EFFECTS OF MOTHER TONGUE ON STUDENTS' ACHIEVEMENT IN BASIC SCIENCE AND TECHNOLOGY AT THE UPPER BASIC EDUCATION IN KATSINA-ALA LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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ABSTRACT

This study sought to find out the effects of using Tiv language as medium of instruction on students' achievement in Basic Science and Technology at Upper Basic Education in Katsina-Ala Local Government area of Benue state. The study was carried out in two secondary schools in Katsina-Ala Government area of Benue State. Two intact classes of the schools were assigned to experimental and control conditions. Experiment lasted for two weeks. It started with a pretest before treatment and a posttest after treatment using Basic science and Technology achievement test (BSAT). Mean and standard deviation were used to answer the research questions while analysis of covariance (ANCOVA) was the statistical tool to test the hypotheses. The result showed that students in experimental group who were taught in Tiv did not perform better than the control taught in English language and there was no significant difference in the achievement scores of male and female students taught in Tiv language. Based on the findings, the researcher recommended that the use of Tiv language alone in teaching of Basic science and Technology should be discourage, however, Basic Science and Technology teachers may use Tiv language as an instructional tool in teaching of Basic Science and Technology at Upper Basic Education in Katsina-Ala Local Government Area of Benue State.

Keywords: *Language, Achievement, Students*

INTRODUCTION

There has been public outcry of students' poor achievement in science especially at the lower level of education. Several factors have been identified by educators as being responsible for this abysmal performance in science subjects. Bala (2010) observed that there is a general misinterpretation of science by some science teachers which has attribute to poor understanding that results to poor teaching which leads to low achievement and interest in science from students. One of the factors responsible for this is that science context presented to students is being so abstract and has no direct bearing in the life of the students especially at the lower level of education. Ada (2013) expressed his worried that, some universal basic education teachers hardly make correct sentences in English language. The problem of effective communication in English language among teachers and learners at Basic education seemed to be prevalent even in the urban centers in Benue State especially now that there is massive rural to urban migration caused by herdsmen farmers crisis, poverty, and lack of basic amenities in the rural areas.

In communicating science, the use of language is very important, be it in sign or verbal, mother tongue or foreign. However, if the teacher and the learner are not familiar with the language use for instructions it rather creates more confusion than solution. Vygotsky (1962) stated that language plays two important roles in cognitive development, it is the means by which adults transmit information to children and language itself becomes a very powerful tool of intellectual adaptation. Application of this theory to science education has significant to the growth of students in their immediate environment. Bruner (1966) also views language as being important for the increased ability to deal with abstract concepts. He argues that language can code stimuli and free an individual from the constraints of dealing only with appearance, to provide a complex flexible cognition. This

implies that the language of instruction if understood very well by the teacher and the learner it will help to reduce the abstract nature of science and also serve as a teaching aid or tool in science instructions.

Chukwu (2011) maintained that the use of mother tongue as a medium of instruction in schools can improved students achievement in all areas of learning including Basic science and Technology. Ezeudu (2013) stated that for students to achieve high in Basic Science and Technology they must be taught by the language of their culture and it is only through this language that they interact with their environment. Eze and Eze (2008) argued that countries like Japan, Brazil, Taiwan, Holland, India, China, Russia, France and Germany do not speak English as their national language but they have developed scientifically and technologically.

In lined with the basic science and technology education curriculum which support the use of mother tongue in teaching and learning Basic Science and Technology, and the effort to overcome the challenge of language barrier in basic science and technology, Benue State government recently approved the use of Tiv, Idoma and Igede languages in the teaching of Basic Science and Technology in Benue State. Tiv language is largely spoken in Benue state and other neighbouring States like Cross-river, Taraba, Nasarawa and Plateau States of Nigeria. According to Nigeria National population (2006 census) the estimated population of the Tiv stood at about five million. More than half of this population lives in rural areas where Tiv language is use as a medium of communication.

Although, there are many literatures written in Tiv and the language is being study as a course in some tertiary institutions in Benue State there is no written textbook of Basic science and

Technology in Tiv language and the language is hardly taught as a subject at Basic education level. Students learn the language through their parents and relations, the language is also use as a medium of communication and teaching of catechism in some churches in the State.

