Autonomous Learning Strategy and Academic Performance of Senior Secondary Two Students in Agricultural Science in Uyo Local Government Area, Nigeria

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ABSTRACT
The study examined the effect of autonomous learning strategy on the academic performance of Agricultural science students in Uyo Local Government Area of Akwa Ibom State-Nigeria. Three research questions and three null hypotheses were formulated to guide the study. The study was guided by Bruner (1966) Constructivist theory and adopted the pre-test-post-test non randomised quasi experimental design. A sample of 220 senior secondary two students offering Agricultural science during the 2017/2018 academic session from two schools in two intact classes were purposively sampled from a population of 2,492 students in 13 public secondary schools in Uyo Local Government Area of Akwa Ibom State. The subjects in their intact classes were randomly assigned into experimental and control groups. The experimental group was treated with Autonomous Learning Strategy while the control group was taught using expository method. The two groups were pre-tested before treatment and post-tested after the treatment. Data were collected using Agricultural Science Performance Test (AGSPT). The instrument was validated by experts in the faculty of Education, University of Uyo. The instrument had reliability co-efficient of 0.81. The data from the respondents were analysed using descriptive statistics of Mean and Standard Deviation to answer the research questions, ANCOVA was used to test hypothesis one while independent t-test was used in testing hypotheses two and three. The results of the analysis showed a significant difference in performance of students using Autonomous learning strategy and those taught with expository method. There was also a significant difference between male and female students using autonomous learning strategy and also a significant difference in the performance of urban and rural agricultural science students using autonomous learning strategy for instruction. Some recommendations were made to enhance the use of autonomous learning that schools should have well equipped libraries and that government should provide technological devices for students to access learning materials when need arises among other recommendations.

Keywords: Autonomous learning, Academic performance, Agricultural science, senior secondary two students

INTRODUCTION
Autonomous learning has been an important focus of educational practices and research for more than three decades. The word autonomy is derived from a Greek word “auto” meaning “self” and “nomos”
meaning “rule or law”. Autonomous refers to a state where one gives oneself his/her own law (Voltz, 2008). Crome, Farrar and O’Connor (2009) defined autonomous learning as a habit of mind, expressed through a range of activities and skills acquired and developed through practice. From this perspective, autonomous learning becomes the habitual exercise of skills developed and perfected through continuous practice, which comes to be second nature. Once students own this kind of thinking, they will have the ability to learn by themselves. Students will become more motivated to think and work independently. Moreover, they will know what they need and will engender their independent thoughts as well, as focus on one’s own learning.

Benson (2009) and Dang (2010), say autonomous learning also known as learner autonomy was originally defined as an ability to take charge of one’s own learning. Later “ability” and “take charge of” was replaced by capacity and take responsibility for respectively. These words replacements seem to be matters of linguistics and semantic aspects only as the construct remains unchanged. The notion of learner autonomy has been modified and transformed during its development and it has been advocated to be a fundamental goal of education for several decades (Benson, 2001).

Dang (2010), perceived and translated learner autonomy into practice in several ways depending on particular political, social, and contemporary situations. Generally considered as an ability of knowing how to learn, control one’s learning activities, detachment or ability to learn without the involvement of a teacher and capacity to make and carry out choices or perform rational decision-making processes over learning activities. More specifically, it is viewed as an ability to give responses beyond usual instructions (Benson, 2007). Though different aspects of this ability can be the focus in each definition, they always maintain the central core of this construct which is the ability to understand and manage learning processes responsibly and effectively.

Learner autonomy has been claimed to be an ultimate goal of education in general for a long time (Benson, 2001, 2009; Dang, 2010; McClure, 2001). It is often identified to signify students’ active participation in learning activities (Benson, 2007). This view is supported by a number of studies in different contexts (Aoki, 2001; Christopher, 2006; Hart, 2002; and Smith, 2001). It has also been reported to result in better productivity, higher level of motivation, higher rate of knowledge retention and less frustration (Rivers, 2001). This indicates that learner autonomy directly contributes to both processes and outcomes of learning activities. In addition, it indirectly accelerates the level of other learning variables.

