International Journal of Education, Management Sciences and Professional Studies (IJEMPS)
Vol. 1 Issue 2 (AS) PRINT *ISSN:3115-5065* || E-ISSN:3115-5545
URL: https://journals.iempsglobal.org/index.php/IJEMPS

CONCEPT MAPPING IMPACT ON STUDENTS INTEREST IN BASIC TECHNOLOGY IN JUNIOR SECONDARY SCHOOL IN IKWERRE LOCAL GOVERNMENT OF RIVERS STATE

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Abstract

This study examined Concept mapping impact on students interest in basic technology in Basic Technology in Junior Secondary School in Ikwerre Local Government of Rivers state. Descriptive design was used. Two research questions and two hypotheses tested at 0.05 level of significance were used to guide the study. The study population comprised 1150 JSSII junior secondary school Basic technology students in public schools in Ikwerre Local Government of Rivers State. Sample of 300 JSS11 Basic Technology students was selected by simple random sampling technique for the study. Instrument for data collection was Basic Technology Interest Inventory Scale. The instrument was validated by an expert and three subject teachers. The Reliability of the instrument was established using Cronbach alpha and 0.89 was obtained as reliability coefficient. The collected data were analysed using mean and Standard deviation to answer the Research questions while z-test and Chi square were used to test the hypotheses at 0.05 level of significance. Findings of the study revealed that Students had a high interest in learning Basic Technology when exposed to concept mapping strategy. Female students showed a higher interest in Basic technology than their male counterparts. Based on the findings it was recommended that Basic Technology teachers should apply concept mapping strategy for effective teaching and learning to arouse students' interest.

Keywords: Concept Mapping, Interest, Basic Technology, Students, Instructional Material, Strategy

Introduction

Basic Technology is one of the core subjects among other science related subjects in Nigeria education system in the junior secondary school level. The lack of interest of the students towards the subject has enormous adverse effect on almost all the sectors of economy and every walk of life. It is a prevocational subject that gives students opportunities to see what the world of work is

like. Basic Technology has been a matter of great concern for quite some time that students' interest in this subject has been persistently below expectations, and what has been even more worrying is the poor understanding level of the subject. In this vain therefore, it would be meaningful to apply newer strategies that would arouse students interest towards learning and understanding of the subject. Basic Technology is deemed difficult to teach and to learn because it consists of unfamiliar concepts such as basic electrical/electronics, building drawing, wood work, technical drawing, concrete practice and metal work involving complex relations (Okardi & Tuesday, 2022). The highly conceptual and diversification nature of Basic technology makes it particularly boring for students to learn. The strategies commonly used in the classroom have not sufficiently eased the learning process of the subject at junior secondary school level. The continued unsatisfactory interest of students in Basic technology in Secondary schools in Rivers State has been a matter of concern by science educators and many other stake holders. The knowledge level of pre - service students in Basic technology in most cases not coherent with the demand of the subject matter hence, the majority of students engage in memorization in order to pass examinations.

Conventional method of teaching Basic technology contributes very little to the interest of the learners and therefore cannot promote reflective thinking in more critical and abstract manner. If students can see a clear organized picture of a broad unit covering various concepts, then they would build a deeper understanding and appreciation of this subject. Every country often changes and redesigns her curriculum to include new teaching strategy in order to help students develop a wider picture of the concepts. For secondary schools in Rivers state, which use a conventional method, it is advisable they embrace innovative teaching strategy that could arouse and enhance students' interest in learning Basic technology. The conventional approach mostly encourages students to memorize concepts even in the area of problem-solving, explanation of observed phenomena and comprehension. The application of conventional teaching strategy in Basic technology classroom activity is superficial which makes students find it difficult to connect to a coherent frame work that would allow them make sense of it and apply it to real life situations. It is therefore suggested that teachers adopt constructivists and innovative approach to learning of which the learner is an active participant in the learning process, construct his own knowledge and help meet the needs of the contemporary and ever evolving society. In Basic technology teaching, various teaching strategies such as discussion, lecture, question and answer, field trip and brain storming are used but the performance has still not been as good as expected among junior secondary schools students both in internal and external examinations. Even though these strategies are not really effective in helping students learn concepts and skills, it is important that Students learn to interact effectively so that the interest of the students towards learning Basic technology would not be hindered. In light of this, there is a general concern from teachers, curriculum developers and all stakeholders about the drop in students' interest in Basic technology

Interest is a variable that could enhance students activity in the classroom. It is a motivational variable that involves not only the emotions, but also the intellect, making it a powerful energizer.

