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Unpacking self-regulation's buffering effect on academic procrastination and mathematics performance

Veronica O. Calasang, Ernesto P. Atwel Jr., Luiza T. Bonganciso, Jane S. Cabañog, Yachane P. Lara, Emerson D. Peteros
College of Education, Cebu Technological University-Main Campus, Cebu, Philippines

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ABSTRACT

This research assessed the moderating role of self-regulation in the relationship between academic procrastination and mathematics performance among grade 10 students at Lapu-Lapu City, Cebu, Philippines. Using a descriptive correlational design, data were collected from 862 students through multidimensional academic procrastination scale (MAPS-15), self-regulation formative questionnaire, and first-quarter grades in mathematics. Treatment of data includes descriptive measures, Pearson's r, and multiple regression analysis. The results revealed moderate academic procrastination levels, high levels of self-regulation, and very satisfactory math performance. Academic procrastination was significantly and negatively correlated with mathematics achievement, while self-regulation buffered its adverse effects Hence, these results underscore the need for interventions that foster self-regulation and reduce academic procrastination through structured workshops, teacher support, and institutional programs to enhance students' mathematics performance and engagement.

Corresponding Author:

Ernesto P. Atwel Jr.
College of Education, Cebu Technological University-Main Campus
Cebu City, Cebu, Philippines
Email: atwelernestojr@gmail.com

1. INTRODUCTION

Mathematics is a wide area of knowledge that deals with figures and structures consisting of everything that surrounds humans [1]–[3]. The subject covers essential academic disciplines such as engineering, science, business, finance, and technology [4]–[6]. Beyond its academic relevance, mathematics matters in everyday life as it fosters critical thinking and problem-solving [7].

However, the difficulty of mathematics has been prominent in disrupting the engagement process of the students due to behaviors done on purpose. The intentional postponement of academic tasks despite the awareness of potential negative consequences is the behavior called academic procrastination [8]. In the Philippines, academic procrastination has become prevalent among the students ages 15 and above upon studying mathematics directly affecting their performance of the course [9]. Students that are unable to manage properly their actions towards a certain task due to academic procrastination will have difficulty achieving success [10], [11].

Procrastination is often seen as inability to manage behaviors in completing necessary goals [12]. It is indubitably one of problems for students because of students having lack of necessary strategies to handle their learning processes effectively [13]. Conversely, this becomes relevant in self-regulation, which promotes efficient understanding of information through developing communication, providing reliable perspective across disciplines and into practice and policy [14], [15]. Self-regulated learning is a powerful

way that encourages student to take control of their own learning process by implying strategies that promotes goal setting, motivation, and more reflection on their progress that leads to better performance in mathematics [16], [17]. Thus, self-regulation bears the components that may mitigate the effects of academic procrastination to student's mathematics performance.

The interconnectedness of self-regulation and academic procrastination is well-explained through three prominent theories. Sweller's cognitive load theory highlights the impact of cognitive overload on learning and its role in fostering procrastination, especially in demanding subjects like mathematics [18]. In addition, Steel and König's temporal motivation theory identifies procrastination as the interplay of expectancy, value, impulsiveness, and time, pointing to self-regulation failures as contributors to stress and diminished performance [19], [20]. Meanwhile, the importance to self-regulation as a critical mechanism in human behavior is emphasized through Bandura's social cognitive theory with monitoring, adjusting, and reflecting processes as key drivers [21]. Together, these theories provide an understanding to the challenges of academic procrastination and the role of self-regulation in managing its effects.

Self-regulation is deemed as an effective moderator to deplete the chance to procrastinate. In the study of Hussin and Matore [22], the results show that students will obtain optimal mathematics learning outcomes if they can overcome procrastination behavior. Salguero-Pazos and Reyes-de-Cózar [23] suggests that students should practice effective self-regulation that involves managing time, emotions, and thoughts. When students align their intentions with actions that reduces procrastination it helps students to engage more in mathematics [24], [25]. This means that if the students' self-regulation is high, a low chance of academic procrastination occurs and vice versa.