The use of mother tongue at home and English in school creates communication gap between the teacher and the learner in the classroom. Nwadike (2002) maintained that the teaching of the students through the use of the environmental examples will make the teaching lively and bring the lesson home. If students had known much in their mother tongue, it would be better and easier to build their new knowledge on what they have known using their mother tongue.

Nsofor (1998) argued that though it has been suggested by many educators that the use of mother tongue as the medium of communication in teaching of science, technology and mathematics (STM) will make the learning easy and more meaningful to the learner there should be some restrictions to this effect. He maintained that the use of local language alone in communicating STM should not be encouraged. This is because some of these spoken local languages are not fully developed in terms of satisfactory definitions and explanations' being available for some concepts in foreign language. Hence foreign language should be combined with the most widely spoken language to reap the benefit of both.

Surprisingly, many schools especially private schools forbid the use of mother tongue in schools. In our primary and secondary schools both in rural and urban there is always an inscription on the notice boards and in all classrooms that vernacular speaking is strictly prohibited. Many Tiv children cannot name local birds, plants, animals, fishes etc in Tiv and some of

them cannot pronounce their Tiv names well. The question now is the use of Tiv language in teaching Basic Science and Technology still has positive effect on students' academic achievement in this trend of prohibiting the use of mother tongue in the school and lack of interest on the part of students to communicate in the mother tongue? This informed the decision for carrying out this research work.

Ezeudu (2013) carried out research in Nsukka Local Government area of Enugu State using Igbo language at the junior secondary school (Upper Basic), the researcher used 79 boys and 94 girls and she found out that the experimental group performed better than the control group and there was no language effect on gender. Bala (2014) conducted the research using Hausa language at primary school (Lower and Middle Basic) level and the researcher found that the students taught using Hausa language perform better than those taught in English. The researchers mentioned above used Igbo and Hausa languages, the current study used Tiv language.

Purpose of the study

The purpose of this study was specifically;

a. To compare the mean achievement of Basic Science and Technology students taught in English language with those taught using Tiv language.
b. To find out whether gender had any effect on students' achievement in Basic Science and Technology when they are taught in Tiv language.

Research questions

The following research questions were formulated to guide this study;

1. What is the difference between achievement scores of students taught Basic Science and Technology in Tiv language and those taught in English language?

2. What is the difference between achievement scores of male and female students taught in Tiv language?

Hypotheses

The following hypotheses were formulated and tested at 0.05 to ascertain the level of significant of the difference.

1. There is no significant difference between the mean achievement scores of students taught Basic Science and Technology in Tiv language and those taught in English language?
2. There is no significant difference between the mean achievement scores of male and female students taught Basic Science and Technology in Tiv language?

METHODOLOGY

This study was a non-randomized, pretest-posttest control group of quasi-experimental design. The design was used because the researcher had no control over the subjects.

The study was carried out at Ikurav-Tiev Community Secondary school Joo-Mbatyough and Government Comprehensive Secondary School Amaafu in Katsina-Ala Local Government Area of Benue State. The researcher chose the schools because it predominates with Tiv speaking students at Upper Basic Education.

The target population for the study was all the Upper Basic (JSS) two students in in Katsina-Ala Local Government Area of Benue State. Two schools were purposively selected. In the schools selected all Upper Basic (JSS) two students in their two intact classes were assigned to the treatment conditions. A total of 32 students were used, 17 in experimental group and 15 in control group, in the experimental group 10 female and 7 male were used to determine the effect of gender on academic achievement.

Upper Basic (JSS) two students were used because they are in the middle of upper basic education whatever affects them is likely to affects upper basic one and three.

Lesson notes on Theme: Basic Science, Sub-Theme: learning about our environment and the Topics: living things and chemicals for upper basic two was developed by the researcher. The notes were divided into three periods of 40minutes and translated into Tiv language. Both notes were validated by an expert in science education. The instrument Basic Science and Technology achievement test (BSTAT) based on the topics used was developed and translated in Tiv by the researcher and validated by an expert in science education. The instruments were made up of 30 multiple choice items and marked over 100%. The topics living things and chemicals were used because they were in the students' scheme of work as of the time of this study.

