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Self-Regulation as a Correlates of Problem-Solving Skills Among University Undergraduates in Southwestern, Nigeria

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ABSTRACT: The study investigated the problem-solving skills of the undergraduates in Southwestern Nigeria. It also ascertained the relationship between self-regulation and problem solving skills of the students. The study also examined the level of problem solving skills and self-regulation of the undergraduates. The study also investigated the correlation between socio demographic variable (sex) and problem-solving skills of the of the students in the zone. The study adopted descriptive survey research design. The study population comprised 378,982 undergraduate students. The sample size was 1,442 students which were selected using multistage sampling procedure. Three states were selected out of six states in southwest using simple random sampling technique and from each of the three states; one federal, one state and one private university were selected using simple random sampling technique. From each university, two faculties were selected using simple random sampling technique and from each faculty, four departments were selected using simple random sampling technique. Two adapted instruments titled Problem-Solving Skills Questionnaire (PSQ) and Self-Regulation Scale (SRS) were used to obtain data from the undergraduate students. Data collected for the study were analysed using frequency counts, simple percentages, and Point Biserial Correlation. The results indicated that 36.1%, 31.7% and 28.1% of undergraduates in Southwestern Nigeria demonstrated low, moderate and high problem solving skills respectively. The results also showed that 35.0, 26.8 and 30.8 of undergraduates in Southwestern Nigeria demonstrated low, moderate and high self-regulation respectively. The findings of the study also revealed that there was a significant relationship between self-regulation and problem solving skills ($N=1426$, $r_{pb}=0.298$, $p < 0.05$). Finally, the results of the study showed that there was a significant relationship between sex and problem solving skills ($N=1426$, $r_{pb}=0.130$, $p< 0.05$).

INTRODUCTION

Everybody encounters one problem or the other on daily basis. Problem could be referred to as a situation which makes a discomfort for the individuals that encounter the situation. This kind of problematic discomfort makes an individual uncomfortable and this ambiguous situation reaches balance only by a plausible, reasonable, and practical solution. A problem is a situation, in which a person finds a solution and does not know exactly how but still tries to provide solutions to the problem using all skills embedded in the person. One of the important elements of problem solving skills that individuals should have is to choose the appropriate methodology in the solution of the problems, which is important in terms of achieving success in solving the problems; be academic problem or life problem.

Hung, Jonassen, and Liu (2006) defined problem solving skills as a process of understanding the discrepancy between current and goal states of a problem, detecting causes of the problem, developing solutions to the problem, and executing the solution to put an end to the undergraduate student's problem. To develop problem-solving skills in the students; lecturers need to be asking students creative, critical and logical thinking questions on regular basis. National Council of Teachers of Mathematics Standards (2000), emphasized that the questions to ask university students should be based on the lives of students, academics and challenge the students to develop, apply strategies to solve the problem, and this would enable students to form new knowledge by making use of their previous knowledge. Problem solving usually refers to handling, evaluating causes of problems, and arriving at a solution to put an end to it. Problem solving skills is a goal-directed behavior which requires an appropriate mental representation of the problem and the application of certain methods or strategies in order to solve the problem (Metallidou, 2009). Problem solving skills could be related to cognitive abilities, ranging from logic, analysis, and courses learnt in the university (Aslan, 2012). Problem solving skills are important skills in all ramifications because a healthy society, a healthy nation and high academic performance could only maintain its existence through application of problem solving skills. Problem solving skills are important for students to graduate with good grades. Problem solving skills are related to individuals' previous knowledge experiences and

internalization of such behaviour by the students. Hence, internalization of problem solving skills is an important step for using them effectively. An individual would become more successful once he/she internalizes that behavior.

Developing competency in Problem Solving skills is one of the often claimed but rarely implemented goals of education. A problem arises, whenever (a) a person wants to achieve certain goals in a situation that is complex (i.e., containing many highly interrelated elements) and (b) the causal structure of the situation is not sufficiently known to the problem solver (Fischer, Greiff, & Funke, 2012). In order to solve problems, the problem solver has to (a) build a parsimonious and viable representation of the most important elements and relations, and to (b) search for a solution based on the representation of the problem (Novick & Bassok, 2015). Problems solving involves interaction of the problem solver with a new system to discover rules that in turn must be applied to solve the problem (OECD, 2010). Specific prior experience and background knowledge may heavily detect how a problem arises (Novick & Bassok,
2005) and this kind of knowledge may be sufficient in the provision of solutions to the problem; be it academic or real life problems (Greiff & Fischer, 2013).

