International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

http://ijpsat.ijsht-journals.org
Vol. 21 No. 2 July 2020, pp. 58-63

Motivational Constructs for Daily Lesson Logs in General Physics

Monserrat, Richard C.

Ph.D., *Manila Science High School*
Taft Ave., cor. Padre Faura St., Ermita, Manila

Abstract – Motivation is the basic drive for all our actions. When students are motivated, they tend to approach challenging tasks with greater eagerness, persevere in demanding situations, and take pleasure in their achievements. The purpose of this study is to determine the constructs of motivation towards learning Physics based on the responses of senior high school students of Manila Science High School. Respondents answered the survey questionnaire adopted from Physics Motivation Questionnaire and Motivation towards Learning Physics Questionnaire. Results show that intrinsic motivation, personal relevance, self-efficacy, career motivation and self-determination are the most prominent motivational constructs.

Keywords – Motivation, Intrinsic Motivation, Self-efficacy, Personal Relevance, Self-determination, Career Motivation, Daily Lesson Log

I. Introduction

One of the major impacts in Philippine educational system is the transition from Basic Education Curriculum (BEC) to K to 12 curriculum. It started when Republic Act No. 10533, also known as Enhanced Basic Education Act of 2013, was approved last May 15, 2013. As a result, this will develop productive and responsible citizens equipped with the essential competencies, skills and values for both life-long learning and employment. In line with this, holistically developed learners must have 21st century skills in preparation for higher education, middle-level skills development, employment, and entrepreneurship. These 21st century skills are effective communication skills, learning and innovation skills, life and career skills, and information, media and technology skills. It will also provide solutions to existing problems in educational community: (1) low achievement of students in the National Achievement Test and Trends in International Mathematics and Science Study (TIMMS) exam; (2) congested curriculum; (3) high school graduates are too young to work and not ready to pursue higher education; and (4) we are the only country in Asia with 10-year basic education cycle and this was not recognized abroad (“K to 12 Basic Education program,” n.d.).

1.1 The Purpose

The purpose of this study is to determine the constructs of motivation towards learning Physics based on the responses of senior high school students of Manila Science High School. It is expected to develop and validate a Motivation towards Learning Physics questionnaire (MtLP) and propose an example of daily lesson log based on the motivational constructs.

1.2 Research Questions

In line with the purpose of this study, the researcher addresses the difficulty of the teacher to provide motivational approaches in teaching Physics for senior high school students under the STEM strands. This study will seek answer to the following:

1. What are the motivational constructs affecting the students' motivation towards learning General Physics 1?
2. How are motivational construct related to each other?
3. How the motivational constructs are integrated to daily lesson logs to optimize students learning experiences?

1.3 Review of Related Literature

Motivation has various definitions, one of which is given by Schunk (2000) as process of seditious and maintenance on goal-directed behavior. Schunk states that this definition is cognitive in nature since motivation hypothesized that as the learners set up their goals, they employ cognitive processing and behaviors to reach their goals. Furthermore, Schunk perceives that motivation is an explanatory concept because it gives information to understand reasons of learners' behaviors [1].

Koballa and Glynn (2011) described these motivational constructs as arousal, interest, curiosity, and anxiety. They have important roles on motivation of the students. In addition, motivation is influenced by the degree of students' self-determination, goal-directing behavior, self-regulation, self-efficacy, and the expectations of their teachers about them. One of the possible ways to increase students' motivation is through contextualization [2].

Contextualization engages the learner to task which makes the course interesting, enjoyable, and useful. These benefits perceived by the learners have favorable effects to their motivation. Carrigan (2008) noted that contextualized instruction is an effective way to engage at-risk students and that it increases student performance, success, motivation, enthusiasm, interest, and transfer of skills. Of all the personal and psychological variables that have attracted researchers in this area of educational achievement, motivation seems to be gaining more popularity and leading other variables (Tella, 2003).

Wisely (2009) reported that the motivation of the student could be a factor attributed to the differences on the academic achievement between the group exposed to contextual learning and the group who experienced the traditional approach. He also added that vocational students' increased motivation to pass the standard courses was not sufficient without the application of contextualization in the course [4]. In addition, researches done by Demircioglu (2008) and Ng & Nguyen (2006) revealed positive effect of contextualization to students [5], [6].