Given the significantly important role of learner autonomy in education, it has been perceived from four different perspectives, namely, psychological, technical, socio-cultural and political-critical (Benson, 2006; Healy, 2007; Oxford, 2003; Sinclair, 2000). While psychological perspective values the personal attributes of the learners; the technical perspectives values attributes in the learning environment; the socio-cultural perspectives emphasizes the interactions between learners and their environment and the political-critical perspectives focuses on learners access, control, power and ideology in their community. According to the psychological perspective, learner autonomy is regarded as a mental and emotional attribute that enables an individual to exercise his/her learning activities effectively (Oxford, 2003). Autonomous learners can then be seen as those who believe that they are capable of organizing and performing a course of action required for the purpose of achieving success.

The promotion of learner autonomy corresponds with the shift towards a student-centered approach in modern education (Geng, 2010 and Weden, 2002). Over the past two decades, student centeredness has been popularly claimed and identified to be an effective learning trend in both Western and non-Western contexts. More power is removed from the teachers’ domain of authoritative knowledge (Rivers, 2011). Courses are designed to serve particular groups of learners instead of attempting to make one for all. Therefore, students are given more opportunities, responsibilities and power to deal with their learning activities. To effectively benefit from this process, students need to be capable of taking control over all the activities provided to them during each learning process. If they are appropriately supported to develop this capacity defined as learner autonomy, they can take better advantage of the benefits which
the modern approach offers. However, if students are not provided with this support, this may in turn lead to a failure of the whole approach. According to Fazey and Fazey (2001), the capacity to think, learn and behave automatically is often claimed as an outcome for students in secondary schools. Fry, Ketteridge and Marshall (2003) stipulated that the autonomy of students learning commonly refers to student taking more responsibility for and control of themselves and their learning. According to the author, if the learner takes absolute responsibility for learning and the teacher facilitates and not control, then, autonomous learning becomes effective. The teachers’ role is to guide and help students to learn by themselves which eventually leads to a more effective and deeper understanding of learning and retention.

Autonomous learners have insights into their own learning styles and strategies, they take an active approach to the learning task at hand, they are willing to take risks i.e. they are good guessers and they attend to form as well as to content in that they place importance on accuracy as well as appropriateness. The ultimate aim of teaching and learning is to enhance students’ performance and achievement of expected and immediate results especially in knowledge and skill acquisition, development of acceptable norms, belief system, attitudes and interest etc. as well as passing internal and external examinations. To achieve this, different teaching strategies should be adopted to suit the learning styles of the learners.

Okoeye (2009) studied the effect of gender, socio-economic status and school location on students’ performance in integrated science. The findings showed a significant interaction between gender and socio-economic status on student’s achievement in integrated science. Cooper (2012) posited that there is gender differences in performance as far as creativity are concerned. Angrist (2009) reported that boys perform better in mathematics and all science related subjects than their female counterparts. The school environment is a major determinant of scholastic performance because of the existence of a significant interplay between the learning process and the learning environment in which the child finds himself. A stimulating school environment arouses the students to learn especially in the area of science. Okoye (2009), Owoeye and Yara (2011) reported a significant difference between students’ academic performance of rural and urban secondary schools in school certificate examinations and that students in urban areas had better academic achievement than their rural counterpart. Unfortunately, the researchers observe an abysmal and dwindling level of performance of students in Agricultural science as there has been a steady decline in public examinations such as the West African Examination Council (WASC) and National Examination Council (NECO). For instance, the examiner’s report showed that between 2015 and 2017 the failure rates were 53%, 55% and 59% respectively Akwa Ibom Ministry of Education (2018). A cursory survey of the pedagogical strategies adopted by most teachers of Agricultural science seem to emphasize lecture method where teachers play active role while learners remain passive recipients during the learning process. This situation may be responsible for the poor performance of students observed in external examinations. The aim of this study therefore is to examine if the utilization of autonomous learning strategy could change the situation and promote the learning of Agricultural science by students in Uyo Local Government Area.

