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Learning Motivation Factors of Grade 8 Students and its Implications in Science Teaching

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Abstract

The purpose of this study is to assess students' achievement motivation towards science learning. Six scales were developed: Self-efficacy, active learning strategies, science learning value, performance goal, achievement goal, and learning environment stimulation. A total of 70 grade 8 students of La Consolacion University Philippines, a mixture of boys and girls with various grades and achievements coming from high performing and low-performing classes were selected to answer the questionnaire. Based from the results, it shows that high-performing students tends to believe on their own ability to achieve science learning which increases their satisfaction when they see positive results. In addition, high performing students value science learning and becomes more interesting for them if they can use and apply what they have learned inside the classroom on their daily living. Furthermore, the outcome also proves that achievement and motivation of the grade 8 students in science learning is highly affected by their learning environment such as the curriculum, teaching strategies and the interaction inside the classroom.

Keywords: Motivation; science education; teaching methods.

1. Introduction

The best way to learn something is applying what you have learned in a real-life situation and to experience them on your own. UNESCO had long recognized the belief that schools should make science teaching more relevant in their own lives, in the way they live every day.

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In line with this, UNESCO emphasized the need for quality science education in schools. They believe that schools should make science teaching more relevant in their own lives, in the way they live every day [1]. This belief had also been echoed in other studies [2]. It is important to keep this principle in mind, especially that it has been proven that science competencies must be mastered by the early years. A study had proven that students should develop adequate science competences during their preliminary science education [3]. This study also showed that students' motivation to learn science has a high significant influence on students' science competences development. Even when such mastery has been observed, other factors, motivation in particular, makes a profound effect on the learning of science in the basic education years. A study had emphasized that students' interest, motivation and attitude towards science learning is usually positive but is now declining due to considerable international, gender and subject-related differences [4]. Another study had shown that there was a significant difference between the motivational orientation of students with high and low ability as well as between genders [5]. The same study also found that students learn more with extrinsic motivation than intrinsic motivation. Some studies also point to teachers as the proponents of student motivation. When a teacher becomes inspiring for a student to aspire better achievement in science, learning is more evident [6]. A study underlined that even the students are highly motivated and viewed the class as engaging experience, the level of their cognitive engagement is highly affected by two factors; the control of the teacher on how he facilitates learning and the student beliefs on the importance of learning in this context [7]. Another study proved that instructional methods done in the classroom that nurture and draw curiosity among the students have the best chance to motivate students to learn science [8]. The use of medium or other similar forms of objects were found to help motivate learners. A study was conducted a study that showed that an augmented reality-based mobile learning system was able to improve learners' achievements [9]. Furthermore, students who learned through this system showed significantly higher motivations in learning. Another study found out that new media enriched problem-based learning (PBL) environment was able to increase students' motivation and science learning [10]. The study proved that there was a positive relationship between students' motivation and their posttest scores on the study's experiment. Games, likewise, provide a significant effect on students' motivation, as they act as the teacher's instructional aid. A study found out that game-based learning motivates students to learn science explicitly and mindfully, thus, learning which is reinforced with collaboration with other students will enrich the learning experience and collective problem solving which will bring the students to the next level of learning [11]. A study investigated that struggle-oriented background information made students to visualize scientists as hardworking individuals who adds contributions on the body of science rather than achievement-oriented background information [12]. Furthermore, it also increased students' interests and curiosity, prolong memory retention of science concepts and improve their mathematical abilities to solve complex problems. Speaking of teacher techniques, the literature also showed applying specific methods like inquiry-based science education (IBSE) and problem-based learning (PBL) has different effects on students' motivation in learning science [13; 14]. A study was conducted to a group of adolescent learners with different motivation types and they found out that IBSE was not applicable to all. Instead, teachers should adjust to each students' motivation types [15]. As also mentioned earlier, a had used PBL and conducted that its use is effective [16]. This conflict in the results with the use of specific pedagogical methods can be an area for further study.

1.1. Objectives

The study aims to see the difference between the high-performing students and low-performing students' motivation in learning science. Specifically, would like to:

A. Determine the factors that affect the students' motivation in science learning in terms of:
   a. self-efficacy
   b. active learning strategies
   c. science learning values
   d. performance goals
   e. achievement goals; and
   f. learning environment stimulation

B. Compare the motivation factors between high-performing and low-performing students in the grade 8 level of LCUP

C. Draw the implications of the motivation factors of the students in science teaching

This study will contribute to help science teachers to understand students' different motivation and learning styles to be able to adjust and come up with varied motivational techniques to be used in the classroom. Moreover, varied motivational techniques that will be used inside the classroom will help the students to easily grasp science concepts, critically solve problems and be able to use their science learnings through application of what they have learned in real-life situations.