Similarly, Glynn and Koballa (2011) developed Science Motivation Questionnaire II to assess the motivation to learn science. This was done to improve the construct validity of their earlier version of the instrument made in 2006. They conducted it to 340 students. In this study, they constructed 44 initial questions. The focus group discussion of science and nonscience majors, table of specification and 4 science instructors suggested that only 38 items were relevant. They used exploratory factor analysis to examine the students' responses to the revised questionnaire. They identified 5 constructs: 1) intrinsic motivation 2) self-efficacy 3) self-determination 4) career motivation and 5) grade motivation [1].

1.4 Conceptual and theoretical Framework

Based the on the relevant studies cited, motivational constructs can be extracted based from the answers of the students in the MtLP questionnaires. Correlation from these constructs must be emphasized in order for the educators develop activities suitable for optimum learning experiences. According to Piaget's cognitive constructivism theory, the information acquired by an individual can be created through personal process (Powell K. & Kalina C., 2009). The processes involve in Piaget's theory are assimilation and accommodation. Figure 1 below depicted the conceptual and theoretical framework.

Motivation indicates the extent of students' enthusiasm to learn physics. According to Maslow's Motivation Theory, the man's behavior is controlled by both internal and external factors. Behaviorists think that human behavior is prohibited by external environmental factors. Psychoanalytic Psychology is based on the thought that human behavior is prohibited by internal unconscious forces.

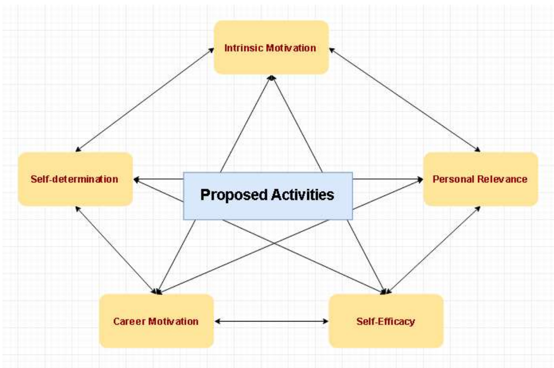

Figure 1. Conceptual and Theoretical Framework

In this study, the motivation towards learning physics is limited to internal motivation. The consequences of rewards and punishments are excluded. More specifically, the factors of motivation towards learning physics are self-efficacy, personal relevance, self-determination, career motivation and intrinsic motivation. Internal motivation deals with students' internal drive to learn physics for its own sake. Career motivation deals with students' drive in learning for their future job. Self – determination pertains to innate needs of competence, autonomy and relatedness. Personal relevance refers to student's aspiration, interest or cultural experiences. Self-efficacy is the student's confidence that they can achieve well in physics courses.

1.5 Action Research Paradigm

Figure 2 shows the Input-Process-Output of this study. The research began with planning actions, gathering questions for the development of MtLP questionnaires, and observing the motivation on students. The Process stage is the development and validation of the MtLP questionnaires. This phase of study ensures that the MtLP questionnaire was fitted and suitable in the SHS setting since the original questionnaire came from international researches. The feedback loop gave us an opportunity to alter the planning stage for a more aligned and coherent production of questions. The third stage is the output phase. This stage produced the final validated MtLP questionnaires for future use of teachers to know the most prominent motivational construct in his students. This stage also produced the proposed DLL for physics teachers, which is aligned to the motivational constructs found on students' responses. The feedback loop from output stage to input stage and process stage provided the opportunity to alter again the former stages.

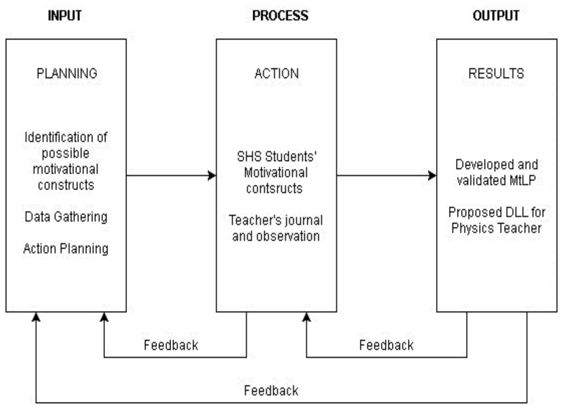

Figure 2. IPO of the study

II. Research Design / Methods of Collecting Data

The descriptive-survey method was used in this study where it is employed to know the extent of students' motivation in accordance to motivational constructs. The researcher used questionnaires, informal interviews and observations in collecting data. The questionnaires were given to gather responses on how students greatly motivated in learning Physics. Informal interviews were conducted by asking students about some activities they are expecting to have in physics to improve their motivation. Lastly, observations are made from classes to see how students show enthusiasm in learning physics.

