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Difficulties encountered, learning strategies and academic performance in physics of Psychology students

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Abstract:
Introductory physics courses have a reputation among students of being more difficult than other introductory science courses. This may be because success in physics courses requires a different approach, attitude and perspective than other science courses. Realizing the students' perception that physics is tedious and irrelevant, the researcher was motivated to conduct the study which aimed to determine the level of difficulty in the different topics in physics, causes of difficulties in physics, frequency of use of learning strategies to overcome the difficulties encountered in physics, and academic performance in physics of the respondents. The study also determined the relationship between the respondents' level of difficulty in physics and their frequency of use of learning strategies to overcome the difficulties encountered. It also looked into the relationship between the respondents' frequency of use of learning strategies to overcome the difficulties encountered and their academic performance in physics. This study, which involved seventy-two (72) psychology students, utilized the descriptive-correlation research design. Findings showed that the respondents found majority of the physics topics to be difficult. The students cited that their difficulty in physics was caused by their poor background in mathematics and that they had inadequate time for studying. Listening attentively to the lectures, note-taking, and studying alone were often utilized by the respondents to overcome the difficulties encountered in physics. The respondents' academic performance in physics was fair. The respondents' level of difficulty in physics has no bearing on their frequency of use of learning strategies to overcome such difficulties. The more frequent the respondents took notes, listened attentively to lectures and studied alone; the better is their performance in physics.

Keywords:
Difficulties, learning strategies academic performance, psychology students
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Introduction

Physics, the most basic of sciences, is the study of matter and energy, and the interactions between them. It is the foundation upon which other sciences, such as chemistry, astronomy, and geology are based (Santisteban, 2009). Many other fields of science make use of concepts from physics and it has contributed a lot to our present understanding of the universe (Asuncion, et al, 2012).

Physics can predict how nature will behave in one situation on the basis of experimental data obtained from another situation. These predictions place physics at the heart of modern technology, and, therefore, can have a tremendous impact on our lives. Rocketry and the development of space travel have their roots firmly planted in the physical laws of Galileo Galilei (1564-1642) and Isaac Newton (1642-1727). The transportation industry relies heavily on physics in the development of engines and the design of aerodynamic vehicles. Entire electronics and computer industries owe their existence to the invention of the transistor. The telecommunications industry depends extensively on electromagnetic waves, whose existence was predicted by James Clerk Maxwell (1831-1879) in his theory of electricity and magnetism. The medical profession uses X-ray, ultrasonic, and magnetic resonance methods for obtaining images on the interior of the human body. Perhaps the most widespread impact in modern technology is that due to the laser. Fields ranging from space exploration to medicine benefit from this incredible device, which is a direct application of the principles of atomic physics (Cutnell, 2004).

Because physics is so fundamental, it is a required course for students in a wide range of major areas. By studying physics, skills that are useful in other disciplines are acquired. These include thinking logically and analytically; solving problems; constructing mathematical models; using valid approximations, and making precise definitions (Giambattista, et al, 2007).

In spite of the unquestionable importance of physics to mankind, majority of the students would not want to pursue a career in physics. The mere inclusion of physics as part of the curriculum gives them undue anxiety. The students have that fear for the course as they think it is difficult. Introductory physics courses have a reputation among students of being more difficult than other introductory science courses (Ornek, et al, 2008). This may be because success in physics courses requires a different approach, attitude and perspective than other science courses. Physics uses mathematics more intensively, and has far more and stronger internal logical connections and unifying principles derives its reputation as a difficult course primarily from its dominant problem-solving nature (Ogunleye, 2009). Good mathematics skills are a prerequisite for success in physics. According to Angell, et al (2004) and Redish (1994), students find physics difficult because they have to contend with different representations such as experiments, formulas and calculations, graphs and conceptual explanations at the same time. Physics requires the ability to use algebra and geometry and to go from specific to general and back. For many students, math alone makes physics difficult. Weak mathematics ability is one cause of student difficulty in studying physics. Comprehension of physics requires mathematics acquisition.

In a study conducted by Ogunleye (2009), lack of students' understanding of the problem and their poor mathematical skills constitute the major obstacles in the circle of difficulties that students experience in solving physics problems. Harper (2006) stated that students

skip the qualitative steps in solving physics problems because they are not aware of the valuable information contained in the qualitative representations. According to Ali (2012), students fail to engage in meaningful learning because of their inability to demonstrate a good understanding of the very basic concepts of the subject.