The study comprises of one control group (those taught in English language) and one experimental group (those taught in Tiv language). The researcher carried out the teaching himself both the experimental and the control. This was done to avoid the teacher effect. And to avoid Hawthorns effect the researcher was introduced to students as a new Basic science and Technology teacher but not as a researcher. Students were pretest before teaching, the experiment last two weeks before posttest was administered. This was to enable the teacher complete what he planned to teach before the posttest. The Basic Science and Technology teacher taught the students in their normal classrooms. It was not possible to do randomization.

The research questions were answered using the means and standard deviations and the hypotheses were tested using Analysis of Covariance (ANCOVA) at the 0.05 alpha levels. Analysis

of Variance (ANCOVA) was used to bridge the gap of non-equivalence of the two schools.

Results of the findings

The results of this study are presented in the tables below:

Research Question 1: What is the difference between achievement scores of students taught Basic Science and Technology in Tiv language and those taught in English language?

Table1: Means and Standard Deviation of Pre-scores and Post-Scores of Those Taught using Tiv Language and Those Taught using English Language

Group	Mean	Std. Deviation	N
Pre-test			
Those taught using Tiv language	30.8824	7.54886	17
Those taught using English language	33.2000	6.94056	15
Total	31.9687	7.24896	32
Post-test			
Those taught using Tiv language	34.7059	11.3840	17
Those taught using English language	44.9333	12.53262	15
Total	39.5000	12.83393	32

From table 1 the result shows that for the pretest, the mean achievement score of those taught using English language was 30.8824, the standard deviation was 7.54886 while the posttests mean achievement score was 34.7059, the standard deviation was 11.3840. For those taught using Tiv language, the mean achievement score for the pretest was 33.2, the standard deviation was 6.94056 and posttest mean achievement score was 44.9333, the standard deviation was 12.53262. Therefore there was a mean gain of 3.8235 in those taught using Tiv language and 11.7333 in those taught using English language.

Research question 2: There is no significant difference between the mean achievement scores of male and female students taught Basic Science and Technology in Tiv language?

Table 2: Means and Standard Deviation of Pre-scores and Post-Scores of Male and Female students

	Sex	Mean	Std. Deviation	N
Pre-test	Male	31.1429	9.3707	7
	Female	30.7000	5.0804	10
	Total	30.92149	8.3456	17
Post-test	Male	33.8571	8.76410	7
	Female	35.3000	13.35041	10
	Total	34.7059	11.38401	17

From table 2 the result shows that for the pretest, the mean score of girls was 30.7 while the standard deviation was 5.0804. At the posttests, the mean score was 34.3 while the standard deviation was 9.3707. For the boys, the mean score for the pretest was 31.1429 while the standard deviation was 9.6574. At the posttest, the mean score was 31.5714 while the standard deviation was 11.7699. Therefore there was a mean gain of 3.6 in the achievement of girls and 0.4258 in the achievement of boys.

Hypotheses

Hypothesis 1: There is no significant difference between the mean achievement scores of students taught Basic Science and Technology in Tiv language and those taught in English language.

Table 3: Analysis of covariance on Posttest of students taught in Tiv and English language?

Source	Type III sum of squares	df	Mean square	F	Sig
Corrected model	835.687	2	417.843	2.838	.075
Intercept	2476.983	1	2476.983	16.821	.000
Pretest	2.149	1	2.149	.015	.905
Group	825.232	1	825.232	5.604	.025
Errol	4270.313	29	147.252		
Total	55034.000	32			
Corrected total	5106.000	31			

From table 3 the result showed that F= 5.604, P= 0.25. Therefore, p<0.05, the null hypothesis which states that, there is no significant difference between the mean achievement scores of students taught Basic Science and Technology in Tiv language and those taught in English language was rejected.

Hypothesis 2: There is no significant difference (P < 0.05) between the mean academic achievement scores of male and female students in Basic science when they are taught in Tiv language.

