

# **The Relationship Between Self-Discipline and Academic Achievement of Chinese Undergraduate Students in the E-Learning Environment**

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*Self-discipline, the ability to suppress prepotent responses for obtaining a higher goal, is a crucial skill with far-reaching effects in every aspect of life. This paper measures the self-discipline and academic achievement levels of Chinese undergraduate students in the E-learning environment. It investigates the relationship between these two variables. The samples include 100 English major students at the Guilin University of Electronic Technology in China. Based on the scores from the adapted Academic Self-Discipline (ASD) questionnaire (Şal, 2016) and the scores from Test for English Majors - Band 4 (TEM-4), the findings indicated that 75% of students maintained a moderate level of self-discipline and 76% of students had a poor academic performance. The findings provide insights for educators by showing a significant relationship between students' self-discipline and academic achievement in the E-learning environment.*

*Keywords: self-discipline, academic achievement, E-learning environment, Chinese undergraduate students*

## **INTRODUCTION**

The effect of self-discipline on academic achievement has received considerable attention in recent years. As an ability to control one's impulses, emotions, and habits to accomplish a higher objective, self-discipline is widely acknowledged as a crucial talent for obtaining success in life (Duckworth & Seligman, 2005). It is the skill to govern oneself and regulate urges that can lead to unpleasant outcomes like procrastination, impulsivity, and lack of self-control (Duckworth et al., 2007). Past studies have demonstrated that self-discipline is favorably related to academic success (Duckworth & Seligman, 2005; Duckworth et al., 2012). Independent of their intelligence quotient (IQ) and other cognitive talents, students with a high level of self-discipline are more likely to achieve greater academic performance (Duckworth et al., 2007).

With the development of technology, E-learning has become a prominent style of education, allowing students to study at their own pace and convenience. It has also become an integral part of the education system in China, particularly in light of the COVID-19 pandemic. To preserve academic continuity, Chinese universities have implemented online teaching and learning, increasing E-learning activities among students (Xiong et al., 2020). According to previous studies, E-learning has offered many advantages,

including increased flexibility and accessibility. Still, it also poses new challenges, such as the need for self-motivation and self-discipline (Bonk & Graham, 2006). Students engaged in E-learning programs should have higher degrees of self-discipline than those in traditional learning environments due to the lack of face-to-face interactions and the ability to create their study timetables. However, little is known about the level of self-discipline awareness and the academic achievement of Chinese undergraduates in an E-learning environment. Hence, in the current study, we attempt to look into the levels of these two variables and examine the relationship between self-discipline and academic achievement.

## LITERATURE REVIEW

Self-discipline is frequently viewed as a sort of self-regulation involving training oneself to enhance one's capacity to concentrate and overcome distractions. Based on Taylor et al.'s (2002) study, there are three interconnected types of self-discipline: attention, impulse control, and delayed pleasure. Focus includes paying conscious attention to the job, blocking impulses typically linked with short-term desires, and delaying particular gratifications to accomplish long-term objectives. They found a substantial correlation between self-discipline and academic achievement, particularly among adolescents. As further research is required to determine if this correlation applies to students in higher education settings, such as undergraduates and graduates, Şal (2016) created a new 58-item Academic Self-discipline Questionnaire (ASDQ) which measures individual differences in academic self-discipline on a five-point Likert scale ranging from strongly disagree to strongly agree. The questionnaire evaluates three facets of academic self-discipline: focus, impulse control, and delayed gratification. The ASDQ has grown increasingly popular among academic self-discipline researchers in recent years. Several studies have demonstrated the dependability and validity of Şal's (2016) ASDQ overall. The scale has proven to be a dependable instrument for measuring and assessing academic self-discipline. It has been frequently utilized in research examining the effect of academic self-discipline on academic performance and achievement. In a study conducted by Shin et al. (2019), for instance, the ASDQ was used to assess the self-discipline of college-aged women. The purpose of the study was to evaluate their time management skills.

Similarly, Atmaca and Nal (2018) measured the self-discipline of university students pursuing educational sciences using the same scale. The association between academic self-discipline, academic accomplishment, and academic procrastination was examined here. In addition, Ukpokodu (2016) investigated the variations in academic self-discipline between high school students and adult learners pursuing university degrees. This study found that the average level of academic self-discipline among secondary school students is much higher than that of people seeking a university degree.