METHODOLOGY
The pre-test-post-test non randomized quasi experimental design was adopted to guide the study. This design establishes the cause and effect of a phenomenon. The purpose of this study was to examine the effect of autonomous learning strategy on academic performance of senior secondary two Agricultural science students in Uyo Local Government Area. Three research questions and three null hypotheses were postulated to guide the study. This study was guided by Bruner (1966) constructivist theory. The theory postulates that learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge. The study was carried out in Uyo Local Government Area of Akwa Ibom State-Nigeria. The local government has eight public secondary schools with 2,492 senior secondary two students offering Agricultural science during 2017/2018 academic school year. A sample size of 220 students was purposefully selected in addition to these criteria:
a) Schools that have at least two graduate (B.Ed.) Agricultural science teachers with teaching qualification and at least three years teaching experience.
b) Schools must be coeducational
c) Schools that have not yet taught farm machinery.
d) Schools with well-equipped library with at least three senior secondary school agricultural science textbooks.

Four schools met the above requirements, one urban and one rural school were randomly selected for the study using simple random sampling technique by balloting. One hundred and ten students each from the urban and rural schools in their intact classes of 53 and 57 students were used for experimental and control groups respectively. There were 112 females and 108 males. An instrument titled Agricultural Science Performance Test (AGSPT) with 40 multiple choice options of (A-D) with only one correct option was systematically designed using the ASSURE model as postulated by Heinrich, Molenda and Russel (1982). Every instructional system component was identified, analysed and matched with the content, method of instruction and level of the learners. The instrument was validated by experts and was used to illicit responses from the two groups. Their subject teachers were used as research assistants for two days on how to treat the experimental and control groups. The experimental groups were given the topic “Farm Machinery and Implements” together with the objectives of the lesson for them to go and read for one week while the control groups were taught the same topic with the objectives using the traditional method for the same period of time and the exercise lasted for two weeks. Before the treatment, all the groups were pre-tested and post-tested with AGSPT after the treatment; all their scripts were retrieved for marking. Their scores were used for analysis. In order to establish the reliability estimates, the instrument was administered to 30 respondents who were not part of the main study but equivalent in all aspects to students in the main study. The scores obtained from these respondents using Split-half reliability strategy were coded and treated to Pearson Product Moment Correlation (PPMC) statistics. The r-value was converted using Spearman Brown Prophesy Formula to obtain a reliability coefficient of 0.81. The instrument was therefore regarded as being reliable for the study. Descriptive statistics of mean and standard deviation were used in answering all research questions while Analysis of Covariance (ANCOVA) was used in testing hypothesis 1 and independent t-test was used in testing hypotheses 2 and 3. All the null hypotheses were tested at 0.05 level of significance.

RESULTS

Research Question 1: What is the difference in the performance of SSII Agricultural science students using autonomous learning strategy and those taught with expository method?

Table 1: Mean and Standard Deviation of Pre-test and Post-test Scores of SS II Students Performance in Agricultural Science using autonomous strategy and those taught with expository method

<table>
<thead>
<tr>
<th>Treatment Groups</th>
<th>n</th>
<th>Pre-test Mean</th>
<th>SD</th>
<th>Post-test Mean</th>
<th>SD</th>
<th>Mean Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous strategy (Experimental)</td>
<td>110</td>
<td>29.45</td>
<td>4.56</td>
<td>76.18</td>
<td>5.29</td>
<td>46.73</td>
</tr>
<tr>
<td>Expository (Control)</td>
<td>110</td>
<td>28.29</td>
<td>5.34</td>
<td>69.85</td>
<td>7.34</td>
<td>41.56</td>
</tr>
<tr>
<td>n=220</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1 explains the mean gain of students using autonomous strategy and those taught with expository method. The mean gain of 46.73 of experimental group is higher than that of the expository group with the mean gain of 41.56. This shows that students that used the autonomous strategy in Agricultural science performed better than those taught with expository strategy.

