Relationship between problem-solving ability and study behaviour among school-going adolescents in southwestern Nigeria

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Abstract

This study examined the relationship between problem-solving ability and study behaviour of secondary school students in Southwestern Nigeria. A total of 430 SS 3 students randomly selected from fifteen secondary schools in Southwestern Nigeria participated in the study. A Problem-Solving Inventory and a Study Behaviour Inventory were employed in the data collection from the respondents. Multiple Regression Analysis was used to treat the data. The results obtained indicated that problem-solving ability was significantly predictive of study behaviour. Implications for counsellors to use problem-solving activities in improving students' study behaviours were discussed.

Keywords: problem-solving ability, study behaviour, school-going adolescents, southwestern Nigeria.

Introduction

Several decades of research have documented that secondary school students in Nigeria experience academic problems that manifested itself in the form of poor academic performance (Ajayi, 1999; Akinboye, 1980; Aremu, 2000; Fasanmi, 1986; Kagu, 2000; Omolewa, 1981; Salami, 1987 & 2002). This occurrence had been linked with the poor study habits of the students (Akinboye, 1980; Bakare, 1975; Emeke, 1984; Kagu, 1999; Pindar, 2000; Salami, 1987, 1991a and 1991b).

Many psychologists have long discovered that many students perform poorly in their academic work not because they do not possess the mental ability to do well but because they do not know or do not use the most effective methods of studying (Bakare, 1977). According to Bakare (1977), in learning any school subject or any material, there are three identifiable stages. The first is the acquisition stage when the material is studied, "taken in" or "absorbed" by the students. The second is the retention stage when the material studied is stored while the third is the recall stage when the stored material is produced when required by the student or during tests or examinations. The three stages are closely interrelated. As such when a material is poorly studied at the acquisition stage, it will be poorly stored at the retention stage and it will be poorly produced at the recall stage. A variety of factors affect the effectiveness of students learning at each of these three stages which can result in poor academic performance. It should be noted that both the passing and failing students need to have effective study habits. Even the good student can raise his or her grades higher by cultivating better study habits. What this boils down to is that good study behaviour is essential for effective learning.

Bakare (1975) claimed that poor study habits are non-consonant with efficient learning. He was of the view that students' inadequate or poor time allocation for studies, delay or non-completion of homework and assignments, and defective examination strategies, defective note-taking, poor concentration, and lack of teacher concentration limit or distort the materials acquired, stored during learning and the reproduction of learned materials during examinations. The net effects of this is poor academic performance (Bakare, 1986; Kagu, 1999; 2000; Wilhite, 1990).

Some investigators in Nigeria have found that most secondary school students have inefficient study methods (See Abdullahi, 1996; Akinboye, 1981; Emeke, 1984; Kagu, 2000; Omoegun, 2000; Salami, 2002; Yoloye, 2004). There is therefore the need to identify the fac-

tors that influence the study behaviour of the secondary school students so that appropriate intervention strategies could be mounted for them in order to modify their in efficient study habits. Results from a number of studies (e.g. Abdullahi, 1996; Aremu, 2000; Bakare, 1997; Emeke, 1984; Hassana, 1991; Kagu, 1999 & 2000; Pindar, 2000; Salami, 2002; Yoloye, 2004) suggest that age, gender, ecological background, personal defects, innate and congenital factors, psycholinguistic problems, physical and cultural factors, and school environments are significant factors influencing students' study habits.

Hardly had any investigator related study habits to problem-solving ability in Nigeria. In the United States of America some researchers (Elliot, Godshall, Shrout & Witty, 1990) had related problem-solving appraisal, and self-reported study habits to the performance of academically at-risk college students. This is the nearest literature related to this study. Self-appraisal problem-solving ability theoretically serves an important function in the way in which a person processes information about the self, the environment, and problematic situations encountered in everyday life (Elliot, Sherwin, Harkins & Marmarosh, 1995; Heppner & Krauskopf, 1987). This variable was derived from the problem-solving model of D'Zurrilla and Goldfried (1971) which categorised the problem-solving process into five general stages: (a) problem orientation stage, (b) problem definition and formulation, (c) generation of alternatives (d) decision making and (e) verification.

With the development of the Problem-Solving Inventory (PSI) by Heppner & Peterson (1982) and Heppner (1988), a lot of literature had investigated the relation between personal problem-solving and adaptive behaviour. Some researchers have found that participants who appraise their problem-solving ability to be effective were less depressed and distressed than ineffective problem-solvers under general conditions (Heppner & Anderson, 1985; Heppner, Kampa & Brunning, 1987); or under stressful ones (Nezu, 1986b). Other studies have found differences between effective and ineffective problem solvers on cognitive variables. In relation to this, some researchers had reported that effective problem solvers tend to have a more internal locus of control, use more problem-focused coping strategies, have fewer irrational thoughts, and more confidence about their decision-making ability than ineffective problem-solvers (Heppner et al 1982; Heppner, Reeder & Larson, 1983; Priester & Clum, 1993).

