Predictors of students' SQ3R in Learning Statistics During Distance Education: an Ordinal Logit Modeling

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ABSTRAK

Mempelajari statistik selama pendidikan jarak jauh merupakan tantangan karena keterbatasan dan masalah komunikasi. Hal ini berdampak pada kegiatan pembelajaran yang kurang optimal. Tujuan penelitian ini yaitu menganalisis tingkat SQ3R siswa dalam pembelajaran statistik dan menentukan prediktor signifikannya. Jenis penelitian ini yaitu penelitian kuantitatif. Desain penelitian penelitian ini adalah penelitian korelasional kompleks. Metode pengumpulan data menggunakan kuesioner. Teknik analisis data menggunakan menggunakan statistik deskriptif dan inferensial. Data sekunder digunakan dari studi penelitian yang ada dan diringkas menggunakan metrik statistik standar. Selain itu, analisis regresi ordinal digunakan untuk mengetahui prediktor tingkat SQ3R siswa pada pembelajaran statistika dan diuji pada taraf signifikansi standar. Temuan mengungkapkan bahwa siswa biasanya menggunakan metode SQ3R untuk mempelajari statistik selama pembelajaran online. Model statistik menggambarkan bahwa kemampuan membaca dan mengulas statistik siswa dibentuk oleh lingkungan belajar, sikap belajar, kesehatan fisik dan emosional, serta aktivitas waktu luang. Studi tersebut menyarankan bahwa untuk meningkatkan pembelajaran statistik siswa dalam pendidikan jarak jauh, lembaga pendidikan, dan profesor harus menciptakan lingkungan belajar yang kondusif, menggunakan metode pengajaran yang strategis, dan menekankan pentingnya kebiasaan belajar yang harmonis karena metode SQ3R.

ABSTRACT

Studying statistics during distance education is challenging due to limitations and communication problems. This has an impact on learning activities that could be more optimal. This research aims to analyze students' SQ3R level in learning statistics and determine its significant predictors. This type of research is quantitative research. The research design of this study is complex correlational research. The data collection method uses a questionnaire. Data analysis techniques use descriptive and inferential statistics. Secondary data from existing research studies were used and summarized using standard statistical metrics. In addition, ordinal regression analysis was used to determine the predictors of students' SQ3R level in statistics learning and was tested at a standard significance level. Findings reveal that students usually use the SQ3R method to learn statistics during online learning. The statistical model illustrates that students' ability to read and review statistics is shaped by the learning environment, teaching attitudes, physical and emotional health, and free time activities. The study suggests that to improve students' learning of statistics in distance education, educational institutions and professors should create a conducive learning environment, use strategic teaching methods, and emphasize the importance of harmonious study habits due to the SQ3R method.

1. INTRODUCTION

The students' learning statistics during the COVID-19 pandemic need to be clarified and concrete due to the educational gap and lack of resources in online education. Students encountered several problems in their online lectures in statistics, which caused them stress and a draining learning experience (Casinillo, 2022). Students needed to be more focused on household chores, bothersome family members, social media, and online games so that they could not focus on their learning activities (Casinillo, 2023;

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Dontre, 2021; Dubey & Pandey, 2020). In that case, the student's cognitive attitude toward statistics does not align with the teachers' goal, which results in poor educational processes and low performance of students. Teachers face difficulty delivering their lessons online, and monitoring students' learning ability is challenging due to its barriers (Francom et al., 2021). Students' perspectives on distance education could be more exciting and engaging, adversely affecting their learning and cognitive thought process (Bestiantono et al., 2020). Moreover, students' reading comprehension of their lessons only prevails during online learning. On the face of it, studying the five steps in reading, such as survey, question, read, recite, and review (SQ3R), perhaps may give insights into how to improve the student's comprehension and mental understanding of their lessons (Kohar et al., 2022; Miñoza & Casinillo, 2022). Statistics requires good critical thinking and reading comprehension so that the concept will be well understood (Miñoza & Casinillo, 2022).

