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Study strategy as predictor of undergraduate students' achievement of Abubakar Tafawa Balewa University, Bauchi

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This study examines the influence of study strategy on academic achievement of undergraduate students of ATBU Bauchi. A survey design was adopted. One thousand two hundred undergraduate students of ATBU Bauchi participated in the study and were selected randomly from the seven faculties of the university. A study strategy questionnaire adopted from previous studies relevant to the current research was used as an instrument for data collection, while academic achievement of the students was measured using students' cumulative grade point average (CGPA). The study found that there was positive and significant relationship between study strategy and academic achievement of undergraduate students. The study further suggests that undergraduate students with efficient and effective study strategy perform better academically. It was, therefore, recommended that, study strategy should be emphasized at ATBU. This will help students improve their poor academic achievements which usually result in many being withdrawn or spend many years in the university.

Key words: Study, strategy, academic, achievement, undergraduate, success.

INTRODUCTION

The ability of a student to graduate successfully in the university programmes requires that the student demonstrates some skills to enable him successfully pass all his/her required courses. Therefore, at all levels, students are saddled with the responsibility to demonstrate the required academic skills to pass at different levels. That is why, as rightly noted by Adelman (1999) the completion of a university degree programme

is of great concern not only to the students and their parents, but also to the university management and the society as a whole.

Grade Point Average (GPA) is one of the main indicators of student's academic achievement, while Cumulative Grade Point Average (CGPA) is used to give student's overall academic achievement. For students to perform well in an examination, effective study skills

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comprising learning techniques and Study Strategies have been found to play an important role (Mohammad et al., 2017; Rahim and Meon, 2013; Beena and Sudha, 2013). All these studies are pointing to the existence of correlation between Study Strategies and academic achievement of student. This means that any student who has developed efficient Study Strategies mostly uses them effectively and appropriately to master any learning task. On the other hand, students with ineffective and poor Study Strategies may fail on a similar learning task due to poor Study Strategy. Also, such students who do not develop effective Study Strategies may be unable to respond appropriately to the opportunities and expectation that arise at the different levels in their education.

Siahi and Maiyo (2015) found that students have different approach to study. And some of the approach can be good or bad depending on the usage. Some of the good study approach students can develop includes; good note taking, concentration, developing good memory, adopting study techniques, consulting your tutors or counselors, giving attention when reading, preparing for examination, allocating time for study, early submission of assignment, and practicing spaced revision. Due to individual difference, what may be considered as bad study approach to "one" may be productive and efficient to "another". Nevertheless, bad study approach comprises lack of concentration during lessons, late submission of assignment, examination anxiety, procrastination, selective reading, and watching television while studying. Students with poor learning approach according to Jafari et al., (2019), results in poor academic achievement even among the naturally bright students.

A number of students who gained admission into various degree programmes either stay more than the maximum study year or are withdrawn from their program or the university due to poor academic achievement (Renzulli, 2015; Nabizadeh et al., 2019). This poor academic achievement has continued to persist over the years (Hayatu and Abubakar, 2019; Olatunji et al., 2016), and might not be unconnected to the students' poor Study Strategy. Then recognizing the relationship between students' academic achievement and study strategies is very important as it would offer students the opportunity to provide specific feedback related to their strengths and weaknesses that can be used to help support their academic achievement. It is in view of this that this study investigates the undergraduate students Study Strategies at Abubakar Tafawa Balewa University (ATBU) Bauchi, and how that is correlated with the students' performance.

The outcome of the study will hopefully relate the undergraduate students of ATBU Bauchi Study Strategies and their roles in determining their academic achievement. It is also hoped that the persistent poor academic achievement among undergraduate students, which lead to delay in graduation or even withdrawal can be minimized when students realize that greater percentage of their academic achievement can be explained by their Study Strategies. In addition, the research will add to the existent literature on the ways students at risk of dropping out of the university can benefit with enhanced and efficient Study Strategies.