However, very few studies have related problem-solving ability to specific skills having to do with overt adaptive cognitive behaviour. Incidentally, Neal and Heppner (1986) found that effective problem-solvers were more knowledgeable about their environment and

were more likely to appropriately use student services and help providers on campus. Effective problem-solvers were reported to have better social skills and are less anxious. Heppner and Krauskopf (1987) proposed information – processing model of personal problem-solving. According to this model, problem-solving is synonymous with coping, and any situation can be regarded either objectively or subjectively as a problem that should be solved. This model relies on cognitive activity in the perception of a problem; and in the processing and generation of solutions and is therefore not restricted to social and interpersonal behaviours as suggested by D'Zurilla and Nezu (1987). Heppner and Krauskopf (1987) put forward a thesis that effective problem solvers process and generate more adaptive, goal-directed solutions to problems encountered in their environments than ineffective problem-solvers. They also believe that effective problem-solvers can plan, organize, and recognise appropriate skills, attitudes and behaviours crucial to adaptive problem-solving behaviour. All these are characteristics of effective study habits.

For students to perform successfully, they have to possess competencies in organizing their time, effective studying of course materials, and programme requirements, and being capable of meeting academic requirements for successful completion of course and programmes. In short, the students should display effective academic skills to perform successfully. Based on Heppner and Krauskopf's (1987) information processing model, effective problem-solving could be significantly predictive of more effective study habits than ineffective problem-solving. Since problem-solving appraisal is not restricted to social skills domain alone but also involves cognitive domain, problem solving is expected to be related to study behaviours or habits of students.

The purpose of this study is to investigate the relationship between problem-solving ability and study behaviours of secondary school students. In order to carry out the above objective, the following research questions were answered in this study.

(1) To what extent will the problem-solving ability variables jointly predict study behaviour of secondary school students?

(2) What is the relative contribution of each of the problem-solving ability variables to the prediction of study behaviour of the secondary school students?

Method

A descriptive survey research design was employed in this study in which in researcher collected data from the respondents by means of questionnaires to investigate the relationship between problem-solving ability and study behaviour of the secondary school students.

Participants

The participants for this study were four hundred and thirty final year senior secondary school (SS 3) students (215 males, 215 females) selected by stratified random sampling technique from fifteen randomly selected mixed secondary schools from five states in Southwestern Nigeria. Three schools were randomly selected from each state capital and thirty SS 3 students were randomly selected from each school. 450 questionnaires were distributed and collected however only 430 were properly filled and used in the analysis. This gave a return rate of 95.50%. The age range of the students was from 13 to 19 years with a mean of 16.5 years and a standard deviation of 2.08. Students in the final year (SS 3) class were involved in this study on the ground that they must have been exposed to all the schools academic and counselling activities and acquired experiences which would enable them to understand and respond to the questionnaires objectively than those in the lower classes.

Instruments

Two research instruments were used in this study. These were the Problem-Solving Inventory (PSI) (Heppner, 1988) and the Adolescent Personal Data Inventory (APDI) Section (B) (Akinboye, 1977).

1. *The Problem-Solving Ability*. The Problem-Solving Inventory (PSI) (Heppner, 1988) was used to assess the problem-solving ability. The PSI is a 32-item, self-report measure. The respondents were required to rate each item on a 6-point Likert scale (1 = strongly agree, to 6 = strongly disagree). A factor analysis has identified three factors, problem-solving confidence, Approach-Avoidance, and Personal Control (Heppner, 1988). A total score is derived from these factor scores and serves as a global index of problem-solving ability. The reliability estimates revealed that these constructs are internally consistent (alpha coefficient ranged from .72 to .90) and stable over a 2-week period (i.e. test-retest correlations from .83 to .89; Heppner, 1988). For this study, the test-retest reliability coefficient was found to be .83

after 2-week interval of administration on a sample of 50 secondary school students. the PSI has high concurrent validity when correlated with other problem-solving measures and high divergent validity with measures of intelligence and social desirability (Heppner & Petersen, 1982). Lower scores indicate effective problem-solving attitudes and behaviours; higher scores suggest more ineffective strategies.

