American Journal of Educational Research, 2023, Vol. 11, No. 1, 7-11
Available online at http://pubs.sciepub.com/education/11/1/2
Published by Science and Education Publishing
DOI:10.12691/education-11-1-2

Reducing Students' Academic Procrastination through Unconstrained Non-Routine Contextualized-Localized Problems in Mathematics

Ryan Jay B. Gumban*, Dennis B. Roble

University of Science and Technology of Southern Philippines, Cagayan de Oro City, Philippines
*Corresponding author: ryanjaygumban14@gmail.com

Received November 21, 2022; Revised January 02, 2023; Accepted January 10, 2023

Abstract Different pedagogies are used in order to meet international standards, where Filipino pupils' performance is subpar. This results in a challenge for teachers to infuse the right strategy, like non-routine problem solving, to enhance students' problem solving skills for both instruction and behavior improvement. This study demonstrates how offering students flexible time through non-routine, contextualized problems as formative evaluation improves their academic procrastination. This study will examine students' abilities to complete unrestricted, non-routine, contextualized tasks as well as a more intangible aspect like academic procrastination. The level of performance and whether there is a significant difference between students exposed to constrained and unconstrained non-routine contextualized-localized problems as part of formative assessments in terms of academic procrastination were determined using quantitative data collected using a descriptive research design. Although it was found that students' levels of academic procrastination remain unchanged, the numerical increase in the mean is a good thing to keep in mind. It is recommended that mathematics teachers employ unrestricted, non-routine, contextualized problems as formative assessments to gradually raise students' mathematics achievement and reduce academic procrastination.

Keywords: *unconstrained non-routine problems, contextualized-localized problems, academic procrastination*

Cite This Article: Ryan Jay B. Gumban, and Dennis B. Roble, "Reducing Students' Academic Procrastination through Unconstrained Non-Routine Contextualized-Localized Problems in Mathematics." *American Journal of Educational Research*, vol. 11, no. 1 (2023): 7-11. doi: 10.12691/education-11-1-2.

1. Introduction

It's becoming more and more important to be able to solve problems in order to excel in mathematics. Students who are prepared to solve problems effectively and go above and beyond the expected may manage the situation while responding to a demanding environment. These expectations logically resulted from the requirement for schools to foster students' capacity for mathematical problem-solving [1]. However, there are other occurrences that may be related to procrastination that impede students' mathematical development. Asio [2] asserts that procrastination can have an impact on all forms of academic misconduct. It is crucial to remember that academic procrastination is a harmful trait, with increasing stress being a recognized effect. As a result, each person needs to possess some fundamental life skills, such as problem solving [3].

Additionally, earlier research has shown that procrastination is becoming increasingly common among students [4]. This is acknowledged to be more detrimental to academic progress than beneficial [5]. This study also made reference to the fact that academic procrastination is one of several variables contributing to students' low math learning achievement [6]. It should nonetheless be highlighted that the effects of academic procrastination are the only ones included in these study results. This study demonstrates how giving students' flexible time reduces academic procrastination using non-routine, contextualized-localized problems as formative evaluation. Teachers who want to use problem solving with students who appear to be procrastinating may benefit from unrestricted, non-routine contextualized tasks.

This study will examine students' abilities to complete unrestricted, non-routine, contextualized tasks as well as a more intangible aspect like academic procrastination. Furthermore, students can gradually catch up to the requirements of international math tests like Trends in International Mathematics and Science Study (TIMSS) and Program for International Student Assessment (PISA), which use non-routine questions in their exams. When it comes to math and science, Filipino students rank last out of 58 countries in TIMMS 2019 and 77th out of 78 countries in PISA 2018 [7]. Finally, the study's objective is not merely mathematical performance; rather, as students develop their skills in dealing with challenging situations, they will come to regard them as ordinary.

Based on the aforementioned perspectives, the researcher sought to establish a style of formative

assessment that is unrestricted, non-routine, contextualized, and localized and to ascertain how it influences and reduces students' academic procrastination.