1.2. Scope and Limitations

For the purposes of this study, students from the Grade 8 level were taken as respondents of the study from a laboratory high school in a suburban university. The choice of students in the Grade 8 level were subject to considerations of convenience as the researcher handled Science subjects for Grade 8. It is also worth considering that the framework of Science topics in the Junior High School at this point in time were newly introduced together with the recent implementation of the K-12 Enhanced Basic Education Curriculum in the Philippines. As such, any ideas as maybe suggested in previous literature that relates to Science education in the Philippines may no longer be relevant.

2. Method

This is a descriptive study showing the motivation factors of grade 8 students of LCUP. The instrument used was adopted from a previously conducted study that also studied science learning motivation [17]. The instrument was constructed through adopting and modifying various learning motivation questionnaires.

The study was given to 70 grade 8 students of the Basic Education Department of La Consolacion University Philippines. The 38 of these students were considered as high-performing students while 33 of them are classified as low-performing students. They were chosen and grouped based on their performance in science for

the current period of the study.

The data was interpreted using their weighted mean. The data was also interpreted using the values in the table below.

Table 1: Descriptive Equivalents

Descriptive Equivalent	Score	Range Scale
Strongly Disagree	1	1.00-1.49
Disagree	2	1.50-2.49
No Opinion	3	2.50-3.49
Agree	4	3.50-4.49
Strongly Agree	5	4.50-5.00

3. Results and Discussion

Table 2 shows the information and data from the questionnaire given to the high performing and low performing group of grade 8 students of LCUP with the different learning motivation factors, while Figure 1 presented a graphical representation of the data used above.

Table 2: Descriptive Statistics and t-Ratio values

Learning Motivation Factors	High Performing Group		Low Performing Group		t-Ratio
	Mean	Standard Deviation	Mean	Standard Deviation	
1. Self-efficacy	2.4971	1.12090	2.5357	.98427	0.068
2. Active Learning Strategies	4.1450	.16062	3.9263	.14764	2.836
3. Science Learning Values	4.3980	.20241	4.1280	.11692	2.583
4. Performance Goals	1.8950	.62389	2.1400	.33317	-.693
5. Achievement Goals	4.1780	.15369	3.9920	.11498	2.167
6. Learning Environment Stimulation	3.8700	.27662	3.7733	.22518	0.664