Table 4: Analysis of covariance on Posttest of males and females students taught in Tiv language.

Source	Type III sum of squares	df	Mean square	F	Sig
Corrected model	47.596	2	23.798	.164	.850
Intercept	568.069	1	568.069	3.926	.068
Pretest	39.024	1	39.024	.270	.612
Sex	26.279	1	26.279	.182	.676
Errol	2025.934	14	144.710		
Total	22550.000	17			
Corrected total	2073.529	16			

From table 4 the result showed that F =0.182, p= n0.676. Therefore, p>0.05, the null hypothesis which states that, there is no significant difference between the mean achievement scores

of male and female students taught Basic Science and Technology in Tiv language was accepted.

DISCUSSION OF FINDINGS

The results in table 1 showed that students taught with English language had higher mean scores than those taught in Tiv language. Also table 3 indicated that there was significant difference between the mean scores of students taught in English language and those taught in Tiv language. This finding disagreed with Bala (2014), Ezeudu (2013), and chukwu (2011) which states that students in mother tongue significantly achieved higher than those taught in English language. However, the finding agreed with the suggestions of Nsofor (1998) that, there should be some restrictions in using mother tongue in teaching science. For instance, some concepts in Basic Science have no Tiv words for them so it was very difficult to convey their meanings such once were only described and they lost their conceptual ideals.

Writing in Tiv language with Tiv letters and words are no longer going on at Basic education level, reading and writing in Tiv is not common with Tiv children for this reason they refused to respond to pretest until the reading aspect was done to them. At the posttest the researcher took it for granted that the treatment has been given so they should read, contrary inability of reading with understanding became a big factor that affected the result. It will be recall that schools do discouraged use of vernacular in other to promote English language the carryover of that mentality in the students have affected the results, many of them look at the use of Tiv language not right, uninterested and hindering them of learning what they need to learn, so they indicated serious lack of interest and that has also affected the result.

From table 2 the results showed that female students have higher mean score in the posttest than male students. Also table 4

indicated that there was no significant difference between the mean scores of male and female students taught Basic science in Tiv language. This fining is in line with other works done by Bala (2014), Ezeudu (2013), Chukwu (2011) and Fafunwa, Ba. Macaulay, I. & Sokoga J. A (1989).

Conclusion

Based on the findings, the following conclusions were drawn; the students in taught Basic science and Technology using Tiv language at upper basic education did not achieved significantly higher than their counterparts taught in English language. There was no significant difference between achievements of male and female students taught Basic science and Technology using Tiv language at upper basic education.

RECOMMENDATIONS

Base on the above conclusion the following recommendations were made; the use of Tiv language alone in teaching Basic Science and Technology at upper basic education should be discouraged, Basic Science and Technology teachers can make use of Tiv language as an instructional tool for teaching of Basic Science and Technology at Upper Basic Education.

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APPENDIX I

SCHEME OF WORK

The human excretory system:

a. The kidney

b. The skin and lungs

c. Liver and the need for excretion

A LESSON NOTE IN BASIC SCIENCE

Subject: Basic Science

Class: Upper Basic II

Average age: 14years

Date: 21/05/2014

Time: 40 minutes

Major topic: Human excretory system

Sub topic: The kidney

Specific Objectives: By the end of the lesson, the students should be able to:

1. Name the excretory organs
2. Mention at least three parts of the kidney
3. Describe how the kidney work

Entry behavior: the students can mention carbon dioxide as waste product of respiration.

Test on Entry behavior: The teacher asks the students this question. What are the waste products that are released during respiration?

Instructional Materials: Charts showing the cross section of the kidney.

Instructional procedure:

Teacher's activities Students' activities Strategies

Introduction: The teacher walks into the classroom breathing in and out deeply and looking intensively at the students. The students' being attractive to the teacher's behavior looks at the teacher.

Presentation

Step I

The human excretory system: The teacher tells the students that the waste products that are released during respiration and other activities of the body such as carbon dioxide, excess water, salts urea etc are called excretory waste. The process by which excretory wastes are removed from the body is called excretion. The human excretory system consists of different organs of the body which collectively ensure the removal of different waste products. These organs are: kidney, skin, lungs and liver. He/she writes on the board and explains the above.
The students listen to the teacher's explanations. They answer the teacher's questions when asked. They also ask questions.

