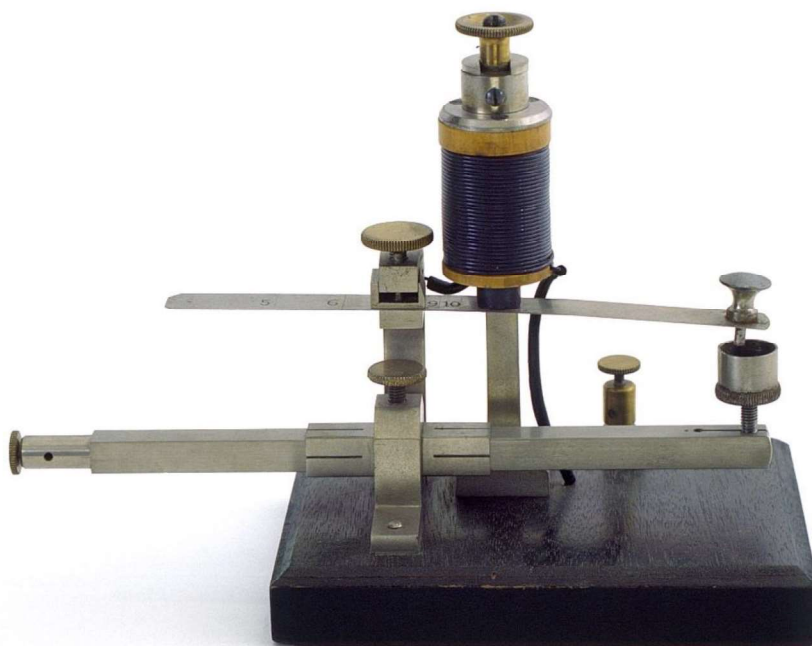PROCEEDINGS OF THE
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Learning Strategies during Covid-19 Pandemic: How Well Do They Predict School Achievement and How Do They Differ in Classroom and Remote-Learning Situation?

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Abstract

Considering the fact that the Covid-19 pandemic has called for the urgent adaptation of the remote-learning environment and hence the modification of learning habits, the aim of this research was to examine which learning strategies the secondary high-school student use during this transition and how well these strategies predict school achievement. Four subscales were adapted from the MSLQ questionnaire and administered to 135 students (82% of girls; M_{age}=16; SD_{age} = .64), as well as one open-ended question regarding the difference between learning in the classroom and remote learning situations. Results showed that only Elaboration was a statistically significant predictor of school achievement, while conducted qualitative analysis of the answers revealed that students find the classroom environment to be more stimulating and beneficial to their learning, suggesting that the elaborative learning is a prerequisite when it comes to school achievement ant the remote-learning should be more engaging.

Keywords: learning strategies; elaboration; remote learning; school achievement

Introduction

Since the outburst of the Covid-19 pandemic, schools all over the world have been forced to implement and adapt to the remote-learning environment, soon realizing that the traditional classroom setting is diametrically different when transposed online. Both students and teachers were faced with numerous issues regarding online education (Moralista & Oducado, 2020; Tria, 2021), while studies shed the light on two major groups of problems that were recurrent in the transition period. Not only did the student report increasing levels of anxiety and academic stress (Baloran, 2020), but they also reported that their learning has overall worsened (Chen et al., 2020). Bearing in mind that self-regulated learning strategies (e.g. planning, monitoring, etc.) are considered to be even more important in a distance learning environment than in a traditional learning setting (Dabbagh & Kitsantas, 2004), the aim of this study was to: (1) explore which learning-strategies the secondary high-school students use in a newly adapted environment; (2) examine how well do these strategies predict school achievement?; (3) and finally compare these strategies and look into how they differ in the newly created environment.

Method

Sample and procedure

A convenient sample was collected by the snowball method, comprising 135 secondary school students – 1st to 3rd grade (82% of girls; M_{age}=16; SD_{age}=.64). Prior to filling out the survey, students were asked to give out information regarding their school achievement at the end of the previous grade, ranging from satisfying (mark 2; .7%), good (mark 3; 26.7%), very good (mark 4; 54.8%) and excellent (mark 5; 17.8%). The survey was administered via GoogleForms online software, while informed consent was obtained from all participants in the study.

Measures

MLSQ (Motivated Strategies for Learning Questionnaire; Pintrich et al., 1993) represents a self-report Likert-scale instrument designed to assess students' motivation and usage of different learning strategies. Four subscales were obtained from the original instrument which measure cognitive and metacognitive learning strategies. The adapted questionnaire contained 26 questions, organized into four subscales which measure strategies of Elaboration (6 items; α =.77), Organization (4 items; α=.76), Critical thinking (5 items; α=.79) and Metacognitive self-regulation (11 items; α =.72). Students were instructed to rate each item on a 7-point Likert scale (1 – Does not apply to me at all, 7 – Completely applies to me), depending on how well sentences relate to how they learn and memorize school material.

One open-ended question was also included in the survey. Students were asked to explain the differences in how they learn when classes are carried out in school and online. The question stated: „*Is there a difference in how you learn (e.g. how you organize your time, how you memorize, what learning strategies you use) when teaching is live and when it is online? Please explain the difference.*"

Data analysis

Linear multiple regression analysis was conducted using SPSS software (*SPSS*, v. 25). Summary scores for each of the four learning strategies subscales were inputted as

predictor variables. The criterion variable was the school achievement students reported they had had at the end of the previous grade, operationalized through the numerical mark linked to the category of achievement. Content analysis of the students' answers to the open-ended question was also conducted by singling out the differences that students mentioned. Each difference was registered and coded either as the pro or the con for both learning environments. Qualitatively similar differences were then grouped into a broader code and each code was then counted.

