Active Learning Strategies and Student Learning Outcomes Among Some University Students in Barbados

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Abstract

Active learning is a crucial component in the learning process; the learner needs to be actively engaged during the lecture for effective learning to take place. This study therefore investigated the relationships between the active learning strategies (discussion, video clips simulation, game show, role – play, five minute paper, clarification pauses, group work) and the students' learning outcomes (SLOs) among a sample of 158 undergraduate psychology students in The University of the West Indies, Barbados. They responded to Active Learning Strategies Questionnaire and Student Learning Outcomes Assessment Scale. Results revealed statistically significant positive correlations between active learning strategies and student learning outcomes; so also the active learning strategies contributed 14% (Rsq= 0.139) to the variance being accounted for in student learning outcomes and this was found to be statistically significant (F (1,156) = 25.23, p < .05). Additionally, video - clips simulation emerged as the best active learning strategy and had the highest correlations with student learning outcomes (r=0.340, p<0.05). These results were discussed in the light of the importance of the active learning strategies promoting learning among the university students.

Keywords: *Student learning outcomes (SLO), active learning strategies, active learning, undergraduates*

Introduction

There is a growing realisation that students need to do more than just listen to learn in a changing environment. Active learning is a key element in the learning process and most adult learning models view interaction (active learning) as a crucial component (Mantyla, 1999). Paulson and Faust (2010) refer to active learning as anything that students do in a classroom other than merely passively listening to an instructor's lecture. This includes everything apart from listening practices which help the students to absorb what they hear, to short writing exercises in which students react to lecture material, to complex group exercises in which students apply course material to "real life" situations and/or to new problems. Likewise, Chickering and Gamson (1987) suggest that for students to be actively engaged, they must do more than just listen: they must read, write, discuss, or be engaged in problem solving and take part in cooperative learning and group activities. Most importantly, to be actively involved, students must engage in such higher-order thinking tasks as analysis, synthesis, and evaluation. Considering the components of active learning strategies, (Mantyla, 1999) posited that good active learning activities are the same, whether presented in traditional or in online environments and activities should among other things have a definite beginning and ending; clear purpose or objective and a feedback mechanism.

Importance of Active Learning

Investigators suggested that active participation strengthens learning regardless of environment (Harasim, Starr, Teles, & Turnoff, (1997); active learning requires "intellectual effort, encouraging higher-order thinking (analysis, synthesis, evaluation)" and provides a means for the learner to assimilate, apply, and retain learning (Bonwell & Eison, 1991; Harasim, et al, 1997). It was further suggested that strategies promoting active learning are superior to passive learning (lectures) in promoting the development of student's skills in thinking and writing (Bonwell and Eison, 1991). Active learning accommodates a variety of learning styles, promotes student achievement, enhances learner motivation, changes student attitudes, and basically, causes learners to learn more (Astin, 1985). Bonwell and Eison (1991) contended that from a preference perspective, students generally prefer strategies promoting active learning to traditional lectures and other passive methodologies. Use of these techniques in the classroom is vital because of their powerful impact upon students' learning. Investigators evaluating students' achievement have demonstrated that many strategies promoting active learning are comparable to lectures in promoting the mastery of content but superior to lectures in promoting the development of students' skills in thinking and writing (Harasim, et al, 1997). Furthermore, some cognitive researches have shown that a significant number of individuals have learning styles best served by pedagogical techniques other than lecturing. Therefore, a thoughtful and scholarly approach to skilful teaching requires that faculty become knowledgeable about the many ways strategies promoting active learning have been successfully used across the disciplines. Further, each faculty member should engage in self-reflection, exploring his or her personal willingness to experiment with alternative approaches to instruction.

