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Relationship Analysis Between Procrastination Behavior and Non-Cognitive Abilities

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Abstract: The paper explores the relationship between procrastination in academic contexts and three sub-concepts of non-cognitive abilities: self-efficacy, self-acceptance, and self-regulated learning strategies. The study at Sophia University involved collecting data on students' procrastination behavior and non-cognitive abilities through questionnaires and Moodle logs. The findings reveal a weak negative correlation between procrastination and the three sub-concepts. Among them, self-regulated learning strategies showed the strongest negative correlation (-0.28) and were identified as the sub-concept most closely associated with procrastination. The cluster analysis divided participants into two groups: those procrastinating longer and those procrastinating less. The latter group scored higher in self-acceptance and self-regulated learning strategies. The study concludes that while procrastination has a limited correlation with the studied non-cognitive abilities, self-regulated learning strategies stand out as significantly related to procrastination behavior. This sub-concept, linked to effective information processing, appears most capable of influencing students' procrastination tendencies. The paper suggests future research to explore new methods of measuring procrastination to unveil different associations with non-cognitive abilities potentially.

Keywords: Learning Analytics, Procrastination, Non-cognitive Skill

1. Introduction

The behavior of "procrastination" has been attracting attention in education. Procrastination is defined as delaying the accomplishment of some task (Lay,1986). Research has shown that procrastination in learning has a negative impact on academic performance (Corezo, 2017). On the other hand, "non-cognitive abilities" refer to physical and mental health, as well as social and emotional qualities such as persistence, attentiveness, motivation, and self-confidence (Nishisaka,2017). Non-cognitive abilities include sub-concepts such as self-efficacy, self-acceptance, and self-regulated learning strategies. Self-efficacy is an individual's belief that they can accomplish a certain learning task (Wood, 1987). Self-acceptance means the acceptance of oneself as one is (Ueda,1996). Self-regulated learning strategies are the volitional control exercised by the learner to process information more efficiently during the learning process (Fujita,2012). We focus on the three sub-concepts of non-cognitive abilities: self-efficacy, self-acceptance, and self-regulated learning strategies.

Previous studies have analyzed the relationship between academic procrastination and non-cognitive abilities, including the three types mentioned above. However, many studies have measured procrastination tendencies through self-awareness using questionnaires, and there are few studies that compare multiple elements of sub-concepts of non-cognitive abilities.

Therefore, in this study, we aim to analyze the relationship between procrastination behavior, which is measured objectively by collecting learning logs, and the sub-concepts of multiple non-cognitive abilities. This study aims to verify the hypothesis that there is a negative correlation between procrastination behavior in learning and three sub-concepts of non-

cognitive abilities. In addition, we will identify which of the three sub-concepts is most closely related to procrastination behavior. This will deepen understanding of the factors that cause procrastination behavior, which has a negative impact on academic performance, and make it easier to support learners.

2. Method

2.1 Measuring procrastination behavior

Procrastination time is calculated as the time from when the assignment is posted to when the assignment is submitted, i.e., "submission date and time of assignment—posting date and time of assignment." The learner's submission date and time, which is necessary to measure procrastination time, is obtained from the Moodle log.

2.2 Measurement of sub-concepts of non-cognitive abilities

A non-cognitive ability questionnaire was used to measure learners' three sub-concepts: self-efficacy, self-acceptance, and self-regulated learning strategies. This questionnaire was created based on the ScTN questionnaire (ScTN,2023). Each question item in the ScTN questionnaire corresponds to the question text and the perspective of the question. Based on this, questions corresponding to the three sub-concepts were extracted and used in this study. The non-cognitive ability questionnaire consisted of 12 questions in total. Each sub-concept had four questions, and each question was answered with a score of 1 to 5. The total score for each sub-concept ranged from 4 to 20 points, with a higher score indicating a stronger degree of that sub-concept held by the learner.

2.3 Experiment

This experiment will be conducted on students who agreed to participate in the "Educational Information Engineering" course at Sophia University. In this class, preparatory assignments for the next class will be posted on Moodle. Students will check the assignments, then work on them and submit them. The experiment will take place from November 6th to November 20th, 2023. The subjects were 23 people who agreed to participate in the research and completed the non-cognitive ability questionnaire and assignment submission.

3. Result

Figure 1 shows the results of the correlation analysis between procrastination time and the three sub-concepts, as well as a scatter plot of the results classified into two groups using cluster analysis. Two groups classified by cluster analysis show that one group tends to procrastinate for more extended periods, while the other tends to procrastinate for shorter periods.