Furthermore, the relationship between academic procrastination and self-regulated learning is prone in secondary education [26]. da Costa Júnior *et al.* [27] contends that self-regulated learning strategies highly affects the academic performance of junior high school students as it possesses the capacity to control negative impulses and distractions. Students who apply self-regulated learning demonstrate improved mathematics performance and overcome distractions [28]. Hence, self-regulation helps students to have a sense of responsibility and obligation that is crucial for their academic success.

Challenges and factors that lead students to procrastinate [29] will pave an opportunity for self-regulated learning predicting academic performance [30]. Despite the continuous studies on academic procrastination and self-regulation, there are only few studies examining the moderating role of self-regulation in the relationship between academic procrastination and mathematics performance among secondary students, particularly within the Philippine context. Existing research often focuses on direct relationships or explore these constructs separately, leaving the interaction effect less being explored. Furthermore, this study addresses the gap by investigating how self-regulation reduce the negative impact of academic procrastination on mathematics performance relying on its integration of theoretical frameworks with empirical evidence.

By that, this study aims to understand how academic procrastination affect the grade 10 students' math performance and how self-regulation moderates this relationship in the Philippine context. Thus, this study provides new insights into the protective role of self-regulation and offers practical implication for designing interventions that enhance students' mathematics performance through self-regulatory strategies. Specifically, this study aimed to determine to answer the following queries: i) what is the level of academic procrastination of the respondents in terms of work disconnection, core procrastination, and poor time management? ii) what is the level of self-regulation of the respondents in terms of planning, monitoring, adjusting, and reflecting? iii) what is the level of mathematics performance of the respondents? iv) is there a significant relationship between the respondents' academic procrastination and their mathematics performance? and v) does self-regulation significantly moderate the relationship between academic procrastination and mathematics performance of the respondents?

2. METHOD

This section of the study highlights the strategies and methods that were utilized in studying how self-regulation moderates the relationship between academic procrastination and mathematics performance. This section also gives the emphasis to the design utilized, data gathering procedures, and the treatment of the data after it is collected.

2.1. Research method

This study employed a quantitative research approach and applied a descriptive correlational research design to describe and examined the relationship between the variables. According to Aggarwal and Ranganathan [31], descriptive design caters into gathering necessary data relative to identified variables from the respondents making it suitable in this study as it pursues to give an exact and systematical interpretation of the population and level of the specified behaviors. Furthermore, a correlational research design seeks to

measure the significance relationship between the variables without changing the variable's intent within the variables used [32]. Additionally, this study used adopted survey questionnaire and handed out through simple random sampling in selecting respondents and were tested the following null hypotheses at 0.05 level of significance: i) Ho_1: there is no significant relationship between respondents' academic procrastination and the respondents' mathematics performance and ii) Ho_2: self-regulation does not significantly moderate the relationship between the academic procrastination and mathematics performance of the respondents.

2.2. Respondents

The respondents of this study are grade 10 students enrolled of the school year 2024-2025 from four different identified public schools at Lapu-Lapu City Division in Cebu, Philippines. A simple random technique was used to determine the respondents. Additionally, Cochran's formula was used to calculate the essential size for the required respondents as it is suitable for survey research allowing more accurate estimation based on the confidence level, margin of error and population variability.

The distribution of respondents as depicted in Table 1, the age group with highest frequency is 15 years old, having 575 students or 66.71% of the total respondents. Indeed, the most frequent age in the study is consistent with a typical Grade 10 students in the Philippines. The second most age group is 16 years old, with 239 students or 27.73%. Although a year older, this age is still normal as students vary in birthdates. Additionally, such ages are fit to participate since the tenth-grade level of junior high school are much more exposed in different concepts of mathematics that is more likely to be complicated compared to the other grade levels. As for the gender, male students make up a slightly higher proportion at 53.94%, while females make up 46.06%.