Statistics is one of the most challenging subjects at the college level that needs deep understanding and comprehension through critical reading. Sefriani et al. (2021) portrayed that statistical learning during the pandemic became challenging since the lecture-discussion process involves an online system with limitations and obstacles (Sefriani et al., 2021). Teachers had obstacles presenting their lessons online, and most of the time, students read their printed notes at their respective homes (Guinto et al., 2020; Guzman, 2020). Students' mental well-being is affected by the adverse effects of the pandemic; hence, teachers were making printed lecture notes that are academically friendly to read and understand (Mendoza et al., 2023). Hence, self-learning is more dominant to students by comprehensive reading and understanding their lecture-discussion. In that case, the idea of SQ3R in learning statistics at a distance during the pandemic is vital for students as they apply self-learning in their studies. SQ3R is a form of method in reading that surveys the main concepts and ideas to grasp and remember the lessons quickly (Aziz, 2019). It is worth noting that statistical concepts are challenging to grasp, which requires a good and deep rational reading. Hence, the SQ3R method is helpful in intensive reading and understanding the main context of the subject (Kohar et al., 2022; Mendoza et al., 2023). The SQ3R study technique effectively improves the students reading acquisition and understanding of their lectures (Sugiharti et al., 2020). Learning effectiveness is governed by outside factors aside from their teachers' influence; hence, it must be guided and mediated by the SQ3R method to increase the student's learning outcomes (Zulaikhah et al., 2020).

The literature contains only a few studies on the SQ3R method in higher education, and researchers are still determining a study involving the application of the SQ3R method in learning statistics. Furthermore, this is the first time anyone has researched the SQ3R technique in studying statistics during distance education amid the pandemic. In this context, this article investigates college students' utilization of the SQ3R method in comprehending statistics lessons. Hence, the general objective of this research study is to investigate the students' SQ3R in learning statistics during distance education and capture its governing predictors. Specifically, the study dealt with the following goals: (1) to obtain a descriptive interpretation of the variables of interest; (2) to measure the level of students' SQ3R in learning statistics; and (3) to develop an ordered logistic model that captures the governing predictors of students' SQ3R in learning statistics at a distance.

This study addresses the students' problem of understanding the statistics lesson independently during distance education. The results of this article study may help the students improve their reading comprehension and remember their lessons over a long period, increasing their learning outcomes. Moreover, the study might give valuable insights that help the teachers and students discover the difficulties during distance education. Furthermore, the research study expects to develop an idea of how to improve statistics education across the globe and provide information to educators and researchers as a baseline for social and education research.

2. METHOD

This research article employed a quantitative approach, utilizing descriptive and inferential statistics. The research design of this study is a complex correlational study, employing multivariate regression analysis to ascertain the significant factors and their degree of relationship between various independent variables and the dependent variable, as outlined by (Trafimow, 2006). The study concentrated on conducting a cross-sectional survey with a large sample size of students to draw inferences regarding SQ3R learning in statistics in a distance education setting.

This research obtained data from one of the state universities in Region 8, Philippines, namely Visayas State University (VSU). It involved engineering students enrolled in the "Engineering Data Analysis" course during the first semester of the School Year 2021-2022. It is essential to highlight that the research took place as the school shifted to distance education in response to the COVID-19 lockdown, prioritizing virus containment and student safety. The study employed a complete enumeration survey, considering all sample units (students) within the population. This approach is commonly known as the census method, as

described by (Beşe Canpolat & Gök, 2020). The census method was chosen due to the manageable number of sampling units and its ability to yield accurate data from the population of interest. Since the study commenced during the global lockdown of universities prompted by the COVID-19 pandemic, data was collected using Google Forms surveys.

In this context, the research questions were formulated within the Google survey platform and distributed to students through their contact email addresses and Facebook accounts. Before initiating the data collection process, the researchers diligently adhered to ethical procedures to mitigate potential conflicts of interest and other research biases. Initially, formal consent letters were obtained from school authorities and participating teachers. Subsequently, students were provided an orientation regarding the study's objectives. Emphasizing that participation was entirely voluntary, students were free to decline participation if they so chose. Furthermore, it was clear that no sensitive information would be collected, and all data would remain private, solely for research purposes.