2. *Study Behaviour.* The APDI section (B) by Akinboye (1977) was used to measure the study behaviour of the students. There are 25 items in this subscale. The higher the students' scores on this subscale, the more efficient their study behaviour patterns. The subscale has 5-point scale of 1-5 such that the students were to rate themselves to the extent to which the statements are descriptive of their study behaviour. The reliability of the study habits subscale was found by the establishment of an internal consistency reliability using the coefficient of alpha which was 0.874. The convergent construct validity of the subscale was established by correlating the scores on the scale with scores on the Bakare's (1970) Study Habits Inventory (SHI). The construct validity was found to be 0.705.

The two instruments, PSI and APDI section B (Subscale on study behaviour) were administered to the randomly selected final year senior secondary school (SS 3) students in the fifteen secondary schools that participated in the study. Before the administration of the two instruments the author and the research assistants, visited the schools, explained the purpose of the study and obtained the consents of the final year students and the school authorities of the schools involved in this study. The two instruments together with a set of questionnaires designed for another study were all administered with the help of some undergraduate students who were enrolled for the B.Ed degree in Guidance and Counselling and postgraduate students in the Department of Guidance and Counselling of the University of Ibadan. Of the 450 sets of questionnaire collected, twenty were not useable because of incompleteness. Thus 430 questionnaires were used for the data analysis.

Statistical analysis

The responses of the students got from the two instruments were coded and the scores obtained were grouped into appropriate variables. The students' scores on PSI were the predictor variables while their study behaviour scores from the APDI (Section B Subscale) served as the criterion or dependent variable. The data were subjected to two statistical tech-

niques namely Pearson Correlation and Multiple Regression. Multiple regression was used to find out the predictive nature of each and a combination of the independent variables.

Results

The results of the data analysis using Pearson Correlation are shown in Table 1.

Table 1: Means,Standard Deviations and Intercorrelational Matrix of the Predictor Variables (Problem-Solving Ability) and the Criterion measure (study behaviour) (N = 430).

Variables	1	2	3	4	5
1. PSI Total	1.00				
2. PSI Personal Control	.59*	1.00			
3. PSI Approach-Avoidance	.85*	.53*	1.00		
4. PSI Confidence	.69*	.05	.30*	1.00	
5. STB Study Behaviour	.82*	.60*	.80*	.40*	1.00
Mean	82.93	16.34	41.87	25.42	84.96
S.D.	6.01	1.55	3.45	3.24	7.47

Note: PSI = Problem-Solving Inventory; STB = Study behaviour
* = P < .05 (Significant results)

The intercorrelational coefficients between a pair of the independent variables (PSI total, PSI p-c.; PsiA-A, and PSIc) were mostly high and so the relationships are strong. The highest correlation coefficient was found between PSI total and PSIA-A (r = .85) while the least correlation coefficient is found between PSIp-c and PSIc (r = .05). The highest r value was found between PSI total and STB (r = .82), followed by PSIA-A and PSIp-c with r = .80 and .60 respectively. The least correlation coefficient is found between PSI confidence and STB (Study behaviour), with r = .40. This indicates that all the independent variables all significantly influenced the study behaviour of the adolescent students.

Table 2:Summary of Multiple Regression Analysis between the Predictor variables (Problem-Solving Ability) and the Criterion measure study behaviour

Multiple R	.86
R Square	.73
Adjusted R Square	.73
Standard Error	3.84

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	4	7458.79	1864.69	148.82	.05*
Residual	425	5326.77	14.78		
Total	429	12785.56			

Note: * = P < .05 (Significant results).

Table 2 shows that using the independent variables (PSItotal, PSIpersonal control, PSIapproach avoidance, and PSIconfidence) to predict study behaviour of the secondary school students yielded a coefficient of multiple regression (R) of .86 and a multiple correlation square (R^2) of .73. This indicate that 73% of the total variance in study behaviour of the students is accounted for by the linear combination of the variables.

The table also shows that the analysis of variance of the multiple regression data gave an F-ratio significant at the .05 level [F(4,425) = 148.82; P<.05].

Table 3: Testing the significance of Regression weights

Variables	B	SEB	Beta	T	Sig. T
PSI Total	1.19	.42	.95	2.26	.005*
PSI Personal Control	1.85	.48	1.01	2.10	.005*
PSI Approach-Avoidance	.14	.42	.06	.35	.72
PSI Confidence	-1.66	.41	-1.28	-3.12	.005*
(Constant)	-4.54	3.61		-1.25	.21

Note: PSI = Problem-Solving Inventory. * = P < .05 (Signif

The multiple regression tested the prediction that problem-solving ability would be predictive of the students' study behaviour. The results obtained on Table 3 shows that the block of problem-solving ability subscales PSItotal was significantly predictive of study behaviour, (Beta = .95, t = 2.26; P < .05). The results further indicated that the following beta weights which represented the contributions of the separate subscales to the prediction were observed: Problem-solving, confidence. Beta = -1.28, t = -3.12, P < .05; PSI personal control, Beta = 1.01, t = 2.10, P < .05; and PSI approach-avoidance, Beta = 0.06, t = 0.35, P > .05 in decreasing order of magnitude. Although the PSI approach-avoidance contribution to the prediction was not significant at the .05 level, the overall findings supported the hypothesis that the problem-solving ability would be significantly predictive of students' study behaviour as measured by the APDI section B.

