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EFFECT OF STUDENT-INTERACTION PATTERNS ON STUDENTS' ACADEMIC PERFORMANCE IN BASIC TECHNOLOGY IN EDO STATE SECONDARY SCHOOLS

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ABSTRACT

This study investigated the effect of student-interaction patterns on students academic performance in Basic Technology in Edo State junior secondary schools using non-equivalent control group quasi experimental research design. Two research questions and two null hypotheses guided the study. The study was conducted in Edo State. A sample size of 138 vocational II students was drawn using purposive sampling technique and used for the study. Three groups were used for this study; they are student-student interaction, student-teachers interaction and student material interaction patterns. The instrument for data collection was Basic Technology Achievement Test (BTAT). The research questions were answered using Mean and standard deviation while Analysis of Covariance (ANOVA) was used to test the hypotheses at .05 level of significance. Findings from the study revealed that there was significant mean effect of instructional strategies on students mean performance score in Basic Technology; there was no significant mean effect of gender on students' Mean performance score in Basic Technology. In line with the findings of the study, the educational implication of the findings were highlighted and it was recommended among others that Basic Technology teachers should be trained on how best to involve students in student-student interaction patterns during instructions to facilitate students' academic performance in the subject. This could be achieved through in-service training such as conferences, seminars and workshops for technical teachers.

Keywords: Academic performance, technology, student.

INTRODUCTION

Basic Technology is the only core prevocational subjects at the junior secondary school level in Nigeria which seeks to expose students to the world of work through exploration. It is a subject that is aimed at catching the young learner to love and learn technology and create change in the learners' environment. This subject is of contemporary and national concerns to make its curriculum more relevant, practical, interest generating to the young learners and in line with global best practices. Basic technology is a multi-disciplinary subject that provides a broad field of knowledge for a linkage for metalwork, woodwork, applied electricity, basic electronics, technical drawing, automobile, air flow, water flow, physics, chemistry, food preservation, ceramics, plastics and building. It exposes students to the basic skills of scientific and technological world and provides the students with necessary foundation on which to build subsequent technological learning.

Basic Technology being a prevocational subject that seeks to expose students to technology is a veritable tool for educational and technological advancement in Nigeria. It is a functional education which is geared towards general education purposes. Through the exposure of students to prevocational education, they develop a broader understanding of industrial and business processes, and are also able to expose their individual interest and aptitudes. Students can also develop desirable traits and attitudes such as pride in productive work, respect for authority and dignity for labour. These are attributes that can endear interest in technology and self-reliance. Its objectives include: (i) to provide prevocational orientation for further training in technology; (ii) to provide basic technological literacy for everyday living; and (iii) to stimulate creativity (Federal Ministry of Science & Technology, 2007).

Basic Technology formerly known as introductory technology is the first form of technology a child comes across at the secondary school level; hence Basic Technology prepares students at the junior secondary school level for the study of core technology subjects/courses at the senior secondary school level and beyond. This implies that for students to be able to study technological based subjects or programmes successfully, such a student has to be well grounded in Basic Technology at the junior secondary school level. In view of this, Basic Technology is given great emphasis in the junior secondary school curriculum. It involves helping learners develop basic scientific and technological ideas and understanding, which will enable them explore and investigate their world. For basic technology to be taught effectively to students at the junior secondary school level, the teachers must employ adequate instructional strategies. Instructional strategies are styles used by teachers to ensure that lessons are properly delivered to learners. An instructional strategy is a reliable method teachers use to bring about learning and enhancing students' achievement. Achievement is a representation of what a person has successfully acquired. Academic achievement is the accomplishment of academic goals in the school. Achievement is what a learner gained after passing through a training programme or after successful performance of a task. Achievement is something that somebody succeeds in doing usually with effort