Emmanuel Martha, Chianson-Akaa and Elom (2022) defined interest as an individual behaviour tendency to be attracted towards a certain class or classes of activities. It has to do with students' preference for one activity over the other which has to do with choice and ranking of activities Interest is an immanent feeling of persisting tendency to pay attention and enjoy some content (Jane & Adeola, 2017). This is because interest is a pre-indication of attention, once there is direct interest, attention is guaranteed and learning is assured (Jane & Adeola, 2017). It could also be seen as the quality which arouses concern or curiosity that holds a learners attention on an object. This implies that when one is interested in learning, closer attention is paid in processing the information more efficiently to employ more effective learning strategies such as making connections between knowledge and real life situation in Basic technology. Students' interest in Basic technology could influence their attentiveness, degree of commitment and concentration.

Generally, there seems to be a lot of emphasis how students can understand key concepts in Basic technology, demonstrate proficiency in skills such as, problem solving, critical thinking, mastery and grasping of scientific methods and processes and apply knowledge in real life situations. The problem of poor conceptual understanding seems to be recurring also from the fact that students come to the secondary level with a weak background in science related subjects. The poor articulation of science and technology concepts by students is reflected among public school students in Rivers state. For learning be more meaningful and more interesting , there is a need to explore and adopt more innovative techniques. Concept Mapping is reportedly one such strategy that may be used to enable students to think about connections on what is being learned, organize their thoughts, visualize relationships between key concepts in a systematic way and be able to reflect on their understanding (Indra Sen & Karren , 2015).

Concept mapping is a teaching and learning strategy that has been developed by Novak (1977) and which helps students to organize concepts into hierarchies. It is a pedagogical and Meta cognitive tool designed to help students learn how to learn (Novak, 1998). Okardi and Tuesday (2022) defined Concept Mapping as a method concepts in a topic are represented in maps with different shapes such as circle, box, rectangle, triangle and arrows used to show their relationship with words or phrases linking the concepts by the sides of the arrows. Concept mapping-based instruction is one of the instructional strategies propounded by CEMASTER as learner-centred approach (Makoba, 2016). Rao (2015) defined concept mapping as strategy with diagrammatic representations which show meaningful relationships and between concepts in the form of propositions which are linked together by words, circles, and cross links in a hierarchical organized manner. The application of concept-mapping method in a classroom helps both learners and teachers to make clear small number of key ideas which focus on specific learning task (Awodun ,2017). Awodun (2017), also said that concept map provides a variety of features that make it possible for teachers to use concept maps for a various tasks that students perform.

Okardi and Tuesday (2022) examined Concept Mapping Influence on Student Interest in Basic Technology in Junior Secondary School in Yenagoa Local Government Area. The study revealed that Students that were exposed to concept mapping instructional strategy had a higher interest in

Basic Technology than their counterparts taught using lecture method. Indra Sen and Karren (2015) also conducted a study on the Effect of using Concept Maps on Student Achievement in Selected Topics in Chemistry at Tertiary Level. The results show that there was no significant difference in the performance of the students in all groups. Similary, Jane and Adeola (2017) investigated the effect of concept mapping strategy on students academic performance and interest in technical drawing in technical colleges in Edo State, Nigeria. The findings revealed among others that students taught technical drawing using concept mapping teaching strategy had higher mean achievement and interest scores than those taught with the conventional teaching method. Although research support concept mapping as an effective method for improving students' performance and interest but study conducted seem not to use concept mapping strategy to check its effectiveness on the students' interest only in Basic technology in Ikwerre Local Government of Rivers state. Therefore, it would be worthwhile to carry out a research on this strategy on students' interest in Ikwerre Local Government of Rivers state.