Table 1. Distribution of the respondents

Profile		*f*	%
Age	>17	10	1.16
	17	31	3.60
	16	239	27.73
	15	575	66.71
	14	7	0.81
	Total	862	100.00
Gender	Female	397	46.06
	Male	465	53.94
	Total	862	100.00

2.3. Instrument

This research made use of a two-part survey questionnaire to assess the variables investigated in this study. Part I, multidimensional academic procrastination scale (MAPS) by González-Brignardello and Paniagua [33], consists of 15 items designed to assess students' academic procrastination behavior. The three-factor model of MAPS-15 was highly reliable, with omega (ω) values of 0.84, 0.83, and 0.71 and H factor reliability index values of 0.89, 0.88, and 0.85 for core procrastination, poor time management, and work disconnection respectively, indicating satisfactory internal consistency. The composite reliability coefficient (CRC) values are 0.84, 0.83, and 0.77 and average variance extracted (AVE) values of 0.48, 0.56, and 0.41 confirming convergent validity for all three factors. Temporal stability was confirmed using test-retest months apart, with intraclass correlation coefficient (ICC>0.70) indicating good score stability. Part II utilized the self-regulation formative questionnaire by Erickson and Noonan [34], comprising 28 items to evaluate students' self-regulatory abilities in academic settings. Construct validity was verified through exploratory factor analysis, and the tool showed high reliability (α=0.889), making it suitable for measuring student self-regulation. The content validity of the eight subscales was assessed through two methods: calculating bivariate correlations between item values and total subscale scores, followed by evaluating the significance of the two-tailed test, and comparing correlation values against critical benchmarks ($p<0.05$; df=2). These analyses confirmed that all items met the required criteria, validating the adaptation of the self-regulation formative questionnaire (SRFQ) as a reliable measure of content validity. Both part I and part II use a 5-point Likert scale: 5-strongly agree, 4-agree, 3-undecided, 2-disagree, 1-strongly disagree. To assess mathematics performance, the researchers asked their exact final grades for the first quarter in mathematics, which were used throughout this study.

2.4. Data collection process

The researchers ensured to follow ethical conduct in the gathering of data from the respondents. The researchers secured permission and consent from the schools division superintendent and the school principals.

After the approval, researchers conducted an orientation with grade 10 teachers on assisting the students in answering the questionnaires effectively. The researchers gave out the informed assent to students, that served as the students' parents approval and willingness in the participation of the gathering of data.

After getting the assent form back from their parents with approval, the researchers handed out the questionnaires and gave ample time to fulfill the questionnaires. The respondents were also given the choice to withdraw at any point in the process answering the questionnaire if they feel uncomfortable. In addition to the responses, the researcher also sought permission to access the student's mathematics grades from first quarter to measure their performance in mathematics. All collected data were handled strictly abiding the data privacy act to protect the respondents.

2.5. Data analysis

The data gathered by the researcher was compiled, sorted, organized, and tabulated using Microsoft Excel and Jamovi [35], [36]. The researchers analyzed the data to test the null hypothesis presented in the study. Frequency distribution, percentage, weighted mean (M), standard deviation (SD), Pearson's r, and moderation analysis were used as statistical tools to treat the data

3. RESULTS

This segment poses the interpretation of results of the data acquired based on the objectives of the study which intended to measure the level of academic procrastination of the respondents, their level of self-regulation, their level of mathematics performance, the test of relationship of the variables, and the moderation of self-regulation between academic procrastination and mathematics performance.

Table 2 displays the results upon the measurement of the level of the respondents' academic procrastination which shows moderate academic procrastination behaviors with a M of 2.83 and a SD of 1.11 and moderate on all of its components: work disconnection (M=2.94, SD=1.14), poor time management (M=2.62, SD=1.07), and core procrastination (M=2.93, SD=1.13). Moderate procrastination indicates students occasionally delay tasks but not excessively. This behavior can still interrupt learning especially in mathematics that requires consistent practice and timely completion of assignments. The presence of procrastination, even at moderate levels, suggests a need for strategies to improve time management and task prioritization.