(Anikweze, 2010). It refers to the educational outcomes of students, stating how well or poor a student performed as regards to the stated educational goals or objectives. In the context of this study, achievement is a measure of the level of knowledge of the subject matter possessed by junior secondary school students in basic technology.
In basic technology, achievement is when students pass internal and external examinations and use their performance in the school to develop their interest in studying science and technology based programmes in senior secondary schools later in higher institutions. But observation by the researcher shows that students get low grades in basic technology in examinations. Example National Examination Council (NECO) (2017) noted that the performance of students who offered basic technology is below expectation as only 27% got credit level and above. This poor academic achievement of students have been attributed to a lot of factors such as: poor teaching method, students' negative attitude, dearth in instructional materials for teaching the subject, lack of workshop and laboratory materials, gender stereotype and lack of proper interaction in the, dearth in instructional materials for teaching the subject, lack of workshop and laboratory materials, gender stereotype and lack of proper interaction in the class (Isiugo-Abanho, Long John & Ibiene, 2010; Oviawe, Ezeji & Uwameiye, 2015). The teacher-centred technique which still upholds in the junior secondary school today make teaching and learning of Basic Technology clumsy, uninteresting and ineffective (Oviawe, Ezeji & Uwameiye, 2016). It stresses more on the transmission of knowledgein a manner that emphasizes memorization, mastery of content with less emphasis on the development of skills and nurturing of inquiry attitude and social interaction among students. It encourages unidirectional flow of information in teaching/learning process and makes students passive and unable to construct meaningful knowledge needed for lifelong learning and enhancing students' academic achievement.

The Federal Ministry of Education (2010) emphasized and recommended student-centred pedagogical methods that can assist in achieving national educational goals which include among others: the acquisition of appropriate skills, mental, physical and social abilities and competence that will equip an individual to live in and contribute to the development of the society. To realize the above stated objectives in Nigeria, there is need to identify effective student-centred instructional strategies for teaching in schools. To this end, Borich (2008) asserted that an effective teaching method should be one that promotes understanding by helping learners understand ideas and find productive path to knowledge. The persistent search for such effective instructional methods culminated to the suggestions by many researchers (Oviawe, Ezeji & Uwameiye, 2015, 2016) for the use of innovative instructional methods. Hence, this study sought to determine the effect of student interaction pattern on students' academic performance in Basic Technology.

Interaction is a process that involves people working together and having an influence on each other. This is seen in the way people relate with each other at home, in school, within the society and among peers. In particular, the relationship between students and their teachers is an essential part of teaching and learning process and it is expected to have a great effect on their lives. Flander (1970) developed an instrument known as

Flanders Interaction Analysis (FIA) designed to categorize the types and quantity of verbal interaction in the classroom and to plot the information on a matrix so that it could be analyzed and interpreted. The finding gave a picture as to who was talking in the classroom, how much and kind of talking that took place. This system comprises of 10 categories, viz: accepting feelings, praising or encouraging, using ideas of student, asking questions, lecturing, giving directions, criticizing or justifying student talk-response, student talk-initiation and silence or confusion. Therefore, the way students learn any subject or concept will depend on the teachers' pattern of classroom interaction. Students' interaction pattern is an instructional strategy that simultaneously addresses academic and social skill learning of students (Kalu, 2009). It helps students' to identify their own learning methods, guides the students to communicate with their peers easily and give them an exposure to the verse body of knowledge (Anaekwe, 1996). Students interaction pattern aims at meaningful communication among the students in their target topic, helps at probing into the learner's prior learning ability and the learner's way of conceptualizing facts and ideas and also helps the teacher to have a detailed study of the nature and the frequency of student's interaction inside the classroom (Lockwood, 2008). Lockwood outlined three types of students' interaction patterns as student-teacher interaction pattern, student-student interaction pattern and student-material interaction pattern.