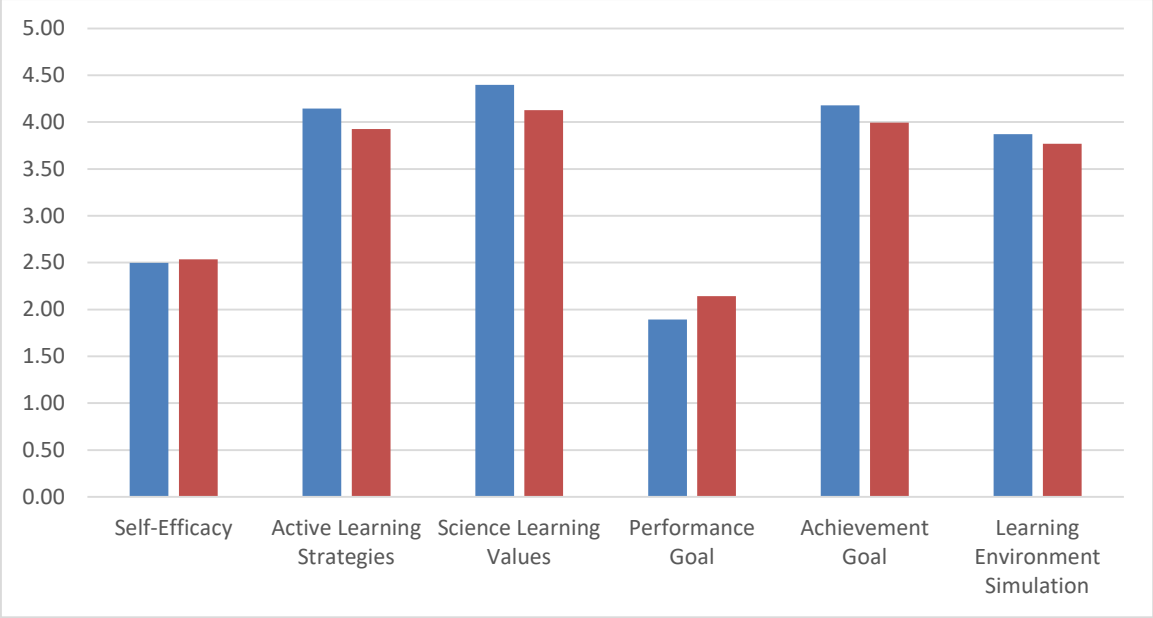

Figure 1: Achievement Motivation Profile of Grade 8 Students

In terms of self-efficacy, the high performing group recorded a mean value of 2.50 with a standard deviation of 1.12 while low performing group gathered 2.54 with a standard deviation of 0.98, resulting to a t-ratio of 0.68. To consider that most of the survey items under self-efficacy are negatives, the high-performing group got a lower mean value. This indicates that the students from the high performing believes in their own ability to perform well in science learning tasks. In terms of active learning strategies, the high performing group gathered a total average of 4.14 with a standard deviation of 0.16 while low performing group gathered a total average of 3.92, resulting with a t-ratio of 2.84. The results show that the high performing group students take an active role in using a variety of strategies to construct new knowledge based on their previous understanding. For science learning values, the high performing recorded a mean value of 4.40 with a standard deviation of 0.20, while low performing group gathered 4.13 with a standard deviation of 0.12, resulting to a t-ratio of 2.58. This specifies that high performing group students thinks that the value of science learning is to let students acquire problem-solving competency, experience the inquiry activity, stimulate their own thinking, and find the relevance of science with daily life. If they can perceive these important values, they will be motivated to learn science. For performance goals, high performing group gathered a total average of 1.90 with a standard deviation of 0.62, while low performing group recorded 1.89 with a standard deviation of 0.33, resulting to a t-ratio of -0.70. To consider that all descriptive statements are negatives, the high performing group got a lower mean value. This illustrates that the low performing students' goal in science learning are to compete with other students and get attention from the teacher. For achievement goals, the high performing group recorded a mean score of 4.18 with a standard deviation of 0.15, while low performing group recorded 3.99 with a standard deviation of 0.11, resulting to a t-ratio of 2.17. This concludes that the high performing group students feel satisfaction as they increase their competence and achievement during science learning. For learning environment stimulation, the high performing group gathered a total average of 3.87 with a standard deviation of 0.28 while low performing group gathered 3.77 with a standard deviation of 0.23, resulting to a t-ratio of 0.66. This displays that for the high performing group, learning environment surrounding students, such as

curriculum, teachers' teaching, and pupil interaction influenced students' motivation in science learning.

3.1. Conclusion

The study aimed to look for the learning motivation of students in science. The study's results show that in all aspects of learning motivation, students from the high performing classes show more motivation than low-performing classes, albeit in small margins. Students from high performing group can be more active and productive on their science classes than students from low performing group if their prior knowledge on science will be triggered. This supports the findings of another study that students should develop adequate science competencies during their early science education, which will be utilized when they reach more complex science for better achievement and more evident learning [18]. The results also show that high performing students are have more satisfaction if they see their improvement on their science classes which is reflected on the results of their quizzes, performance tasks and the grades they receive every quarter. The results of this research also show that high performing students are highly competitive in terms of their performance on their science classes. This contradicts the findings of one study that the motivation and attitude towards science learning starts to decline nowadays due to environmental factors such as competition among students inside the classroom [19]. This conflict on these findings can be resolved in further studies. Lastly, high performing students' motivation is more affected by their learning environment such as the changes in the curriculum, utilized teaching strategies and the interaction inside the classroom than high performing students' motivation. They find the science subject more inspiring and fun to learn if their teacher inspires and motivates them [20]. From the results of this study it can be deduced that several implications can be enumerated to aid in actual classroom scenarios. One of those is that the students have different perceptions on their own ability to perform well in class. Though high-performing students believe on their own abilities and strengths, low-performing students have low self-efficacy. Teachers should address individual differences especially in the approach and strategies that they will use inside the classroom which will help the low performing student to strive more and perform better. This can be done by doing differentiated instruction with consideration to the performance of the students and even by giving encouraging words and responses for their efforts inside the classroom. It is also suggested that classroom activities that involves active participation of students help them to construct their own meanings of science and science learning. If the students are directly involved in the construction of the new knowledge, then learning is more evident. Activation of the prior knowledge such as recall of their past lessons and connecting it to the present lesson is also a must to make science learning easier. Another implication of this study is that the value of science learning must go beyond the classroom walls. Instead, science learning will be more valuable for the students if the science concepts and theories learned in the classroom will be utilized and applied in the actual life scenarios. This will help the students to realize the value of learning science and to make science learning a lived experience.

3.2. Recommendations

As it is, the researchers understand the limitations present in the conduct of the study. In order to fully understand the implications of learning motivation in the academic performance of secondary school students, the study can be retooled to suit the following suggestions:

- In terms of methodology, a larger sample would suffice for a better representation of the Junior High School level. The present study only accommodated the Grade 8 level. Including other levels may present different results, but more inclusive results.
- A parallel study may also be conducted in the Senior High School level, particularly focusing on the Science, Technology, Engineering and Mathematics (STEM) strand takers, as well as in the Primary levels. These two different populations may also present different results that can help in enhancing science learning in their respective levels.
- As it is currently a challenge in developing countries like the Philippines, it would also be insightful to conduct relationship studies between the learning motivation of students in Science with the sufficiency of learning materials presented in the teaching-learning process. It would help provide a more empirical and definitive insight regarding the issue of instructional materials in the classroom, or the lack thereof.
- The results of this study can also be utilized to compare learning motivation of students in other disciplines. An interdisciplinary comparative analysis of these results can help provide educational administrators with appropriate perspectives that help encourage learning in the school level.

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