Step II

The kidney: With the diagram of the kidney, the teacher explains the structure of the kidney. He/she tells students that the kidney is connected to the body's circulatory system and blood carrying excretory products from all parts of the body is purified in the kidney. There are many excretory units in the kidney known as **Nephrons** which are the unit for excretion. A section through kidney show three region called **cortex**, the inner region called **medulla** and the funnel- shaped pelvis that leads to the urinary duct called **ureter**. The **nephron** is made up of the Bowman's capsule containing the network of blood vessels called **glomerulus**. Blood reaching the kidney enters into the **glomerulus** at high pressure that sieves out protein and blood cells to be retained in the cup of the Bowman's capsule. Excess mineral salts, excess water as well as urea flow into the space in the tube. Some water and mineral salts are reabsorbed in the tubule. The liquid containing excess salts, excess water and urea is passed into the bladder as urine. Urine is passed out of the body from the bladder through the urethra. The teacher discusses the process with the students. The students make contributions to the discussion. They ask questions.

Activity for students: teacher provide model of human kidney and asks students to observed and draw the structure of the kidney showing the mains part.

Evaluation: The Teacher asks the following questions:

I. Name the excretory organs
II. Mention at least three parts of the kidney
III. Describe how the kidney works

The students answer the teacher's questions.

Summary: The teacher gives summary of the lesson to the students by writing short notes on the board.

Assignment: He/she asks the students to mention other organs of the body that helps in removing excess water in the body.

APPENDIX II

A LESSON NOTE IN BASIC SCIENCE

Subject: Basic Science
Class: Upper Basic II
Average age: 14years
Date: 22/05/2014
Time: 40 minutes
Topic: The skin and lungs
Specific Objectives: By the end of the lesson, the students should be able to:

1. Mention at least three parts of the skin and lungs respectively
2. Describe how the skin and lungs works
3. State two reasons why you must wash your body regularly.

Instructional Materials: Charts showing the cross section of the human skin.
Entry behavior: the students can mentions other excretory organs
Test on Entry behavior: The teacher reminds the students about the assignment and asks this question. What are the other organs of the body that can remove excess water in the body?
Teacher's activities Students' activities Strategies
Introduction: The teacher walks into the class and starts cleaning his or her face with handkerchief and asks students why he or she is doing so.
Presentation:
Step I
The skin
The teacher tells the students that the skin is the organ of excretion; the skin removes excess water, salt and urea in the blood in form of sweat. The skin is made up of two layers: the epidermis and the dermis. The epidermis is made up of horny layer, granular layer and sensitive malpighian layer. These serve to protect the inner structures. The dermis has sweat glands, the

sweat ducts and the sweat pores that are directly involved in excretion of sweat from the body. The sweat gland collects excess water, excess salt and urea from the blood capillaries in the dermis to form a salty liquid called sweat. The sweat flows into the sweat duct through the contraction of the muscles and passes out through the sweat pore. The teacher presents the chart and explains the skin to students.

Teacher pauses and asks students this question: what do you think the passing out of the sweat do to the body?

Students contribute by given different answers.

The teacher corrects the wrong responses from the students and put them in this way: the passing out of sweat through the skin helps to control the temperature of the body. It causes cooling. However, if the sweat dries on your skin, it may block the sweat pores and if bacteria settle on it, you may have body odour. This is why you must wash your body regularly.

Step II

The lungs: the teacher tells students that the lungs are another organ of excretion; they are used for the removal of carbon (IV) oxide that results from respiration in the body. Carbon (IV) oxide is dissolves in the blood plasma and is carried to lungs through the blood vessels. The gas diffuses through the capillaries into the alveoli. When contraction of the chest cavity takes place, carbon (IV) oxide flows from alveolus to the bronchioles, to the bronchi, to the trachea and out through the nostrils.

Evaluation: The teacher asks the students to;

1. Mention at least three parts of the skin and lungs respectively
2. Describe how the skin and lungs works
3. State two reasons why you must wash your body regularly.