It can be gleamed in Table 3 that the respondents have high levels of self-regulation (M=3.53, SD=1.04) exhibiting high levels of reflect (M=3.63, SD=1.06), adjust (M=3.58, SD=1.06), plan (M=3.50, SD=1.03), and monitor (M=3.42, SD=1.02). High level of self-regulation suggests that students have strong skills in planning, monitoring, reflecting, and adapting their learning strategies. These abilities are critical for overcoming procrastination and maintaining focus on mathematics tasks. Reflection and adjustment being the highest imply that students actively evaluate their progress and make necessary changes.

Table 2. Level of academic procrastination of the respondents

Components	M	SD	Verbal description
Work disconnection	2.94	1.14	Moderate
Poor time management	2.62	1.07	Moderate
Core procrastination	2.93	1.13	Moderate
Grand M	2.83		Moderate
Grand SD		1.11	Moderate

Note: 4.21-5.00: very high; 3.41-4.20: high; 2.61-3.40: moderate; 1.81-2.60: low; and 1.00-1.81: very low.

Table 3. Level of self-regulation of the respondents

Components	M	SD	Verbal description
Plan	3.50	1.03	High
Monitor	3.42	1.02	High
Adjust	3.58	1.06	High
Reflect	3.63	1.06	High
Grand M	3.53		High
Grand SD		1.04	High

Note: 4.21-5.00: very high; 3.41-4.20: high; 2.61-3.40: moderate; 1.81-2.60: low; and 1.00-1.81: very low.

Table 4 reveal the respondents' level of mathematics performance. It can be observed that 338 (39.21%) of the students have very satisfactory grades varying from 85 to 89 while 281 (32.60%) of them have

satisfactory grades of 80 to 84. There were also 155 (17.98%) respondents have outstanding performance with a grade range of 90 to 100 and 88 (10.21%) respondents with a grade range of 75 to 79 have fairly satisfactory performance. Generally, the respondents had a very satisfactory performance with a M of 85.24 and SD of 4.40. The distribution indicates that while a significant portion of students performs well, there is still room for improvement. The absence of poor performance suggests that despite procrastination tendencies, students manage to maintain acceptable grades, likely due to their high self-regulation skills.

It is presented in Table 5 that the result of the relationship between academic procrastination and mathematics performance of grade 10 students. The results of the statistics using Pearson's r showed that academic procrastination has negative correlation to the respondents' mathematics performance ($r=-0.206$, $p<0.001$) in which the relationship of the two variables is significant rejecting the null hypothesis. Notably, self-regulation has a positive correlation to their mathematics performance ($r=0.242$, $p<0.001$). The correlations confirm that procrastination weakens mathematics performance, whereas self-regulation enhances it. The negative link between self-regulation and procrastination reinforces the role of the former as a protective factor, reducing the behaviors of the latter that hinders academic success.

Table 6 shows the multiple-regression analysis that is done on the variables of this study using the method of Hayes [37]. The utilization of the statistical tool measures the moderation of self-regulation between academic procrastination and mathematics performance. Furthermore, the researchers implemented bootstrapping with up to 5000 samples to ensure the validity of the results. The statistics indicate that academic procrastination has a significantly negative relationship with the mathematics performance of the respondents ($\beta=-1.10$, $t=-3.39$, $p<0.001$). Meanwhile, self-regulation has a positive significant relationship with the mathematics performance of the students ($\beta=2.19$, $t=5.26$, $p<0.001$). The interaction effect of self-regulation acts as a negative moderator thus, significantly weakens the relationship between academic procrastination and the respondents' mathematics performance ($\beta=-1.42$, $t=-2.14$, $p=0.033$). A simple slope analysis was also conducted to understand the nature of the interaction of the moderator. Students with high self-regulation experiences less impact from procrastination on their mathematics performance. It demonstrates that self-regulation acts as a moderator, buffering the detrimental effects of procrastination.

