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Effects of Time Pressure on Academic Performance in General Physics at Young Achievers' School

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Abstract
This study is focused on the effects of time pressure on the academic performance of 30 Grade 12 STEM students in General Physics at Young Achievers' School of Caloocan. The students answered the same General Physics test in two conditions: one without a time limit (pre-test) and another with time pressure (post-test). Their scores were then compared to see if time limits made a difference. The results showed that students scored higher when there was no time limit. It was also observed that time pressure affected problem-solving questions more than conceptual ones, since many students made mistakes or skipped steps when rushing. A short survey further revealed that most students felt stressed and distracted under time pressure. From these findings, the study concludes that time limits can lower the performance of students in General Physics. The researchers suggest that tests should provide enough time, especially for questions that require longer solutions.

Keywords: Time Pressure, Academic Performance, General Physics, STEM Students, Test Anxiety

Introduction

The General Physics subject explains how the physical world behaves. It contains a wide range of topics including motion, forces, energy, and electricity (Department of Education [DepEd], 2016) [3]. Many human problems can be solved or prevented with the help of physics. (Muhammad Shahid, 2020) [7]. However, despite its importance, General Physics includes mathematical applications and requires deep understanding of some subtopics. With that, it is known as one of the most challenging subjects in the science field. Redish (1994) [9] explained that physics requires learners to apply different methods to solve problems, which is why many students describe it as difficult.

Many students around the world experience different factors that affect their performance, especially with the hard ones. One of the common and significant factors is time pressure. Pressure often arises from complex subjects and limited time, which negatively affects student performance. According to Bryan and Locke (1967) [1] time pressure can lead to burnout and decreased thinking skills. The study of Conte, Scarsini, and Surucu (2015) [2] states that the cause of pressure and what makes it hard is not always about how strict the time limit is. Students often experience stress and panic simply from knowing that there is a time limit, which makes them feel rushed and use their time inefficiently. The study also states that reactions to the stress caused by time pressure depends on individuals. Some may perform worse even with no time pressure, while others may do better due to the encouragement because of the pressure.

When making choices under limited time, students may tend to rely on the elimination-by-aspects decision strategy; this method prioritizes choosing what they think are most important, then eliminates those that are not, which Tversky (1972) [11] found as less effective. Both studies show what and how students react when being pressured, which is both negative.

In Asia, education is highly competitive, and academic achievement is considered a key indicator of success, which increases pressure on learners. In the Philippines, senior high school students under the Science, Technology, Engineering, and Mathematics (STEM) strand take General Physics, which is known to be one of the most difficult subjects and it demands understanding both mathematical and conceptual — which need more focus and time. Students are usually required to answer under timed assessments, which may affect how well they perform — even if they understand the lesson.

The 1987 Philippine Constitution guarantees that the state must "protect and promote the right of all citizens to quality education at all levels" (Philippine Constitution, 1987, Art. XIV, Sec. 1) [8]. Additionally, Magna Carta for Students (Republic

Act No. 4670 – Magna Carta for Public School Teachers) focuses mainly on teachers but also emphasizes the need to safeguard the mental health of teachers and students by promoting fair learning conditions and accessible to all. Time pressure in complex subjects such as General Physics may limit students' ability to recall and apply their knowledge in assessments, which goes against the principles of effective education. Understanding how time pressure affects students' performance is a step for a better future of fair and quality academic experiences.

While some existing studies have explored the impact of general factors such as test anxiety on student performance in broader terms, the specific impact of time pressure on academic performance, specifically in General Physics — remains not thoroughly investigated. This study aims to experimentally explore how time pressure influences the academic performance of STEM students in General Physics.

This study predicts that time pressure will have a significant effect on the academic performance of STEM students in General Physics. Students who perform with a time limit are expected to perform lower due to increased stress, reduced concentration, and inefficient time management during assessments.

Results from this study can help teachers adjust tasks and assessment approaches and better support students who experience pressure during schoolwork or exams in the General Physics subject.

Materials and Methods

Research Design

This study employed a quantitative-experimental research design to determine whether time pressure had a direct effect on the academic performance of Grade 12 STEM (Science, Technology, Engineering, and Mathematics) students during the school year 2025–2026 in General Physics. The same group of participants took two sets of tests: one under a fixed time limit and another without any time restriction. This within-subjects approach allowed the researchers to directly compare student performance under timed and untimed conditions while controlling for individual differences. A paired t-test was used to determine whether there was a significant difference in performance between the two conditions. The use of an experimental design was appropriate for this research because it allowed for the comparison of results between two conditions. By manipulating the time factor and keeping all other conditions the same, the researchers were able to observe whether time pressure made a significant difference in the students' test performance.