Literature analysis demonstrates an increasing interest in the correlation between academic self-discipline and academic achievement in China's higher education institutions. In a study by Liu et al. (2019), self-discipline was positively connected with academic achievement among Chinese college students. Chen and Liu (2018) discovered a similar relationship between academic self-discipline and academic success among Chinese university students. Chinese medical students' self-discipline somewhat mediated the association between stress and academic performance, according to a study by Li et al. (2017). In a separate study, Liu and Wang (2017) showed that self-discipline was positively connected with academic achievement, with motivation partially mediating this association. Yet, some other studies have shown contradictory findings. For instance, Chen et al. (2016) discovered that self-discipline and academic achievement among Chinese college students were not substantially associated. Wang et al. (2018) observed in another study that the association between self-discipline and academic performance was only significant for students with high academic stress.

Most research using the Academic Self-Discipline Scale (ASDS) shows a substantial link between academic self-discipline and academic achievement, especially among Chinese university students. This link will likely remain stable throughout different regions of China, assuming that the investigated population's background and demography remain constant. Yet, there appears to be a shortage of research on the actual effects of the relationship between self-discipline and academic achievement in English major students. This makes this subject ripe for additional study, particularly in the E-learning environment.

Test for English Majors-Band 4 (TEM-4) results are used as a benchmark to measure academic achievement. TEM-4 is a vital language competence exam meant to assess second-year English majors' comprehensive language skills. It seeks to assess students' application of fundamental language abilities and their command of English phonetics, vocabulary, grammar, and conversation. This exam is administered annually during the fourth semester of the English major curriculum. The Foreign Language Teaching and Testing Experts Committee organizes the TEM-4 exam, and the Foreign Language Teaching and Testing Office is responsible for its administration. The examination is divided into six sections: dictation, listening comprehension, language knowledge, cloze test, reading comprehension, and writing. The students have 130 minutes to finish the examination. Several formats are utilized to assure the test's scientific and objective nature and practicability. The passing score for the TEM-4 is 60 out of 100, and the Foreign Language Teaching and Testing Guidelines Committee provides successful candidates with a score report. The score report classifies students into three categories: passing (60-69 points), good (70-79 points), and exceptional (80 or more points). Eligible candidates for the TEM-4 exam include second-year undergraduate students majoring in English from institutions of higher education registered or approved by the Ministry of Education, as well as two- or three-year college students who have completed the required English major courses in their final year of study. In addition, applicants must have completed the second year of a four-year, full-time undergraduate degree in English at an institution registered with or approved by the Ministry of Education.

The effect of students' self-discipline on their academic achievement is among the key topics highlighted in educational settings. However, the research to date has mostly focused on the traditional physical environment of learning and teaching. What is not yet clear is how students' self-discipline levels will affect their academic achievement in the E-learning environment where students need to manage their studies outside the face-to-face classrooms, and teachers are required to provide instructions, distribute contents and facilitate interactions through the use of electronic networks. With the development of information technology, the concept of E-learning is no longer unfamiliar in the Chinese educational system. Still, there has been little analysis regarding the levels and correlations of self-discipline and academic achievement when Chinese students are learning via online classes at home or in other public places. Hence, the current study aims to fill this gap, and the research objectives and research questions are presented as follows:

## **RESEARCH OBJECTIVES**

1. To measure the self-discipline and academic achievement levels of Chinese undergraduate students in the E-learning environment.
2. To investigate the relationship between students' self-discipline and academic achievement in the E-learning environment.

## **RESEARCH QUESTIONS**

1. What are the levels of Chinese undergraduate students' self-discipline and academic achievement in the E-learning environment?
2. Is there any significant relationship between students' self-discipline and academic achievement in the E-learning environment?

## **METHODOLOGY**

### **Research Design**

A quantitative research design was implemented in this study. The students' levels of self-discipline were measured by adapting a recently developed questionnaire by Şal (2016). Their academic achievement levels were identified through the scores they got from the Test for English Majors - Band 4 (TEM-4)

during the E-learning period. Then a correlational study was conducted to determine the possible relationship between these two variables.

### Sample Description

In this study, 100 Chinese undergraduate students who majored in English were randomly selected from 4 classes at the Guilin University of Electronic Technology in China. They are registered students enrolled in English courses in the academic year 2023 and have all experienced learning online. These students include sophomores and juniors and got the scores of the Test for English Majors - Band 4 (TEM-4) during the E-learning period. Table 1 shows the summary of the participants' information.