LITERATURE REVIEW

Research over the years in education and other related areas of psychology has demonstrated repeatedly that students who engage in strategic learning perform higher academically than those who do not. In addition, academic achievement can be improved significantly by improving the study skills, reading comprehension and related strategies of learning (Muelasa and Navarro, 2015). This can be at all ages, and is effective with both regular and special education students. Study Strategy, according to Hassan (2013), is attitudes, behavior and styles the learners or students adopt in processing of learning. Study Strategies in this context can be referred to as the "secret algorithms of learning" (Subramanian, 2018, p. 864). Thus, Study Strategies are technique that assists students in the acquisition, manipulation, integration, storage and retrieval of the studied content. Dinsmore et al. (2017) observed that effective Study Strategy does not just happen, but requires deliberate and conscious effort. As such, students have to go through mental processes before it can be established as a strategy. Efficient Study Strategy produces positive academic performance while inefficient Study Strategy may lead to academic failure (Gbollie and Keanu, 2017). Thus both Study Strategies and academic achievement are interrelated and dependent on each other. In addition, Beena and Sudha (2013) found that academic achievement is significantly related to students' levels of concentration, selection of main ideas, effective time management and test taking strategies. Many studies have established the relationships between Study Strategies and academic achievement (Subramanian, 2018; Silverrajoo and Hassan, 2018; Muelasa and Navarro, 2015; Beena and Sudha, 2013; Michael and Olive, 2005).

For example, Silverrajoo and Hassan (2018) sought to identify the relationship between Study Strategy and academic achievements of Health Science Students in Masterskill University College of Health Sciences. The survey research also identifies the different study strategy used by health science students and the academic achievement of the health science students. The overall health science students who participated in this survey

were 150 (125 females and 25 males). Factor analysis was carried out to group the variables under three different construct. That is: Underlining, Outline Summary and Note-taking (UON), Method of Study (MOS), and Reading. Descriptive statistic was used to determine the different Study Strategy practiced by the health science students and to identify the academic achievements of the health science students. Pearson Correlation analysis was used to determine the relationship between Underlining, Outline Summary and Note-taking (UON), MOS, and Reading method with the academic achievement of the health science students. The results of this study revealed that majority of the students are using all the three different Study Strategy and students' academic achievement was found to be on the average. The results show that there is no significant relationship between UON and reading towards the academic achievements of the health science students. However, the relationship between MOS shows a significant but negative relationship with the students' academic achievement. Though Silverrajoo and Hassan (2018) conducted their study on learning strategy in connection to academic achievement, their focus was health science students in Masterskill while the present study was conducted with undergraduate students of ATBU Bauchi.

Ilcin et al. (2018) explore the relationship between learning styles and academic performance in Turkish physiotherapy students. The learning styles of 184 physiotherapy students were determined using the Grasha-Riechmann Student Learning Style Scales. Cumulative grade point average was accepted as a measure of academic performance. The Kruskal-Wallis test was conducted to compare academic performance among the six learning style groups (Independent, Dependent, Competitive, Collaborative, Avoidant, and Participant). The findings showed that the most common learning style was Collaborative (34.8%). Academic performance was negatively correlated with Avoidant score ($p < 0.001$, $r = -0.317$) and positively correlated with Participant score ($p < 0.001$, $r = 0.400$). The academic performance of the participant learning style group was significantly higher than that of all the other groups ($p < 0.003$). Although Turkish physiotherapy students most commonly exhibited a collaborative learning style, the participant learning style was associated with significantly higher academic performance. However, Ilcin et al. (2018)'s study was conducted on study strategy and academic performance which is the interest of the current study but his study was conducted in Turkish with physiotherapy student and the present study was conducted with general undergraduate students of ATBU Bauchi.

Charles and Harriett (2017) in another study explored the motivational beliefs and learning strategy used by Liberia junior and senior school students in connection with their academic performance. The study used a cross-sectional quantitative research design; 323 participants took part in the study from 2 counties. Motivated Strategies for Learning Questionnaire was used as instrument. The results showed the motivational belief component of extrinsic goal orientation as the most preferred belief while test anxiety was the least possessed belief. The study found that rehearsal and organization strategies are of priority to students as they make strides to progress through the academic ladder of high school. Nevertheless, help seeking strategies for asking for assistance from peers or instructors when needed remain the least strategy component considered among the students. However, Charles and Harriett (2017) conducted a study on learning strategy in connection to academic performance; their focus was on junior and senior secondary school students of Liberia while the present study was conducted with undergraduate students.