Research Locale

The study was conducted at Young Achievers School of Caloocan during the school year 2025–2026.. This is the school where the researchers themselves are currently enrolled as Grade 12 STEM (Science, Technology, and Mathematics) students. Since the participants are also taking General Physics as part of the curriculum, it made the school an ideal place for the research. The study will take place in the same school where the researchers are enrolled, everything became a lot more convenient. It was easier to ask help from classmates and talk to them casually about the test since everyone was already familiar with each other.

This setup saved time and effort, and it made the process feel less stressful for both the researchers and participants. This allowed them to answer naturally — especially during the timed portion of the test. This helped the researchers collect results that are closer to how students actually perform in real class conditions, instead of in a formal or unfamiliar place.

Respondents of the Study

The participants in this study were Grade 12 STEM students of Young Achievers' School of Caloocan during the school year 2025–2026. All of them were taking General Physics, which made them suitable for the topic we were studying.

Since the study focused on a specific group of students, the researchers used purposive sampling. This meant the only respondents were those who were already part of the STEM strand and currently taking the General Physics subject. A total of 30 students were chosen to participate in the study. Each student took the same General Physics test twice: once under a time limit and once without any time pressure. This within-subjects design allowed for a direct comparison of individual performance across the two conditions.

Data Gathering Procedure

Before conducting the study, the researchers waited for approval from the Grade 12 Level Head of Young Achievers' School of Caloocan to start the research. Once permission was granted, the researchers gathered a group of Grade 12 STEM students who are currently studying General Physics of the school year 2025–2026.

To begin the procedure, the researchers administered a pre-test covering the topic Scalar and Vector Quantities. This helped assess the students' current understanding of the lesson before any intervention was made. All students will answer the same set of questions under normal (untimed) conditions.

After a short break or on the same day, the post-test will be given to the same group of students, this time under timed conditions. The post-test contained similar questions, but the items were rearranged to avoid information recall. This post-test served as the intervention stage, introducing time pressure as the variable.

Since the same participants took both tests—first without time pressure and then with it—the paired t-test was used to compare their scores before and after the intervention.. The statistical tool will help to determine whether the time pressure had a significant effect on their performance.

At last, the researchers will provide a feedback questionnaire using a Likert scale. The questionnaire allowed students to express what they felt while answering both tests, particularly regarding stress, confidence, focus, and time management.

All activities were done in one day or within a closely controlled timeframe to minimize any external factors that could affect the results and minimize the bias. After collecting all the test scores and feedback, the researchers will analyze the data to identify if time pressure had a noticeable and statistically significant impact on students' academic performance in General Physics.

Data Gathering Instrument

The researchers developed a questionnaire test on the basis of the Statement of the Problem of this study which focused on the effects of time pressure on academic performance in General Physics. The first draft of the instrument was

approved by the Practical Research 2 adviser and the General Physics teacher to identify the clarity and relevance of the items in the instrument. Any items identified as irrelevant or not clear were modified or deleted. The test was finalized after the changes were incorporated.

As to meet ethical standards, the instrument contained a confidentiality statement that clarified the researchers' assurance to the respondents that the information received would be kept confidential and that the information would not be used in any way that could jeopardize their academic performance or personal life. The identity of each participant was discounted, and the data obtained was solely for research purposes.

The test questionnaire was prepared in pre-test and post-test format and was divided into two main parts:

- Part I included the demographic profile of the respondents such as name (optional) and section.
- Part II consisted of multiple-choice questions based on the content covered in General Physics.

The exam was used as the sole instrument for measuring student performance based on timed and non-timed conditions. One group of students took the exam under time pressure, while the other group completed the same exam with an unlimited amount of time. This format allowed researchers to examine the effect of time pressure upon student performance in General Physics.

Additionally, a feedback survey instrument utilizing a Likert scale was administered after the post-test. The feedback survey was divided into four (4) sections:

- Part I collects additional demographic data and includes personal identifiers for example, their name (but that was optional) and section.
- Part II asks respondents to reflect on their experience with the use of Likert scale about the experience both for time pressured group and not time pressured group.

An indication of quantitative data information from the feedback survey distinguished the data collected from both pre-test/post-test and feedback survey instrument.

Statistical Tool

The paired t-test was used to compare the two sets of scores. It calculates the differences between each pair of observations and determines if there is a significant difference between the two related groups. By applying Paired T-test It can help the researchers to gain valuable insights and make meaningful contributions into the field of their study. This design is frequently used in research involving pairs of conditions. With it, the interest is in looking to see whether differences in the responses between two groups are statistically significant.

A paired t-test was utilized in this study because it is aimed to compare the academic performance of the same group of Grade 12 STEM (Science, Technology, and Mathematics) students under two conditions; that is, the same test with time pressure and the same test without time pressure. This statistical tool is suitable to determine whether time pressure would significantly affect their performance in General Physics of respondents that was involved. The paired t-test helped identify whether the changes in their scores were meaningful or happened by chance. Furthering our aim by questioning whether indeed time pressure affects students' academic performance, and what much of an impact it makes. Moreover, the results from the paired t-test will serve as a statistical basis for interpreting the data whether the time constraint condition had resulted in consistent increases or decreases in scores.