**TABLE 1**  
**SUMMARY OF THE PARTICIPANTS' INFORMATION**

<b>N=100</b> (Undergraduate Students)	<b>Major</b>	<b>Age</b>	<b>Gender</b>	<b>Average Time in Filling the Questionnaire</b>
	English	Min: 19 Max: 23	Male: 17 Female: 83	

### Research Instruments

To answer the research questions, the levels of students' self-discipline in the E-learning environment were measured by adapting the Academic Self-Discipline (ASD) questionnaire developed by Şal (2016). This questionnaire had 58 items, involving 37 positive statements and 21 negative statements (Febri, 2016), and the internal consistency of items has been reached with a coefficient value of  $\alpha=0.93$ . Meanwhile, a 5-Point Likert Scale (1=never; 2=rare; 3=sometimes; 4=often; 5=always) was used in these 58 closed-ended questions. As there were positive and negative items, we generally added the corresponding score of the positive statements. We applied a reversed score for the negative statements to determine the final score for each participant. That is, for the 37 positive items, we attribute a student's answer of "never" with a score of 1, "rare" with a score of 2, "sometimes" with 3, "often" with 4 and "always" with 5. However, for the 21 negative items, the numerical scoring scale should be run in the opposite direction. So, "never" would attract a score of 5, "rare" would be 4, "sometimes" still equalled 3, "often" became 2, and "always" was 1. According to the previous study by Febri (2016), the final scores for each student may range from 58 to 290 and these scores were categorized into three groups to show the level of self-discipline. If the ultimate scores ranged from 58 to 134, the students would have a low level of self-discipline, meaning students favored short-term pleasure over long-term benefit. If ranged from 135 to 212, then there would be moderate or average level of self-discipline, indicating students could not maintain self-discipline. If ranged from 213 to 290, a high level of self-discipline would be recorded, and with this level, the students could organize and pay attention to their studies.

Moreover, the level of academic achievement for each student was measured by each of their TEM-4 scores. Served as a criterion-referenced test, the TEM-4 aims to measure the English proficiency of Chinese university undergraduates majoring in English Language and Literature. It has been carried out in China since 1991 by the National Advisory Commission on Foreign Language Teaching in Higher Education (NACFLT) and enjoys wide social recognition. Table 2 shows the range of TEM-4 scores and the corresponding levels of academic achievement.

**TABLE 2**  
**ACADEMIC ACHIEVEMENT CATEGORIES (TEST FOR ENGLISH MAJORS – BAND 4)**

No.	Range of Scores	Levels of Achievement
1	≥80	Excellent
2	70-79	Good
3	60-69	Pass
4	<60	Fail

### DATA COLLECTION PROCEDURES

To measure students' self-discipline level, the adapted questionnaire of "test on students' academic self-discipline in the E-learning environment" was sent to 100 undergraduate students. They completed the questionnaire by scanning the QR code on the poster made by Questionnaire Star. Answering all of the questions took roughly 11.4 minutes. The responses were collected automatically in the Questionnaire Star, from which the researchers could obtain the results in an Excel file. Data deduction and refinement were also performed by removing invalid and missing data from the results.

To know the levels of academic achievements, the researchers checked each student's grade sheet report again after they got the TEM-4 scores and filled in the questionnaire to ensure accuracy (scores equal to or above 60 would get a certificate).

### DATA ANALYSIS PROCEDURES

To answer the first research question, the students' levels of self-discipline in the E-learning environment were initially measured by the scores they got from the 58-item questionnaire. The scores were inserted into the SPSS software for a normality test and further analysis. For the normality test, the data were considered acceptable if the skewness and kurtosis values are between  $\pm 2$  (George & Mallery, 2003). In the current study, as the skewness value was .002 and the kurtosis value was -.192, the distribution of the data was normal and bell-shaped. Descriptive statistics were then used to demonstrate the frequency, percentage and mean self-discipline scores in 100 students. After getting the results, the students' levels of self-discipline were categorized.

Next, for measuring the students' levels of academic achievement in the E-learning environment, the scores they obtained in the TEM-4 were used. A normality test was also done to ensure the normal distribution of data. The skewness value was -.224 and the kurtosis value was -.421. Like what the researchers conducted for self-discipline levels, the frequency, percentage, and mean scores in 100 students were generated. According to the range of scores in TEM-4 and layers of achievement levels, the students were put into different groups.