The research instrument adapted the independent variables from the current study by (Casinillo et al., 2022). In which the situation of distance education influenced such information during the COVID-19 pandemic lockdown. Moreover, the independent variables have two categories: the demographic profile and the learning profile of students. The demographic profiles of students are age, sex, and hometown. The said demographic profile does not vary in any given situation. The learning profile of students in learning statistics consists of the following: anxiety level (scale of 1 to 10), difficulty level (scale of 1 to 10), creativity level (scale of 1 to 10), how conducive the learning place (scale of 1 to 10), hours studying per week, internet signal (scale of 1 to 10), money spent for internet per week (Philippine peso (PHP)), physical and mental health (scale of 1 to 10), and leisure time (scale of 1 to 10). As for the dependent variables, the study dealt with the SQ3R of students, based on (Jannah, 2018). In this case, students were asked how they survey, question, read, recite, and review their statistics lessons. The five questions involved a Likert scaling of 1 to 3: 1-No, 2-Sometimes, and 3-Yes. Table 1 presents the possible average score of students' perception of their SQ3R in learning statistics and the corresponding response.

Table 1. Average Perception Scores and their Response

Average Perception Score	Response
1.00 - 1.67	No
1.68 - 2.33	Sometimes
2.34 - 3.00	Yes

The SQ3R questionnaire has been thoroughly scrutinized and validated by education experts. It has been deemed a valid tool to collect data from students regarding their reading and study abilities in statistics without compromising their reputation and identity. Additionally, the reliability test for the SQ3R instrument reveals a reliability coefficient of 0.71, indicating that the questions were consistently posed and reliable (Cronbach, 1951). This makes SQ3R a sound and acceptable tool for gathering data on students' reading and study abilities in statistics. The researchers encoded the collected data in Excel and conducted data cleaning, which involved removing outliers and excluding respondents with missing data. Subsequently, the study considered n = 127 students. After formatting the data to fit the STATA program for statistical calculations, descriptive metrics were used: frequency counts (n), percentages (%), mean (M), standard deviation (SD), minimum (min), and maximum (max) values. These computed values were then presented in tabular form.

It is important to note that the dependent variables were ordinal in nature. This study employed ordinal logistic regression analysis to determine the statistically significant factors influencing students' SQ3R in learning statistics. Ordinal logistic regression is a statistical modeling analysis that deals with the association between the ordered dependent variable and one or more independent variables (Bender & Grouven, 1997). In this case, the response variable is categorical, correctly ordering the categories. Thus, the model addressed ordinal responses Y_i (1 to 3 scaling) for i^{th} student and with 3 categories ($k = 0, 1, 2$) is characterized by an equation where the cumulative probabilities. In other words, increasing the independent variable x_i by 1 unit multiplies the odds, resulting in the outcome with the value of e^{β_i}. The researcher performed a post-estimation technique known as diagnostic tests for regression analysis to validate the results. Finally, all statistical results were tested at a standard level of significance.

3. RESULT AND DISCUSSION

Result

The socio-demographic profile reveals that the mean age of students is about 19.98 years (SD=0.89), with the youngest being 18 years old and the oldest being 23 years old. Among these engineering students, 38% are male, while the remaining 62% are female. Notably, 26% of these students reside in urban areas, while the majority, constituting 74%, live in rural places where consistent internet connectivity can be an issue. When assessing their learning profiles using a 1 to 10 scale, students disclose an average anxiety level of 7.18 (SD=1.87), pointing to moderate anxiety concerning statistics. Similarly, they characterize the subject as notably challenging, with an average difficulty rating of 7.89 (SD=2.19). Regarding creativity, students report an average score of 6.09 (SD=1.86), also measured on a scale of 1 to 10.