Table 4. Level of mathematics performance of the respondents

Level	Numerical range	*f*	%
Outstanding	90-100	155	17.98
Very satisfactory	85-89	338	39.21
Satisfactory	80-84	281	32.60
Fairly satisfactory	75-79	88	10.21
Poor	Below 75	0	0.00
Total		862	100.00
M		85.24	
SD		4.40	

Table 5. Correlation analysis

	Variables	1	2	3
1	Academic procrastination	1		
2	Self-regulation	-0.348***	1	
3	Mathematics performance	-0.206***	0.242***	1

Note: ***significant at p<0.001

Table 6. Moderation analysis

Interaction terms	95% confidence interval					
	β	Standard error	Lower	Upper	t	p
Academic procrastination	-1.10	0.324	-1.74	-0.4712	-3.39	<0.001
Self-regulation	2.19	0.416	1.35	3.0018	5.26	<0.001
Academic procrastination and self-regulation	-1.42	0.667	-2.71	-0.0913	-2.14	0.033

Table 7 indicates that when self-regulation is low, its interaction to the relationship between academic procrastination and students' mathematics performance has no significant effect ($\beta=-0.551$, $t=-1.19$, $p=0.234$) since academic procrastination negatively impacts the respondents' mathematics performance regardless of self-regulation. However, the relationship of academic procrastination and mathematics performance of the students significantly weakens when self-regulation is high as evidenced by its negative moderation effect ($\beta=-1.646$, $t=4.61$, $p<0.001$). This means that self-regulation is most effective when

strongly developed. Students with high self-regulation can maintain performance even when procrastination tendencies exist, highlighting the importance of fostering these skills in educational interventions.

Table 7. Simple slope analysis

Levels of self-regulation		95% confidence interval				
	β	Standard error	Lower	Upper	t	p
Low (-1SD)	-0.551	0.463	-1.47	0.362	-1.19	0.234
Average	-1.098	0.325	-1.74	-0.459	-3.38	<0.001
High (+1SD)	-1.646	0.357	-2.35	-0.954	-4.61	<0.001

Note: shows the effect of the predictor (academic procrastination) on the dependent variable (mathematics performance) at different levels of moderator (self-regulation).

4. DISCUSSION

The data presented in the results of the study highlight that on a moderate level, students do not always procrastinate but, still reflects common misjudgment of their time and task management abilities overestimating their daily productivity [38]. Interestingly, respondents do not view breaks as a major hindrance of their productivity, suggesting that more about counterproductive habits and lack of focus rather than frequent breaks. Previous study by Valente *et al.* [39], coincides with the findings of the study that students do not excessively engage into external distractions, but they are indeed struggling with disorganization and prioritizing the tasks. Meanwhile, according to Farooq *et al.* [40], students procrastinate more due to other external factors such as living situation, work involvement and etc. Thus, when students do not agree that they are always interrupting their work through breaks, it shows that they may struggle to recognize their procrastination habits in that area.

Moreover, many students have difficulty prioritizing their academic responsibilities and allocating their time effectively which is why poor academic performance prevails. It is also showed from previous study that students with poor management skills tend to have lower grades [41]. Upon the results, the students claimed to that they stay on top of their studies. Students delay tasks based on mood or rewards [42], and lack of intrinsic motivation increases procrastination [20], this has a negative impact to subjects that needs continuous hard work like mathematics despite trying to meet their responsibilities [9].