To answer the second research question, inferential statistics were used through a Pearson Product-Moment Correlation to determine if there is any relationship between the self-discipline scores and academic achievement in all participants. Based on Guilford's (1973) Rule of Thumb, the strength of the relationship was detected by the Pearson coefficient ( $r$ ). Then, the relationship's direction (positive or negative) was also described. We will reject the null hypothesis if the significant value ( $p$ -value) is less than  $\alpha$  (0.05) ( $p < \alpha$ ). Otherwise, we would accept the null hypothesis ( $p \geq \alpha$ ).

## RESULTS AND DISCUSSION

### Levels of Students' Self-Discipline in the E-Learning Environment

To address the first research question, which aimed to assess the level of self-discipline among Chinese students in an E-learning environment, the data from 100 collected questionnaires were analyzed with SPSS software. Şal's (2016) and Febri's (2016) rationales were used to categorize the levels based on the scores.

Table 3 displays the descriptive results for the students' self-discipline by the mean, minimum, and maximum scores.

**TABLE 3**  
**DESCRIPTIVE STATISTICS FOR SELF-DISCIPLINE SCORES IN THE E-LEARNING ENVIRONMENT**

Self-Discipline Scores (N=100)	Mean	Min	Max
	193.41	126.00	256.00

As shown in Table 3, as the mean score (193.41) was within the range of 135 to 212, the results suggested that most Chinese undergraduate students exhibited a moderate level of self-discipline in an E-learning environment. At the same time, the minimum and maximum scores were 126.00 and 256.00, respectively, indicating that students with low and high levels of self-discipline also existed. Table 4 will then explain the specific distribution of self-discipline levels.

**TABLE 4**  
**THE LEVELS OF SELF-DISCIPLINE IN THE E-LEARNING ENVIRONMENT**

Groups	Scores	Frequency ( <i>f</i> )	Percentage (%)
Low	58-134	1	1.0
Moderate	135-212	75	75.0
High	213-290	24	24.0
Total	/	100	100.0

The self-discipline levels of 100 Chinese undergraduate students are summarized in Table 4. There are three levels: low, moderate, and high. Based on the range of the scores, we discovered that only 1% of the students had low self-discipline levels in the E-learning setting, while 75% maintained a moderate level. As for the high self-discipline level, 24% of the students could create self-discipline in themselves while seeking knowledge. This result suggested that more than 3/4 of the Chinese undergraduate students had moderate self-discipline. The current finding is consistent with recent similar research by Muksin and Makhsin (2021), who also found that the level of high school students' self-discipline in E-learning was moderate throughout the Covid-19 Movement Control Order in Malaysia. This indicated that E-learning had benefited the education system and strengthened the effectiveness of training programs, particularly at institutions that practiced remote learning or hybrid learning styles.

#### **Levels of Students' Academic Achievement in the E-Learning Environment**

To measure students' academic achievement levels, their TEM-4 scores obtained during the online learning period were recorded, analyzed, and grouped. Table 5 displays descriptive statistics that can help explain their academic performance.

**TABLE 5**  
**DESCRIPTIVE STATISTICS FOR STUDENTS' TEM-4 SCORES DURING THE E-LEARNING PERIOD**

TEM-4 Scores (N=100)	Mean	Min	Max
	54.13	33.00	78.00

Based on Table 5, it could be seen that the mean value of Chinese undergraduate students' TEM-4 scores was 54.13, and the lowest and highest score they got were 33.00 and 78.00, respectively. This

indicated that most students failed TEM-4, designed to assess their listening, reading, writing, and speaking skills using various test methods. This might be related to their absence from the examination. At the same time, the lowest score of 33.00 showed that the bottom student only got a 1/3 mark in TEM-4. However, according to the results, some students reached a respectable academic achievement level, as the top student's TEM-4 score is 78.00, which is in the range of 70 to 79. Table 6 then shows how the academic achievement levels of these English major students were spread out.

**TABLE 6**  
**THE LEVELS OF ACADEMIC ACHIEVEMENT IN THE E-LEARNING ENVIRONMENT**

<b>Groups</b>	<b>Scores</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
<b>Fail</b>	<60	76	76.0
<b>Pass</b>	60-69	17	17.0
<b>Good</b>	70-79	7	7.0
<b>Excellent</b>	≥80	0	0
<b>Total</b>	/	100	100.0

As shown in Table 6, the levels of students' academic achievement in the E-learning environment are categorized as failing, passing, good, and excellent based on the range of TEM-4 scores. The results showed that 76% of students failed the TEM-4, and none reached the excellent level. The low levels of academic accomplishment revealed in this study may be attributable to the absence of some elements in the E-learning experience of students. For instance, students may lack the motivation to learn and participate in academic activities owing to a shortage of face-to-face interactions with teachers and peers, which can lead to feelings of isolation and detachment. Meanwhile, a lack of readiness and preparation for the exam and the inadequate implementation of plans would also lead to relatively weak academic achievement. In addition, as this study was conducted online, poor plan execution and a lack of self-management abilities may result in a low passing rate of TEM-4.