Students provide insights into the conducive nature of their learning environment, with an average rating of 5.62 (SD=2.31) on a scale of 1 to 10. This indicates their perception of the environment's suitability for effective learning. On average, students allocate 6.85 hours (SD=9.72) to their weekly study sessions, reflecting their commitment to academic endeavors. Regarding internet connectivity, a cornerstone of contemporary education, students give an average rating of 5.48 (SD=1.96) on a 1 to 10 scale. Furthermore, students take stock of their physical health, assessing it at 6.08 (SD=2.25) on the same scale and their mental well-being at 4.78 (SD=2.30). These evaluations shed light on their overall health and psychological state, indicating areas that may warrant attention and support. Regarding leisure time, students rate it at 6.63 (SD=2.49) on the 1 to 10 scale, revealing their perceived balance between academic commitments and personal life. Moreover, students acknowledge the financial commitment associated with their educational pursuits by disclosing an average expenditure of PHP 235.82 (SD=PHP 206.33) on internet-related expenses. Descriptive statistics for the statistics students' profile during distance education showed in Table 2.

Table 2. Descriptive Statistics for the Statistics Students' Profile During Distance Education

Profile	n	Mean	Std dev.	min	max
Age	127	19.98	0.89	18	23
Male[b]	127	0.38	0.49	0	1
Urban[b]	127	0.26	0.44	0	1
Anxiety[a]	127	7.18	1.87	1	10
Difficulty[a]	127	7.89	2.19	2	10
Creativity[a]	127	6.09	1.86	2	10
How Conducive is the Learning Place[b]	127	5.62	2.31	1	10
Number of Hours studying Within a Week	127	6.85	9.72	1	70
Internet Signal[a]	127	5.48	1.96	1	10
Physical Health[a]	127	6.08	2.25	1	10
Mental Health[a]	127	4.78	2.30	1	10
Leisure Time[a]	127	6.63	2.49	1	10
Money Spent for Internet (PhP)	127	235.82	206.33	20	1400

Students have expressed that they sometimes conduct preliminary investigations to gain an overview of the content or subject to be studied when dealing with a text that has an outline or an organized sequence (Mean (±SD) = 2.24 (±0.59)). This proactive behavior indicates that students are willing to take an active role in their learning, leading to a deeper understanding of statistical concepts (Hartikainen et al., 2019). Learners with prior knowledge are likelier to perform better when prompted than those with lower prior knowledge (Wong et al., 2019). Therefore, encouraging this behavior during the survey phase of SQ3R can foster a more engaging and participatory learning environment in statistics education. Moreover, students occasionally generate and enumerate supplementary inquiries that they should be able to address once they complete the chapter (Mean (±SD) = 2.22 (±0.64)). This activity aligned with the larger objective of improving understanding and analytical thinking in Statistics. In addition, the act of underlining, making notes, or otherwise marking vital information to address previously formulated questions while reading serves as an excellent technique for enhancing understanding and memory of statistical ideas (Mean (±SD) = 2.77 (±0.44)). The proactive method described here involves a deliberate study approach by emphasizing and annotating relevant material that directly relates to the specific questions or inquiries. This method aims to direct attention toward the most critical parts of the subject matter, thereby increasing the likelihood of understanding and internalizing fundamental statistical principles. Students who possess advanced critical thinking abilities demonstrate superior aptitude in comprehending, interpreting,

analyzing, evaluating, deducing, elucidating, and self-regulating compared to students with limited critical thinking skills (Mulyanto et al., 2018). Students with a proactive personality are more likely to actively participate in studying (Chen et al., 2021). By engaging in anticipatory thinking and formulating inquiries, students can better prepare themselves to focus on essential concepts while reading, improving comprehension and memory of statistical principles. The findings above indicate that adopting a proactive approach to learning, which involves conducting preliminary investigations, generating inquiries, and underlining important information, can substantially impact students' comprehension and retention of statistical concepts.