Summary: The teacher puts up some notes on the topic for the students to copy in their notebooks.

Assignment: The teacher asks the students to draw the structure of the human skin using their UBE Basic Science for Junior secondary school 2.

APPENDIX III

A LESSON NOTE IN BASIC SCIENCE III

Subject: Basic Science
Class: Upper Basic II
Average age: 14years
Date: 23/05/2014
Time: 40 minutes
Topic: The Liver and the need for excretion
Specific Objectives: By the end of the lesson, the students should be able to:

1. Mention at least three functions of the liver
2. Give at least two reasons while excretion is important in the human body.
3. Mention at least two treatment procedures for managing kidney disease.

Instructional Materials: Charts showing the diagram of the liver
Entry behavior: students are aware that the liver is an excretory organ
Test on Entry behavior: The teacher reminds the students about the excretory organs of the body.
Teacher's activities Students' activities Strategies
Introduction: The teacher walks into the class and asks the students to mention excretory organs they know?
Presentation:
Step I:
The liver and it functions: The teacher tells the students that the liver unlike other excretory organs does not pass out any waste directly but involved in changing the chemical composition of some substances that are harmful forms. The liver is thus involved in the following excretory functions:

1. Conversion of death red blood cells into bile that is useful in digestion.

2. Conversion of excess amino acids into ammonia and consequently urea that can be easily removed from the body through the kidney.
3. Conversion of poisonous alcohol, nicotine and pesticide to non-poisonous substance. The teacher presents the chart an explains the liver

Step II:

The need for excretion

The teacher tells the students that excretion is the removal of waste products from the human body. If this process of excretion does not take place wastes accumulate in the body may poison or destroy the body. This will consequently result in sickness and death. For example, excess salt, water and urea in the blood results in abnormal swelling of body parts that can lead to death if not properly managed through the advanced process of dialysis or kidney transplant. In either of the two treatment procedures mentioned, a lot of money is required and the victim suffers much pains.

Students listen to the teacher, asks question and contributes by answering questions from the teacher.

Evaluation: The teacher asks the students the following questions

1. Mention at least three functions of the liver
2. Give two reasons while excretion is important in the human body.
3. Mention two treatment procedures for managing kidney disease.

Summary: The teacher writes some short notes on the board for the students to copy.

Assignment: The teacher asks the students to find out other benefits of excretion in the human body.

APPENDIX IV

TOM U IWASHIMA U EREN

Igbinda i akaa a alu a injaga aduen ke iyol i orumache

a. Ahi

b. kwavyolough man huhu

c. mtebam man iwasen i akaa alun a injaga duen ke iyol i orumache kera.

Kwaghgeren sha gbenda u tesen Mhii u mfeuigbetar

Subject: mhii u mfeuigbetar

kelase: nongu uhar ke koroji

Anyom: pue kaa anyiin

Wer ayang: 21/05/2014

Shighe: miniti akunduahar

Tinekwagh ivesen: igbenda i akaa alun a injaga a duen ke iyol i orumache:

Tinekwagh i kyiriki: Ahi

Kwagh u i soo er ifa: shighe u a bee ityesen ne yo mbayev vea fa u:

1. Yilan ati a alegh a ka a wase u dughun akaa a alu a injaga ke iyol i orumache
2. Yilan aveer a ahi yinan atar ga
3. Oron er ahi ka a er tom yo

Ieren i nyoronker: mbayevmakeranta vea feityo u yilan carbon (IV) oxide er ka kwagh u lun a inja ken iyol ga shie u or nan oo yo.

Iyolkaren sha Ieren i nyoronker: ortesen una pine mbayevmakeranta mpin ne; ka nyi kwagh ka i lu i saan ishe shie or nan oo?

Ikyav mbi tesenkwagh: foto u ikpera ahi shamin yo.

Tom u ortesen una lu eren, Tom u mbayevmakeranta vea lu eren

Mhii

Ortesen una nyor ken kelase, una oo akyondu akyondu shi ahide a oo asen asen una kenger mbayevmakeranta sha shi jighlii.