As for the pass and good level, 17% of students got scores from 60 to 69, and only 7% obtained 70 to 79. This finding indicated that these students may have kept a study habit in the E-learning environment and could focus on preparing for listening, reading, writing, and speaking tests. As there are various formats of questions such as word-for-word dictation, multiple choice question, text and note writing, story retelling, presentation, and role play tasks to check their language ability, students must learn comprehensively and practice systematically in a daily routine.

#### **Relationship Between Students' Self-Discipline and Their Academic Achievement**

After knowing the levels of students' self-discipline and academic achievement, this section answered the second research question. Further, it investigated the relationship between these variables in the E-learning environment. In the current study, SPSS software was used to measure the relationship between students' self-discipline and academic achievement through Pearson Product-Moment Correlation.

After the findings were obtained, the strength of the correlation between variables was interpreted using Guildford's (1973) Rule of Thumb. A correlation coefficient of less than 0.20 indicates a 'negligible' relationship; 0.20 to 0.40 suggests a 'low' relationship; 0.41 to 0.70 shows a 'moderate' relationship; 0.70 to 0.90 implies a 'high' relationship; and a value more than 0.90 signifies a 'very high' relationship (Guildford, 1973). Table 7 shows the statistics regarding the relationship.

**TABLE 7**  
**STATISTICS OF THE RELATIONSHIP BETWEEN STUDENTS' SELF-DISCIPLINE AND**  
**ACADEMIC ACHIEVEMENT**

		<b>Correlations</b>	
		Self-Discipline	Academic Achievement
Self-Discipline	Pearson Correlation	1	.259**
	Sig. (2-tailed)		.009
	N	100	100
Academic Achievement	Pearson Correlation	.259**	1
	Sig. (2-tailed)	.009	
	N	100	100

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The Pearson Product-Moment Correlation results show that the correlation coefficient ( $r$ ) was 0.259. Based on Guildford's (1973) Rule of Thumb, there is a positive and low relationship between Chinese undergraduate students' self-discipline and academic achievement in the E-learning environment. The positive relationship suggested that an increase in self-discipline would lead to an increase in academic achievement. The results also showed a significant value of  $p = .009$ , which is smaller than alpha at a .05 level of significance. Hence, the null hypothesis can be rejected. In other words, there is a significant relationship between self-discipline and academic achievement in the E-learning setting. Consistent with prior research indicating that self-discipline is vital for academic success, especially in online learning environments, these results indicate that self-discipline is crucial in online learning environments (Wolters & Hussain, 2015). Students with a high level of self-discipline will effectively manage their time and engage in active learning in E-learning (Alqahtani, 2018). Besides, Rosário et al. (2018) found that a lack of self-discipline leads to procrastination, poor time management, and poor academic achievement. Furthermore, past research has demonstrated that students' academic accomplishment in E-learning settings is influenced by various variables, including motivation, engagement, and learning strategies (Moos & Marroquin, 2021; Wang et al., 2018).

## CONCLUSION

This paper investigated the levels of self-discipline and the academic achievement of Chinese undergraduate students. It explored how self-discipline awareness will affect academic achievement in the E-learning environment. These are some tentative conclusions that can be made: First, there is a tendency that most students had a moderate level of discipline in the online learning setting. Second, there is a propensity for the majority of students to have a poor level of academic achievement. Third, a significant positive but low relationship has been detected between self-discipline and academic achievement. The results of this study indicate that self-discipline is favorably associated with academic accomplishment in an E-learning environment. Cultivating and refining the self-discipline skills of students can result in increased academic performance. Instructors and institutions should consider offering students support and resources to develop their self-discipline and encourage them to engage in active learning in an E-learning environment.

The low relationship between self-discipline and academic achievement was mainly due to the small sample size. In further research, the sample size could be enlarged by containing more participants from different countries. In addition, future studies should continue to investigate the elements that influence academic achievement in E-learning environments and discover effective techniques for encouraging self-discipline and academic achievement.