Teaching of Basic Technology in junior secondary schools seems to be teacher-centered through giving and taking of notes and conventional methods which do not enable students to form mental models of the concepts presented to them. Also, absence in the teacher-centered method is the enthusiasm to learn since the method is boring, and monotonous, with only the teacher doing the talking. Teaching of basic technology requires active and innovative approaches. Even though in Rivers state, Basic technology is taught in junior secondary schools with the intention of enabling students to follow instructions, perform experiments, record observations, evaluate and draw conclusions, these noble intentions are not achieved in reality. Students therefore go through their Basic technology with no ability and a deficiency in visualizing and organizing their thoughts. Basic technology tends to be disliked by most students since most of the concepts are not organize into hierarchies to arouse their interest. Although the inability of the teachers to communicate basic technology concepts in an organizational and hierarchical manner have been the subject of concern for some time now at the junior secondary school level, there appears to be no immediate solution. For this reason, this study was designed to investigate Concept mapping impact on students' interest in basic technology in Basic Technology in Junior Secondary School in Ikwerre Local Government of Rivers state.

The aim of this study is to investigate Concept mapping impact on students' interest in basic technology in Basic Technology in Junior Secondary School in Ikwerre Local Government of Rivers state. This study sought to determine;

- The effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology.
- The influence of concept mapping strategy on male and female junior secondary schools students' mean interest scores in Basic technology.

The following research questions guided the study

1. What is the effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology?

2. What is the significant difference between male and female junior secondary schools students' mean interest scores in Basic technology when exposed concept mapping strategy?

The following null hypotheses were formulated and tested at 0.05 level of significance.

(i) There is no significant effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology.

(ii) There no significant difference between male and female junior secondary schools students' mean interest scores in Basic technology when exposed concept mapping strategy.

Methodology

The design of the study is a descriptive survey research design. Igharo and Obed (2022) defined descriptive survey research design as a group of people or items who are studied by collecting and analysing data from only a representative of the entire population. The essence of this was to collect and interpret respondents' interest about Basic technology.

The population of this study comprise 1,150 junior secondary students in Ikwerre local Government of Rivers state. (source: Rivers state Universal Basic Education, 2020/2021 JSS II Enrolment)

A simple random sampling was used to select six (6) junior secondary schools in Ikwerre Local Government Area, Rivers sate and fifty students were randomly selected from these schools which made up three hundred (300) students. Therefore, three hundred (300) students constitute the sample size for this study.

Table 1: Sample Distribution

Schools	Male	Female	Total
A	20	30	50
B	24	26	50
C	21	29	50
D	25	25	50
E	19	31	50
F	23	27	50

Total	132	168	300

The instrument used for data collection was the researcher developed Basic Technology Interest Inventory Scale (BTIIS). The Basic Technology Interest Inventory Scale (BIIS) was made up of two sections, Section A addressed respondents' demographic data while section B consisted of statements of students' interest towards Basic technology which consisted of eight (8) interest items measured on a four point -Liker type interest rating scale. This rating scale enables students indicate their level of interest thus SA=Strongly Agreed (4) A=Agreed (3), D = Disagree (2), SD = Strongly Disagreed (1).The level of agreement of the respondents on the items in each construct represented their perceived interest towards Basic technology.

The content coverage of Basic Technology Interest Inventory Scale (BTIIS) was validated by my supervisor and two experts who were in the field of Basic Technology. This was to check whether the items are in line with the specifics objectives of the study. The corrected items were used for the instruments for the study.

The reliability of the Basic Technology Interest Inventory Scale (BTIIS) was determined using Cronbach Alpha Reliability test method and the reliability of 0.89 was obtained.

Method of Data Analysis: Data collected were analyzed using mean and standard deviation to answer the research questions. The decision rule for interpretation of the mean scores of the items was 2.5 criterion mean. Items whose mean scores is higher or equal to 2.5 was considered agree and items whose mean is below 2.5 was considered disagreed. Goodness of fit Chi Square was used in testing the hypothesis one while Independent sample z-test was used in testing the hypothesis two at 0.05 level of significance.

