no multicollinearity problem as the overall correlation coefficient did not exceed .7.

As a result of descriptive statistical analysis, all scores were higher than the median of 3 points, and among them, emotional intelligence was the highest ($M=3.7409$).

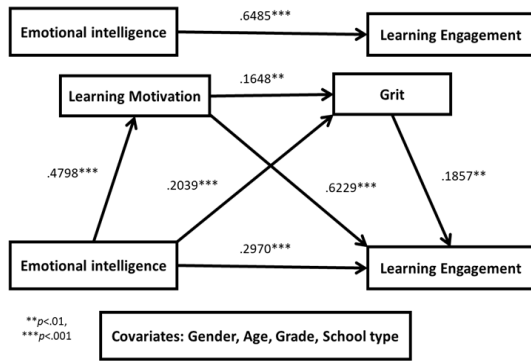
(Table 1) Correlation between main variables

	1	2	3	4
1.Emotional intelligence	1			
2.Learning motivation	.465**	1		
3.Grit	.301**	.296**	1	
4.Learning engagement	.474**	.614**	.336**	1
M	3.7409	3.1763	3.278	3.0068
SD	0.57739	0.6128	0.5608	0.80664

** $p<.01$

4.2 Double mediating effect of learning motivation and grit

To determine whether learning motivation and grit serially mediate the relationship between emotional intelligence and learning engagement, model number 6 of the SPSS PROCESS macro was applied. The confidence interval for bootstrap was set at 95%, the number of samples was set at 5,000, and gender, age, grade, and school type were controlled during analysis. The analysis results are presented in Figure 2 and Table 2.



[Fig. 2] Statistical model of Dual mediating effects of learning motivation and learning engagement

In the mediating model, emotional intelligence had a statistically significant effect on learning motivation (M1) (B=.4798, p<.001). In the second mediating model, emotional intelligence had a significant positive effect on grit (M2) (B=.2039, p<.001), and learning motivation

(M1) also had a significant positive effect on grit (M2) (B=.2039, p<.001). B=.1648, p<.01).

In the dependent variable model, emotional intelligence had a significant positive effect on learning engagement (B=.2970, p<.001), and learning motivation (M1) also had a significant positive effect on learning engagement (B=.6229, p<.001). Grit (M2) had a significant positive effect on learning engagement (B=.1857, p<.001). In other words, emotional intelligence had a significant effect on learning motivation, learning motivation had a significant effect on grit, and grit had a significant effect on learning engagement, so learning motivation and grit serially mediated in the relationship between emotional intelligence and learning engagement.

As a result of verifying the serial dual mediation effect of learning motivation and grit using bootstrap, the dual mediation effect was B=.0147, which was

<Table 2> Dual mediating effects of learning motivation and learning engagement

Variables		Mediating variable model 1 (DV: Learning motivation)			Mediating variable model 2 (DV: Grit)			Dependent variable model (DV: Learning engagement)			
		Coeffect	SE	t value	Coeffect	SE	t value	Coeffect	SE	t value	
Constant		1.1643	.3404	3.4200***	2.0171	.3395	5.9428***	-.7130	.4171	-1.7094	
ID	Emotional intelligence	.4798	.0540	8.8931***	.2039	.0594	3.4349***	.2970	.0703	4.2244***	
M1	Learning motivation				.1648	.0567	2.9076**	.6229	.0668	9.3318***	
M2	Grit							.1857	.0674	2.7549**	
Control variables	Gender	.0210	.0642	.3368	.0262	.0611	.4282	.0060	.0710	.0848	
	Age	.0707	.0712	.9938	-.0113	.0697	-.1615	.0205	.0810	.2525	
	Grade	.0836	.0378	2.2137*	.0631	.0372	1.6939	.0031	.0435	.0712	
	School type	-.0993	.0791	-1.2558	-.0829	.0775	-1.0693	-.0299	.0903	-.3315	
Model Summary	R ²		.2393			.1339		.4370			
	F		18.7538***			7.6525***		32.8242***			
Effects					Effect	SE	Confidence interval				
Total effect					.6485	.0712	.5083	.7886			
Direct effect					.2970	.0703	.1587	.4354			
Total indirect effect					.3514	.0510	.2574	.4550			
Indirect effect	Emotional intelligence → Learning motivation → Learning engagement				.2989	.0453	.2131	.3933			
	Emotional intelligence → Grit → Learning engagement				.0379	.0183	.0089	.0794			
	Emotional intelligence → Learning motivation → Grit → Learning engagement				.0147	.0081	.0023	.0331			