However, self-regulation has been deemed as a key factor in mitigating procrastination [16]. Based on the data obtained regarding to the respondents' level of self-regulation, grade 10 students demonstrate self-regulation skills on high level signifying that they comprehensively manage their own learning thus, improving their academic performance [43]. Additionally, the current research study shows that respondents exhibit a high level of all of the components of self-regulation namely: planning, monitoring, adjusting, and reflecting. Students typically claimed that they are diligent and has self-controllable behaviors, reflecting a low level of academic procrastination.

Self-regulation is one of the psychological factors that influence the learning process and is related to students' self-management [44]. The findings of this study corroborated to the study of Elhusseini *et al*. [17], indicating that students' academic performance increases with their level of self-regulation. Moreover, according to Li *et al.* [45] cultivating self-regulation skills, students can develop the resilience and adaptability needed to succeed in their academic pursuits. Furthermore, findings suggest that students should continue to improve their existing self-regulation skills, providing guidance and support to help them refine their skills and apply them in different contexts so it would not negatively affect their academic performance specifically in mathematics [23], [46].

Mathematics performance reflects student's habits on studying, their behavior and participation in class. The students showed satisfactory range in mathematics, and it showed that students highly emulating self-regulation skills in mathematics due to the students' ability to set plan, manage time, and use of strategies [47]. Cormack *et al.* [48] reveal that student's procrastination and mathematics performance has a minor negative correlation. Moreover, Araya-Castillo *et al.* [49] highlight the tendency of students prioritizing leisure over success to perceive themselves as procrastinators, especially when their goals lack personal relevance.

In addition, students who actively participate in learning contribute to the understanding and enhance problem-solving [50]. This is consistent with García-Ros *et al*. [26], who found that self-regulated learners procrastinate less and perform better. The results support Zimmerman's [51] model of self-regulated learning, according to which students who are self-regulated and actively involved in planning, monitoring, and regulating their learning experience better academic performance. This aligns with Bandura's social cognitive theory [21], which emphasizes self-regulation as a mechanism for monitoring and adjusting behavior to achieve goals. Students who actively regulate their learning can counteract procrastination and maintain engagement in

mathematics task [28]. Thus, self-regulation contributed to the weak impact of academic procrastination towards the students showcasing very satisfactory performance on their mathematics performance.

Building on the findings of de la Fuente *et al.* [52], this study identifies self-regulation as a mitigating factor against academic procrastination. Self-regulation has a negative moderation effect towards the relationship between academic procrastination and mathematics performance. These results align with Zarrin *et al*. [13] and Ragusa *et al.* [53], who demonstrated how adopting self-regulation behaviors significantly reduces procrastination's detrimental impact on academic performance. Furthermore, it is confirmed in the slope analysis that inconsistency arises upon the combination of the effect of high levels of self-regulation and academic procrastination that leads to poor academic outcomes. Contrastingly, Nen *et al.* [30] report that low self-regulation has minimal influence on the relationship between procrastination and mathematics performance. Furthermore, insufficient self-regulation correlates with reduced mathematics performance, albeit insignificantly [22]. Valenzuela *et al.* [54] emphasize that enhanced self-regulated learning reduces procrastination, improving academic performance reducing stress. Similarly, Zhao *et al.* [55] assert that improving self-regulation lessens procrastination's impact on students' performance, contributing to its negligible effect on mathematics performance. This supports temporal motivation theory [19], which explains procrastination as a result of low expectancy and value combined with impulsiveness. High self-regulation helps students manage impulsivity and maintain motivation, reducing procrastinations' detrimental effect [26].

The findings advocate for educational interventions that prioritize the development of self-regulation skill. Chen *et al.* [18] emphasizes that according to cognitive load theory, excessive cognitive load can lead to procrastination especially on mathematics tasks that often impose high cognitive demands. Kurtovic *et al.* [56] recommend introducing self-regulation education at the secondary level, where structured responsibilities provide an encouraging environment for cultivating these skills to reduce the load and enable students to organize tasks, manage time, and apply strategies that simplify complex problems. Furthermore, code [57] highlights the use of varied educational programs, stressing the importance of reflective practices and strategic adjustments that are helpful in mitigating the effects of procrastination.

