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Relationship Between Self-Regulated Learning And Student Performance In Physics In Public Secondary Schools In Nakuru East Sub-County

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Abstract:*Education is critical to the economic and technological development of many countries around the world. As such, students across all levels of education need to perform well in their academics and play an active role in realization of sustainable development goals (SDG's) and Kenya vision (2030). This study aimed to establish the relationship between self-regulated learning and student performance in physics. The objective of the study was to establish the relationship between motivation strategies and student performance in physics in public secondary schools in Nakuru East Sub-County. The study was based on Structuralist Theory of Learning by Steffe and Gale (1995) and Social Cognitive Theory of Self-Regulation by Bandura (1986). The study adopted correlational design with mixed approaches where both qualitative and quantitative data were concurrently analyzed and triangulated. Target population comprised principals, physics teachers and physics students in public secondary schools in Nakuru East Sub-County. Student sample was determined using Krejcie and Morgan (1990) at 95% confidence level and a sampling error of 5%. Purposive sampling was used for the principals and physics teachers. Research instruments comprised questionnaire, interview guide and document analysis guide in the form of performance proforma table. Piloting of instruments was done in 10% of the schools. Validity was assessed through expert judgment and from the results of the pilot study. Cronbach alpha reliability coefficient was computed to assess the internal consistency of the instruments. The test yielded an overall reliability coefficient, ɤ=0.786 based on standardized items. The results of the study were evaluated using Statistical Package for Social Sciences (SPSS). Descriptive statistics were used to describe the characteristics of the sample while inferential statistics were used to test hypotheses. Cross-tabulations were also done to determine interrelations between study variables. Through data analysis, the study established positive correlations between motivation strategies and student performance in physics. Highest correlationswere observed for learning goal orientation; then self-efficacy beliefs and lastly performance goal orientations. The study further established statistically significant differences in the mean performance of learners using different motivation strategies. The study finally established that motivational strategies jointlyaccount for 72.4% of variance in student academic performance in physics (R^2 = 0. 724). The study recommended that students need to apply the right motivation strategies so as to optimize their academic achievement. Teachersshould also use learner centered method so as to enable learners develop the right skills, attitudes and confidence towards the learning.*

Key words:*learning goal orientations, self-efficacy beliefs, performance goal orientations, academic performance*

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I. Introduction

Thereis a commonunderstanding that to achieve academic success and overcome difficultacademic tasks, learners must be able to regulate their learning processes and maintaintheiracademicgoals (Pintrich&Zusho, 2007;Richardson*etal*., 2012). Therefore,students must effectively apply motivation strategies and demonstrate a wide range of learning skills Bogdanovic*et al*., (2015) and Rahman, *et al*., (2010). Motivation strategies are used by learners to align their learning goals and beliefs; andthey have been classified into learning goal orientation, performance goal orientation and self-efficacy beliefs (Achufusi&Mgbemena, 2013). Learning goal orientation concerns the learning of a new thing for the sake of competence, challenge, curiosity, and mastery. Learning goal orientation gives attention to learning and development rather than on competition and comparison (Blinkenstaff& Walker, 2013). Performance goal orientation is learning for reasons such as grades, rewards, evaluation by others, and competition (Downing & Hoi Kwan, 2010). Self-efficacy is based on individuals' beliefs on their abilities to achieve their goals. Students with high self-efficacy beliefs are often confident enough to accept challenging tasks (Deci& Ryan, 2012). Kahraman and Sungur (2011) observed that self-efficacious students who studied science in order to learn and understand it tended to use motivation strategies more, and performed significantly better in academics than students with low self-efficacy. Othman and Leng (2011) examined the relationships among goal orientation dimensions and student achievement in primary school and college contexts and reported positive results from both samples. Cazan (2012) also found moderate correlations between academic achievement and self-efficacy beliefs.

Statement of the Problem

Over the years, Nakuru East Sub-County has continuously recorded dismal performance in physics in Kenya Certificate of Secondary Education (KCSE). This trend is unwarranted as many students miss opportunities in higher education and this negatively impacts on their individual and national development. Several efforts have been made to improve the situation but students continue to register below averageperformance. There is a growing concern that most of the interventions target the teacher and little is being done to enable learners take control of their own learning processes. Studies have shown that self-regulated learning is related to academic performance. However, no such studies have been done in Nakuru East Sub-County. This study therefore sought to investigate the relationship between motivation strategies and student performance in physics in public secondary schools

1.1 Research Objective

The objective of the study to establish the relationship between motivation strategies and student performance in physics in public secondary schools

1.2 Research Hypothesis

There is no significant relationship between motivation strategies and student performance in physics in public secondary schools

1.3 Significance of the Study

Policy makers understand may gainclearerperspective of howtosupportthedevelopmentofeffective self-regulated learning among learners by to understanding how learners regulate their learning processes of motivation, behavior and strategies. Teacher trainers may realize the importance of equipping teachers with the necessary skills needed to enhance students' self-regulation in learning through the use of varied teaching methods and strategies. Students may understand and regulate their learning processes to better their learning outcomes. In the field of research, the findings of this study will add to the existing knowledge on the relationship between self-regulated learning and academic performance in physics.