In a correlational study conducted by Mohammad et al (2017), on the relationship between learning and Study Strategies and academic achievement of nursing students; the study employed the Learning and Study Strategies Inventory (LASSI) made up of three main components of study and learning strategies. The Pearson correlation was used to compare students' academic achievement as they relate to the three main components. The Pearson correlation coefficient result showed that the three main components of learning strategies and study skills component, respectively: Skill ($P=0.001$, $r=0.349$), Self-regulation ($P=0.009$, $r=0.280$) and the component of Will ($P=0.045$, $r=0.218$) with student achievement (mean grade of last term) had a positive and significant relationship. Although Mohammad et al. (2017)'s study was conducted on Study Strategy and academic performance which is the interest of the current study, their study was conducted in Iran and the present study was conducted among the undergraduate students of ATBU Bauchi, Nigeria.

To further explore the consistency of the Study Strategy with the previous results, Zhou et al. (2016) investigated if and to what extent the Learning and Study Strategy Inventory (LASSI) and the Self-Directed Learning Readiness Scale (SDLRS) yield academic performance predictors; to examine if LASSI findings are consistent with previous research. Medical school students completed the LASSI and SDLRS before their first and second years (n = 168). Correlational and regression analyses were used to determine the predictive value of the LASSI and the SDLRS. Paired t-tests were used to test if the two measurement points differed. Bi-variate correlations and R's were compared with five other relevant studies. The result showed that SDLRS was moderately correlated with all LASSI subscales in both measures ($r (152) =0.255$, $P=0.001$) to ($r (152) =0.592$, $P =.000$). The first SDLRS, not the first LASSI were predictive of academic performance. The second LASSI measure was a significant predictor of academic performance ($R (138) = 0.188$, $P = 0.003$). Six

prior LASSI studies yielded a range of R's from 10-49%. Though Zhou et al (2016) investigated the relationship between study strategies and academic performance, however, the focus was restricted to only the medical students in USA; while this research was conducted among all the undergraduate students in ATBU Bauchi, Nigeria.

Similarly, Muelasa and Navarro (2015) explore the central role of the brain, using learning strategies of students to improve their academic performance. The study focused on the use of learning strategies in language and mathematical social science subjects and its influences on academic performance. In the study, 30 students were sample in first course of bachelor's degree. A correlational research design was used to measures and evaluates the degree of relationship between learning strategies and academic performance in a group of subjects. The study used the test of learning strategies "ACRA" (Román and Gallego, 1994), which analyzes the following strategies: (1) information acquisition strategies (repetition and attentional strategies); (2) information coding strategies (mnemonic, organizational and development strategies); (3) information retrieval strategies (search strategies and response generation); and (4) processing support strategies (meta-cognitive and socio-affective strategies). The results showed that learning strategies significantly correlated with students' academic performance; specifically, with language subject. In addition, performance is significantly related with coding (Pearson=0.45; P=0.007) and recovery (Pearson=0.56; P=0.000). On the other hand, in Mathematics subject the significant correlation occurs with the coding strategy (Pearson=0.49; P=0.000). Although Muelasa and Navarro (2015) study was conducted on learning strategy and academic performance which is the interest of the current study, their study was conducted in Spain and the present study was conducted among the undergraduate students of ATBU Bauchi, Nigeria. In a similar study, Fazal et al. (2012) identified various study skills used by the students. This is to ascertain which study skill is more related to academic achievement and to compare the use of study skills between girls and boys. There was a sample of 300 intermediate students (173 girls, 127 boys) taken from 10 Colleges of Abbottabad, Pakistan. The study used modified version of Scale for Study Strategy and Attitudes to identify various study skills among students while academic achievement was determined by marks scored by students in annual examinations conducted by Board of Intermediate and Secondary Education, examination. The findings indicate a significant relationship between students' time-management skills, reading, and note-taking skills with academic achievement. No significant relationship was found for other study skills. Students with higher academic achievement use a wide range of study skills as compared to students with lower academic achievement. The result further revealed that the girls were better in using study skills as compared to boys.

Marzieh (2010) compared learning strategies between what he termed under-achiever and upper-achiever students (including both genders in 3 school grades). The study was designed in retrospective framework. Sample for the study was selected using random multi-level cluster sampling technique. The participants completed the Learning and Study Skill Inventory (LSSI) form that assesses both cognitive and meta-cognitive learning strategies. Result showed that upper students used cognitive and meta-cognitive strategies more than the lower group. Girls used LSS more than boys. In addition, Marzieh (2010) established that meta-cognitive learning strategies predict academic achievement more effectively than cognitive strategies. Similarly, Jason et al. (2018) found that high-achieving students endorsed Study Strategies that have been demonstrated through empirical research to be effective. Even though Marzieh (2010) and Jason et al. (2018)'s study was on Study Strategy and academic performance which is the interest of the current study, their studies were conducted with under-achiever and upper-achiever students; the present study is conducted with general undergraduate students of ATBU Bauchi.