In further consideration of the importance of active learning, research findings also revealed that for the past decades, the majority of college faculties still teach their classes in the traditional lecture mode in which professors talk and students listen, dominate college and university classrooms. Some scholars have criticized traditional method of teaching and argued that it is boring and found that it is one of the factors responsible for absenteeism among the tertiary education students in Nigeria and Barbados, (Fayombo, Babalola and Olaleye 2012) and also among the students in theUniversity of Canterbury, New Zealand, (Hunter and Tetley 1999). Thus, the students are likely to miss lectures because they are not actively involved in the classroom activities and if the content of the lecture did not match the changing environment which are characteristics of traditional lecture method.

Active Learning Strategies and Student Learning Outcomes

Bonwell and Eison (1991) described active learning strategies as those that involve "students in doing things and (have the students) think about the things they are doing" In an effective learning environment that incorporates active learning strategies, "greater emphasis is placed on students' exploration of their own meaning, attitudes, and values" (Bonwell & Eison, 1991; Mantyla, 1999). Additionally, Wiggins and McTighe (1998) emphasized that good activities develop deep understanding of the important ideas to be learned. To do this, the activities must be designed around important learning outcomes and promote thoughtful engagement on the part of the student. The activity suggested by Ruhl, Hughes and Schloss, (1987) for example, encourages students to think about what they are learning. Adopting instructional practices that engage students in the learning process is the defining feature of active learning.

Student learning outcomes (SLOs) are statements that specify what students will know, be able to do or be able to demonstrate when they have completed or participated in a programme/ activity/course/project. Outcomes are usually expressed as knowledge, skills, attitudes or values. (Student Learning & Outcomes Assessment; University of Rhode Island). Learning outcomes therefore are statements of what a student should know, understand or be able to do at the end of a learning activity such as lecture, a module or an entire programme (Kennedy 2006). Thus, the emphasis is on the learner regarding the ability to do something using the terms like define, list, identify, name, recall, analyse, calculate, design, and on teaching —aims and objectives and use of terms like know, understand, be familiar with.

Some have found some relationships between learning strategies and learning outcomes. Ruhl, Hughes & Schloss, (1987) show some significant results of adopting the pause procedure among a sample of 72 students over two courses in each of two semesters. The researchers examined the effect of interrupting a 45-minute lecture three times with two-minute breaks during which students worked in pairs to clarify their notes. In parallel with this approach, they taught a separate group using a straight lecture and then tested short and long-term retention of lecture material. Short-term retention was assessed by a free-recall exercise where students wrote down everything they could remember in three minutes after each lecture and results were scored by the number of correct facts recorded. Short-term recall with the pause procedure averaged 108 correct facts compared to 80 correct facts recalled in classes with straight lecture. Long-term retention was assessed with a 65 question multiple-choice exam given one and a half weeks after the last of five lectures used in the study. Test scores were 89.4 with the pause procedure compared to 80.9 without pause for one class, and 80.4 with the pause procedure compared to72.6 with no pause in the other class.

Researchers alaso found that cooperative groups encourage discussion of problem solving techniques and avoid the embarrassment of students who have not yet mastered all of the skills required (Millis & Cottell, 1998 ; Feden, & Vogel, 2003)**.** Qin, Johnson, and Johnson, (1995) reported that cooperation promotes higher quality individual problem solving than does competition. The result stems from the finding that individuals in cooperative groups produced better solutions to problems than individuals working in competitive environments. While the finding might provide strong support for cooperative learning, it is important to understand what the study does *not* specifically demonstrate. It does not necessarily follow from these results that students in cooperative environments developed stronger, more permanent and more transferable problem solving skills.

Present Study

From the literature reviewed, it is evident that active learning strategies are necessary for students' involvement during lectures and important in achieving learning outcomes, yet this had not been investigated among the UWI students in Barbados to find out the relationships between active learning strategies and student learning outcomes (SLOs). In the present study, a wide variety of active learning techniques which supplement rather than replace lectures and the evidence for promoting learning outcomes were incorporated into the classroom activities**.** This study is therefore conducted to find out whether active learning strategies (video clip simulations, discussion, game show, clarification pauses, role play, one-minute-paper, group work,) will influence learning outcomes among some psychology undergraduate students taking PSYC 2009: Learning Theory and Practice Course at the University of the West Indies, Barbados with the aim of finding out whether these strategies will influence the learning outcomes thereby suggesting ways of

incorporating the strategies into classroom activities for effective learning. This study posits that active learning strategies will predict the student learning outcomes (SLOs).