**Research Question 2:** What is the difference in the performance of SSII Agricultural science students using autonomous learning strategy based on gender?

Table 2: Mean and Standard Deviation of Students Performance in Agricultural Science using autonomous strategy based on gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>X</th>
<th>SD</th>
<th>Mean diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>54</td>
<td>75.50</td>
<td>5.33</td>
<td>5.89</td>
</tr>
<tr>
<td>Female</td>
<td>56</td>
<td>69.61</td>
<td>8.27</td>
<td></td>
</tr>
</tbody>
</table>

n=110

Table 2 explains male and female students mean scores using autonomous learning strategy in agricultural science. Male students’ with the mean score of 75.50 is seen to perform better than their female counterparts with the mean score of 69.61. Hence, there is mean difference of 5.89 in the performance of Agricultural science male and female students exposed to autonomous learning strategy.

**Research Question 3:** What is the difference in the performance of SSII Agricultural science students using autonomous learning strategy based on school location?

Table 3: Mean and Standard Deviation of Students Performance in Agricultural Science using autonomous strategy based on school location. (n=110)

<table>
<thead>
<tr>
<th>School location</th>
<th>n</th>
<th>X</th>
<th>SD</th>
<th>Mean difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>57</td>
<td>75.27</td>
<td>5.55</td>
<td>2.82</td>
</tr>
<tr>
<td>Rural</td>
<td>53</td>
<td>72.45</td>
<td>8.64</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 explains urban and rural students mean scores using autonomous learning strategy in Agricultural Science. Urban students with the mean score of 75.27 performed better than their rural counterparts with the mean score of 72.45. Hence, there is mean difference of 2.82 in the performance of Agricultural science students in urban and rural schools exposed to autonomous learning strategy.
Testing of Hypotheses

**Hypothesis 1:** There is no significant difference in the performance of SSII Agricultural science students using autonomous learning strategy and those taught with expository method.

**Table 4:** ANCOVA analysis of the difference in academic performance of students using autonomous strategy and those taught with expository method.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-cal.</th>
<th>F-crit.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>2214.226*</td>
<td>2</td>
<td>1107.113</td>
<td>26.958</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>35096.068</td>
<td>1</td>
<td>35096.068</td>
<td>854.590</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>12.563</td>
<td>1</td>
<td>12.563</td>
<td>.306</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effect*</td>
<td>2213.956</td>
<td>1</td>
<td>2213.956</td>
<td>53.91*</td>
<td>3.07</td>
<td>*</td>
</tr>
<tr>
<td>Error</td>
<td>8911.701</td>
<td>217</td>
<td>41.068</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1184090.000</td>
<td>220</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>11125.927</td>
<td>219</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n=220,  *Significant at .05 level

The analysis as shown on table 4 reveals a significant difference in academic performance of agricultural science students using autonomous strategy and those taught with expository method. The F-value of 53.91 is higher than the critical F-value of 3.07 at 2, 219 degree of freedom at 0.05 level of significance. With this result the null hypothesis is therefore rejected. This implies that there is a significant difference in the academic performance of agricultural science students using autonomous strategy and those taught using expository method.

**Hypothesis 2:** There is no significant difference in the performance of SSII Agricultural science students using autonomous learning strategy based on gender.

**Table 5:** t-test analysis of male and female students’ when exposed to autonomous strategy in agricultural science.

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>( \bar{X} )</th>
<th>SD</th>
<th>df</th>
<th>t-cal</th>
<th>t-crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>54</td>
<td>75.50</td>
<td>5.33</td>
<td>108</td>
<td>4.42*</td>
<td>1.96</td>
</tr>
<tr>
<td>Female</td>
<td>56</td>
<td>69.61</td>
<td>8.27</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n=110

Results in table 5 revealed that the calculated t-value of 4.42 is greater than the critical t-value of 1.96 at 0.05 level of significance and degree of freedom 108. The null hypothesis is rejected. This means that there is a significant difference in the academic performance of male and female SSII agricultural science students using autonomous strategy.