Theoretical Framework

Structuralist Theory of Learning (Steffe and Gale, 1995) views learning as a self-regulated process in which learners improve their ability to learn through selective use strategies. Learners can monitor, control or regulate certain aspects of their own cognition, motivation and behavior, as well as some features of their environment. Social Cognitive Theory of Self-Regulation by Bandura (1986) proclaims that students have goals and during their learning activities, they observe, judge and react to their perceptions of goal processes. According to the theory, self-regulation is a self-directed process through which students transform their mental abilities into academic skills. Based on the two theories, it is evident that, if students effectivelyuse motivation strategies in their studies, it is expected that their learning outcomes will be enhanced. This informs the use of the theories in the current study.

Research Design

The study adoptedcorrelational design with mixed research methodology where bothquantitative and qualitative techniqueswere concurrently analyzed and triangulated. According to Creswell (2008) the design is appropriate as it allows the researcher to gather information that uses the best features of both quantitative and qualitative data collection and analysis.

Research Instruments

Questionnaires, interview guide and document analysis guide were used. The student questionnaire was adopted from Motivated Strategies for Learning Questionnaire and Achievement Motivation Scales (AMS) but the constructs were modified to suit the scope and context of the current study. The teacher's questionnaire was developed by the researcher. The scales were Likert in naturewith responses ranging from; Very Often (VF),Often(O), Sometime(S),Rarely (R), andNever(N). Interview guide was used for principals while the document analysis was done in student progressive records to obtain student performance in physics.

Research Findings

In order to establish the inter-relationships between academic performance and the various motivation strategies, the respondents were first categorized according to their levels of use of motivation strategies in physics. Figure 4.1 presents the findings.

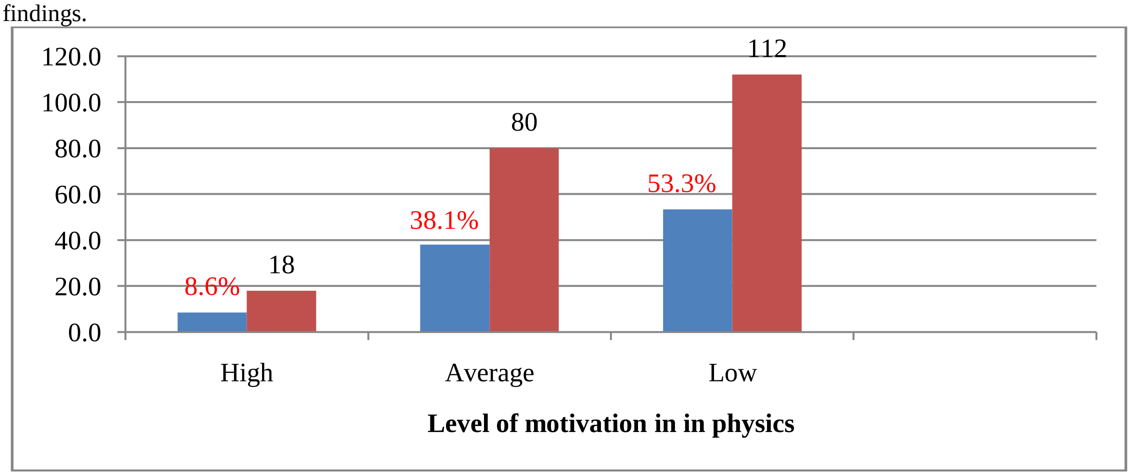

***Figure 4.1*: Level of use of motivation strategies by students**

From Figure 4.1 about half (53.3%) of the students have low levels of use of motivation strategies in physics. Those with average levels constituted 38.1 percent while only 8.6 percent had high levels of motivation strategies in physics. Having established the overall levels of student motivation, the study went ahead to determine the extent of use of the various sub-domains of motivation strategies by students in physics. The students were therefore presented with statements on a likert a scale of; very often (1), often (2), sometimes (3), rarely (4) and never (5). Table 4.6 presents the results of descriptive analysis

Table 4.6: ***Descriptive statistics on the use of various motivation strategies by students***