2. Literature Review

Studies and research that support the current study are considered with regard to non-routine problems, unconstrained non-routine problems, and academic procrastination in mathematics among students.

According to Klymchuk et al., interesting non-routine problems, such as puzzles, can engage students' emotions, creativity, and curiosity while also improving their conceptual understanding, critical thinking skills, problem-solving strategies, and lateral "outside the box" thinking. They also stated that during the intervention, students' behavioural engagement was significantly higher. The findings suggested that students found the tasks more interesting than the lecture, with fewer instances of off-task behaviour detected [8].

The teachers' influences on changing classroom culture were brought about by bringing realistic experiences of learning mathematics through non-routine problem solving into the classroom, thus, students persevered and managed to complete this task through good discussion and strategic collaboration. It has been proposed that high cognitive demand tasks may cause students to become more engaged and active in the exploration stage, as well as to be able to use strategies that are meaningfully connected to concepts in their study of problem solving integration in order to increase students' affective competency [9].

Freihat et al. stated in their study on self-concept and its association with academic procrastination (AP) that there are various behavioral phenomena that occur in the course of our lives in general and our educational process in particular. The phenomenon of AP is taking a clear and influential course in the academic process, which lies in the unnecessary postponement of some of the tasks that must be performed, delayed, or abandoned until the last. Some individuals fail to complete their duties because of their procrastinating and avoiding performing tasks, in addition to personal fears of failure, or because of questioning one's personal abilities. Discover that procrastination manifests itself as the postponement of a desired behavior to a later time, which impairs the achievement of the individual's goals, and that it is sometimes an acquired behavior, and at other times it is a form of resistance or a way to avoid work that he does not consider to be fun or valuable, or that it has any positive consequences [10].

Zarrin et al.'s inquiry found that fear of failure and self-regulation predicted academic procrastination. People with a strong sense of responsibility appear to be more responsible for the learning process [11].

Academic procrastination is defined by Amin as the tendency to postpone and delay academic tasks or to ignore academic responsibility throughout the course of studies. Academic procrastination is indicated by postponing or delaying the start of a task, delaying the completion or submission of assignments, exceeding the deadline for a planned task, and engaging in other activities other than finishing the tasks. It is a frequent practice among college students during their academic year [12].

Furthermore, Moonaghi et al. stressed on this prevalent notion that academic procrastination has bad repercussions for students in terms of academic progress and well-being in their study regarding academic procrastination and its features. Also, given that procrastination, particularly academic procrastination, is a relatively common phenomenon that is increasing due to technological progress, and given its effects on the physical and mental health of humans as well as its consequences on academic progress, strategies for coping should be taught to teachers and students, and motivation for its prevention and coping should be created so that its prevalence is reduced as much as possible [13].

Soyleyen et al. stated that laziness, a diminished sense of responsibility, fear of failure, and difficulty managing time are the main causes of academic procrastination [14].

According to Sari and Fakhruddiana, postponing activities occurs not only in the context of a job but also in the context of school or academic pursuits. They discovered that social support influences pupils' ability to complete their activities. Students or people with a high internal locus of control see the world as something that can be controlled so that their behavior has an impact on it, and this belief motivates them to complete their tasks [15].

Moreover, Winarso and Agustin mentioned that pupils with less procrastination have great academic achievement and academic happiness. According to the findings of their research, there are six reasons why pupils procrastinate when answering mathematical problems. Fear of failure, time management, seeking assistance, difficulty making decisions, low concentration, and task avoidance are the six factors. In addition, time management is something that every student must have when doing math homework. Students with good time management skills may simply configure the priority scale so that assignments are finished on time. However, because most students have poor time management skills, their activity plans do not operate as well as they should [16].

Nisrina & Salafudin mentioned in their study about the effects of academic procrastination and student creativity on the outcomes of mathematics learning that if academic procrastination decreases, the mathematics learning outcomes will be better [17].