*p<.05, **p<.01, ***p<.001, ID: Independent variable, DV: Dependent variable, M: Mediating variable

significant as there was no zero between the lower and upper limit of the bootstrap (.0023~.0331). In other words, learning motivation and grit serially mediated in the relationship between emotional intelligence and learning engagement.

5. Discussion and conclusion

The discussion focusing on the results of the study is as follows.

First, emotional intelligence, learning motivation, grit, and learning engagement all showed significant positive correlations. These results were consistent with the results showing that emotional intelligence has a positive effect on learning engagement [1,2]. These results were consistent with research results showing that learning motivation affects learning engagement [4,18], and research results showing that emotional intelligence affects grit [6,21]. These results show that learning engagement is positively related to various variables, in particular, it is highly correlated with learning motivation, so it is necessary to find ways to improve learning engagement by increasing learning motivation, especially intrinsic motivation among learning motivation.

Second, high school students' learning motivation and grit double-mediated the relationship between emotional intelligence and learning engagement. In other words, learning engagement can be promoted through the path of emotional intelligence → learning motivation → grit. Therefore, to increase the learning engagement of high school students, it is suggested that one way is to enhance emotional intelligence itself, but it is also necessary to find a way to utilize the path of emotional intelligence → learning motivation → grit.

The limitations of the study and suggestions for further research are as follows. First, the high schools selected for this study were intentionally sampled by the researcher. Since this may result in sampling error, it is necessary to purposively sample at least three high

schools to reduce sampling error.

Second, countless psychological factors affect learning engagement. In follow-up research, research is needed to further explore variables that affect learning engagement such as hope and growth mindset, among positive psychological variables.

References

- [1] M.-S. Park & M.-H. Yoo (2014). Comparison of character strengths, emotional intelligence, and learning flow between elementary gifted students and general students and analysis of the relationships. *Journal of Gifted/Talented Education*, 24(5), 829-849.
- [2] S. J. Lee & H. Kim (2019). The influence of emotional intelligence on self-determination and learning flow. *Journal of Arts, Humanities and Social Convergence Multimedia*, 9(8), 229-239.
- [3] C. Goun (2014). The mediating effect of emotional intelligence in the relationship between elementary school students' perceived parenting attitude and self-determination learning motivation. Master's Thesis, Gyeongin National University of Education, Incheon.
- [4] D. Kim (2018). The impact of barista training at a lifelong vocational education academy on learning immersion, self-efficacy, learning performance, and learning transfer: Focusing on ARCS learning motivation theory. Doctoral thesis, Far East University.
- [5] Liu, Y. & Cho, G.-P. (2020). The mediating effect of positive emotion on the relationship between grit and learning flow in Chinese high school students. *Gyeongin National University of Education Research Institute Journal of Education*, 40(2), 135-151.
- [6] Heo, E.-S. (2019). The impact of an emotional intelligence promotion group counseling program on consideration and grit in upper elementary school students. Master's Thesis, Gyeongin National Univ-