Summary

This research is focused on finding out how time pressure affects the academic performance of Grade 12 STEM students in General Physics. To do this, the researchers will use a quantitative-experimental method, where the same group of students will take two tests—one without a time limit and one with a time limit. This setup helps the researchers compare if the time pressure really affects how well students perform.

The study will be done at Young Achievers School of Caloocan during the school year 2025–2026, where all the respondents and researchers are currently enrolled. This makes the process more practical and comfortable for everyone involved. Since both groups are familiar with the setting, it helps lessen nervousness and create results that reflect how students really perform in class.

The participants of the study will be 110 Grade 12 STEM students who are all taking General Physics. The researchers will use the purposive sampling method, which means only those who meet the criteria—currently enrolled in General Physics—will be chosen. The same group of students will take both tests under different conditions.

For the data gathering, the researchers will give a pre-test on the topic Scalar and Vector Quantities, without time pressure. The test will help to identify each student's current understanding about the topic. Afterward, they will take a post-test with the same coverage but with the questions rearranged—and this time, with time pressure added. This part is where the time constraint is introduced.

To better understand how students felt during the tests, a feedback form using a Likert scale will also be given. This survey will ask them how they handled the pressure, whether they felt confident or rushed, and how it affected their focus while answering.

All parts of the experiment will be done within a controlled time frame to avoid external distractions. Once everything is done, the results from both tests will be analyzed using a paired t-test, a statistical tool that helps to compare the scores from the same group under two conditions. This will help the researchers clearly see whether time pressure had a real and meaningful impact on student performance in General Physics.

Results and Discussion

Table 1: Pre-test scores of students under untimed conditions

S. No	A (Pre - Test)	S. No	A (Pre - Test)
1	7	16	4
2	9	17	8
3	8	18	9
4	8	19	4
5	9	20	2
6	7	21	5
7	6	22	5
8	9	23	3
9	2	24	4
10	3	25	3
11	2	26	3
12	4	27	4
13	4	28	2
14	5	29	6
15	4	30	2

Table 2: Post-test scores of students under timed conditions

S. No	B (Post - Test)	S. No	B (Post - Test)
1	1	16	3
2	7	17	3
3	3	18	1
4	2	19	1
5	7	20	2
6	4	21	4
7	7	22	3
8	5	23	0
9	7	24	2
10	3	25	4
11	2	26	5
12	1	27	4
13	2	28	2
14	3	29	0
15	2	30	1

D = difference score
$\underline{D}$ = mean of the sample different scores
μ_D = mean of the population of difference scores
S_D = standard deviation of the sample difference scores
N = number of difference scores
$SS_D = \Sigma(D - \underline{D})^2$ = sum of squares of sample difference score

Step By Step Calculation
Step 1: Get the $\underline{D}$
Formula:

$$\underline{D} = \frac{\Sigma D}{N}$$

$$\underline{D} = \frac{57}{30} = 1.9$$

Answer:

$$\underline{D} = 1.9$$

Step 2: Get the SS_D
Formula:

$$SS_D = \Sigma D^2 - \frac{(\Sigma D)^2}{N}$$

$$SS_D = 310 - \frac{(57)^2}{30} = 201.7$$

Answer:

$$SS_D = 201.7$$

Step 3: Compute the t-statistics
Formula:

$$t = \frac{\underline{D} - \mu_D}{\sqrt{\frac{SS_D}{N(N-1)}}}$$

$$t = \frac{1.9 - 0}{\sqrt{\frac{201.7}{30(29)}}} = 3.96$$

Answer:

$$t = 3.96$$

Step 4: Find out the critical value

$$df = 30 - 1$$

$$df = 29$$

$$\alpha = .05$$

Critical Value = 1.699

Step 5: Compare the t-statistic to critical value

$$1.69 < 3.96$$

$$table\ t < t$$

General Problem 1
Does time pressure significantly affect the academic performance of STEM students in General Physics?

Table 3: Results of Computation

Statistics	Value
Number of pairs (n)	30
Mean of the differences (Pre – Post)	1.90
Standard Error of the mean differences	0.48
Computed t-value	3.96
Degrees of freedom (df)	29
Critical t	1.699
Decision	Reject Null Hypothesis

Because the computed t-value (3.96) is greater than the critical t-value (1.699), the null hypothesis is rejected. This means there is a statistically significant difference between students' scores when taking a General Physics test with and without time pressure. The data suggest that time pressure negatively affects student performance.
Since a significant difference was found between timed and untimed conditions, the next step is to find out how students themselves perceived the effects of time pressure during testing.