Aims of Study

Specifically, the following four research questions were addressed in this study:
1) Were learning outcomes satisfactorily achieved after the lectures?
2) Were the students actively engaged in the lectures?
3) Which of the learning strategies was most engaging for the students?
4) Will there be significant relationships between the active learning strategies (video, discussion, game show, clarification pauses, role play, one-minute-paper, group work,) and the learning outcomes?
5) Will the active learning strategies predict student learning outcomes?

Methods

Participants

Out of 189 students, only 158 students participated in the class activities in the Learning Theory and Practice Course at The University of the West Indies, Cave Hill Campus, Barbados, 2011/2012 session. Their age ranged between 18- 60years (Mean age 39.0years, SD = 1.73years). There were 59 males and 99 females, 90 from the Faculty of Social Sciences; 68 from the Faculty of Humanities & Education; Pure and Applied Sciences; 107 were Barbadians while others were from other Caribbean Islands- St Vincent, Trinidad and Tobago, St Lucia, Jamaica, Dominica and Grenada.

Measures

The two instruments used to collect data in this study were: Active Learning Strategy Questionnaire and Student Learning Outcomes Assessment Scale developed by the researcher.

Active Learning Strategy Scale has three sections. Section A comprises of the demographic variables such as gender, faculty/department, year of study, nationality, age etc. Section B consists of 7 close and open ended questions designed to find out whether the students have been participating in the different class activities involving the active learning strategies. Items include:

a. Did you participate in game - show during the lectures?   Yes   No
   If yes, how many times? _____
   If no, why not? _____
b. Have you ever role played during the lectures?   Yes   No
   If yes how many times? _____
   If no, why not? _____

Section C consists of seven subscales with 42 items designed to measure the different active learning strategies (video, discussion, game show, clarification pauses, role play, one-minute-paper, group work) for promoting learning. There are six items in each of the subscale which were generated during the review of literature and from classroom experiences. Each subscale consists of three positively and three negatively worded items thus:

Video clips simulations

    (i)   Videos create mental images of the topics taught
    (ii) Watching videos during lectures is a waste of time

Discussions

    (i)   Discussion helps me to clarify points discussed during the lecture
    (ii) Discussion disrupts the flow of the lecture

Group Work

    (i)   Group work enhances my academic achievement
    (ii) Group work limits my intellectual capability

Role Play

    (i)   Role play creates excitement during lectures
    (ii) Role play is just a form of entertainment

Game Show

    (i)   Game show makes the lecture lively and interesting
    (ii) No need for the game, too childlike

Five-minute-paper

    (i)   Five minute paper helps to monitor students' understanding of the topic discussed
    (ii) Five minute paper is like a test

Clarification Pauses

    (i)   Clarification pauses help in clarifying points that are not clear
    (ii) Clarification pauses distort free flow of lectures

All the items were measured by a modified 4-point Likert scale response anchors ranging from strongly agree to strongly disagree with corresponding scores of 4, 3, 2, and 1. All the negative items were reversed during analysis. The items were generated during the review of literature and the initial versions were given to experts for suggestions and comments before coming up with the final version. The reliability of the instrument was ascertained by carrying out pilot studies among the students taking PSYC 2009. The instrument yielded the following Cronbach's Alpha reliability coefficients as shown in table 1:

Table 1. *Alpha Reliability Coefficients of Active Learning Strategies with 7 subscales (N = 40)*

Sub Scale	Alpha Coefficients	No of Items
Video clips simulations	0.84	6
Discussions	0.83	6
Group Work	0.75	6

Role Play	0.77	6
Game Show	0.85	6
Five Minute Paper	0.70	6
Clarification Pauses	0.81	6

These alpha reliability coefficients of the 7 subscales ranging from 0.70 to 0.85 indicated that the instrument has a high internal consistency and the validity was ascertained by the choice of items which were subjected to internal consistency analysis (Cronbach's Alpha), which is an index of item homogeneity and an indication of construct validity.