Nahan ieren i ortesen la i a doo mbayevmakeranta nahan vea lu kenger un.

Higen ityesen a hii

Iaven i sha I

Igbinda i akaa alun a injaga aduen ke iyol: ortesen una or mbayevmakeranta er akaa a alu a injaga a ka adue or ke iyol shighe u or kanan oo shin nana er kwagh yo ka; carbon (Iv) oxide, mngerem, bar, urea kua mbagen, ka i yila akaa ne er akaa a lun a injaga (Excreta or excretory product). Gbenda u akaa a lun a injaga ka adue ke iyol i or yo ka i yila er **mdugh u akaa a lun a injaga ken iyol (removal of waste products)**. Or umache ngu a alegh kposo kposo a ka azua uwasen u dughun akaa a a lu a injaga ke iyol yo. Alegh shon yo ka: ahi (kidney), kwavyolough (skin), huhu(lungs) man mtebam (liver).

Ortesen una nger sha kpande shi ataiwanger shamin. Mbayevmakeranta alu ungwan iwanger i ortesen la. Vea na mbamlumun sha mbampin mba ortesen la shighe u una pine yo. Shi ve kpa vea pine mbavev.

Iaven i sha II

Ahi: ortesen a too foto u ahi, una taiwanger sha mlu u ahi. Una kaa a mbayevmakeranta er ahi zua vea mzende u awambe ke iyol man awambe a ka atoo akaa a lun a injaga ke aleghayolough agen la cii ka ahi ka akile a awanger ye. Ahi nga a ajighir kpishi aduen a akaa alun a injaga ke iyol, mba yer a er **Nephrons**. Aluer unenge sha ahi yo nga aveer atar a i yer er cortex, u ke ato la er medulla man u alu er ka tsonka a zua sha ho mnyande la er ureter. **Nephron ngu a** Bowman's capsule un gema ngu a igbinda awambe i iyer er **glomerulus.** Awambe ka a vaan pe ahi alu yo a nyor ke **glomerulus** sha utaha nahan a tsaa a adue a protein man blood cells a hide a haa shin cup u iyer er Bowman's capsule la. Bar, mngerem kua urea mba ngeenganden la ka ve kua ve yem ke ho u ulu ke ahi la. Mngerem ma ngeenganden man bar mbangen ka ve hide ve nyor ke iho ikiriki i ke ahi. Zaakwagh u ka u lu a bar, mangerem man urea mbangeengaden la ka u yem kan

ikpamnyande nahan u hingir mnyadem. Mnyadem ma ke ikpamnyande la ka ma due ke iyol i or sha kwagh u iyer er ho mnyande la (urethral).

Ortesen una tese er kwagh ne ka a er yo, mbayevmakeranta afa shi vea na mbamhen vev sha kwagh ne. Shi vea pine akaa.

Tom u mbayevmakeranta: ortesen una ver foto u ahi a or er mbayevmakeranta ve nenge dedoo shi ve kpera ve tese aveer a ahi alu amin la.

Tom Nengen: ortesen una pine mbayevmakeranta mba mpin mban:

I. Yila ati a alegh a ka a wase u duen a akaa a alu a injaga ke iyol i orumache yo?
II. Yila aveer a ahi atar a u fe yo?
III. Or er ahi ka a er tom yo?

Mbayevmakeranta ana mlumun sha mbampin.

Asavasav: ortesen una sav kwaghoron sha ityesen i ane mbayevmakeranta la sha u ngeren kwagh u atese la sha kpande tionoon.

Tom u ken ya: ortesen a kaa a mbayev makeranta er vea yem yo ve nger ati a alegh agen a ka a wase u duun mngerem ma ngeenganden ken iyol yo.

APPENDIX V

Kwaghgeren sha gbenda u tesen Mhii u mfeuigbetar

Subject: mhii u mfeuigbetar

kelase: nongu uhar ke koroji

Anyom : pue kaa anyiin

Wer ayang: 22/05/2014

Shighe: miniti akunduahar

Tinekwagh: kwavyolough man huhu

Kwagh u i soo er ifa: shighe u a bee ityesen ne yo mbayev vea fa u:

1. Telen alegh atar a kwavyolough man shi huhu voughvough
2. Oron er kwavyolough man huhu ka ve er tom yo
3. Telen atoakyaa ahar a i doo u saa u oon iyol felefele yo

Ikyav mbi tesenkwagh: foto u ikpera kwavyolough shamin yo.