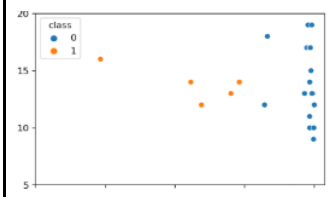
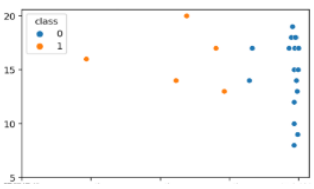
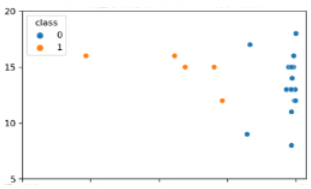
	Self-efficacy	Self-acceptance	SRL Strategy
Scatter Plot			
Correlation	-0.08	-0.16	-0.28
p value	0.71	0.45	0.20

Figure 1. Correlation analysis between procrastination time and the three sub-concepts

3.1 Correlation analysis between procrastination time and scores on three sub-constructs

As shown in Figure 1, there was almost no negative correlation between procrastination behavior and the three sub-concepts. Among the three, the weakest negative correlation was with self-efficacy, with a correlation coefficient of -0.08. The strongest negative correlation was with self-regulated learning strategies, with a correlation coefficient of -0.28.

3.2 Cluster analysis of procrastination duration and scores for three sub-concepts

Because the cluster analysis resulted in classification into Group 0, which tends to procrastinate longer, and Group 1, which tends to procrastinate shorter, we calculated the average scores for the three sub-concepts of each group. We also calculated the difference in average scores between each group. The results are shown in Table 1, where long procrastination cluster of n=16 and short one of n=7. The difference in the average between the groups was small at 0.2 for self-efficacy. For self-acceptance it was relatively high at 1.1, and for self-regulated learning strategies it was 1.4, the highest of the three sub-constructs. Furthermore, for self-acceptance and self-regulated learning strategies, the group that tended to procrastinate for shorter periods had higher average scores for the sub-constructs.

Table 1. *Average scores for the three sub-concepts for each group*

	Self-efficacy	Self-acceptance	SRL Strategy
Long Procrastination	14.0	14.9	13.4
Short Procrastination	13.8	16.0	14.8

4. Discussion

Based on the result above, self-regulated learning strategies had the strongest correlation and the largest difference in the average values between the groups classified by cluster analysis, and therefore, among the three sub-concepts, they have the strongest relationship with procrastination behavior. This is because self-regulated learning strategies are related to efficient information processing during the learning process (Fujita,2012) and are likely to be the psychological scale most closely related to learning plans.

The reason why the average score for self-acceptance in Group 1, who have a short tendency to procrastinate, is high may be that when self-acceptance is low, students may escape from the fear that they will not be able to complete the task, which may lead to delays in submitting the assignment. Also, the high average score for self-regulated learning strategies may be that when self-regulated learning strategies are low, students are unable to plan their studies and may start working on the assignment just before the deadline, which may lead to delays in submitting the assignment.

5. Conclusion

In this study, we hypothesized and verified a negative correlation between procrastination behavior in learning and the sub-concepts of multiple non-cognitive abilities. In addition, we investigated the sub-concept that is most closely related to procrastination behavior among the three types. As a result, we confirmed that there is almost no correlation between procrastination behavior and the three sub-concepts. However, it was revealed that of the three types, self-regulated learning strategies have the strongest relationship with procrastination behavior.

One future challenge is to conduct analysis using new methods for measuring procrastination behavior. If the method for measuring procrastination is different, it is possible that which sub-concepts of learners' non-cognitive abilities are related to procrastination behavior may change.

References

Cerezo, R., Esteban, M., Sánchez-Santillán, M., & Núñez, JC (2017). Procrastinating behavior in computer-based learning environments to predict performance: A case study in Moodle. Frontiers in psychology, 8, 1403.

Fujita, T. & Tomita, S. (2012). The effects of learning motivation and cognition of learning strategies on self-regulated learning. Bulletin of the Nara University of Education Educational Practice Development Research Center, 21, 81-87.

Lay, C.H. (1986). At last, my research article on procrastination. Journal of research in personality, 20(4), 474-495.

Nishisaka, S., Iwatate, K. & Matsui, T. (2017). The relationship between preschool children's non-cognitive and cognitive abilities and interactions at home. Bulletin of the Faculty of Home Economics, Kyoritsu Women's University, 63, 135-142.

ScTN (School Transformation Networking) (2023). "Overview of the ScTN Questionnaire". School Transformation Networking (ScTN). https://sctn.jp/questionnaire, (accessed 2023-12-20).

Ueda, T. (1996). Reexamination of the concept of self-acceptance: as a "good way of giving up" for people with low self-esteem. Psychological Research, 67(4), 327-332.

Wood, R.E. & Locke, E.A. (1987). The relation of self-efficacy and grade goals to academic performance. Educational and psychological measurement, 47(4), 1013-1024.