Problem solving skills activities could open opportunities for students to learn freely. In their own ways, students would be encouraged to investigate, seek for the truth, develop ideas, and explore the problem. Students are also trained not to be afraid to try various ways to solve problems, as well as having the courage to make decisions, act on the decisions and be responsible for the products of the action. The experiences gained through problem solving would help university students to become progressive, creative and ambitious. These characteristics are necessary in order to be a successful student in the school and society at large.

There has been a fundamental shift in education from an emphasis on knowledge and procedural skills to focus on the active process of extending and applying known concepts in new contexts and problem solving (Schoenfeld, 2007). This shift is based on the idea that education is not for reading and writing alone, but also applying it to solve problems (be it academic or real life problems) that may arise any time for the students. Van Streun (2014) posited that education is not only about reproducing readymade answers alone, but about promoting critical thinking, understanding and developing problem solving skills in university students in Southwestern Nigeria.

It is common knowledge that Nigerian university students are facing frequent decline in their involvement in teaching and learning processes which results into poor development of problem-solving skils and poor academic performance. Instead of them to fully involve in the teaching and learning process in the classroom, they may be cracking jokes, using non-verbal means to communicate, playing games on Global System Mobile (GSM).And this could also distract other students from learning to the extent that the knowledge, skills and experience that ought to have been learnt that could make them to be academically successful, development of problem-solving skills and reach their future dreams may not be acquired by university undergraduates. At the end of the day, they may drop out of the university, disrupt school academic activities, and also hinder the peace of the community and the country at large.

There are some factors that could correlate with problem-solving skills among university undergraduate students in Southwestern Nigeria and self-regulation among them all seems to correlate with it. Self-regulation is the ability to manage one's states of emotions, behaviours and attention in ways that are socially acceptable and achieving positive goals, such as maintaining good relationships, learning and well-being. Self-regulation allows students to develop and use proactive strategies that are necessary to achieve their academic goal (Olofin, 2018). Self-regulation involves the relationship between the person, their behaviours, and the environment. Self-regulation involves establishing goals monitoring behaviour and appraising behaviour to determine if it meets the established goals of the students. If there is a discrepancy between behaviour and goals, an attempt would be made to modify. If the individual has succeeded in achieving the goal; it means the student could successfully regulate himself or herself.

Self-regulation included self-management of thinking, effort, and promotion of flexible approaches to problem- solving skills that are adaptive, persistent, self-controlled, strategic, and goal-oriented towards problem-solving. According to Dabbagh and Kitsantas (2012), students' practice of self-regulation may be regarded as a skill toward solving academic problems or real life problems. Besides self-regulation assists students in planning, goal-setting, self-evaluation and reflection. Self-regulation develops in students a higher sense of learning efficacy, as well as greater persistence, effort, and intrinsic interest in their own learning and performance. Self-regulated learners often make greater use of learning strategies and achieve better overall learning than learners who make little use of self-directed strategies when comes to learning in the university. Vukman and Licardo (2010) went so far as to state that, based upon their research; self-regulation in learning situation should be a goal of formal education in order to equip students with problem- solving skills.

In this vein, self-regulation proved a valuable concept due to its emphasis of the self in terms of the agent establishing learning goals (Paris & Winograd, 2003) – and its combination of cognitive strategies, metacognition, and motivation (behaviorally controlled) into one coherent construct towards acquiring problem-solving skills and aids high academic performance in unversity undergraduates. Self-regulation covers three interrelated processes of self-observation, self- evaluation, and self-reaction. If these three factors are practiced very well by university students; it would lead to self- regulation, high academic performance and

development of problem-solving skills in the students. Across various studies, researchers have determined that the concept of self-regulation in academics include pre-planning, completion monitoring, evaluating and reflecting on work that could foster students' academic achievement (Loyens, 2008). However, current theories and empirical evidence suggested that self-regulation acts as a mediator of success rather than a direct cause of it (Gonzalez, 2012). University undergraduates who are self-regulated are aware of their accomplishment through monitoring, evaluation and reflection on their learning process in the university. This research therefore aims at examining the correlation between self-regulation and problem-solving skills among undergraduate students in Southwestern Nigeria universities.