Throughout their statistics study, the participants demonstrated a conscious and strategic approach to learning. They would pause at pivotal points in the chapter to recall previously developed questions or set aside the book to reflect on related material (Mean (±SD) = 2.46 (±0.58)). This active recall and recitation technique helped them reinforce their understanding of statistical concepts. Similarly, they were dedicated to reviewing the material and persistently revisiting their recitations, notes, and questions until they possessed a comprehensive understanding of the content (Mean (±SD) = 2.50 (±0.53)). This was especially crucial when preparing for an exam following the survey, questioning, reading, and recitation of textual material. Students' commitment to mastering the subject extended beyond initial reading and questioning. This reveals a well-rounded study strategy emphasizing active learning and a deliberate approach to mastery and focusing on long-term retention and in-depth comprehension. Approach is associated with increased student accountability in the learning process, heightened motivation, and a more gratifying educational outcome (García-Peñalvo et al., 2019). The students' conscious and strategic approach to learning statistics fosters a deeper understanding of the subject. It aligns with broader educational research advocating for active and engaged learning practices. Students' SQ3R in learning statistics online showed in Table 3.

Table 3. Students' SQ3R in Learning Statistics Online

SQ3R	Response	Frequency (n)	Percentages (%)
Survey	No	10	7.87
	Sometimes	76	59.84
	Yes	41	32.28
Mean (±SD) = 2.24 (±0.59); (Over all response: Sometimes)			
Question	No	15	11.81
	Sometimes	69	54.33
	Yes	43	33.86
Mean (±SD) = 2.22 (±0.64); (Over all response: Sometimes)			
Read	No	1	0.79
	Sometimes	27	21.26
	Yes	99	77.95
Mean (±SD) = 2.77 (±0.44); (Over all response: Yes)			
Recite	No	6	4.72
	Sometimes	57	44.88
	Yes	64	50.39
Mean (±SD) = 2.46 (±0.58); (Over all response: Yes)			
Review	No	2	1.57
	Sometimes	59	46.46
	Yes	66	51.97
Mean (±SD) = 2.50 (±0.53); (Over all response: Yes)			

The five models do not possess a multicollinearity problem based on the variance inflation factor (VIF) approximation since each VIF of independent variables does not exceed by 10 as well as the mean VIF (i.e., mean VIF=1.39<10) (Allison, 2012). The statistical analysis suggests that the variables "Survey" (R^2 =0.085), "Question" (R^2 =0.061), and "Recite" (R^2 =0.041) are not statistically significant at a 5% significance level. This suggests that the highlighted factors have little impact on the SQ3R learning style students choose regarding statistics. However, when examining Table 4, it becomes evident that certain other factors play a significant role in predicting the students' mode of learning statistics using the SQ3R method. Specifically, "Creativity" (p-value of <0.05) and "Internet Connectivity" (p-value of <0.10) are shown to be significant predictors of the survey approach. This approach, which involves obtaining an overview of the subject, benefits from creativity through interactive visualizations, multimedia resources, and real-world examples. Students with creative thinking abilities are more likely to succeed in

mathematics because they can develop their knowledge and capabilities to construct various innovative strategies for solving mathematical problems (Yaniawati et al., 2020). These creative elements make this approach more enjoyable and encourage students to delve deeper into statistical concepts and make informed judgments about which aspects of statistics to explore during this phase. Furthermore, this approach often requires students to access online resources, including digital textbooks, video lectures, and statistical software. Reliable internet access is pivotal in this context, enabling students to explore these resources seamlessly and fully leverage the survey procedure (Apuke & Iyendo, 2018). Conversely, slow or unreliable internet connections can significantly hinder students' ability to access and effectively utilize these resources, potentially limiting their engagement and the quality of their survey activities (Sarker et al., 2019).

Significant predictors for the "Question" element of learning include the students' "Anxiety Level" (p-value <0.10), "Creativity" (p-value <0.05), and "Internet Expenses" (p-value <0.10). This finding suggests that students with elevated anxiety levels benefit from the "Question" approach, allowing them to seek clarity, reassurance, and control over their learning process. By actively generating and addressing questions, they can alleviate their anxiety and gain a comprehensive understanding of the subject matter. High mathematical anxiety students may use different strategies to manage their negative emotions in different learning situations and work harder in math to avoid the immediate consequences of poor math performance (Wang et al., 2018). On the other hand, creative individuals are inclined to approach problem-solving by considering multiple perspectives, engaging in critical thinking, and formulating innovative concerns. Creative thinking, characterized by attributes like persistence, self-discipline, attentiveness, and mental activities such as questioning, embracing new and unusual concepts, free association of ideas, imaginative thinking, and reliance on intuition, is the foundation for effectively addressing issues, considering novel ideas, and making connections to solve problems (Yaniawati et al., 2020). Similarly, students mindful of their internet expenses tend to maximize the value of their online resources by actively seeking clarification and more profound understanding through questioning. Students use the Internet for academic and research purposes because it offers free access to online journals, magazines, and other valuable information resources (Apuke & Iyendo, 2018). Ordinal regression models for students' SQ3R in learning statistics and its predictors showed in Table 4.