Strategy	VO %	O %	S %	R %	N %	$\bar{X}$	Skew
I choose topics that arouse my curiosity, even if they are difficult	14	3.8	9.0	60	25.7	4.05	-1.25
I prefer to study material that I can learn from even if it can't be tested	0.0	2.9	15.7	56.7	24.8	4.13	-0.51
Getting a good grade in physics is the most satisfying thing for me	65.7	26.2	7.1	1.0	0.0	1.43	1.45
I pass physics to show my ability to my family, friends, and teachers	32.4	20.0	23.8	14.8	9.0	2.19	0.12
I belief I can understand the most difficult topics in physics	0.0	4.3	24.8	41.4	29.0	4.27	-0.31
I convince myself that I can understand scientific skills in physics	0.0	4.8	42.4	31.4	21.4	3.89	0.61
I belief I can do very well in assignments and tests in physics	0.5	26.7	40.0	30.5	2.4	3.97	0.40

N=210

Table 4.6 presents statements on motivation strategies namely; learning goal orientation, performance goal orientation and self-efficacy beliefs in physics. On performance goal orientation, 25.7% and 60% respectively said they never and rarely studied topics that arouse their curiosity even if they are difficult to learn (mean=4.05). Still on the same, 56.7% students rarely study physics for the sake of learning even if the content can't be tested in an exam (mean=4.03). On performance goal orientation, 65.7% of students quite often derived pleasure from getting good grades (mean=1.43). Similarly, more than half of the students (52.4%) usually pass physics to show their abilities to their family, friends, and teachers (mean=2.19). On self-efficacy beliefs in physics, majority of students (41.4%) rarely trust in their abilities to understand difficult concepts in physics (mean=4.27); and almost a similar percentage (42.4%) sometimes convince themselves that they can master scientific skills in physics (mean=3.89). Furthermore, 40% of them sometimes belief that that they can pass in assignments and tests in physics (mean=3.97). Concerning the distribution of responses, most statements have negative values of skewedness implying that the students rated themselves highly on them. The few with positive values of skewedness indicate low self-ratings by students.

The analyses show that students have low intrinsic motivation towards physics. This implies that they do not study physics for the sake of competence, challenge, curiosity, and mastery but rather are geared towards goals such as grades, rewards, evaluation by others, and competition. This explains why an appreciable number of them desire to pass in exams so as to show their abilities to their peers, teachers and parents. The inclination by most students to the extrinsic aspects of performance as opposed to is intrinsic aspects of meaningful learning could be detrimental to their overall achievement in physics as Othman and Leng (2011) reported that, the learning goal orientation was a better determinant to academic achievement when compared to performance goal orientation. On the same nerve, Vahedi (2014) also notes that, preoccupation with performance can be a source of performance decrement for students. On self-efficacy sub-domain of motivation strategies, the findings reveal that majority of students are not confident enough to learn and understand difficult concepts in physics. This implies that, they do not have sufficient trust in their learning and passing abilities but as Kahraman and Sungur (2011) observed, self-efficacious students who study science in order to learn and understand it tend to perform better in academics than those with low self-efficacy.

A cross-tabulation was also done to establish the interconnections between the levels of use of motivation strategies by students and their levels of performance in physics. Table 4.7 presents the results obtained

Table 4.7: ***Cross-tabulation between use of motivation strategies and academic performance***

		Level of performance in physics			
		Low	Average	High	Total
level of use of motivation strategies	Low	32.4%	0%	0%	32.4%
	Average	8.6%	21.0%	0%	29.6%
	High	0%	12.8%	25.2%	38.0%
Total		41.0%	33.8%	25.2%	100.0%

n=210

Tables 4.7 indicate that, performance in physics was interconnected to student motivation. This is because of the fact that, low level of academic motivation is associated to low level of performance and vice versa.

Table 4.8: ***Correlation matrix of academic performance and motivation strategies***

	LGO	LGO	PGO	PGO	SEB	SEB	SEB	APP
LGO	1							
LGO	.599**	1						
PGO	.213**	.138*	1					
PGO	.104	-.015	.140*	1				
SEB	.581**	.537**	.243**	.060	1			

SEB	.287**	.328**	.240**	.120	.224**	1		
SEB	.428**	.355**	.304**	.046	.291**	.622**	1	
APP	.792**	.660**	.250**	.094**	.681**	.336**	.436**	1
Sig (*2-tailed*)	0.00	0.00	0.00	0.174	0.00	0.00	0.00	

**Correlation is significant at the 0.01 level (2-tailed) P<0.01; N=210
Key: *LGO* – Learning Goal Orientation; *PGO* – Performance Goal Orientation; *SEB* – Self- Efficacy Beliefs, *APP* – Academic Performance in Physics