Student-teacher interaction is the type of interaction that is seen in a conventional classroom. It is the relationships that exist between the teacher and the students in the classroom. It can be in form of direct instruction where the teacher gives the students factual information about the concepts taught without allowing the students to construct the information by themselves. Here, the teacher takes charge of the learning process while the students listen and ask questions. This is observed in most conventional classroom, where individual student's learning style is not put into consideration during instruction. Also students-material interaction is a learning situation where the students work independently with the learning materials and depend on his/her understanding of a read text, observations, experiments and demonstrations with the materials (individualized pattern). In these patterns, the students can cooperate with one another towards a mutual set goals (cooperate learning strategy), students can compete with one another towards a set goal (competitive learning strategy), students can work individually towards a set goal (individualized learning strategy). Students-student interaction involves a learning situation whereby the learners work together in a small group of about four or five students each to arrive at a certain learning objective. In this type of interaction, there is mutual cooperation among the students and each student's failure/success may affect other students. It is a one-on-one student interaction that allows students to understand what it means to work with a partner. Student-student interaction gives learners the opportunity of constructing knowledge by themselves, while the teacher serves as a facilitator by going round to monitor and if necessary directs learners attention to significant issues. Students must learn to rely on one another and must be able to evaluate their strengths and weaknesses irrespective of their gender as they try to complete a given task.

Gender is the socially culturally constructed characteristics and roles that are ascribed to males and females in any society. It is a major factor that influences career choice, subject interest and academic performance of students. Gender difference is a variable in the educational system that tends to affect students. Researchers have expressed diverse views about gender and academic performance especially in science and technology. While some opined that male students do better than female students (Okwo & Otunbar, 2007); others disagree with this view, arguing that performance is a factor dependent on several factors such as socio-economic background, teaching method, among others (Ogunleye & Babajide, 2011). Daniella, Fulcher and Weisgram (2014) posited that the more masculine characteristic that young adults had, the more they are attracted to masculine career such as engineering or mechanic and the less attracted to feminine career such as teacher or social worker. Based on the above, it becomes pertinent to find out the effect of these three types of students' interaction patterns on students' academic performance in Basic Technology.

METHOD OF THE STUDY

The study employed a pre-test, post-test non-equivalent control group quasi-experimental research design in examining the effects of student-teacher interaction pattern, students-student interaction pattern and student-material interaction pattern on Basic Technology Students performance in junior secondary schools in Edo State. The design was specific with non-equivalent control group and non-randomized groups. This is because intact classes consisting of male and female students were used for the different groups. The population for this study consisted of all the 6,230 JSS II students in all the public junior secondary schools in the three senatorial district of Edo State as at 2018/2019 academic session. Purposively sampling technique was adopted in selecting one junior secondary school each from each of the three senatorial districts of Edo State that offer Basic Technology. In each of the schools, the JSS II Basic Technology intact classes were randomly assigned to control and experimental groups. The choice of purposive sampling technique is because of the need to pick a school each from each senatorial district. There are three experimental groups used for this study; namely: student-teacher interaction (experimental group 1), students-student interaction (experimental group 2) and student-material interaction (experimental group 3). The three experimental groups served as control to each other. Basic Technology teachers in the three intact classes drawn for this study helped to carry out this experiment. The only instrument used for data collection was the researchers developed Basic Technology Achievement Test (BTAT). BTAT contains 50 multiple choice items with five options, A, B, C, D, and E based on the Basic technology FEST (2007) curriculum. BTAT was used for pre-test and post-test. BTAT was validated by two Technical teacher educators and an expert in Measurement and Evaluation. The reliability of BTAT was determined by administering BTAT on a trial group of intact class of 30 JSS II Basic Technology students in a secondary school within the study population but not included in the main study using test-re-test method. The reliability co-efficient of .88 was obtained using Kuder Richardson's formula 21 (K_{R-21}). Mean and Standard Deviation were used to answer the research questions. The hypotheses were tested with analysis of Covariance (ANCOVA). The pre-test scores of both the achievement test and workplace skills assessment were fused as the covariates to their post-test scores. The ANCOVA served as a means of controlling the extraneous variables from dependent variables thereby dealing with the threats of initial differences across the groups; and

increasing the precision of the experimental results. Acceptance and rejection of the null hypotheses depended on this alpha level and the degree of freedom in relation to the calculated F-value. Acceptance mean of achievement score was 50 per cent in this study.