Similarly, Michael and Olive (2005) investigated the relationship between Study Strategies and academic achievement, and the study used revised version of the Learning and Study Strategies Inventory (LSSI) (Weinstein et al., 1988). It was established that Study Strategies and academic performance are interrelated, and Study Strategies are good determinants of academic success. Moreover, their findings also showed that some effective Study Strategies used in secondary schools may not work at the university level. Even though Michael and Olive (2005) study was conducted on Study Strategy and academic achievement which is the interest of the current study, their study was conducted with different learning phases of higher education students in Hong Kong students; but the present study was conducted with general undergraduate students of ATBU Bauchi, Nigeria. That is why there is need for this study. From the foregoing, previous studies have demonstrated a close association between Study Strategies and Academic Achievement. Despite all these findings, not much is known about the role of Study Strategies as they relate to students' achievement in ATBU, Bauchi, Nigeria. In addition, to the best of our knowledge, there are no prior publications in the literature that report the relationship between Study Strategies and Academic Achievement of ATBU students. It is in view of this that this study was carried out.

Research framework

A framework of this study indicates the relationship

between Study Strategies and academic achievement of students in Abubakar Tafawa Balewa University (ATBU) Bauchi. The framework is developed based on the underpinning theory and empirical studies discussed in the preceding section (Figure 1). It is developed based on the Cognitive Information Processing (CIP) theory. The theory was originally developed by Atkinson and Shiffrin (1968). According to CIP theory, the human learner is conceived to be a processor of information, in much the same way as a computer. When learning occurs, information is input from the environment, processed and stored in memory and output in the form of a learned capability. The following hypothesis is formulated:

H_1: There is a significant positive relationship between Study Strategies and academic achievement of students in ATBU Bauchi.

METHODOLOGY

The study's target population consists of all undergraduate students of ATBU Bauchi. A sample of one thousand two hundred undergraduate students was selected from seven faculties including the college of medicine. A Simple random sampling technique was used in the present study, because this sampling technique is believed to produce samples which are free from bias (Sambo, 2005). Following this argument, the study randomly selected equal number of students from each faculty of the university to form the sample size.

A survey is used when a researcher is interested in studying the opinions, feelings, and thoughts of the respondents about a particular situation (Fisher, 2010). A survey method was used to collect data on students Study Strategies. To examine the relationship between Study Strategies and academic achievement of undergraduate students of ATBU Bauchi, a correlational research design was adopted. This method enables the researchers to collect and analyze quantitative data as well as suggesting the reasons for the relationship between the variables of interest (Saunders et al., 2009; Creswell, 2012). Hence, a correlational method was appropriate in achieving the objective of this study.

The undergraduate instrument for data collection on undergraduate students' academic achievement was students' CGPA. Cumulative grade point average shown on the students' result sheets was used as the measure of academic achievement. The students' CGPAs at the end of the 2018-2019 academic years were obtained from the academic unit of ATBU. The Study Strategies of undergraduate students on the other hand, was measured using Study Strategies questionnaire adopted from previous studies relevant to the current research. The reliability of the instrument was determined using Cronbach Alpha. Hair et al. (2013) recommended that the value of Cronbach Alpha of 0.70 and above is acceptable and sufficient. In the present study, reliability coefficient is .86 suggesting that the instrument is reliable. In this study the researchers administered the questionnaires and collect data regarding study strategies of undergraduate students of ATBU Bauchi.

Statistical analyses were performed on the cleaned data to compare study strategy with academic achievement. All data were analyzed using Statistical Package for Social Science software (IBM Corporation, version 25.0 for Windows). The predictive power of Study Strategies (independent variable) on academic achievement of undergraduate students of ATBU Bauchi (dependent variable) was determined using simple linear regression. A simple linear regression is used in predicting the score on one variable from another variable score (Tabachnick and Fidell, 2013). Hence, simple linear regression is appropriated in testing the hypothesis of the current study.