Discussion

The results of the regression analysis in the present study revealed that problem-solving ability was significantly predictive of study behaviour of the secondary school students. The observed F-ratio was significant at the .05 level. This is an indication that a combination of the independent variables (problem-solving ability subscales) were effective in predicting study behaviour of the students and that it could not have occurred by chance. The magnitude of the values of the coefficient of multiple correlation (0.86) and multiple R Square (0.73) as displayed on Table 2. One could infer that 73% of the total variance in the study behaviour of the students is accounted for by a linear combination of the independent variables.

On the extent to which each of the independent variables contributed to the prediction, the values of T-ratio associated with each variable in Table 3 indicate that PSI total contributed significantly to the prediction of study behaviour. Two of the three separate PSI subscales – PSI personal control and PSI confidence – did make significant contributions to the prediction of study behaviour though they all had significant correlations with the dependent variable.

That problem-solving ability was found to be significantly predictive of study behaviour corroborates the findings of Elliot, Godshall, Shrout and Witty (1990) who had similar results with academically at-risk college students. This finding suggests that problem-solving ability involves more than social skills and interpersonal competence contrary to the assertion of D'Zurilla and Nezu (1987). One could infer that effective problem solvers in this study

were more aware of and recognised more effective study behaviours than ineffective problem solvers. It is very likely as suggested by Elliot et al (1990) that, effective problem solvers endorsed behaviours important for functioning successfully in an academic environment. This finding is also in support of the work of Heppner and Krauskopf (1987) who theorized that effective problem solvers process and generate more adaptive, goal-directed solutions to problems encountered in their environment than ineffective problem solvers. According to Heppner and Krauskofpf (1987) effective problem-solving implies an ability to plan, organize, and recognise appropriate habits, attitudes and behaviours crucial to adaptive problem-solving action.

It is interesting to note that all the three problem-solving subscales, problems-solving personal control, approach-avoidance, and confidence, were significantly correlated with study behaviour but it was only PSI approach-avoidance that was not significantly predictive of study behaviour. This implies that PSI approach-avoidance could not separately predict study behaviour but all of them combined together were able to predict significantly the study behaviour of the students. These findings supported the work of Elliot, Godshall, Shrout and Witty (1990) who reported that problem-solving total and problem-solving confidence were significantly predictive of study habits but PSI personal control and PSI approach-avoidance did not. That problem-solving personal control and confidence were predictive of study behaviour could be attributed to the fact that the two factors assess certain motivational aspects of problem-solving and for students to be engaged in serious studying, they have has to be motivated. The non-significant predictive result obtained with problem-solving approach-avoidance could be linked to the fact that this factor assesses items relevant to specific cognitive behavioural strategies found in problem-solving skills (Nezu & Perri, 1989) and not motivation.

It could be concluded from this study that problem-solving ability correlated significantly with study behaviour and it is significantly predictive of the secondary school students' study behaviour. Also, the relation between study behaviour and problem-solving ability may be instrumental to good academic performance and as such problem-solving ability has important roles to play in the academic pursuits of the secondary school students.

Since problem-solving ability is found to be predictive of the students' study behaviour, it could be inferred that effective problem solvers endorsed good study habits that are important and necessary for functioning successfully in academic work. Students with good

study habits are likely to show higher level, of academic success as will be shown in their examination results. Therefore, it will be more rewarding for school counsellors and psychologists as well as the subject teachers to focus on the study problems of the students apart from emphasizing learning of subject-matter contents in the schools. While handling the study problems of the students, problem-solving procedures should be adopted and taught by the counselling psychologists so that the students could handle other academic problems as well as how-to-study problems that may be facing them in their academic pursuits. By this we could obtain high quality products from our schools. The findings also provide a basis for the suggestion that problem-solving skills acquisition and how-to-study effectively should be part of the orientation activities for new students in Nigerian schools.

It is important to note some limitations of this study. First, the study is a correlational one and as such we cannot assume any causal relationship between problem-solving ability and study behaviour. Second, the sample used for this study are secondary school students and as such one cannot generalize the findings to other populations such as universities, colleges of education and polytechnics students. Future researchers may focus on the limitations and work on how they could be minimized in order to improve on the generalizability of the findings.

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