Toker and Avci [18] discovered that the academic procrastination scores of university students who participated in a cognitive-behavioral approach intervention program decreased, citing Ossebaard et al. Furthermore, their qualitative findings show that the experimental group members had positive thoughts about the group practices and were satisfied with the group processes; group members achieved the personal goals set at the beginning of the group sessions, and nearly all had an idea of how to achieve their personal goals and understood that it would take time; and experimental group students reported that after the program, they had begun to initiate studying sessions.

In his study on procrastination, Asio stated that instructors should be given a flexible class schedule of exercises to address the issue of academic procrastination [2].

In her study, Eltayeb found that development on the level of female academic procrastination may be ascribed to students because of their capacity to focus on academic

duties and their personal motivation for academic success [19].

Finally, Akinsola et al. discovered that students who procrastinate the least outperformed students who procrastinate the most in mathematics.Some of the practical tasks are for the kids to be well organized by starting small and working their way up to the greater goal. In other words, a student may need to create a scale of daily preferences by breaking down large projects that appear overwhelming into smaller pieces. A procrastinator may also need to begin with the easiest work and progress to more rigorous and difficult duties. Success in the easier task is likely to motivate and nudge him to attempt the more difficult task, thereby increasing his confidence in his ability to handle academic matters [5].

3. Methods

The descriptive research design was used in this paper. The level of performance and whether there is a statistically significant difference between students exposed to constrained and unconstrained non-routine contextualized-localized problems as part of formative assessments in terms of academic procrastination were determined through the collection of quantitative data. Feedback embedded in the researcher made instrument was also gathered from the respondents to support the findings and describe further the effects of unconstrained, non-routine, contextualized-localized problems on students' academic procrastination. Two (2) intact sections of Grade 10 students from Banisilan National High School participated in the study for both the constrained and unconstrained non-routine contextualized-localized problems implementation for school year 2022–2023. The students in these two sections were a heterogeneous group. There were forty (40) students in the experimental group and fifty-eight (58) in the control group. To avoid bias, both sections were chosen at random from regular classes.

The researcher requested permission from the principle of Banisilan National High School to conduct the study in Grade 10 in two sections in order to collect the data. After the letter was approved, it was sent to the selected subject teachers whose classes would be included in the study. The researcher presented himself to the teachers and asked for courtesy. The respondents received assurances regarding the confidentiality and anonymity of the participant's identity.

Additionally, before the study was conducted, students were given a pre-test for academic procrastination. Both the control and experimental groups received face-to-face instruction before the test. For each topic or subtopic, distinct, non-routine, contextualized-localized problems were developed and anchored to the learning competencies found in the Department of Education's curriculum for grade 10 mathematics. Twelve non-routine tasks were divided into two groups—the experimental group and the control group—and were approved by experts. The researcher then spoke with the participants about the initial topics for grading. Both the control group and the experimental group are made aware that all non-routine formative assessments will be evaluated using a rubric for creativity that takes into account originality, fluency, and flexibility.

Moreover, as a formative assessment, the researcher time-bounded each non-routine problem for the control group in the classroom and gave it to them during class. Contrarily, in an experimental setting, students were given non-routine, contextualized-localized problems after discussion. These problems did not have a time limit and could be completed outside of the classroom or at home. Likewise, students were reminded daily and given the opportunity to ask questions or request clarifications regarding the non-routine problems. After discussing each topic or subtopic, one or two non-routine problems were provided.

Following the discussion of all the topics, the researcher collected the non-routine problems from the students and examined their work before grading it in class. Also, the experimental group is further along in topic discussions than the control group because formative assessments were not completed during class. Since the criteria used to evaluate students' answers is creativity, which also considers the originality of their solutions, the students were always reminded to work on their own. To ascertain the degree of academic procrastination and assess whether there is a significant difference, the posttest for academic procrastination was given to the students in both groups.