RESULTS

Research Question 1: Is there any difference in the mean achievement scores of students taught Basic Technology using students' interaction patterns?

Table 1.

Mean of Students' Pre-test and Post-test Scores Taught Basic Technology using Students' Interaction patterns

Groups	N	Pre-test		Post-test		$\bar{X}$ gain score	SD
		$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2		
Student-student	40	30.80	9.69	60.90	18.70	30.10	9.01
Student-material	31	32.90	9.33	42.80	12.60	9.90	2.27
Student-teacher	62	31.10	9.25	59.30	18.10	28.20	8.85

Table 1 shows the pretest and posttest mean achievement scores of students taught Basic Technology using students' interaction patterns in Edo State. At pretest students taught with student-student interaction pattern had mean achievement score of 30.80 and standard deviation of 9.69; those taught using student-material interaction pattern had mean achievement score of 32.90 with a standard deviation of 9.33; while those taught using student-teacher interact pattern had mean achievement score of 31.10 and standard deviation of 9.25. At posttest, students taught basic technology using student-student interaction pattern had posttest mean achievement score of 60.90 and standard deviation of 18.70, indicating a mean gain of 30.10 and standard deviation of 9.01; those taught using student-material interaction pattern had posttest mean achievement score of 42.80 with standard deviation of 12.60, indicating a mean gain of 9.90 and standard deviation of 2.27; while those taught using student-teacher interaction pattern had posttest mean achievement score of 59.30 and standard deviation of 18.10, indicating a mean gain of 28.20 and standard deviation of 8.85. Thus, students taught using student-student interaction pattern had higher gain mean score followed by those taught with student-teacher interaction pattern, and those taught using student-material interaction had the least gain score. This means that difference exists between the pretest and posttest mean achievement scores of students taught basic technology using students' interaction patterns in favour of student-student interaction pattern at posttest. The implication is that the student-student interaction and student-teacher interaction patterns had positive effects on students Mean achievement scores in Basic Technology.

Research Question 2: Is there any difference between the posttest mean achievement scores of male and female students taught Basic Technology using students' interaction patterns?

Table 2.

Mean of Male and Female Students Posttest achievement Scores Taught Basic Technology using Students' Interaction patterns

Groups	N_1	N_2	Male		Female		$\bar{X}$ Difference
			$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	
Student-student	33	7	62.50	18.70	59.30	17.80	3.20
Student-material	26	5	44.70	12.90	40.90	12.10	3.80
Student-teacher	53	9	60.50	19.80	58.10	17.30	2.40
Total	117	21	55.90	17.10	52.70	15.70	3.10

Table 2 shows that the differences between the Mean achievement scores of male and female students in Basic Technology for the three students' interaction patterns (student-student, student-material, and student-teacher) were significant to suggest differences in achievement due to gender. The posttest Mean achievement scores of male students taught using student-student interaction pattern was 62.50, student-material pattern interaction was 44.70, and student-teacher interaction pattern was 60.50 with standard deviation of8.70, 12.90 and 19.80 respectively. While the posttest Mean scores of female students exposed to student-student interaction pattern was 59.30, student-material pattern interaction was 40.90, and student-teacher interaction pattern was 58.10 with standard deviation of 17.80, 12.10 and 17.30 respectively. The difference 3.3 student-student, 3.8 student-material, and 2.4 student-teacher with a total difference of 3.10. The result of the multiple comparisons of the three groups is shown in Table 3 below.

Table 3.