- ersity of Education, Incheon.
- [7] Salovey, P. & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality*, 9(3), 185-211.
- [8] McCauley, E., Pavlidis, K. & Kendall, K. (2001). Developmental precursors of depression: The child and the social environment. *The Depressed Child and Adolescent*, 2, 46-78.
- [9] Coates, H. (2005). The value of student engagement for higher education quality assurance. *Quality in Higher Education*, 11(1), 25-36.
- [10] Shernoff, D. J. & Csikszentmihalyi, M. (2009). Cultivating engaged learners and optimal learning environments. *Handbook of Positive Psychology in Schools*, 131, 145.
- [11] Raychaudhuri, S., Plenge, R. M., Rossin, E. J., Ng, A. C., International Schizophrenia Consortium, Purcell, S. M. ... & Daly, M. J. (2009). Identifying relationships among genomic disease regions: Predicting genes at pathogenic SNP associations and rare deletions. *PLoS Genetics*, 5(6), e1000534.
- [13] E. Hwang (2021). Analysis of the impact of role clarity and goal clarity on perceived performance and the moderating effect of leadership: Focusing on differences between generations. *Korean Journal of Public Management*, 35(1), 225-247.
- [14] Schunk, D. H., Pintrich, P. R. & Meece, J. L. (2014). *Motivation in education: Theory, research, and applications*.
- [15] Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, 40(2), 85-94.
- [16] Newman, R. S. (1990). Children's help-seeking in the classroom: The role of motivational factors and attitudes. *Journal of Educational Psychology*, 82(1), 71.
- [17] I. Lee, J.-E. Park, D.-J. Kim & S.-Y. Choi (2011). The relative predictive power of elementary school students' emotional intelligence, learning motivation, self-efficacy, and sociability on school adjustment. *Child Education*, 20(3), 21-31.
- [18] E. Lee (2001). The relationship between learning motivation and cognitive strategies for flow. *Journal of Educational Psychology*, 15(3), 199-216.
- [19] Duckworth, A. L., Gendler, T. S. & Gross, J. J. (2016). Situational strategies for self-control. *Perspectives on Psychological Science*, 11(1), 35-55.
- [20] Duckworth, A. L., Peterson, C., Matthews, M. D. & Kelly, D. R. (2007). Grit: perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087.
- [21] S. Noh & S. Bae (2014). A study on the relationship between emotional intelligence, learning flow, and adaptation to college life in college students. *Learning-Centered Curriculum Education Research*, 14(2), 343-362.
- [22] H. Lee (2021). The impact of Korean language learners' grit and self-efficacy on Korean language learning immersion. Doctoral thesis, Busan University of Foreign Studies, Busan.
- [23] Hayes, A. F. (2017). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. Guilford Publications.
- [24] Mayer, J. D. & Salovey, P. (1995). Emotional intelligence and the construction and regulation of feelings. *Applied and Preventive Psychology*, 4(3), 197-208.
- [25] Warih, M. P., Rindarjono, M. G. & Nurhadi, N. (2020). The impact of parental education levels on digital skills of students in urban sprawl impacted areas. *Journal of Physics: Conference Series* (Vol. 1469, No. 1, p. 012071). IOP Publishing.
- [26] Duckworth, A. L. & Quinn, P. D. (2009). Development and validation of the short grit scale (GRIT-S). *Journal of Personality Assessment*, 91(2), 166-174.
- [27] Y.-K. Hwang & C.-S. Lee (2020). The dual mediating effects of growth mindset and hope in the relationship between body image and successful aging

of the elderly. *Industrial Convergence Research*, 18 (1), 87-96.

- [28] Barragan Martin, A. B., Pérez-Fuentes, M. D. C., Molero Jurado, M. D. M., Martos Martínez, A., Simon Marquez, M. D. M., Sisto, M. & Gazquez Linares, J. J. (2021). Emotional intelligence and academic engagement in adolescents: The mediating role of self-esteem. *Psychology Research and Behavior Management*, 307-316.

나 지 문 (Luo Zhiwen)



- 2004년 9월~2008년 6월: School of Foreign Studies, ChangSha University of Science & Technology (Bachelor)
- 2008년 7월~Now: Head of Student Affair, DongGuan NanBo Vocational & Technical School
- Interest: Lifelong Education
- E-Mail: 15920253986@163.com

고 윤 택 (Gao Runze)



- 2008년 8월~2017년 12월: Dean of Studies, YingChuan University of Science and Technology
- 2019년 3월~Now: Office director GuangDong University of Science and Technology
- Interest: Lifelong Education
- E-Mail: g258396346@163.com

이 창 식 (Chang Seek Lee)



- 1993년 2월~Now: Prof. Hanseo University
- 2010년 3월~Now: Head, Multicultural Education and Welfare Institute
- Interest: Lifelong Education, Slow Lerner
- E-Mail: lee1246@hanmail.net