4. Results and Findings

The levels of students' academic procrastination during pre-test and post-test were determined by their scores in the test using the adopted Academic Procrastination Scale questionnaire with 5 as the highest rating and perfect mean score, conducted before and after the implementation. Table 1 shows the descriptive statistics of academic procrastination of the students under the control and experimental groups.

Table 1. Level of Students' Academic Procrastination

Group of Learners	Pre-test			Post-test		
	Mean	SD	Descriptive Level	Mean	SD	Descriptive Level
Control Group	3.14	0.44	Moderate Procrastination	3.08	0.40	Moderate Procrastination
Experimental Group	3.04	0.44	Moderate Procrastination	2.82	0.37	Moderate Procrastination

Perfect Mean: 5.00

Legend: Mean Interval	Interpretation
4.51-5.00	*Very High Procrastination*
3.51-4.50	*High Procrastination*
2.51-3.50	*Moderate Procrastination*
1.51-2.50	*Low Procrastination*
1.00-1.50	*Very Low Procrastination*

The pre-test and post-test results of students' academic procrastination for both groups are displayed in Table 1. The pre-test mean scores for both groups show moderate procrastination, with mean scores for the control and experimental groups of 3.14 and 3.04, respectively. This shows that the students' levels of academic procrastination were more similar before the study was conducted. Additionally, the controlled group's and the experimental group's pre-tests had equal standard deviations of 0.44. This suggests that the control group students' academic procrastination scores were spread equally with those of the students in the other group.

The post-test results for academic procrastination for the control group and experimental group are likewise shown in Table 1, with mean scores of 3.08 and 2.82, respectively. It suggests that the control group's mean score was greater than that of the other group. Furthermore, based on the pre-test and post-test mean scores, it can be seen that there were no changes in the levels of academic procrastination for either group, despite the fact that both scores decreased numerically. Likewise, the control group and experimental group's scores for academic procrastination have standard deviations of 0.40 and 0.37, respectively. This means that the academic procrastination in the experimental group improved better than the students in the control group because of a higher decrease in the mean and a lower standard deviation.

Academic procrastination has decreased on average, which can be attributed to better time management in the given unrestricted non-routine tasks. This is consistent with the findings made by Soyleyen et al., which assert that laziness, a diminished sense of responsibility, fear of failure, and difficulty managing time are the main causes of academic procrastination [14]. The decrease in the mean of students' academic procrastination in the experimental group is attributed to the contextualized and localized features of the given non-routine problems as formative assessment, and, more importantly, to answering them in a more flexible time where students can explore more in doing the given tasks. Moreover, feedback from the respondents supports this finding. They have noted that giving them non-routine problems both challenged and engaged them; the problems are relatable because they were localized in a familiar setting to them, and they like the idea of doing it unconstrained so that they can set aside time to study individually or in a group and explore more in doing the tasks.

The following respondents narrated that:

Verbatim: *"Mag allocate gid sang time sa pag answer sir. Gaka challenge ko sir. Day-to-day basis gina basa nga gina basa asta nga daw maintindihan…"*

[Should allocate time to answer. I am challenged. Day to day basis I kept on reading the problems until I understand it.] **(P3)**

Verbatim:"*Ay, localized gali siya sir makagana japon ng anu halimbawa the anu in "Banisilan National High School" amu na sir…*

[Problems are localized for example our school "Banisilan National High School] **(P1)**

Verbatim: *"Naga group study kami kung sabado o domingo para ma answeran. Naga set kami sang day kung free kami para mag solve kami. Mas dali mo maintindihan sir kay ga brainstorming kami…*

[We are having group study on Saturday's or Sunday's to answer. We set time whenever we are free for us to solve. It can be easily understood because we are brainstorming.] **(P6)**

Further analysis of the interview excerpts showed that students allocates time to answer and they are also challenged by the tasks. They spent time on reading and understanding the contextualized-localized problems where they can relate and it also elicited their engagement. Thus, these are an indication of mindfulness of the students to the given tasks that reduces their academic procrastination. Moreover, setting schedule for a study and brainstorming within the group whenever they have vacant time not usual to their everyday scenario when given tasks is a manifestation that the students' takes responsibility in doing the non-routine problems. It is parallel to the study of Toker & Avci [18] about academic procrastination that students had begun to initiate studying sessions, sustain study behavior, better tolerate challenges and difficulties, believe and trust in achieving success, study with the intrinsic motivation for learning, develop time perception and management skills, and better manage short and long-term goals and these students also learned to replace false cognitions with realistic ones, and thus, it can be said that their intentions are consistent with their academic actions. Hence, respondents' feedbacks in experimental group asserts to the decrease in the mean in students' academic procrastination.