Results

Research Question 1: What is the effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology?

Table 1: mean and standard deviation of the effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology

S/N		**Mean**	**SD**	**Decision**
1	I like to listen attentively whenever the teacher is concepts in Basic technology using concept mapping.	2.67	0.81	Agree
2	I enjoy applying knowledge of concept mapping in solving real life problems related to Basic technology.	2.98	0.85	Agree

3	I plan on using concept-mapping techniques to study for any future course that I may take	2.62	0.93	Agree
4	The use of concept mapping in teaching Basic technology reduce my anxiety for the subject	3.01	0.86	Agree
5	I participate more in class whenever my teacher uses concept mapping to illustrate Basic technology concept	3.44	0.89	Agree
6	I have better understanding of Basic technology through concept mapping strategy.	2.88	0.88	Agree
7	Concept Mapping encourages me to actively construct an understanding of basic technology concepts and relationships within my domains of interest	3.31	0.75	Agree
8	concept mapping provides a variety of features that make it possible for me to carry out various tasks related to real life	2.72	0.79	Agree
	GRAND MEAN	**2.95**	**0.85**	**Agree**

Table 1 showed the effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology. The grand mean of 2.95 and standard deviation of 0.85 showed that concept mapping strategy affect the students' interest in Basic technology.

Research Question 2: What is the significant difference between male and female junior secondary schools students' mean interest scores in Basic technology when exposed concept mapping strategy?

Table 2: Mean and standard deviation of male and female students' Interest in Basic Technology towards the Use Concept Mapping strategy

S/N	Questionnaire Items	Male		Female			
		$\bar{x}_1$	SD	$\bar{x}_2$	SD	$\bar{x}_1\bar{x}_2$	Remark
1	I like to listen attentively whenever the teacher is concepts in Basic technology using concept mapping.	3.16	0.83	3.13	0.73	3.15	Agree

2.	I enjoy applying knowledge of concept mapping in solving real life problems related to Basic technology.	2.94	0.51	3.42	0.70	3.18	Agree
3.	I plan on using concept-mapping techniques to study for any future course that I may take	2.76	0.83	2.50	0.92	2.63	Agree
4.	The use of concept mapping in teaching Basic technology reduce my anxiety for the subject	2.82	0.93	2.89	0.95	2.86	Agree
5.	I participate more in class whenever my teacher uses concept mapping to illustrate Basic technology concept	2.63	0.82	2.70	0.79	2.67	Agree
6	I have better understanding of Basic technology through concept mapping strategy.	2.56	0.83	2.61	0.92	2.59	Agree
7	Concept Mapping encourages me to actively construct an understanding of basic technology concepts and relationships within my domains of interest	2.56	0.93	2.94	0.95	2.75	Agree
8	Concept mapping provides a variety of features that make it possible for me to carry out various tasks related to real life	2.71	0.82	3.01	0.79	2.86	Agree
	Clustered Mean	**2.77**	**0.81**	**2.90**	**0.84**	**2.83**	**Agree**

Table 2 reveals the influence of concept mapping strategy on male and female junior secondary schools students' mean interest scores in Basic technology. It shows that male students had mean interest-test score of 2.77 with a standard deviation of 0.81 while their female counterparts had mean interest-test score of 2.90 with a standard deviation of 0.84. This implies that female students have higher interest in Basic Technology than their male counterparts with little difference

Hypothesis 1: There is no significant effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology.

Table 3: Chi square Analysis of significant effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology

Chi-Square	46.517[a]
Df	3

Asymp. Sig.	0.001
Decision	Ho Rejected

Table 3 showed that with the degree of freedom 3 at 0.05 level of significance, the Chi square $X^2 = 46.517^a$ and p-value of 0.001 less than 0.05. Hence the null hypothesis is rejected. This indicate that there is significant effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology

Hypothesis 2: There no significant difference between male and female junior secondary schools students' mean interest scores in Basic technology when exposed concept mapping strategy.