**Hypothesis 3:** There is no significant difference in the performance of SSII Agricultural science students using autonomous learning strategy based on school location.

**Table 6:** t-test analysis of urban and rural students’ when exposed to autonomous strategy in agricultural science.

<table>
<thead>
<tr>
<th>School Location</th>
<th>n</th>
<th>( \bar{X} )</th>
<th>SD</th>
<th>df</th>
<th>t-cal</th>
<th>t-crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>55</td>
<td>75.27</td>
<td>5.55</td>
<td>108</td>
<td>2.04*</td>
<td>1.96</td>
</tr>
<tr>
<td>Rural</td>
<td>55</td>
<td>72.45</td>
<td>8.64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n=110
Data in table 6 revealed that the calculated t-value of 2.04 is greater than the critical t-value of 1.96 at 0.05 level of significance and degree of freedom 108. The null hypothesis is rejected. This implied that there is a significant difference in the academic performance of urban and rural SSII agricultural science students using autonomous strategy.

**DISCUSSION OF FINDINGS**

The result of the analysis on Table 4 presents computed F-value of 53.91. This value was compared with the critical value of 3.07 at 0.05 level of significant with the degree of freedom 2, 219. The computed F-value is greater than the critical value, thus the null hypothesis is rejected. This implies that there is significant difference in the academic performance of students in agricultural science using autonomous strategy and expository method. The reason for this result could be that the autonomous learners took more and control of them and therefore had responsibility for their learning. This finding is in agreement with Rivers (2001) who found out that autonomous learning result in better productivity, higher level of motivation, higher rate of knowledge, retention and less frustration.

The result of the analysis on table 5 presents the computed t-value of 4.42 which is greater than the critical value of 1.96 at 0.05 level of significant with the degree of freedom 108. Thus the null hypothesis is rejected, meaning there is a significant difference in the academic performance of male and female SSII students in agricultural science using autonomous strategy. This therefore indicates that autonomous learning strategy has effect on the students’ based on gender. This finding is supported by the finding of Cooper (2012) who posited that there is gender differences in performance as far as creativity are concerned. The finding is also in line with Angrist (2009) who reported that boys perform better in mathematics and all science related subjects than their female counterparts.

The result of the analysis on table 6 presents the t-value of 2.04 which is greater than the critical value of 1.96 at 0.05 level of significant and degree of freedom 108. This means that there is a significant difference in the academic performance of urban and rural SSII students in agricultural science using autonomous learning strategy. The reason for this result is that a stimulating school environment arouses the students to learn. Urban schools have well equipped libraries that enable students to study effectively. This result is supported by the findings of Okeye (2009), Owoeye and Yara (2007) who reported a significant difference between students’ academic performance in urban and rural areas and that students’ in urban areas had better academic achievements than their rural counterparts.

**CONCLUSION**

This study concludes that autonomous learning strategy is effective among secondary school students in agricultural science. It gives learners the ability to take charge of their own learning in that they set goals and determine their own learning styles. Autonomous learning adds value to the teaching-learning process because it promotes self-learning as learners were opportune to investigate and discover for themselves hidden facts thereby promoting the performance of students in agricultural science. It was observed that students carried out research to discover certain concepts on their own in agricultural science.

**RECOMMENDATIONS**

Based on the findings, the following recommendations are offered:

- Government should provide technological devices for students in secondary schools to enable them gain access to learning materials that encourage independent learning.
- Teachers should be trained on how to use the emerging technologies in the teaching-learning process provided for their usage.
- Schools should have well equipped libraries with current textbooks and journals that will enable students to access information when need arises.
- Teachers should adopt different teaching methods to suit the learning styles of students for effective learning to take place.
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