Student Learning Outcome Assessment Scale is the second instrument used to assess SLOs specified for three lectures in the Learning Theory and Practice Course via a 12 "short answer" items covering Gestalt Psychology, Learning Styles and Pavlov's Classical Conditioning Theory. It is important to define outcomes as clearly and explicitly as possible. The more explicit and overt the statements of learning outcomes are, the easier it will be to measure learning, (Institutional Assessment and Studies (IAS)**.** Thus, the learning outcomes were specific and were stated in measurable terms. To ensure its content and construct validity, the initial versions were given to experts for suggestions and comments before coming up with the final versions as suggested by Student Learning & Outcomes Assessment; University of Rhode Island that it helps to work with one or two people to draft SLOs--incorporating different perspectives; review or edit statements with others in your department and consult resources outside the department.

Thus the final versions of the three SLOs were:

(i)   By the end of the lecture, the students should be able to distinguish the six laws of Gestalt Psychologist that govern perception in five minutes without mixing them together.

(ii)   By the end of the lecture, the students should be able to describe concisely the three different learning styles as propounded by Wooldridge in two minutes without mixing them together

(iii) By the end of the lecture, the students should have the ability to identify and illustrate the three steps in Pavlov's classical conditioning theory in six minutes without muddling them up.

Thus, the Student Learning Outcomes Assessment Scale consists of 12 "short answer" items which were generated from the five- minute, two minute and six minute papers scored out of 30 which assessed the three specified learning outcomes. The initial versions were given to experts for suggestions and comments before coming up with the final versions. Thus, the validity of Student Learning Outcome Scale was ascertained by the choice of items which were subjected to internal consistency analysis and the coefficient alpha of 0.72 was obtained which is an index of item homogeneity and an indication of construct validity.

Procedure

Informed consent of the students to participate in the survey was obtained during the lectures prior to the administration of the questionnaires. The students were briefed of the purpose of the research and that they were free not to participate in the study if they so wished. Thus out of 189 students, only 158 gave their consent to participate and they responded to the items on both instruments. The remaining 31 students were not included in the research because of their irregularity at lectures. The Active Learning Strategies Scale was administered after eight weeks of exposing the students to the different strategies and the administration lasted for approximately 20 minutes, while the Student Learning Outcomes Scale was administered at the end of three different

lectures. The students were surveyed in their lecture halls with the help of three research assistants who had been groomed in the administration of the instruments. The researchers took time to brief the participants on the process of answering the items in the questionnaires and they were told that it was not for examination purpose but for research and they were also told that the information would remain confidential. To buttress this, the students were told not to write their names or identification numbers on the instruments but they were given codes so as to be able to match their responses to the three versions of learning outcomes assessment scale for collation during analysis. The researchers ensured that all the items in the instruments were properly filled and the questionnaires were collected immediately the participants had finished.

Data Analysis

The data collected were entered into SPSS version 16, Descriptive Statistics, Pearson Product Moment Correlation Coefficient, and Regression Analysis were conducted to analyse the data. All the negative items were reversed during the analysis.

Results

Research Question 1: Were student learning outcomes achieved satisfactorily?

In order to find out whether the objectives of the lectures were actually achieved at the end of each of the three lectures, the learning outcomes were measured, collated and marked out of 30.