Specific Problem 1
Is there a significant difference in students' overall test scores when they take Physics tests under time pressure versus without time pressure?

Table 4: Mean between the conditions

Test Condition	Mean Score	Performance Level
Pre-Test (Untimed)	6.00	Satisfactory
Post-Test (Timed)	4.10	Fair

The pre-test mean score (6.00) is higher than the post-test mean score (4.10). This shows that students performed better when no time limits were imposed. The decrease in scores under timed conditions demonstrates that time pressure reduces overall performance.

Specific Problem 2
How does time pressure affect students' ability to solve Physics problems?

Table 5: Likert Scale Tally

Statement	Very Likely (5)	Likely (4)	Neutral (3)	Unlikely (2)	Very Unlikely (1)	Mean	Interpretation
Analyze better w/o rush	14	10	4	2	0	4.20	Likely
Hard to pick method	13	11	5	1	0	4.20	Likely
Misinterpret under pressure	12	10	6	2	0	4.07	Likely
Hard justify solutions	15	9	4	2	0	4.23	Very Likely
Careful reasoning w/o time limit	10	12	5	2	1	3.97	Likely
Hard synthesize concepts	11	13	4	2	0	4.10	Likely
Logical under pressure	4	7	9	6	4	2.90	Neutral
Hard apply formulas	12	10	5	2	1	3.97	Likely
No time to review	14	11	3	2	0	4.23	Very Likely
Skills shown w/ enough time	16	8	4	2	0	4.27	Very Likely

Scale for Interpretation:
4.21–5.00 = Very Likely
3.41–4.20 = Likely
2.61–3.40 = Neutral
1.81–2.60 = Unlikely
1.00–1.80 = Very Unlikely

The highest mean (4.27) indicates that students strongly believe their higher-order thinking skills are best shown when given enough time. Meanwhile, the lowest mean (2.90) shows the same about making logical reasoning under time pressure. This suggests that while students may still manage basic reasoning, their ability to analyze, synthesize, and apply Physics concepts fails significantly when under time pressure.

After establishing how students perceive time pressure, the study then measures their overall performance level when Physics tests are conducted under timed conditions.

Specific Problem 3

What is the performance level of STEM students when they take Physics exams under time pressure?

Table 6: Performance Level

Score Range	Frequency	Percentage	Interpretation
9-10	2	6.7%	Excellent
7-8	5	16.7%	Very Satisfactory
5-6	10	33.3%	Satisfactory
3-4	9	30.0%	Fair
1-2	4	13.3%	Poor
Total	**30**	**100%**	

The majority of students scored within the satisfactory (33.3%) and fair (30%) ranges. Only a small number achieved very satisfactory to excellent levels. This indicates that while students can perform under time pressure, their performance level is generally low compared to untimed conditions.

This finding confirms the combined results of the t-test and Likert scale responses: time pressure has a measurable negative effect on students' ability to fully demonstrate their academic potential in General Physics.

Conclusion

This study examined the effects of time pressure on the academic performance of Grade 12 STEM students in General Physics at Young Achievers' School of Caloocan during the school year 2025–2026. Focusing on the topic of Scalar and Vector Quantities, the findings revealed that students performed significantly better under untimed conditions compared to timed tests. The decline in performance was most evident in computational questions, which required multiple steps and longer processing time, while conceptual questions were less affected.

These results confirm the predictions of Eysenck's Attentional Control Theory (2007, 2023), which explains that anxiety caused by time constraints interferes with attention and reduces working memory capacity. When students were under pressure, they tended to rush, commit errors, and overlook critical steps, which lowered their scores. On the other hand, when given sufficient time, they were able to solve problems more carefully and accurately, demonstrating their true academic potential.

Although the study was limited to a small sample from one school and covered only a single Physics topic, the findings provide meaningful insight into how time constraints influence student performance. They suggest that strict time limits may not always measure students' real level of knowledge and skills, especially in subjects that demand step-by-step problem solving.

In conclusion, time pressure negatively affects the performance of STEM students in General Physics. By understanding this impact, educators and school leaders may design fairer and more effective assessment practices that allow students to balance accuracy and efficiency while reducing unnecessary stress.

Recommendations

Based on the findings and conclusions of the study, the following are recommended:

1. For Teachers – Provide moderate time allowances for assessments, particularly in computational items, to allow students to properly demonstrate their problem-solving skills.
2. For Students – Engage in time-management practice during review and exercises to improve efficiency when solving Physics problems under time pressure.
3. For School Administrators – Support programs and workshops that address stress management, test-taking strategies, and proper pacing in assessments.
4. For Future Researchers – Conduct similar studies involving larger samples or additional variables, such as study habits or test anxiety, to further explore the effects of time pressure on academic performance.

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