Post-Hoc Test using Bonferroni technique with dependent variable of achievement in Basic Technology Dependent variables

Interaction Patterns		$\bar{X}$ Difference	Standard Error	Significant
Group (a)	Group (b)	(a-b)		
Student-student	Student-teacher	1.800	.889	.001
Student-student	Student-material	19.146	.876	.001
Student-teacher	Student-material	17.538	.858	.001

$\bar{X}$ *Difference is significant at .05 level.*

Table 3 shows a pair multiple comparison post-hoc tests of the three students' interaction patterns using Bonferroni technique. The results revealed that student-student and student-teacher interaction patterns had a close Mean difference of 1.800 indicating no difference. Student-material interaction patterns had a Mean difference of 19.146; implying that students taught with student-student interaction pattern performed better than their

counterparts taught with student-material interaction pattern. Similarly, student-teacher interaction pattern was superior to student-material interaction patterns with a Mean difference of 17.538. Thus, students exposed student-teacher interaction pattern performed better than those exposed to student-material interaction pattern in basic technology.

Hypothesis 1: There is no significant difference in the Mean achievement scores of students taught Basic Technology students using Students' Interaction Patterns.

Hypothesis 2: There is no significant difference in the Mean achievement scores of male and female taught Basic Technology students using students' interaction patterns.

Hypothesis 3: There is no significant interaction effect of Students' Interaction Patterns (SIPs) and gender on the Mean achievement scores of students taught Basic Technology.

Table 4.

Analysis of Covariance (ANCOVA) for Students' Interaction Patterns, Gender and Interaction Effect of Students' Interaction Patterns and Gender

Sources of Variations	Sum of Squares	DF	Mean Square	F	Sig.	Remarks
Corrected model	13843.429	5	2768.686	71.749	.000	Significant
Intercept	2221.103	1	2221.103	57.559	.000	Significant
Pretest	1393.333	1	1393.333	36.107	.000	Significant
Main effects:						
Student-student (SS)	3683.263	1	3683.263	*95.451	3.23	
Student-material (SM)	2861.546	1	2861.546	*74.156	3.32	
Student-teacher (ST)	3910.761	1	3910.761	*101.367	3.15	
SS*SM*ST	10955.571	2	5477.786	*141.956	2.99	
Gender	67.828	1	67.828	*1.757	2.99	
Two-ways Interaction:						
SIPs* Gender	105.676	2	52.838	*1.369	2.99	
Error	4900.644	127	38.588			
Total	15777.940	133	119.529			
Corrected total	8979.456	132	68.236			

Significant at P<.05

Testing hypothesis 1, Table 4 reveals that there was significant effect of instructional strategies on students' achievement in basic technology with calculated F-value of 141.956 and critical table F-value of 2.99 at .05 level of significance and 131 degrees of freedom. Since the calculated F (141.956) is greater than the F critical value (2.99), the null hypothesis therefore was rejected, indicating that there was significant difference in the Mean achievement scores of students taught basic technology using students' interaction patterns. Testing hypothesis 2, Table 4 revealed no significant Mean effect of gender on students' Mean achievement scores in basic technology with calculated F-value of 1.757 and critical table F-value of 2.99 at .05 level of significance and 131 degrees of freedom.

Since the calculated F-value (1.757) is less than the critical table F-value (2.99), therefore, the null hypothesis which states that there is no significant difference in the Mean achievement scores of male and female taught Basic Technology students using students' interaction patterns was retained. This implies that gender had no significant effect on students Mean achievement scores in basic technology due to instructional strategies.

Testing hypothesis 3, Table 4 shows an F value of 1.369 as the post-test result for instructional strategies and gender interaction, being significant only at 2.99 which was not significant at .05 level of significance and 131 degrees of freedom. Testing at an alpha level of .05, the P value is much higher than the alpha level, therefore, the null hypothesis which states that there is no significant interaction effect of the instructional strategies and gender on students' Mean achievement scores in Basic Technology is retained. It is concluded that there is no significant interaction effect of the instructional strategies and gender on students' Mean achievement scores in Basic Technology.