Table 2: *Achievement of Student Learning Outcomes*

Student Learning Outcome	N	Minimum	Maximum	Mean	Std. Deviation
	158	13.00	29.00	20.15	3.28

The result on table 2 indicated that the objectives of the lectures were achieved among this sample with the mean score 20.15; maximum score 29.00 minimum score13.00; 4% scored below average (13 -14 marks), 3% scored average mark (15 marks) while 93 % scored above average(16 - 29 marks). Thus, the student learning outcomes specified for the three lectures were satisfactorily achieved.

Research Question 2: Were the students actively engaged during the PSYC 2009 lectures?

The students were asked to indicate whether they participated in the classroom activities when active learning strategies were incorporated.

Table 3: *Participation in Class Activities (n=158)*

C lass Activities/Learning Strategies	Yes (Frequency)	(%)	No (Frequency)	(%)
Participated in game show	147	93	11	7
Took part in discussions during lectures	151	96	7	4
Role played during lectures	134	85	24	15
Watched videos during lectures	154	98	4	2

|			
Took part in group presentations	157	99	1	1
Participated in 5 minute paper	138	87	20	13
Clarified points during lectures	132	84	26	16
Total	158	100	158	100

From the findings on table 3, it is evident that the students participated actively in the class activities. Almost all the students took part in the group presentations and majority of them were also involved in other activities.

Research Question 3: Which of the strategies best facilitated active learning among the students?

Table 4: Profile of students' ratings on strategy that best facilitated active learning.

S/N	Items	SD		D		A		SA	
		F	%	F	%	F	%	F	%
1	Group work facilitates active Leaning	2	1	24	15	82	52	50	32
2	Role Play promotes Student engagement during lectures	0	0	8	5	93	59	57	36
3	Five-minute-paper ensures students' participation in lectures	3	2	26	16	96	61	33	21
4	Videos promote active learning during lectures	0	0	4	2	80	51	74	47
5	Clarification pauses foster active listening during lectures	3	2	8	5	103	65	44	28
6	Game show enhances active learning in this course	1	1	3	2	81	51	73	46
7	Discussion promotes active learning lectures	0	0	2	1	90	57	66	42

Figure 1: *Active Learning Strategy that Best Facilitates Active Learning*
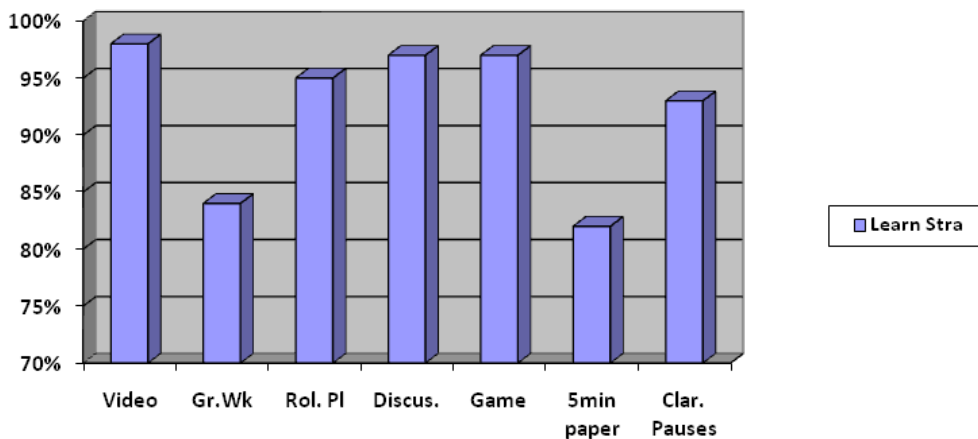
The results displayed on table 4 and figure 1 revealed that video clips simulations top the list with 98% of the students agreeing that it promotes active learning, while discussion and game show occupied the 2nd position with 97%, role play was fourth with 95%, clarification pauses was fifth 96%, group work was sixth 84% and lastly five minute paper with 82%. Nevertheless all the strategies seemed to promote active learning as revealed by the students' responses that they promote learning.