Learning strategies are techniques employed by students to help them learn and understand physics concepts. Success in a physics class requires commitment of time and perseverance. Learning and mastering takes time and patience. Learners must identify their personal preferences for learning and seek the resources that will best help them in their studies. According to Dunn (1984), learning style is the way in which each person absorbs and retains information and/or skills. According to Meyers and Jones (1993), learning strategies is a factor to active learning like small group, cooperative work, case studies, simulation, discussion, problem-solving and journal writing.

To be successful in college, students need to invest in their education with a commitment of time. A set of schedule committed to studying and completing tasks ahead of schedule eliminates cramming and lessens stress. As teachers want their students to succeed, they exert a lot of effort in preparing their lectures to help the students learn. On the students' part, they should be attending their classes regularly and on time. Guided by the course syllabus, students may read about the topic in advance, thus gaining an overview of the topic for discussion. Arrival at ten minutes before the class allows the student to skim the chapter before the lecture starts. During class, students should listen carefully. If something in the lesson is not understood, questions may be raised as there may also be others in class who probably has the same questions. Taking down notes during class lectures and reviewing them later is another learning strategy. Having study partners is also beneficial as there are several minds that will digest the information derived from the lecture. Comparing notes and solutions to problems, explaining to each other and getting involved in the discussion is beneficial to the group as members gain confidence when they teach someone else. A visit to the instructor for consultation is also another option (Giambattista, 2007).

Students' performance in physics is a measure of the students' knowledge, skills and understanding of the subject matter. Because of the impression that physics is a difficult course, a mere passing grade is considered an accomplishment, and a failing grade is but a normal thing. Some students who failed may even have passed the course if only they were a little more persevering in their studies. Many students do not exert extra effort to be able to achieve a fairly good grade in physics.

Although the original purpose of grades was to provide information about student progress and achievement, there can be little doubt that as educational institutions have grown, grades have become a critical factor to the success in the adult world of today's students (Jacobsen, et al, 1993). Top corporations in need of new or additional personnel require job applicants to have high grade-point averages. They do not consider applicants with poor or failing grades. This shows that the grades obtained in college affects the chances of a graduate to land a job in big and prestigious companies. This situation makes it imperative for students to perform satisfactorily not only in physics, but in other courses as well.

A study conducted by Cadorna, et al (2013) showed that the students had a low level of performance in physics. Among the physics concepts considered, the students performed at an average level in forces and work, energy and power, but they performed low in vectors and scalars. The students got an average performance in knowledge, but low in comprehension and application skill levels. Alegre (2012) found out that physics was a real big frustration to students who confirmed that their achievement in physics was very much affected by their attitudes and anxiety.

Students often contend with many difficulties during problem-solving in physics so it is important to determine the causes of these difficulties (Snetinova, 2012). Realizing the students' perception that physics is tedious and irrelevant, the researcher was motivated to conduct the study which aimed to determine the (a) level of difficulty in the different topics in physics, (b) causes of their difficulties in physics, (c) frequency of use of learning strategies to overcome the difficulties encountered in physics, and (d) academic performance in physics of the respondents. The study also looked into the relationship between the respondents' (a) level of difficulty in physics and their frequency of use of learning strategies to overcome the difficulties encountered, and (b) frequency of use of learning strategies to overcome the difficulties encountered and their academic performance in physics.

Methodology

This study utilized the descriptive-correlation design inasmuch as it describes certain phenomena particularly the respondents' level of difficulty in the different topics in physics, the causes of difficulty in physics, the learning strategies utilized by the respondents to overcome the difficulties encountered, and the academic performance of the respondents. The study is also a correlational one since relationships between the variables were looked into.

The respondents of the study were the psychology students of the College of Arts and Sciences at University of Perpetual Help System Laguna- Biñan Campus who were enrolled in physics during the second semester of Academic Year 2015-2016. From a total population of eighty-three (83) students, this study utilized seventy-two (72) respondents who were present at the time of the survey, representing 87 per cent of the population.

The researcher-made instrument used in this study was a three-part questionnaire. Part 1 covered the level of difficulty encountered by the respondents in the different topics in physics, while Part 2 dealt with the causes of difficulty in physics. Part 3 dealt with the frequency of use of learning strategies to overcome the difficulties encountered in physics. The questionnaire was validated by three (3) experts in research, statistics and field of study. The survey was conducted on the last day of the class. The academic performance of the respondents, as measured by their final grades in physics was retrieved from the grading sheets submitted by the physics teacher to the Registrar's Office.