Table 4: z-test analysis of the difference between male and female junior secondary schools students' mean interest scores in Basic technology when exposed concept mapping strategy

Gender	N	$\bar{x}$	SD	df	z-cal	P-value	Remark
Male	132	2.77	0.81				Ho Accepted
				298	1.3516	0.1775	
Female	168	2.90	0.84				

Table 4 showed that the z-test analysis on the influence of concept mapping strategy between male and female junior secondary schools students' mean interest scores in Basic technology. The result of the analysis showed that the z-calculated is 1.3516, p-value is 0.1775 which is less than the 0.05 level of significance i.e. (p>0.05), therefore there is no significant difference between male and female junior secondary schools students' mean interest scores in Basic technology when exposed concept mapping strategy.

Discussion of Results

The result from table 1 showed that concept mapping strategy affects the students' interest in Basic technology. Table 3 confirmed that there is significant effect of concept mapping strategy on junior secondary schools students' means interest scores in Basic technology. The finding of this study agrees with the report of Okardi and Tuesday (2022) who noted that students that were exposed to concept mapping instructional strategy had a higher interest in Basic Technology than their counterparts taught using lecture method. Jane and Adeola (2017) also reported among others that students taught technical drawing using concept mapping teaching strategy had higher mean achievement and interest scores than those taught with the conventional teaching method. Evidence from this results revealed that active involvement of students in the learning process

facilitates their interest in Basic technology through the application of concept mapping. Learning built on prior experience hierarchically arranged and well organized as in concept mapping about meaningful learning hereby promoting students learning in an atmosphere of ease, fun, team work, activity and critical thinking. Furthermore concept mapping create room for tangible thinking because in constructing concept maps thoughts are connected out physically and results are seen. This is against the conventional method approach where thoughts are made in abstraction in the teaching and learning process because most teachers rarely use adequate teaching aids or connect ideas and concepts with physical realities. As a result students see Basic technology as abstract and easy to forget.

The findings of the study in table 2 revealed that Female students have little higher interest in Basic Technology than their male counterparts. Table 4 further showed that the difference was further confirmed that the difference between male and female junior secondary schools students' mean interest scores in Basic technology when exposed concept mapping strategy was not significant. In this study both the male and female students' interests in basic technology were equally enhanced because concept mapping strategy is not sex stereotyped. The finding of this study agrees with the report of Okardi and Tuesday (2022) who reported that Female students have little higher interest in Basic Technology than their male counterparts. In other words, the relative effects of the strategy across the male and female students were consistent. Therefore a gender balanced atmosphere accounted for the superiority of concept mapping strategies in enhancing interest over the conventional method.

Conclusion

Based on the findings of this study, the following conclusions were made.

The use of concept-mapping instructional strategy in teaching Basic technology has proved a more effective approach in improving the interest of students towards learning Basic technology. The method employs independent thinking in the students and impacts more of conceptual understanding than the usual rote learning that most of the students engage themselves in. This approach has proved itself capable of reconciling gender differences in students' interest in Basic technology. This notion of basic technology can only be handled by male students has been shifted by this approach since method by gender was not significant,. Thus concept-mapping instructional strategy which has been found to enhance students' interest in Basic technology can be conveniently used by Basic technology teachers in both male and female schools.

Recommendations

On the basis of findings of this study and the discussions, it is recommended that:

- Students should be taught how to construct concept maps on their own on various topics in Basic technology because this improves the cognitive structures of the students.

- Since the study revealed that the use of concept-mapping instructional strategy enhances students' interest in Basic technology, mathematics teacher should incorporate this strategy in Basic technology classroom activities
- Government should encourage Basic Technology teaching and learning by providing enabling environment for the stimulation and sustenance of the learner's interest in Technology. Availability of adequate classrooms, laboratories, equipment's and facilities for the teaching of Technology will enable the teacher to effectively use concept mapping strategy.
- Regular workshops, seminars and symposia on the use of instructional models in general and concept-mapping in particular should be organized by the Ministry of education and other stakeholders for junior secondary school Basic technology teachers in order to enhance meaningful learning

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