## REFERENCES

- Alqahtani, M. (2018). The importance of self-discipline in online learning environments. *Journal of Education and Practice*, 9(5), 63–68.
- Atmaca, S.S., & Nal, S. (2018). Investigation of the Relationship Between Academic Self-Discipline, Academic Achievement, and Academic Procrastination of Students in Education Sciences Faculty. *International Journal of Educational Methodology*, 4(4), 476–483.
- Bonk, C.J., & Graham, C.R. (2012). *The handbook of blended learning: Global perspectives, local designs*. John Wiley & Sons.
- Chen, J., & Liu, X. (2018). The influence of academic self-discipline and self-efficacy on Chinese university students' learning engagement. *International Journal of Psychology*, 53(S1), 61.
- Chen, L., Zhang, G., Huang, T., & Liu, J. (2016). Academic self-discipline and academic achievement among Chinese college students: A moderated mediation model of academic motivation and self-control. *Frontiers in Psychology*, 7, 1785.
- Duckworth, A.L., & Seligman, M.E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science*, 16(12), 939–944.
- 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.
- Duckworth, A.L., Quinn, P.D., & Tsukayama, E. (2012). What No Child Left Behind leaves behind: The roles of IQ and self-control in predicting standardized achievement test scores and report card grades. *Journal of Educational Psychology*, 104(2), 439.
- Febri, R. (2016). *The correlation between self-discipline and academic achievement of the undergraduate students of English education study program of Uin Raden Fatah Palembang* (doctoral dissertation, Uin Raden Fatah Palembang).
- Guildford, J.P. (1973). *Fundamental statistics in psychology and education*. New York, NY: McGraw-Hill.
- Li, Y., Zhang, Y., Liang, X., Wang, L., & Yin, H. (2017). Self-discipline partially mediates the relationship between stress and academic performance in Chinese medical students. *Advances in Medical Education and Practice*, 8, 337.
- Liu, C., Li, H., & Li, Y. (2019). Relationship between College Students' Self-Discipline and Academic Achievement: Evidence from China. *Children and Youth Services Review*, 96, 175–183.
- Liu, X., & Wang, M. (2017). Self-discipline and academic achievement: A meta-analysis. *Frontiers in Psychology*, 8, 1785.
- Moos, D.C., & Marroquin, Y. (2021). Assessing students' online learning engagement: An exploratory study of the relationship between engagement and academic achievement in a diverse community college setting. *Journal of Educational Computing Research*, 59(1), 57–82.
- Muhsin, N.A.M., & Makhsin, N.H. (2021). Self-discipline and academic achievement among secondary school students during the Covid-19 Movement Control Order in Malaysia: An online survey. *International Journal of Advanced Science and Technology*, 30(4), 10770–10778.
- Rosário, P., Moura, J., Nunes, A.R., Núñez, J.C., González-Pienda, J.A., & Solano, P. (2018). Self-regulated learning, procrastination, and academic achievement in secondary school students: A mediation model. *School Psychology International*, 39(1), 98–116.
- Şal, F. (2016). *Development of an Academic Self-discipline Questionnaire for University Students* [Master's thesis, University of Leicester]. Leicester Research Archive.
- Shin, S.J., Kim, S.Y., & Hwang, H.J. (2019). The relationship among academic self-discipline, time management, and academic procrastination of college women. *Journal of Korea Contents Association*, 19(5), 255–266.
- Taylor, J.E., Kuo, M.C., & Sullivan, M. (2002). Extending research on the consequences of self-discipline: Predictive validity of a brief dyadic adjustment scale. *Journal of Social Psychology*, 142(6), 727–741.

- Ukpokodu, O.N. (2016). Academic self-discipline and academic achievement in high school students and adult learners in higher education. *The Journal of Negro Education*, 85(4), 391–402.
- Wang, H., Zhou, X., & Lu, C. (2018). The association between academic self-discipline and academic achievement: A moderated mediation model of academic stress and need satisfaction. *Frontiers in Psychology*, 9, 2288.
- Wolters, C.A., & Hussain, M. (2015). Investigating grit and its relations with college students' self-regulated learning and academic achievement. *Metacognition and Learning*, 10(3), 293–311.
- Xiong, J., Qin, J., & Yu, B. (2020). Digital transformation of traditional higher education institutions in China: Impacts of COVID-19. *Journal of Educational Technology Development and Exchange*, 13(1), 1–14.