Table 2. One-Way ANCOVA Summary of Students' Academic Procrastination

Source	Sum of Squares	df	Mean Square	F	Sig.
Group	1.752	1	1.752	11.75	0.001*
Error	14.159	95	0.149		
Corrected Total	15.975	97			

*significant at α=0.05.

It can be observed from the table that after the two groups of students were exposed to constrained and unconstrained non-routine contextualized-localized problems, the difference between their pre-test and post-test yields a probability value of 0.001, which is less than 0.05 level of significance. As a result, there is significant evidence to reject the null hypothesis, which states that there was no significant difference in the academic procrastination of the students when exposed to constrained and unconstrained non-routine contextualized-localized problems.

Students' academic procrastination toward the topic is improved when they are exposed to non-routine mathematical problems as formative assessments and given flexible time to answer them. The flexibility of time it provides for unfamiliar problems aids in the development of their sense of responsibility for the tasks. In addition, the noticeable features of something non-routine, such as a puzzle out of the box, and its location pique their interest in completing the task. According to Klymchuk et al., who studied the effects of non-routine problem solving, interesting non-routine problems, such as puzzles, can stimulate students' interest while also enhancing their conceptual understanding, critical thinking skills, problem-solving strategies, and lateral "outside the box" thinking. They had the chance to enhance their

comprehension and explore their answers as a group as well. The students' combined efforts encourage one another to do the tasks mindfully [8].

The result shows that exposing students to unconstrained, non-routine, contextualized-localized problems as formative assessment significantly reduces students' academic procrastination, which is consistent with the findings of Akinsola et al. that there is a significant difference between procrastination and mathematics achievement, with low procrastination having a higher achievement in mathematics [5]. Winarso and Agustin also stated that students who procrastinate less have higher academic performance and satisfaction [16]. This is also consistent with the findings of Nisrina and Salafudin's study, which discovered that reducing academic procrastination improved math learning outcomes [17].

5. Concluding Statements

Based on the aforementioned findings, the researcher concludes that unconstrained, non-routine, contextualized-localized problems as formative assessment are effective in reducing the students' academic procrastination in grade 10 mathematics. This is similar to what Asio [2] stated in his study on procrastination, which was to provide instructors with a flexible class schedule of exercises to address the issue of academic procrastination. As formative assessment, mathematics teachers are advised to use unconstrained non-routine contextualized-localized problems in their application part of the lessons to reduce students' academic procrastination. Furthermore, future researchers may investigate the impact on the student's affective part by using unconstrained non-routine contextualized-localized problems as formative evaluation.

Acknowledgements

The researchers would like to express their sincere gratitude to BNHS headed by Mr. Alex B. Palmes, P1 for allowing the researcher to conduct the study in the school. Furthermore, the researchers are also thankful to the College of Science and Technology Education (CSTE) of USTP headed by Dean Dr. Laila S. Lomibao, and the chair of the Department of Mathematics Education of USTP, Dr. Rosie G. Tan for their approval and support of the conduct of this study. Most importantly, thanks to the Department of Science and Technology-Science Education Institute (DOST-SEI) for the scholarship grant.

References

[1] Nancarrow, M. (2004). Exploration of Metacognition and Non-routine Problem-based Mathematics Instruction on Undergraduate Student Problem Solving Success. The Florida State University.