In practice, educators should employ strategies to enhance planning, monitoring, and adjustment skills among students. Schools can implement structured workshops on time management, goal-setting, and reflective learning. Teachers should integrate classroom strategies such as progress monitoring, study schedules, and feedback session to strengthen planning and adjustment skills. Guidance counselors can provide targeted interventions for students struggling with procrastination, while institutions may embed self-regulation as part of the curriculum. As Amani and Arbabi [58] argue, fostering these competencies not only reduces procrastination but also strengthens mathematics performance reinforcing the critical role of self-regulation in enhancing academic performance. Thus, these practices collectively enhance students' ability to manage distractions, maintain focus, and achieve better academic outcomes

5. CONCLUSION

This study examined the moderating role of self-regulation in the relationship between academic procrastination and mathematics performance among grade 10 students. According to the findings, it is clear that students procrastinate their studies moderately and still make it an interference that affects their performance in mathematics. The capacity for students to delay the tasks varies due to other factors also that could lead them to do it. On the other hand, it is also concluded that students demonstrate diligence and self-management behaviors in their tasks, which leads them to perform well in mathematics. Self-regulation helps students avoid the consequence of academic procrastination on their mathematics performance, especially when self-regulation is shown on a high level. By incorporating procrastination into the difficult nature of mathematics, students are able to develop self-control mechanisms that help them attain desired learning objectives. The findings add to the understanding and new evidence of academic procrastination and mathematics performance being moderated by self-regulation in the Philippine context. The integration of the theories into the findings shows that self-regulation not only reduces cognitive overload and sustains motivations but also strengthens behavioral control, critical for success in complex subjects like mathematics.

Students should reduce academic procrastination by strengthening their self-regulation most importantly its key components such as planning, monitoring, adjusting, and reflecting upon improving mathematics performance in spite of distractions. Teachers need to set fair deadlines for homework assignments and make students responsible for completing them on time. In addition, remote learning is still being applied in some cases as a self-paced form of instruction, teachers should think about the quantity and difficulty of the educational tasks given to students in order to decrease procrastination and boost their motivation to finish assignments on time. In conjunction with the guidance counselor, teachers may assist students in overcoming academic procrastination by teaching self-regulating values. Students who are able to plan their tasks, monitor their performance, adjust to many situations, and reflect on their actions serve as a

defense mechanism against the negative consequences of procrastination and thus show proficient results in their mathematics performance.

Furthermore, this study has notable limitations worthy of acknowledgement. Due to the limited scope of the study confined on only one grade level, it would be helpful to study the data in different levels to generalize the findings to broader population. One constrains is also the data gathered that were from self-reported questionnaire which lacks the validity of the answers of the respondents. Future studies are required to explore deeper the effect of students' mathematics performance upon showing a high level of academic procrastination and self-regulation at the same manner. Thus, methods and analyses that require further interviews with students, using tasks, other reported scale, and experimental methods would be necessary to explore all the developing ideas of academic procrastination and self-regulation and tackle any potential shortcomings, thereby creating new scenarios from further investigated phenomenon and additional motivating themes encountered in future studies.

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Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Veronica O. Calasang	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	
Ernesto P. Atwel Jr.						✓	✓		✓				✓	
Luiza T. Bonganciso						✓	✓		✓				✓	
Jane S. Cabañog						✓	✓		✓				✓	
Yachane P. Lara						✓	✓		✓				✓	
Emerson D. Peteros		✓	✓	✓	✓		✓	✓		✓	✓	✓		

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

The authors obtained informed consent from the parents and informed assent from the students that participated in this study.

DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author, [EPAJ], upon reasonable request.