The statistical tools used for the quantitative analysis of the data gathered included weighted mean, which was used to determine (a) the level of difficulty encountered by the respondents in the different topics in physics, (b) the causes of difficulty in physics, and (3) the frequency of use of learning strategies to overcome the difficulties encountered in

physics. Percentage, was used to describe the academic performance of the respondents, and Pearson r which was used to determine the relationship between the respondents' (a) level of difficulty in physics and their frequency of use of learning strategies to overcome the difficulties encountered, and (b) frequency of use of learning strategies to overcome the difficulties encountered and their academic performance in physics.

Results and discussion

Respondents' Level of Difficulty in Physics

Table 1
Respondents' Level of Difficulty in Physics

Topics	Weighted Mean	Interpretation	Rank
Measurement	2.32	Low	13
Vectors	2.78	High	3
Equilibrium	2.89	High	2
Moment or torque	2.92	High	1
Uniformly accelerated motion	2.61	High	5
Free falling body	2.35	Low	12
Newton's laws of motion	2.53	High	9
Friction	2.60	High	6.5
Work and power	2.37	Low	11
Electrostatics	2.60	High	6.5
Electrodynamics	2.58	High	8
Series and parallel circuits	2.68	High	4
Magnetism	2.42	Low	10
Average Weighted Mean	2.59	High	

As shown in Table 1, the students had high level of difficulty in moment or torque (WM = 2.92) which ranked first, equilibrium (WM = 2.89) which ranked second, and vectors (WM = 2.78) which ranked third. They also encountered high level of difficulty in series and parallel circuits (WM = 2.68), uniformly accelerated motion (WM = 2.61), friction (WM = 2.60), electrostatics (WM = 2.60), electrodynamics (WM = 2.58), and Newton's laws of motion (WM = 2.53). However, students had low level of difficulty in magnetism (WM = 2.42), work and power (WM = 2.37), free falling body (WM = 2.35), and measurement (WM = 2.32). An overall weighted mean of 2.59 generally showed that students find majority of the topics in physics to be difficult.

Causes of Difficulty in Physics as Assessed by the Respondents

Table 2
Causes of Difficulty in Physics as Assessed the Respondents

Indicators	Weighted Mean	Interpretation	Rank
Poor background in mathematics	2.82	Agree	1
Irregular class attendance	2.00	Disagree	6
Poor study habits	2.39	Disagree	3

Ineffective teaching style	1.82	Disagree	7
Dislike for the subject	2.14	Disagree	5
Dislike for the teacher	1.64	Disagree	8
Not focused on the lesson	2.37	Disagree	4
Inadequate time for studying	2.58	Agree	2

As shown in Table 2, the students cited that their difficulty in physics is caused by their poor background in mathematics (WM = 2.82) and that they had inadequate time for studying (WM = 2.58).

Poor study habits (WM = 2.39), not being focused on the lessons (WM = 2.37), dislike for the subject (WM = 2.14), irregular class attendance (WM = 2.00), ineffective teaching style (1.82) and dislike for the teacher (WM = 1.54) were not the causes of their difficulty in physics.

This means that physics requires good mathematics background. Weak mathematics ability is one cause of student difficulty in studying physics. Comprehension of physics requires mathematics acquisition.

Respondents' Frequency of Use of Learning Strategies to Overcome the Difficulties Encountered in Physics

Table 3
Respondents' Frequency of Use of Learning Strategies
to Overcome the Difficulties Encountered in Physics

Learning Strategies	Weighted Mean	Interpretation	Rank
Studying alone	3.13	Often	3
Listening attentively to lectures	3.49	Often	1
Note-taking	3.46	Often	2
Peer-tutoring	2.18	Sometimes	6
Private tutoring	1.53	Sometimes	9
Assistance from a family member	1.81	Sometimes	8
Consultation with the instructor	2.24	Sometimes	4
Joining group study sessions	2.13	Sometimes	7
Reading other reference books	2.19	Sometimes	5
Average Weighted Mean	2.46	Sometimes	

As shown in Table 3, listening attentively to the lectures (WM = 3.49), note-taking (WM = 3.46) and studying alone (WM = 3.13) were often utilized by the respondents to overcome the difficulties encountered in physics. Consultation with the instructor (WM = 2.24), reading other reference books (WM = 2.19), engaging in peer-tutoring (WM = 2.18), joining group study sessions (WM = 2.13), seeking assistance from a family member (WM = 1.81) and availing the services of a private tutor (WM = 1.53) were

sometimes utilized by the respondents to overcome the difficulties encountered in physics. Overall, respondents sometimes utilized the above mentioned learning strategies as their means to overcome the difficulties encountered in physics.