[2] Asio, JM. (2020).The Relationship between Academic Procrastination and Academic Performance of Freshmen Students from a Teacher Education Institution. Journal of Humanities and Social Sciences. 2(3): 105-115. DOI: 10.36079/lamintang.jhass-0203.156.

[3] Fathi, A., et al., (2021). The Role of Mindfulness and Social Competence in Predicting Girls' Problem Solving Mediated by Cognitive Flexibility: A Causal Model. Women. Health. Bull. 8(4):200-210. doi: 10.30476/WHB.2021.92676.1147.

[4] Asikhia, O. (2010). Academic Procrastination in Mathematics: Causes, Dangers, and Implications of Counselling for Effective Learning. International Education Studies. Vol. 3; No. 3.

[5] Akinsola, MK., et al. (2007). Correlates of Academic Procrastination and Mathematics Achievement of University Undergraduate Students. Eurasia Journal of Mathematics, Science & Technology Education, 3(4), 363-370.

[6] Asri, DN., et al. (2017). The Academic Procrastination in Junior High School Students' Mathematics Learning: A Qualitative Study. International Education Studies; Vol. 10, No. 9. Doi: 10.5539/ies.v10n9p70.

[7] Valderama,J. & Oligo, J.(2021). Learning Retention in Mathematics over Consecutive Weeks: Impact of Motivated Forgetting. International Journal of Evaluation and Research in Education (IJERE). Vol., 10, No. 4, December 2021, pp. 1245-1254.

[8] Klymchuk, et al., (2020). Investigating the impact of non-routine problem solving on creativity, engagement, and intuition of STEM tertiary students. Teaching and learning research initiative.

[9] Chong, et al., (2019). The Integration of a Problem-solving Framework for Brunei High School Mathematics Curriculum in Increasing Student's Affective Competency.Journal on Mathematics Education Volume 10, No. 2, May 2019, pp. 215-228.

[10] Freihat, A., et al., (2017). Self-Concept and Its Relationship with Academic Procrastination among the Secondary Stage Students at Ajloun Governorate "Evaluation Study". Journal of Education and Practice. Vol. 8, No.23, 2017.

[11] Zarrin, S., Gracia, E., & Paixao, M.P. (2020). Prediction of Academic Procrastination by Fear of Failure and Self-Regulation. Educational Sciences: Theory and Practice, 20(3), 34-43.

[12] Amin, G. (2019). Academic Procrastination of College Students. Jurnal Muara Ilmu Ekonomi dan Bisnis. Vol. 3, No. 2, Oktober 2019. https://www.researchgat.net/publication/339793804.

[13] Moonaghi, H., Baloochi, T., & Beydokhti. (2017).Academic Procrastination and Its Characteristics: A Narrative Review. Future of Medical Education Journal. FMEJ 7; 2.

[14] Soyleyen, NH. et.al, (2019). Procrastination and Academic Procrastination. The journal of Neurobehavioral Sciences. Volume 6, No. 3.

[15] Sari, W. & Fakhruddiana, F. (2019). Internal locus of control, social support and academic procrastination among students in completing the thesis. International Journal of Evaluation and Research in Education (IJERE). Vol. 8, No. 2, June 2019, pp. 363-368.

[16] Winarso, W. & Agustin, A. (2021). Profile of Student Academic Procrastination Behavior in Problem Solving and Mathematical Digital Literacy. Jurnal Didaktik Matematika.

[17] Nisrina, H. & Salafudin. (2021). The effect of academic procrastination and student creativity on the outcomes of students 'mathematics learning class viii in SMP Negeri 13 Pekalongan. The International Conference of Universitas Pekalongan.

[18] Toker,B. & Avci, R. (2015). Effect of Cognitive-Behavioral-Theory-based Skill Training on Academic Procrastination Behaviors of University Students. Educational Sciences: Theory and Practice.

[19] Eltayeb, F. (2021). Mindfulness and Its Relation to Academic Procrastination among University Students. Universal Journal of Educational Research 9(5).

© The Author(s) 2023. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).