FINDINGS

Having satisfied the necessary assumptions of regression analysis, the simple linear regression was performed to test the hypothesis of the study. The statistical evidence has proved that the model was statistically significant based on the F_{ratio} 7.607, P = 0.006. The result also revealed the R^2 value of 0.42, indicating that Study Strategies accounted for 42% of the explained variables in academic achievement of ATBU Bauchi students. The regression equation was: predicted academic achievement = 0.037 + 2.125 x (Study Strategies value). Furthermore, the statistical evidence documented in Table 1 shows that the relationship between Study Strategy and academic achievement of undergraduate students of ATBU Bauchi had a beta value of 0.605, P = 0.006. This suggests that the influence of Study Strategy on academic achievement of undergraduate students of ATBU was positive and significant. Therefore, hypothesis 1 is, supported.

DISCUSSION

The current study investigated the relationship between Study Strategy and Academic Achievement of ATBU Bauchi students. Analysis of the data in Table 1 reveals that the hypothesis was supported. The regression result indicates that R^2 was 0.42 which means that 42% of academic achievement of ATBU Bauchi student was accounted for by the variable in the equation. In other words, Study Strategies accounted for 42% of the explained variables in academic achievement of ATBU Bauchi students. This implies that there is a significant positive relationship between Study Strategies and academic achievement of students in ATBU Bauchi. This finding is consistent with the findings of Silverrajoo and Hassan (2018) and Zhou et al. (2016). The poor academic achievement among undergraduates as reported by Hayatu and Abubakar (2019) further revealed the relationship between Study Strategy and academic achievement of the students; this means ATBU students' academic achievement increases with better study strategy. In addition, it suggests that students who engage in strategic study perform better academically than those who do not. Therefore, academic achievement among ATBU Bauchi students can be enhanced significantly when students employ efficient Study Strategies. Thus, the assertion of Jason et al. (2018)'s findings, that high-achieving students endorse Study Strategies that have been demonstrated through empirical
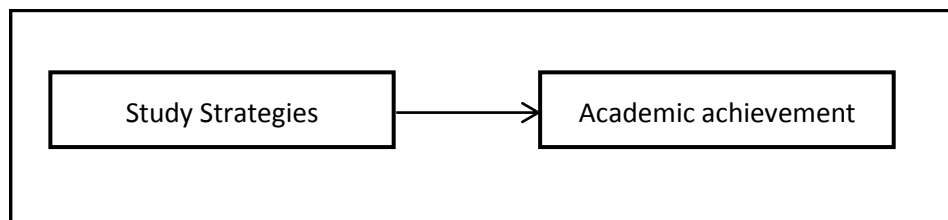
Figure 1. Research framework.

Table 1. Regression analysis on influence of study strategy on academic achievement of undergraduate students of ATBU.

Variable	Standardized coefficients beta	t-value	P-value	Decision
Study strategy	0.605	2.758	0.006	Supported

research to be effective is correct. The findings agree with that of Fazal et al. (2012) who found students who employed good Study Strategies perform better academically and that effective Study Strategy promotes academic achievement. This finding is consistent with the earlier report of Silverrajoo and Hassan (2018) who confirmed a significant relationship between students' Study Strategies and academic performance. Moreover, the finding is in agreement with Ilcin et al. (2018) and Zhou et al. (2016) which revealed that academic performance of students was significantly associated with their learning style.

Although there are quite different Study Strategies, the result in this study suggests that good Study Strategies significantly influences academic achievement of undergraduate students. This result corroborates the findings of Michael and Olive (2005) and Muelasa and Navarro (2015).

Conclusion

This study examines the influence of Study Strategy on academic achievement of undergraduate students of ATBU Bauchi. One thousand two hundred (1200) undergraduate students participated in the study.

The findings established that Study Strategies and academic performance are interrelated, and Study Strategies are good determinants of academic achievement of undergraduate students of ATBU Bauchi. The study found a significant positive relationship between Study Strategies and academic achievement of students in ATBU Bauchi.

However, this study did not only address whether or not there is a relationship between study strategies on academic performance, but also revealed to what extent study strategies predict academic performance.

Therefore, the learning outcome of undergraduate students of ATBU Bauchi that persistently remained discouraging over the years might not be unconnected to their Study Strategies. This can be addressed drastically by teaching the undergraduate students how to develop good and efficient Study Strategies.

It is, therefore, recommended that, the school management, lecturers, and government, in general, should in addition to general studies courses, give emphasis to studying skill courses so that ATBU students can develop good Study Strategies. This might help in addressing the poor academic achievement which result in many students being withdrawn or spend many years in the university.

To examine the constructs that enhance students' academic performance, future studies should be conducted to investigate the relationship existing between educators' teaching strategies and students' academic achievement.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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