Table 4. Ordinal Regression Models for Students' SQ3R in Learning Statistics and its Predictors

Predictors	Dependent variables				
	Survey	Question	Read	Recite	Review
Anxiety[a]	0.090[ns]	0.153*	0.109[ns]	0.081[ns]	0.031[ns]
	(0.106)	(0.102)	(0.129)	(0.101)	(0.109)
Difficulty[a]	0.034[ns]	-0.126[ns]	0.089[ns]	0.105[ns]	0.063[ns]
	(0.107)	(0.104)	(0.131)	(0.104)	(0.109)
Creativity[a]	0.310**	0.251**	0.083[ns]	-0.019[ns]	0.097[ns]
	(0.130)	(0.124)	(0.164)	(0.124)	(0.132)
Age	-0.023[ns]	0.004[ns]	0.056[ns]	0.236[ns]	-0.066[ns]
	(0.221)	(0.216)	(0.301)	(0.226)	(0.234)
Male[b]	-0.553[ns]	-0.161[ns]	-0.732[ns]	-0.221[ns]	0.388[ns]
	(0.428)	(0412)	(0.539)	(0.409)	(0.447)
Urban[b]	0.165[ns]	0.198[ns]	-0.078[ns]	-0.045[ns]	0.112[ns]
	(0.447)	(0.442)	(0.548)	(0.432)	(0.459)
How conducive is the learning place[b]	0.084[ns]	0.091[ns]	0.239*	-0.038[ns]	0.146*
	(0.095)	(0.091)	(0.125)	(0.091)	(0.098)
Number of hours studying within a week	0.011[ns]	-0.026[ns]	0.103*	0.009[ns]	0.021[ns]
	(0.019)	(0.019)	(0.071)	(0.021)	(0.021)
Internet signal[a]	-0.167*	-0.149[ns]	-0.083[ns]	0.036[ns]	-0.061[ns]
	(0.109)	(0.105)	(0.138)	(0.103)	(0.111)
Physical health[a]	-0.071[ns]	-0.075[ns]	-0.061[ns]	-0.062[ns]	-0.236**
	(0.112)	(0.107)	(0.138)	(0.108)	(0.119)
Mental health[a]	0.102[ns]	0.144[ns]	0.164[ns]	0.125[ns]	0.200*
	(0.114)	(0.114)	(0.154)	(0.112)	(0.123)
Leisure time[a]	0.033[ns]	-0.003[ns]	0.068[ns]	0.112*	0.248***
	(0.081)	(0.077)	(0.103)	(0.078)	(0.087)
Money spent for internet (PhP)	0.001[ns]	0.001*	0.0001[ns]	-0.00003[ns]	0.0001[ns]
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Predictors	Dependent variables				
	Survey	*Question*	*Read*	*Recite*	*Review*
Observation	**127**	**127**	**127**	**127**	**127**
Chi-square test	**18.93ns**	**14.77ns**	**19.98***	**8.80ns**	**21.55***
p-value	**0.125**	**0.322**	**0.096**	**0.788**	**0.063**
Pseudo *R²*	**0.085**	**0.061**	**0.140**	**0.041**	**0.111**

Note: *a - Scale 1 to 10; b - dummy variable (indicator); 1 PhP = 0.018 US dollar; ns - not significant; ***p<0.01; **p<0.05; *p<0.1.*

Discussion

The findings in the case of "Recitation" indicate that the emergence of "Leisure Time" (p-value <0.10) as a significant predictor suggests that the availability of leisure time among students may have an impact on their preference for this specific learning method. This suggests that students choose recitation as a learning method if they have spare time. The utilization of recitation as an instructional method has the potential to enhance students' engagement and enhance their scholastic achievements. Nevertheless, the application of this approach necessitates the acquisition of practical time management abilities (Wibowo et al., 2018). Consequently, students must be aware of their time allocation, the length of various tasks, and the capacity to formulate short-term objectives (Adams & Blair, 2019).