During class, students should listen carefully. If something in the lesson is not understood, questions may be raised as there may also be others in class who probably has the same questions. Taking down notes during class lectures and reviewing them later is another learning strategy (Giambattista, 2007).

Respondents' Academic Performance in Physics

Table 4
Respondents' Academic Performance in Physics

Academic Performance	Frequency	Percentage
Outstanding (90 and above)	1	1.4
Very Satisfactory (85-89)	5	6.9
Satisfactory (80-84)	10	13.9
Fairly Satisfactory (75-79)	46	63.9
Poor (74 and below)	10	13.9
Total	72	100.0

As shown in Table 4, forty-six (46) respondents (63.9%) had fairly satisfactory performance in physics. Ten (10) respondents (13.9%) had satisfactory performance while five (5) respondents (6.9%) had very satisfactory performance. Only one (1) respondent (1.4%) had outstanding academic performance in physics. Overall, the respondents' academic performance in physics was fair.

Relationship Between the Respondents' Level of Difficulty in Physics and their Frequency of Use of Learning Strategies to Overcome the Difficulties Encountered

Table 5
Relationship Between the Respondents' Level of Difficulty in Physics and their Frequency of Use of Learning Strategies to Overcome the Difficulties Encountered

Topics	Pearson r	p- value	Interpretation
Measurement	0.181	0.127	Not Significant
Vectors	0.012	0.922	Not Significant
Equilibrium	0.064	0.592	Not Significant
Moment or torque	-0.016	0.894	Not Significant
Uniformly accelerated motion	-0.164	0.169	Not Significant
Free falling body	0.098	0.411	Not Significant
Newton's law of motion	0.067	0.575	Not Significant
Friction	-0.040	0.738	Not Significant
Work and power	0.139	0.243	Not Significant
Electrostatics	0.230	0.052	Not Significant
Electrodynamics	0.072	0.545	Not Significant

Series and parallel circuits	-0.032	0.790	Not Significant
Magnetism	0.026	0.826	Not Significant

0.05 level of significance

As shown in Table 5, there was no significant relationship between the respondents' level of difficulty in physics and their frequency of use of learning strategies to overcome the difficulties encountered as revealed by the p-values which were higher than the 0.05 level of significance. This means that the respondents' level of difficulty in physics has no bearing on their frequency of using learning strategies to overcome such difficulties.

Relationship Between the Respondents Frequency of Use of Learning Strategies to Overcome the Difficulties Encountered and their Academic Performance in Physics

Table 6
Relationship Between the Respondents Frequency of Use of Learning Strategies to Overcome the Difficulties Encountered and their Academic Performance in Physics

Learning Strategies	Pearson r	p- value	Interpretation
Studying alone	0.257	0.029*	Significant
Listening attentively to lectures	0.306	0.008**	Significant
Note-taking	0.366	0.002**	Significant
Peer-tutoring	0.060	0.617	Not Significant
Private tutoring	-0.025	0.837	Not Significant
Assistance from a family member	-0.128	0.286	Not Significant
Consultation with the instructor	0.060	0.615	Not Significant
Joining group study sessions	-0.052	0.667	Not Significant
Reading other reference books	0.083	0.489	Not Significant

*0.05 level of significance
**0.01 level of significance

As shown in Table 6, there was a significant relationship between the respondents' frequency of note-taking (p = 0.022), and listening attentively to lectures (p = 0.008) and the respondents' academic performance in physics as shown by the p-values which were lower than the 0.01 level of significance. This means that the more frequent they took notes and listened attentively to lectures, the better is their performance in physics. Also, there was significant relationship between studying alone (p = 0.029) and the respondents' academic performance in physics as shown by the p-value which were lower than the 0.05 level of significance. This means that the more frequent they review and study alone; the better is their performance in physics.