AIMS AND OBJECTIVES

This research aims to examine the relationship between self-regulation and problem solving skills among undergraduates in Southwestern Nigeria. The specific objectives of this study were to:

1. Investigate the level of problem-solving skills of undergraduates of Southwestern Nigeria.
2. Examine the level of self-regulation of the students in the study area.
3. Ascertain the relationship between self-regulation and problem-solving skills of the students in the study area.
4. Determine the relationship between social demographic variables (sex) and problem-solving skills of the students in the study area.

RESEARCH QUESTIONS

Three research questions were raised from the research objectives:

1 What is the degree of problem-solving skills of undergraduates' in Southwestern Nigeria?

2 What is the extent of undergraduates' self-regulation in Southwestern Nigeria?

Research Hypothesis One: There is no significant relationship between self-regulation and problem solving skills of the undergraduates in Southwestern Nigeria.

Research Hypothesis Two: There is no significant relationship between sex and problem solving skills of undergraduates in Southwestern Nigeria.

METHODOLOGY

The study adopted descriptive survey research design. The population of the study comprised 378,982 university undergraduates in Southwestern Nigeria. Multistage sampling technique was adopted in the selection of samples for the study. Three states (Osun Ekiti and Ogun) states were selected out of the six states in southwestern Nigeria using simple random sampling technique and from each state; one federal, one state and one private university were selected using simple random sampling technique. From each university, two faculties are selected using simple random sampling technique and from each faculty; four departments were selected using simple random sampling technique. (100 to 400/500 levels students were used). The instrument used for collecting data comprised two adapted scales titled Problem-Solving Skills Scale (PSSS) from Behjoo (2013) and Self-Regulation Scale (SRS) from Miller and Brown (1991) which sought information on the relationship between self-regulation and problem-solving skills among undergraduate students in Southwestern Nigeria. The instrument was validated by experts in Psychology of Education and Tests and Measurement to assess the suitability and usefulness of the items in the instrument. The face and content validities were ensured by the experts. A pilot study which consisted of 110 students was carried out to ascertain the reliability and validity of the research instrument used for the study. The pilot study was carried out on students from a university outside the original sampled population intended for carrying out the study. The reliability of the instrument was ascertained through test-re-test method and the reliability coefficient depicted 0.92 and 0.86 respectively.

RESULTS

Research Question One: What is the degree of problem-solving skills of undergraduates' in Southwestern Nigeria? In order to answer this research question, items in problem solving skills were scored such that "Strongly Disagree"
response was allotted 1, "Disagree" response was allotted 2, "Agree" response was allotted 3, while "Strongly Agree" response was allotted 4. Individual responses to each item were computed and the mean and standard deviation values were 44.3 and 6.97 respectively. This is represented in table 1. The minimum and maximum scores obtainable in this inventory were 29 and 82 respectively. Students whose scores were below the group mean score after computing mean minus one standard deviation were adjudged as having low problem solving skills. Also, those whose scores were the mean below the mean after computing mean plus one standard deviation were adjudged as moderate problem solving while those whose scores were above the group mean score after adding the mean to the standard deviation were adjudged as having high problem solving skills.

Table 1. Problem Solving Skills of undergraduates in Southwestern Nigeria.

Problem Solving Skills	Frequency	Percent (%)
Low	537	36.1
Moderate	471	31.7
High	418	28.1

Source: Undergraduates in Southwestern Nigeria (2019/2020 session)

The results in Table 1 showed that 36.1% of the undergraduates had low problem-solving skills, 31.7% and 28.1% of the undergraduates had moderate and high problem-solving skills respectively. From the results, there is an indication that majority of the undergraduates in Southwestern Nigeria have low problem-solving skills.

Research Question Two: What is the extent of undergraduates' self-regulation in Southwestern Nigeria?
To answer this research question two, the results are presented in Table 2 which represents the extent of the Undergraduates' self-regulation in Southwestern Nigeria.

Table 2. Self-regulation of undergraduates in Southwestern Nigeria.

Self-Regulation	Frequency	Percent (%)
Low	521	35.0
Moderate	399	26.8
High	458	30.8

Source: Undergraduates in Southwestern Nigeria (2019/2020 session).

The results in Table 2 showed that 35% of the undergraduates had low self-regulation, 26.8% and 30.8% of the undergraduates had moderate and high self-regulation respectively. From the results, the findings revealed that majority of the undergraduates in Southwestern Nigeria have low self-regulation.

Research Hypothesis One: There is no significant relationship between self-regulation and problem-solving skills of the undergraduates in Southwestern Nigeria.
To answer this research hypothesis one, scores on self-regulation were correlated with the weighted scores of problem-solving skills at 0.05 level of significance and later subjected to Point Biserial Correlation Analysis. The result is presented in the table 3.