Research Question 4: Will there be significant relationships between the active learning strategies (video, discussion, game show, clarification pauses, role play, five-minute-paper, group work,) and the student learning outcomes?

Table 5: *Correlations between Active Learning Strategies and Student Learning Outcomes.*

Variables	1	2	3	4	5	6	7	8
1 Learning Outcomes	-							
2 Discussion	.339**	-						
3 Group Work	.182*	.319**	-					
4 Role - Play	.223**	.481**	.344**					
5 Video	.340**	.548**	.313**	.547**	-			
6 Game show	.236**	.486**	.386**	.675**	.597**	-		
7 Five Minute Paper	.238**	.294**	.152	.465**	.356**	.294**	-	
8 Clarification Pauses	.302**	.428**	.202*	.406**	.656**	.492**	.397**	-

The findings displayed on table 5 revealed the statistically significant positive correlations between students' learning outcomes and active learning strategies indicating that the strategies are important in achieving learning outcomes. The significant positive interrelationships among the learning strategies suggested that they are interwoven. Thus, as students watch the video clips, they discuss, ask and answer questions, make clarifications etc.

Research Question 5: Will the active learning strategies predict student learning outcomes?

Table 6: *Multiple Regression table showing active learning strategies as predictors of*
Student Learning Outcomes

Variables	B	SE (b)	β	t	Sig.(P)
Active Learning Strategies	9.53	.019	.373	5.02	.001
Rsq = 0.139; *Sig p< .001 $F(1,150) = 25.23$,*Sig p < .001					

Note*: SE (b) (unstandardised coefficients showing the predicted increase in the value of the criterion variable)*
β (the standardized beta coefficients, gives a measure of the contribution of each variable to the model)

t (gives a rough indication of the impact of each predictor variable, the bigger the t value, the larger the impact of the predictor variable on the criterion variable)
R-sq the square of the measure of correlation and an indication that the model is fit for future prediction of learning outcomes among the university students.

The result of the regression analysis on table 6 revealed that the active learning strategies significantly accounted for *14% (R-square =0.139); (F (1,156) = 25.23, p < .05)* of the variance in student learning outcomes. Therefore, active learning strategies significantly predicted student learning outcomes among some UWI psychology undergraduate students in Barbados.

Discussions

This study investigated the relationships between active learning strategies and student learning outcomes. The first major finding was that the students were actively involved in the PSYC 2009 lectures. These psychology students were always engaged during the lectures, got involved in discussions, asked and answered questions, role - played, engaged in video clips simulations, clarifications, 5 minute paper, group work and game shows and additionally thought about the things they did. Thus, they understood the tenets of the various learning theories discussed during the lectures and therefore developed deep understanding of the important ideas learnt. It is not surprising therefore to see that the majority of the students reported that they were actively involved in the lectures when the strategies were incorporated and the PowerPoint presentation was used as the tool. These findings corroborated the earlier reports by Bonwell and Eison, (1992) and that of Mantyla, (1999) that active learning strategies facilitates greater emphasis on students' exploration of their own meaning, attitudes and values and therefore developed deep understanding of the important ideas learnt as reported by Wiggins and McTighe,(1998). This finding also amplified Bonwell and Eison (1991) assertion that from a preference perspective, students generally prefer strategies promoting active learning to traditional lectures and that many strategies promoting active learning are comparable to lectures in promoting the mastery of the content but superior to lectures in promoting the development of students' skills in thinking and writing (Harasim, et al, 1997).