DISCUSSION OF RESULTS

The study revealed that there was significant difference in the Mean achievement scores of students in basic technology due to instructional strategies. The student-student interaction pattern was superior to the student-material interaction and student-teacher interaction in facilitating students' achievement in basic technology. The differences in performance may be due to the fact that students were required to find out facts for themselves by interacting with their fellow students, thereby imbibing the scientific processes involved in learning basic technology, which enabled the students to perform better than their counterparts taught basic technology using student-material and student-teacher interaction patterns. When students generate their own questions, analyze and discuss their findings and finally construct their understanding they seemed to understand their own information better than the ones the teachers introduced to them. The student-student instructional strategy was more effective because the instructions were characterized by active student's involvement, thereby capturing the interest of the student and maximizing comprehension of the subject matter. This was followed by student-teacher interaction pattern then the student-material interaction pattern. However, the three interaction patterns facilitate students' achievement in basic technology.

This finding is in line with that of similar experimental studies by Kalu (2009) who conducted a study on classroom interaction patterns and students' learning outcomes in physics and reported that a significant positive relationship exists between interaction pattern and students' post-instructional attitude and achievement. Students accomplish understanding through the social interaction, which occurs in the class (Driver & Oldham, 1986). Students achieve more in learning when they negotiate their understanding through class discussion, interaction with peers and by exchange of thoughts and ideas (Oviawe, Ezeji & Uwameiye, 2015). The findings of this study is in line with that of a study conducted by Mohammed (2005) on the effect of cooperative, competitive and individualized learning on students' achievement in science and found that the students taught with cooperative method performed significantly better than

those taught through competitive and collaborative methods. Similarly, Nwagbo and Okoro (2000) conducted a study on the effects of classroom interaction patterns on achievement of students in biology and reported that the three interaction patterns (cooperative, competitive and individualistic) enhanced achievement of students in biology. Allowing students learn in groups will provide for the low cognitive functioning students to integrate and participate in a way such as to enhance performance and self regulation (Oviawe, Ezeji & Uwameiye, 2015).

The findings of the study showed a slight difference exist between the post-test Mean achievement scores of male students (55.90) and female students (52.70) taught Basic Technology using student-student interaction pattern, student-material interaction pattern and student-teacher interaction pattern in favour of the male students. The findings of hypothesis 2 revealed that there was no significant difference between the post-test Mean achievement scores of male and female students taught basic technology using student-student interaction pattern, student-material interaction pattern and student-teacher interaction pattern in Edo State junior secondary schools. This is in line with similar studies by Oviawe (2008), Ukadike (2005) who reported no significant difference in the academic achievement in pre-vocational subjects and sciences of both male and female. Similarly, the findings lend credence to the findings of Frase and Tobin (1998) in Oviawe (2008) who reported a non-gender difference in achievement in science especially in countries such as Poland, Nigeria, Jamaica and Trinidad/Tabaco. This result may be as a result of the fact that Nigerian culture and values for instance, have been seen to support women, and women have been seen to have always played vital economic role. Okebukola (1986) posited that all students irrespective of gender can perform equally in a given task to support the finding of this study. Okebukola supported his claims by asserting that when students have opportunities to interact among themselves, the teacher and the materials, knowledge and skills are acquired and learning is real for both sexes. Okeke (2007) and Nzewi (2010) reported that females achieve as high as their male counterparts when given equal opportunities. Similarly, Oviawe, Ezeji and Uwameiye (2015) reported that gender has no significant effects on students' academic performance in building technology. Oludipe (2012); Ndinika and Ubani (2017) reported no statistical significant difference in the Mean scores of male and female students to support the findings of this study. However, the finding of this study is at variance with those of Madu (2003), who reported significant difference in the academic performance of male and female students.

The finding of this study did not support that of Ibe and Nwosu (2003) who reported that girls achieved more than boys in science subjects, and that female learners show some superiority over male learners. Asaf and Zahoo (2017) found that girls performed better than boys in their study supports the findings of this study. Also contradicting the findings of this study is that of Ogundola (2017) who found that gender had effects on students' achievement in technical drawing in favour of girls. The findings of this study disagree with that of Nnamani, Akabogu, Uloh-Bethel and Ede (2018) who reported that gender had effect on students' achievement in favour of the girls. Obiekwe (2008) and Okoro (2011) asserted that male students achieve higher than their female counterparts in science. Ezenwosu and Nworgu (2013) reported that gender had