This action research was conducted in Manila Science High School. The researcher randomly selected 30 students from 5 sections in Manila Science High School. All 5 sections are under the STEM strands and are taking up General Physics 2 subject in the 1st semester of academic year 2018-2019. All respondents experienced the usual traditional methods where lecture was most employed during learning hours. This was also done with an assumption that the geographic profile of the students will not affect the results and interpretation of the data.

The questionnaires were personally distributed to the respondents. Data were collected and tabulated using SPSS to extract motivational factors. Other questions pertaining to less dominant motivational factors were omitted leaving all other questions directly pertaining to motivational factors and exactly suited for senior high school students. Using the SPSS tool, the researcher was able to determine the correlation of these motivational factors. This statistical measure will put emphasis on the quality and quantity of the activities that should be given in the classroom. Results from informal interviews and observation will be the bases of the type of activities which will help students improve their motivation for the 2nd phase of the study.

III. Results and Discussion

Face Validation and construct validation were initially done to serve the initial purpose. The pattern matrix from the output of factor analysis also showed 5 factors having enough number of items. The factor analysis was repeated forcing to extract only 5 components. This includes only the items having at least 0.40 factor loading and included into the initial 5 components extracted.

Table 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.906
Bartlett's Test of Sphericity	Approx. Chi-Square	4054.058
	df	300
	Sig.	.000

The KMO measure of sampling adequacy of the MtLP questionnaire increases from 0.901 to 0.906 and the Bartlett's Test of Sphericity is still less than 0.001.

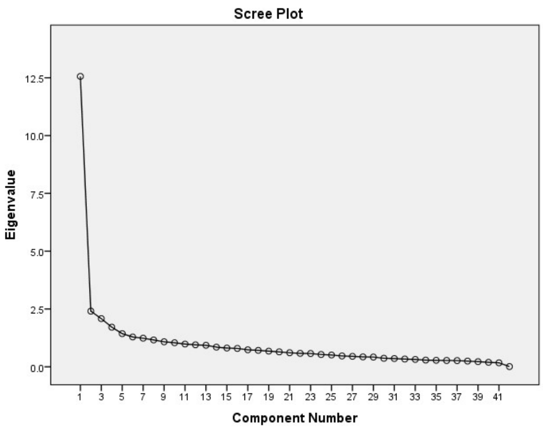

Figure 3. Scree Plot

Table 2. Pattern Matrix

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	9.288	37.151	37.151
2	2.053	8.210	45.362
3	1.571	6.286	51.648
4	1.396	5.583	57.231
5	1.078	4.310	61.541
6	.907	3.630	65.171
7	.790	3.160	68.331

Extraction Method: Principal Component Analysis.

Figure 3 and Table 2 show 5 components with the total variance explained equal 61.54%. All of the 25 items have factor loading greater than 0.4 with respect to their components as shown in Table 3.

Table 3. Principal Component Analysis

ITEM No.	Component				
	1	2	3	4	5
10	.751				
11	.722				
17	.703				
19	.635				
31	.432				
1		.947			
3		.943			
22		.684			
23		.487			
33			.727		
34			.721		
8			.641		
40			.572		
5			.515		
42			.504		
41				-.705	
36	.425			-.555	
38				-.514	
39				-.448	
37				-.416	
29					.878
28					.828
21					.652
27					.442
24					.416

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 23 iterations.

After examining the items in each motivational component, they were named as intrinsic motivation, personal relevance, self-efficacy, career motivation and self-determination. The MtLP questionnaire which will be used in this study consists of 25 items that will measure the motivation of the students towards learning physics upon exposure to context-based approach.

Table 4. Reliability of Motivation Constructs

Motivational Constructs	Cronbach's Alpha	Number of Items
Personal Relevance	0.82	5
Intrinsic Motivation	0.83	4
Self-determination	0.80	6
Career Motivation	0.83	5
Self-efficacy	0.82	5

Overall	0.93	25

The scale used is 5 for always, 4 for usually, 3 for sometimes, 2 for rarely and 1 for never. The MtLP questionnaire will also measure 5 motivational constructs' reliability coefficients. Table 9 shows that the personal relevance consists of 5 items with cronbach's alpha equal to 0.82. The intrinsic motivation consists of 4 items with cronbach's alpha equal to 0.83. The self-determination consists of 6 items with cronbach's alpha equal to 0.80. The career motivation has 5 items with cronbach's equal to 0.83. The self-efficacy has 5 items with cronbach's alpha equal to 0.82.