The conduciveness of the learning environment (p-value<0.10) and the number of hours spent studying (p-value<0.10) have a statistically significant influence on students' approach to reading statistics material. These two predictors explain about 14% of the variance in how students engage with statistics. Fostering a stimulating and inclusive environment characterized by respect, empathy, and trust is fundamental to effective learning (Franklin & Harrington, 2019). This notion is further corroborated by studies, which highlight the motivating influence of a conducive learning environment on academic performance (Asvio, 2017; Y. Fitria et al., 2023; Mahat et al., 2018; Razali et al., 2018). The arrangement of a learning environment and the treatment of students inside it can substantially influence their reading behaviors and their approach to mastering statistical concepts. Additionally, the research underscores the significance of proficient time management, as emphasized by (Hensley et al., 2018; Wolters et al., 2017), in the academic success of college students, making it a pivotal skill (Brady et al., 2022; Wolters et al., 2017). Students adept at managing their time are more likely to allocate sufficient hours to studying, enhancing their approach to reading statistics material. Generally, these findings emphasize the critical need for creating supportive learning environments, fostering effective study habits, and guiding time management to bolster students' engagement with statistics through reading, ultimately leading to improved academic success.

Several factors significantly impact how students learn Statistics when it comes to reviewing. These factors include the conduciveness of the learning environment (p-value<0.10), physical health (p-value<0.05), mental health (p-value<0.10), and leisure time (p-value<0.01). The relevance of a conducive learning environment is particularly noteworthy as it ignites students' motivation and guides them toward a more effective review of the subject matter, as demonstrated by the research conducted by (T. N. Fitria, 2023; Mahat et al., 2018). Moreover, it is imperative to acknowledge the correlation between mathematical expertise and practical executive function, a characteristic tied to physical fitness and activity. The research found that physical well-being is linked with the cognitive functions necessary for attention and memory, which are essential learning processes (Kohl III & Cook, 2013). Similarly, the strong correlation between symptoms of mental distress and academic progress cannot be understated. Students with a more favorable mental health status are shown to possess higher levels of motivation in their educational pursuits and studies, leading to academic success, as evidenced by the studies conducted by (Mahdavi et al., 2023). A stable mental state is crucial for effective learning and sustained educational progress, enhancing motivation, focus, and resilience. Additionally, the academic pressures, especially when reviewing a challenging subject like statistics, can be overwhelming. Engaging in leisure time physical activities can help reduce stress (Bélair et al., 2018). When less stressed, students can approach their studies with a more transparent and focused mind, making the review process more effective (Maajida Aafreen et al., 2018). This enhanced mental state significantly improves the effectiveness of the review process when learning statics. Results suggest that the learning space, study habits, physical health, mental health, and leisure time play significant roles in the student's learning process regarding reading and reviewing statistics.

The study's main limitation is that its findings only apply to a particular group of engineering students in a distance learning setup. It may need to be more generalizable to other academic fields or student populations. Future research should investigate the complexity of these factors in a broader range of participants and various educational settings to obtain a more comprehensive understanding of their

impact on the acquisition of statistical knowledge. Furthermore, a longitudinal study could provide insights into how these factors evolve and their long-term impact on students' statistics comprehension.

4. CONCLUSION

Ordered logistic regression models demonstrated that students' reading and reviewing abilities in statistics are shaped by their learning environment, study habits, physical and emotional well-being, and leisure time management. To enhance students' statistical learning in an online or distance education context, educational institutions and instructors should establish conducive learning environments, employ diverse teaching techniques, and stress the significance of balanced study habits. Moreover, implementing interventions designed to enhance students' physical and emotional well-being can positively impact their reading and reviewing skills, further supporting the effectiveness of online or distance learning.

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