Results

Descriptive parameters of average scores regarding four learning strategies are shown in Table 1. High means and statistically significant negative standardized skewness suggest that the most used strategy among students is Elaboration, followed by Organization, while the least used one is metacognitive self-regulation. Scores were later transformed in order to ensure data normality for future analysis.

Table 1: Descriptive parameters of average scores

	M	Sd	zSk	zKu	KS
Elaboration	5.60	1.12	-.401**	.45	.116**
Organization	4.92	1.51	-3.27**	.50	.093**
Critical thinking	3.99	1.36	-.028	-1.57	.076**
Metacognitive self-regulation	4.50	.97	-0.98	-.70	.071**

Note. Zsk = standardized skewness; zKu = standardized kurtosis; KS = KolmogorovSmirnov statistic

The results of multiple linear regression analysis showed that the regression model comprising four of the learning strategies is significant (R = .324, R^2 = .105, p <. 01), but also revealed that the Elaboration strategy is the only statistically significant predictor of school achievement as shown in Table 2.

Table 2: Learning strategies as predictors of school achievement

	B	SE	β	t	p
Elaboration	.23	.06	.37	3.60	.000
Organization	-.07	.04	-.15	-1.14	.141
Critical thinking	-.05	.04	-.10	-1.07	.285
Metacognitive self-regulation	.04	.07	.05	.51	.610

Results of qualitative analysis of the answers to the additional open-ended question regarding difference between learning in the classroom and remote-learning environment are shown in Table 3. Results revealed that students find that they better learn and monitor lectures in the traditional setting, as well as that they put into greater cognitive effort and have better time management when compared with remote-learning setting.

Table 3: Frequencies of the codes regarding pros of classroom and remote-learning environment

	Cumulative frequency of code	
	Classroom	Remote-learning
Lecture monitoring	15	0
Cognitive effort	11	1
Free time	0	8
Overlearning	2	0
Material understanding	4	0
Time management	12	2
Studying on time	4	0
Learning quality	21	0
Examination quality	3	0
Teachers' engagement	5	0
Communication	4	0

Discussion

Results of this research indicated that elaborative learning was the only learning strategy that can predict school achievement in the remote-learning situation, showing that the more the strategy is used, the greater the achievement will probably be accomplished. What is more, it has shown that this is the most used strategy among students, which corresponds to prior studies that have shown that elaboration is the most utilized strategy in the remote-learning situation during the Covid-19 pandemic (Avila & Genio, 2020). This result pattern suggests that teachers should encourage students to engage in more elaborative learning and that students themselves should practice elaboration techniques while learning, which "*involve meaning-enhancing additions, constructions or generations that improve their memory for what is being learned*" (Levin, 1988: 191). This research has also shed the light on shortcomings of remote-learning environment, suggesting that students have reported much better monitoring and concentration in the classroom setting, greater understanding of the material, better class organization, as well as greater engagement and cognitive effort. These results are also in line with previous studies that point out that students have difficulties when learning via online platforms (Baloran, 2020; Chen et al., 2020). Contrary to these deficiencies, a remote-learning environment has been found better only for organizing free time and activities before and after school time. Results of qualitative analysis suggest that teachers should find a way to simulate a traditional environment via online learning platforms by finding a way to carry out lectures that are more engaging and involving. Future research should focus on exploring and implementing suggested practices online in order to examine their effect on students' motivation and achievement in the future.

References

Avila, E. C., & Genio, A. M. G. J. (2020). Motivation and learning strategies of education students in online learning during pandemic. Psychology and Education Journal, 57(9), 1608-1614. https://doi.org/10.17762/pae.v57i9.506

Baloran, E. T. (2020). Knowledge, attitudes, anxiety, and coping strategies of students during COVID-19 pandemic. Journal of loss and trauma, 25(8), 635-642. https://doi.org/10.1080/15325024.2020.1769300

Chen, T., Peng, L., Yin, X., Rong, J., Yang, J., & Cong, G. (2020, July). Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic. In Healthcare (Vol. 8, No. 3, p. 200). MDPI. https://doi.org/10.3390/healthcare8030200

Dabbagh, N. & Kitsantas, A. (2004). Supporting Self-Regulation in Student-Centered Web-Based Learning Environments. International Journal on E-Learning, 3(1), 40-47. Norfolk, VA: Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/primary/p/4104/.

IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Levin, J. R. (1988). Elaboration-based learning strategies: Powerful theory= powerful application. Contemporary Educational Psychology, 13(3), 191-205. https://doi.org/10.1016/0361-476X(88)90020-3

Moralista, R. B., & Oducado, R. M. F. (2020). Faculty perception toward online education in a state college in the Philippines during the coronavirus disease 19 (COVID-19) pandemic. Universal Journal of Educational Research, 8(10), 4736-4742. https://doi.org/10.13189/ujer.2020.081044

Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). Educational and psychological measurement, 53(3), 801-813. https://doi.org/10.1177/0013164493053003024

Tria, J. Z. (2020). The COVID-19 Pandemic through the Lens of Education in the Philippines: The New Normal. International Journal of Pedagogical Development and Lifelong Learning, 1(1), ep2001. https://doi.org/10.30935/ijpdll/8311