The second major outcome of this study was that video clips simulations emerged as the best active learning strategy. Thus, the inclusion of this multiple media fosters the development of an emotional connection and enhanced the satisfaction of the participants with the learning activity. Thus, it may not be surprising that the sample of this study reported that the video simulations best facilitated active learning the purpose of which was to provide them with practical experiences which were applicable to real world situation. This is in consonance with Mantyla, (1999) assertion that a good active learning strategy should have a clear purpose or objective and have a feedback mechanism. Suffice to say therefore that the exposure of the participants to video clips simulation afforded them the opportunity to imitate and recreate the concepts thoughts which aided their learning. This lends credence to Chickering and Gamson (1987) suggestion that for students to be actively engaged, they must do more than just listen: they must read, write, discuss, or be engaged in problem solving, higher-order thinking tasks as analysis, synthesis, and evaluation. The sample of this study was able to interact with the learning materials which also cater for the different learning styles; auditory, visual as well as kinaesthetic.

Interestingly, the result on table 2 revealed that almost all the students participated in group work yet it occupied the sixth position in the student ratings in table 3. A probable reason for this may be due to the fact that the sample of this study participated in group work for their

presentations for grading but they would have preferred to work individually because of the uncooperative attitudes of their group members which actually affected their ratings in table 3.

Another major finding of this study was that the active learning strategies significantly correlated with SLOs. These significant positive correlations between active learning strategies and SLOs indicated that effective learning depends on the students' active involvement in the lecture. In the present study, the SLOs specified in measurable terms what students will know in PSYC 2009 course, be able to do or be able to demonstrate at the end of the lecture as earlier suggested by Kennedy (2006). Thus, at the end of each of the three lectures these learning outcomes were measured, collated and marked out of 30 to find out whether the objectives of the lectures had actually been achieved. The result on table 2 indicated that the objectives of the lectures were achieved satisfactorily among this sample. This is expected because the learning strategies were utilised throughout the lecture periods and the sample of this study were actively involved in lectures from the beginning to the end   therefore they were able to acquire the necessary knowledge and skills through discussions, group work, role plays, video - clip simulations, etc. These findings are quite consistent with the extant of literature in this field that the activities must be designed around important learning outcomes and promote thoughtful engagement on the part of the student (Wiggins & McTighe 1998); should encourage students to think about what they are learning and that adopting instructional practices that engage students in the learning process is the defining feature of active learning (Ruhl, Hughes, and Schloss, 1987).

The final outcome of this study was that the active learning strategies predicted the SLOs among this sample, they significantly accounted for *14% (R-square = 0.139); (F (1,156) = 25.23, p < .05)* of the variance in SLOs. The reason being that active learning strategies were achievement-oriented when compared with traditional lecture method, therefore the active learning strategies are important in achieving the SLOs. These findings also corroborated the earlier findings by Astin (1995)   that active learning accommodates a variety of   learning styles, promotes student achievement, enhances learner motivation, changes student attitudes, and basically, causes learners to learn more; that   many strategies promoting active learning are comparable to lectures in promoting the mastery of content but superior to lectures in promoting the development of students' skills in thinking and writing (Harasim, et al, 1997) and that cooperation promotes higher quality individual problem solving than does competition, individuals in cooperative groups produced better solutions to problems than individuals working in competitive environments (Qin, Johnson, and Johnson 1995).

Conclusion

The results reported in this study underscore the need for faculty, secondary school teachers and all the people interested in solving the problem of underachievement and promoting learning in institutions of learning to incorporate active learning strategies into their classroom practices and to use the seven active learning strategies (video clips simulation, discussion, game show, role – play, group work, clarification pauses, one/five minute paper) as   predictor   set in studying cognitive outcomes in their classroom practices for achievable learning outcomes. The findings of this study also provided an interesting theoretical link with the prior investigators and learning theorists like Skinner who demonstrated in his operant conditioning theory that the learner is expected to be active, functional and also operate on his environment for effective learning to take place. The need to make learners to be active cannot be overemphasised in the changing environment specifically because the emergence of new technologies is changing the society, consequently, the educational systems are facing significant pressure to change the way we educate our children too in order to

adequately prepare them to live, learn, and work in a global, digital age. Education is all about change and creativity, therefore there should be creative models for engagement in learning in a shifting educational landscape of the 21st century.

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