However, there was no significant relationship noted between the respondents' frequency of use of peer-tutoring (p = 0.617), private tutoring (p = 0.837), availing assistance from a family member (p = 0.286), consultation with the instructor (p = 0.615), joining group study sessions (p = 0.667) and reading other reference books (p = 0.489) and their academic performance in physics as shown by the p-values which were higher than the

0.05 level of significance. This means that the frequency of use of these learning strategies has no bearing on their academic performance in physics.

Conclusion

The respondents find majority of the topics in physics to be difficult. The students cited that their difficulty in physics is caused by their poor background in mathematics and that they had inadequate time for studying. Listening attentively to the lectures, note-taking, and studying alone were often utilized by the respondents to overcome the difficulties encountered in physics. The respondents' academic performance in physics was fair. The respondents' level of difficulty in physics has no bearing on their frequency of use of learning strategies to overcome such difficulties. The more frequent the respondents took notes, listened attentively to lectures and studied alone, the better is their performance in physics.

Directions for Future Use

Based on the conclusions drawn, the following recommendations are offered: Teachers should continue their own remedial tactics and instructional strategies based on their personal experiences with their learners, to address the needs of every unique student. They should explore students' prior knowledge which will be used in helping students in constructing an understanding of the key concepts presented. The University should organize math and science clubs that will actively conduct tutorial/remedial lessons to students with low academic performance in math and science subjects. Students should be encouraged to devote more time for studying and this can be done by joining math and science clubs with lessons conducted in a "less formal" manner to eliminate student anxiety. To improve mathematical problem-solving skills is to solve as many problems as possible.

References

Alegre, H. C. (2012). Revisiting Students' Early and Recurring Experiences and Perceptions about Physics. Philippine Physics Journal, Volume 34, pp. 1-9.

Ali, T. (2012). A Case Study of the Common Difficulties Experienced by High School Students in Chemistry Classroom in Gilgit-Baltistan (Pakistan). SAGE Open. April-June 2012: 1-13.

Angell, C. et al (2004). Physics: Frightful, but fun. Pupils' and teachers' views of physics and physics teaching. Science Education. Vol. 88, Issue 5, pp. 683-706.

Asuncion, A. J., Encina, M. J. M., Mayano-Atienza, R. J. A. (2012). Physics Works. ARMVET Printing Company, Inc., Makati City

Cadorna, E. A.,Garcia, G. A. and Ebojo, M. A. (2013). Mathematics Anxiety and Performance in Physics 102 of Non-Physics Students. Philippine Physics Journal. Volume 35, pp. 24-34

Cutnell, J. D. and Johnson, K. W. (2004). Physics, 6th edition. John Wiley and Sons, Inc. New York

Dunn, R. (1984). Learning style: state of science. Theory into Practice, 23, 10-19

Giambattista, Allan, Richardson, B. M., and Richardson, R. C. (2007). College Physics, 2nd edition. Mc Graw-Hill Education (Asia)

Harper, K. A. (2006). Student Problem-Solving Behaviors. The Physics Teacher. 44(4), pp. 250-251

Jacobsen, D., Eggen, P. and Kauchak, D. (1993). Methods for Teaching. A Skills Approach, 4th edition. Mac Millan Publishing Co. New York

Meyers, C. and Jones, T. B. (1993). Promoting active learning, strategies for college classroom. Jossey-Bass Publishers, San Francisco

Ogunleye, A. O. (2009). Teachers' and Students' Perceptions of Students' Problem-Solving Difficulties in Physics: Implications for Remediation. Journal of College Teaching and Learning. Vol. 6, No. 7. pp. 85-90

Ornek, F., Robinson, W. R. and Haugan, M. P. (2008). What Makes Physics Difficult? International Journal of Environmental and Science Education. Vol. 3, Issue 1. pp. 30-34.

Redish, E. F. (1994). Indicators of Cognitive Studies for Teaching Physics. Am. J. Phys. 62, pp. 796-803.

Santisteban, C. J. C. (2009). C & E Publishing. Inc., Quezon City.

Shake, 2006. http://www.enotes.com/homework-help/why-hard-get-students-learn-even-simple-physi-406962

Snetinova, M. and Koupilova, Z. (2012). Students' Difficulties in Solving Physics Problems. WDS'12 Proceedings of Contributed Papers, Part III, pp. 93-97.