Table 4.8 indicates that all the sub-domains of academic motivation were positively correlated to academic performance. On learning goal orientation, high correlation coefficients were observed for curiosity learning (*r*= 0.792, p< 0.01) and mastery learning (*r* = 0.660, p< 0.01). Weak correlations were however observed between performance goal orientation and academic performance.The satisfaction ofgetting a good grade in physics was a small correlate of performance (*r* =0.250, p< 0.01) as well as the desire to pass physics to show ability to others (*r* =0.094, p>0.05). As for self-efficacy beliefs, the belief of understanding difficult concepts in physics registered the highest coefficient (*r* =0.681, p<0.01), followed by the belief of doing well in tests and assignments (*r* =0.436, p<0.01) and finally the belief of mastering scientific skills in physics (*r* =0.336, p<0.01). The statistics indicates that learning goal orientation is a stronger correlate of academic performance when compared to performance goal orientation, while self-efficacy beliefs are a moderate correlate of performance. This implies that, for students to perform well in physics, they should blend all the three motivation strategies in any learning situation but more emphasis need to be put in the learning beliefs (self- efficacy) and the intrinsic aspect of learning (learning goal orientation)

The findings corroborate those of a study by Chang (2011)which revealed positive correlations between intrinsic motivation and academic performance (0.33) and, extrinsic motivation and performance (0.25). Matuga (2009) also investigated self-regulation, goal orientation, and academic achievement of secondary school students in online university courses in Ohio, America and the study findings indicated positive relationship between motivation and academic performance. Richardson*et*al., (2012), Established that students' academic extrinsic motivation was a small significant positive correlate of performance.

Table 4.9: ***One-Way ANOVA of motivation and performance***

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	41.421	2	20.711	112.012	.000
Within Groups	38.274	207	.185		
Total	79.695	209			

n=210

The analysis show that a statistically significant differences exist between student performance levels of academic motivation (F = 112.012, p < 0.05). The null hypothesis that no significant relationship exists betweenstudents' motivation strategies and academic performance in physics was therefore rejected

The study was further interested in determining the overall predictive ability of motivation strategies on student performance in physics (Table 4.10)

Table 4.10: ***Regression Model Summary***

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.856[a]	.733	.724	6.96386

ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	26954.357	7	3850.622	79.402	.000[b]
Residual	9796.067	202	48.495		
Total	36750.424	209			

a. Dependent Variable: Academic performance in physics
b. Predictors: (Constant): Motivation strategies

The regression model shows an overall adjusted R^2 (coefficient of determination) of 0.724 (F= 79.402, p < 0.01), which implies that approximately 72.4% of the total variance in students' academic performance in physics can be explained by the combined effect of the three sub-strategies of academic motivation

Through the interview schedule, the principals were asked to indicate whether or not learners in their schools were motivated to learn physics. They were also requested to provide reasons for their choice. From their responses, slightly more than half of them said "*No*" while the rest said "*Yes*". Those who gave a "*Yes"* response gave the following reasons for their choice:

"*Because they choose it as an examinable subject"; they perform better than in other sciences", and "they select it in large numbers compared to other subjects".* On the flipside, those who said *No* said that "*They lack creativity and self-*

drive" and "Are discouraged by others". The findings from the interviews are consistent with the descriptive statistics which revealed that more than half of the students had low and average motivation levels in physics while only a small percentage were highly motivated in the subject. This implies that, students are generally not motivated to learn physics and since motivation has positively been related to academic performance, there is need for students to apply motivation strategies in their learning in order to improve their understanding and academic performance in physics. This is in line with Schunk, andErtmer, (2010) who found that students who applied motivation strategies learned independently and show better understanding of the subject matter.

II. Conclusion and Recommendations

5.1 Conclusion

From the findings, it is evident that, among the motivation strategies,learning goal orientation (intrinsic goal of learning) and self-efficacy were highly correlated to student performance than performance goal orientation (extrinsic goal of achievement). However, study results have shown that, students' motivation strategiesare more inclined to performance goals; but less into self-efficacy and learning goals. This implies that students derived satisfaction from getting good grades for the sake of rewards, competition and recognitioninstead of engaging in meaningful learning that result in the acquisition of knowledge, skills, values and competencies.It is imperative to note that, self-efficacious students who are intrinsically motivated to learn; generally performed better than those who extrinsically motivated. This is because extrinsic factors are hard to sustain, but intrinsic factors are life-long, and self-efficacy beliefs act as their catalysts.It is therefore important for students to belief in their learning abilities and derivea sense of fulfillment in studying for competenceas opposed to competition

5.2 Recommendations

Students need to regulate the use of motivation strategies so as to optimize their academic achievement. Teachers should also use learner centered methods so as to promote curiosity learning, and also nurture a learning environment characterized bycreativity, participation and innovation among learners.Educational trainers should equip teacherswith necessary knowledge and skills to enable them mentor their students on how to developand apply motivation strategies in their learning processes.School administration should also organize for sessions where learners can be guided on how to belief in; and optimize their learning potentials.

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