Table 3. Relationship between Self-Regulation and Problem-Solving Skills of Students.

Self-Regulation	Mean ($\bar{x}$)	SD	rpb
Low	42.2476	6.966	0.298
High	46.4020		

Source: Undergraduates in Southwestern Nigeria (2019/2020 session).

Table 3 showed the relationship between self-regulation and problem-solving skills. As shown in table 3, the mean of self-regulation (low self-regulation) is 42.2476 while the mean of self-regulation (high self-regulation) is 46.4020. The Point Biserial Correlation Coefficient (rpb) between self-regulation and problem-solving skills is 0.298. This value is significant at 0.05 probability level. This indicates that there was a significant relationship between self-regulation and problem-solving skills (N = 1426, rpb = 0.298, p 0.05). Since p value is less than 0.05, the stated null hypothesis is therefore rejected. These results demonstrate that there was a significant relationship between self-regulation and problem-solving skills.

Research Hypothesis Two: There is no significant relationship between sex and problem solving skills of undergraduates in Southwestern Nigeria?
To answer this research hypothesis two, scores on sex were correlated with the weighted scores of problem-solving skills at 0.05 level of significance and later subjected to Point Biserial Correlation Analysis. The result is presented in the table 4.

Table 4. Relationship between Sex and Problem-Solving Skills in Southwestern Nigeria.

Sex	Mean ($\bar{x}$)	SD	rpb
Male	43.0483	6.9677	0.130
Female	44.9451		

Source: Undergraduates in Southwestern Nigeria (2019/2020 session).

Table 4 showed the relationship between sex and problem solving skills. As shown in table 4, the mean of sex (male) is 43.0483 while the mean of sex (female) is 44.9451. The Point Biserial Correlation Coefficient (rpb) between sex and problem solving skills is 0.130. This value is significant at 0.05 probability level. This indicates that there was a significant relationship between sex and problem solving skills (N = 1426, rpb = 0.130, p 0.05). Since p value is less than 0.05, the stated null hypothesis is therefore rejected. This result demonstrate that there was a significant relationship between sex and problem solving skills.

DISCUSSION OF FINDINGS

The ultimate goal of this study is to determine the relationship between self-regulation and problem solving skills of undergraduates in Southwestern Nigeria. The findings of the first research question showed that majority of the undergraduates in Southwestern Nigeria have low problem solving skills. Hence, this could lead to low self-confidence and poor life satisfaction for the students and also affect their ability to making an effective decision making**. This is in concordance with the research findings of** Dabbagh., & Kitsantas, that stated low problem-solving skills affect self-regulation and academic performance of university undergraduates (2012) **and contrary to** Hun., Jonassen, & Liu (2008) who stated that low problem-solving skills would not affect university students academics in any way.

The findings from research question two affirmed that majority of the students also have low self-regulation which could affect them negatively.

The findings from research hypothesis one showed that there was a significant relationship between self-regulation and problem-solving skills. The findings of this study was **in line** Paris, & Winograd, (2003) that said in their study that self-regulaton as to do with problem-solving skills that this could lead to high academic performance, excellence and this is **contrary** to Olofin (2018) in his research findings that said that self-regulation as no relationship with problem-solving skills and would not affect undergraduates acdemic pursuit wether positively or negatively.

The findings from research hypothesis two also revealed that there was a significant relationship between demographic variable (sex) and problem-solving skills of undergraduates in Southwestern Nigeria. **This is in concordance with the research findings of** Aslan (2012) who posited that sex (male or female) of the students as to do with problem-solving skills development in undergraduates which could help them to solve their academic challenges and real life problems **but contrary to** Gonzalez, J. A. (2012) who stated that sex of the students as nothing to do with problem-solving skills development of the university students in Southwestern Nigeria.

CONCLUSION

The study concluded that there is a significant relationship between self-regulation and problem-solving skills. The study also concluded that there is a significant relationship between the demographic variable of sex and problem-solving skills of undergraduates in Southwestern Nigeria. The study also showed that students possessed low self- regulation and problem-solving skills respectively.

RECOMMENDATION

From the findings of the study, it is therefore important to recommend that the universities instructors should focus attention on making their teaching practicable than theoretical. This is in a bid to improve their creative skills in solving problems. As a matter of fact, when instructions appears real to learners, they would be motivated to developing interest in listening and development of problem-solving skills.

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