influence on students' achievement in favour of boys to oppose the findings of this study. Gender as a variable in this study revealed no significant effect on students' Mean achievement scores in Basic Technology. This means that gender was not a factor in the Mean achievement of students' in Basic Technology. In this study, the F value for gender interaction with instructional strategies was 1.369 significant at 2.99 level which therefore was not significant at .05 level. Table 3 shows that interaction between gender and students interaction patterns is not statistically significant. Irrespective of students' gender, the effect of instructional strategies on students' performance remained as it were. The finding of this study is in line with those of Moemeke and Omoifo (2003) who reported that no significant interaction effect of methods and gender on learning outcomes. Oviawe, Ezeji and Uwameiye (2015) who found no significant interaction effect of gender and teaching methods on students' performance in building technology is in line with the findings of this study. Similarly, Ogundola (2017) reported no significant interaction effects of treatments and gender on achievement of senior secondary school students in technical drawing. Also supporting the findings of this study Lastari and Syafari (2019) found no interaction effect between instructional strategies and gander on mathematical communication ability. These previous studies have shown that treatment administered (instructional strategies) was responsible for difference in performance among groups. It is a clear fact from the foregoing that although, there are male and female students in Basic Technology classrooms, their differences are more pronounced and significant when inappropriate instructional devices are gender sensitive.

However, the finding of this study is at variance with that of Ndinika and Ubani (2017) who found interaction effect of instructional methods and ability level on students' academic achievement. Also, Nnamani. Akabogu, Uloh-Bethel and Ede (2018) reported a significant interaction effect of methods and gender on students Mean achievement scores in expository essay is at variance to the findings of this study. These studies may not have recognized the efficacy of students' interaction which was used in this present study to bridge the gap that may be created by difference in sex. It may therefore be necessary to conclude on the effect of gender by drawing on the findings of Ukadike (2005) that rather than an interaction by sex to affect performance, other factors bordering on individual differences in growth and cognitive development may affect male and female students performance.

EDUCATIONAL IMPLICATIONS

The findings of this study have implications for education particularly in basic technology instructional delivery in junior secondary schools. The implications of this study border on the development of more virile instructional approach to teaching basic technology. The findings of the study revealed that student-student interaction pattern was superior to student-teacher interaction pattern and student-material interaction pattern. These findings implies that the current instructional strategies used in teaching basic technology might have been partly responsible for students' poor performance and poor interest of prevocational subjects in basic technology.

CONCLUSION AND RECOMMENDATIONS

Since there was a significant effect of instructional strategies on students' achievement in Basic Technology, it is concluded that students' accomplish understanding through the social interaction which occurs in the classroom; they think and talk about their experiences; they suggest and try out new ideas. The conclusion that could be drawn here is that the decline in the instructional delivery has remote pessimistic effect on students' academic performance and Basic Technology objectives. The deterioration is not likely to stop unless some corrective measures (using Students' Interaction Patterns) are taken immediately to avoid total disintegration of Technical and Vocational Education programmes in which basic technology is inclusive. Based on the findings of this study, the following recommendations were made:

- Building Technology teachers should be encouraged to employ student-student interaction pattern and student-teacher interaction pattern in instructional delivery in order to increase the level of students' performance in Basic Technology.
- Government should ensure that authors of textbooks incorporate student-student interactions in the instructional strategies for schools towards enhancing students' achievement and interest in basic technology.
- Basic Technology teachers who lack the knowledge and competence for involving students in student-student interaction patterns during instruction should be equipped with the necessary skills. Basic Technology teachers should be trained and exposed to in-service training, seminars, workshops, conferences and other forms of training-on-the-job to employ student-student interaction patterns.
- Institutions of higher learning charged with the responsibilities of training and producing Basic Technology teachers should train their students in the use of student interaction patterns as instructional strategies of teaching in their course content.
- The curriculum planners should ensure that they integrate student-student interaction patterns in basic technology curriculum, as it will aid to help students' achievement and improve technical vocational education and training.

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