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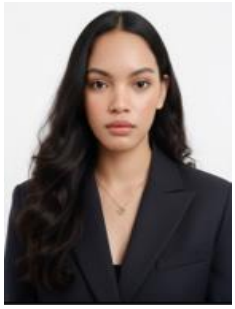
BIOGRAPHIES OF AUTHORS

Veronica O. Calasang is a faculty member of the College of Education at Cebu Technological University-Main Campus, where she is designated as the Chairperson of the Diploma Programs. She earned her baccalaureate degree at the University of San Carlos in 1999 and continued her academic journey at Cebu Technological University-Main Campus, completing both her Doctor of Philosophy in Technology Management (Ph.D.-TM) and Master of Arts in Vocational Education (MAVED). In addition to her academic qualifications, she is a holder of National Certificate (NC 2), National TVET Trainer Certificate (NTTC) and Trainers Methodology (TM 1) in Dressmaking of Technical Education and Skills Development Authority (TESDA). She can be contacted at email: veronscalasang21@gmail.com.

Ernesto P. Atwel Jr. is currently pursuing Bachelor of Secondary Education major in Mathematics at Cebu Technological University-Main Campus. Additionally, he is affiliated with various student organizations of the school. He demonstrates a strong connectivity and interest with mathematics, research and education, therefore of his pursuing program. His academic endeavors reflect his commitment in developing clear instructional approaches, research-driven methods that promote the meaningful understanding on mathematical concepts. He can be contacted at email: atwelernestojr@gmail.com.

Luiza T. Bonganciso is currently taking up Bachelor of Secondary Education major in Mathematics from Cebu Technological University-Main Campus. As a pre-service teacher her interest lies within the classroom management and effective mathematics learning as she has observed in the real classroom settings. She is committed to bridging theory and practice through reflective teaching, classroom observation, and data-driven instructional planning, which she can apply on her next endeavor as future educator. She can be contacted at email: luizabonganciso2@gmail.com.



Jane S. Cabañog is currently pursuing a Bachelor of Secondary Education major in Mathematics at Cebu Technological University-Main Campus. She has demonstrated a strong passion for mathematics, earning multiple academic awards and distinctions throughout her secondary education, as well as being ranked among the highest-performing students in her cohort. She continued to maintain strong academic performance in senior high school, further developing her skills, discipline, and love for learning. As she prepares for a career in mathematics education, she remains committed to sharing her knowledge and inspiring others to appreciate the importance and elegance of mathematics. She can be contacted at email: janecabanog1@gmail.com.

Yachane P. Lara is presently enrolled in the Bachelor of Secondary Education program, specializing in Mathematics, at Cebu Technological University-Main Campus. She has always shown that she has strong academic abilities, being one of the top students throughout her secondary education. Her high school years helped shape her discipline, problem-solving skills, and growing interest in mathematics. As an aspiring mathematics educator, she is dedicated to developing her knowledge and teaching skills and aims to motivate students to build confidence and appreciation for mathematics. She can be contacted at email: larayachane24@gmail.com.

Emerson D. Peteros holds a bachelor degree in Secondary Education major in Mathematics. He earned this degree from Cebu Normal University, Cebu City, Philippines. He also obtained his master's in education major in Teaching Mathematics and his doctorate degree in Development Education from Cebu Technological University-Main Campus, Cebu City, Philippines. He taught high school mathematics in the Sisters of Mary School-Boystown, Inc. and Sisters of Mary School-Girlstown, Inc. for two and twelve years, respectively. He was also a coach for different math competitions such as Metrobank-MTAP Math Challenge, Philippine Math Olympiad (PMO) and other local and regional math competitions. At present, he is associate professor V at Cebu Technological University-Main Campus where he teaches math related subjects and research. He is also the chairman in research and development of the College of Education in the same university. Moreover, he teaches Statistics and Research for postgraduate studies and mentored undergraduate and postgraduate students in research writing. He has presented research at different national and international conferences. He has authored and co-authored research publications in different international peer-reviewed journals in the fields of education such as mathematics, early childhood and special education. He can be contacted at email: emerson.peteros@ctu.edu.ph.