Table 5. Component Correlation Matrix

Constructs	1	2	3	4	5
1	1.000	.337	.367	-.299	.280
2	.337	1.000	.288	-.241	.425
3	.367	.288	1.000	-.222	.370
4	-.299	-.241	-.222	1.000	-.277
5	.280	.425	.370	-.277	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
(1) Personal Relevance, (2) Intrinsic Motivation
(3) Self-determination (4) Career Motivation
(5) Self-efficacy

Table 5 shows the interrelationship of the motivational constructs produced from the students' responses. Self-efficacy and intrinsic motivation seem to be the most related construct but still define their identities as depicted in their coefficient of 0.425. Negative correlation indicates that career motivation has opposite effect with the other four constructs.

3.1 The Plan of Action

Based from the results, respondents of the study have five motivational constructs that can be used as a basis for developing the lessons for General Physics. Teachers are in need to construct their lesson that will motivate the students. Specifically, teachers need to consider the following constructs of motivation in constructing their daily lesson log: (1) Career motivation – This part should be included in the activities or in the problem solving part of the lesson proper to integrate the examples cited to their future job. It will increase the motivation of the students because they know that they will use the concepts and skills to their future job. (2) Self-efficacy – This part should be included in the formative assessment of the lesson. Confidence of the students will increase when they know that they understand the lesson well. (3) Personal Relevance – This part should be included in the finding practical application of concepts and skills in daily living. Concepts and skills learned by the students will be improving in their daily activities. (4) Self-determination – This part should be included in the activity or task given to the students. Challenging task will help increase their motivation as they pursue finishing it at the given time. (5) Intrinsic Motivation - This part should be included in the establishment of purpose for the lesson. Their motivation will increase as they realize that the lesson will be helpful for their own sake.

Teachers creating the daily lesson log should also consider how they will supervise the overall learning experience while implementing the above plan of action. Teachers are expected to conduct this plan of action in the succeeding semester as to know the possible steps to be taken further. The format of the daily lesson log provided by the Department of Education will be used in plotting the lesson consisting of the indicated plan of action.

IV. Conclusion and Implication

Five motivational constructs namely, self-efficacy, personal relevance, intrinsic motivation, career motivation and self-determination are found from the respondents who answered the Motivation towards Learning Physics Questionnaire. The five motivational constructs represent almost the whole aspects of motivation as it shows high percentage of variance. Although 100% of motivation is not covered in this study, the five constructs are enough to address the motivation of the students. The questionnaire produced from this study are also valid based from the evaluation of experts and reliable as it shows high value of Cronbach's alpha. This questionnaire may also be used at the beginning of every semester to measure the learner's motivation before the course and to adjust the lesson with regards to the results.

This study also provides an outline for the construction of daily lesson logs for teachers who are teaching General Physics. It will help teachers who are not equip on handling Physics subjects. It also a great avenue to continuously revise the present DLL for optimizing learning experiences of the students and to be a basis of better educational policy.

This study also recommends using the proposed DLL as to see the results to the students for continuously improving instructional delivery. Any future results can provide an opportunity to revisit the present results of this study as part of action research cycle.

REFERENCES

[1] Schunk, D. H. (2000). Motivation for achievement: Past, present, and future*. Issues in Education*, 6, pp. 161-166.

[2] Glynn, S., & Koballa, T. R. (2011). *The contextual teaching and learning instructional approach*. In R. E. Yager (Ed.), Exemplary science: Best practices in professional development pp. 75–84. Arlington, VA: National Science Teachers Association Press.

[3] Tella, A. (2007). The Impact of motivation on student's academic achievement and learning outcomes in mathematics among secondary school students in Nigeria.

[4] Wiseley, Walter Charles. (2009). *Effectiveness of Contextual Approach to Developmental Math in California Community College*. University of the Pacific Stockton, California.

[5] Cigdemoglu, C. (2012). *Effectiveness of context-based approach through 5E learning cycle model on students' understanding of chemical reactions and energy concepts, and their motivation to learn chemistry.* Unpublished Manuscript. Middle East

[6] Ng, W., & Nguyen, V. T. (2006). Investigating the integration of everyday phenomena and practical work in physics teaching in Vietnamese high schools. *International Education Journal, 7*(1), pp. 36-50.