Ieren i nyoronker: mbayevmakeranta afatyo u telen alegh agen a ka awase udughun akaa a lun a injaga.

Iyolkaren sha ieren i nyoronker: ortesen una umbur mbayevmakeranta tom u ke ya man una pine mpin. Kahanma alegh agen a a faityo dughun mgerem ma geen ken iyol?

Tom u ortesen una lu eren, Tom u mbayevmakeranta vea lu eren

mhii:

ortesen una zende anyor ken kelase man a hii u ovugh ishigh nagh sha hanki man una pine mbayevmakeranta er, ernan man un lu eren nahana?

Higen ityesen a hii

Iaven i sha I

Kwavyolough

Ortesen una or a mbayevmakeranta er kwavyolough ka iliegh ki dughun akaa a alu a injaga ke iyol. Kwavyolough ka u dugh mngerem ma ngeenganden, bar, man urea ke awambe, ka iyila kwagh ne er iusa. Kwavyolough pav ker kwahar; epidermis man dermis. Epidermis ngu a kpar u iyer er horny, granular man kpar u malpighian u a ngor fan er zayol ngula. Ukpar mban ka ve kuran u

kenato u yolough. Dermis ngu a glands mba iusa, igbinda iusa man ananevmba iusa mba ka ve wase u duun iusa ken iyol. Igbinda iusa ka i kohol mngerem ma ngeenganden, bar man urea ke igbila awambe ke kwavyolough u i yer er dermis man ve hingir zaa u lun a bar u ka i yila er iusa la. Iusa i kua i nyor shin sweat duct sha gbenda u mtsule u inyam man ma due sha ananevmba iusa. Ortesen ator foto la atese mbayevmakeranta er ve nenge shi una ta iwanger.

Ortesen a tamber man apine mbayevmakeranta kwaghne. Ka nyi ka i er shighe u iusa ka i adue ken iyol?

Mbayevmakeranta vea na mba mhen vev kposo kposo.

Ortesen una sor mbamlumun mba mbayevmakeranta vea na la man una ver ve nahan er: mdue u iusa sha kwavyolough ka awase u panden shin seer mdohor u yolough. Ka a wase iyol idohor. Nahan kpaa, aluer iusa uma sha kwavyolough yo, i a fatyo u chilin a ananev mba iusa man aluer mbaanyigor mbachukuchuku mba shami yo iyol you i a huma. Sha ciu nahan yo doo pe u oon iyol you felefele.

Iaven i sha II

Huhu: ortsensn una or a mbayevmakeranta er huhu ka iliegh ki gen ki ka ki wase u duun akaa a lun a injaga; ka a duu carbon (IV) oxide u ka alu ken yol shighe u or nan oo la. Carbon (IV) oxide ka a nyor ken zaa awambe man igbila awambe i too un i yem amin sha huhu. Nahan gas ne ka adue hen pe anger la anyor pe alu ga la (diffuses) sha iwasen i capillaries man anyor ken alveoli. Shighe u vanger ka una tsulen yo carbon (IV) oxide a kua ken alveolus a nyor ken bronchiole shi a due anyor ken bronchi adue shi anyor ken gongur u ombor man a due ken iho i ahenga.

Tom nengen: ortesen una pine mbayevmakeranta akaane:

1. Tee alegh atar a kwavyolou man shi huhu a u fe yo?
2. Or er kwavyolou man huhu ka ve er tom yo
3. Tee atoakyaa ahar a i doo u saa u oon yol felefele yo

Asavasav: ortesen una nger kwagh sha itinekwagh i a tese la er mba yev ve nger ken ityakerada ve.

Tom u ken ya: ortesen a or mbayevmakeranta er vea yem yo, ve kpera foto u kwavyolou ve nenge ken tekerada u mhii u mfeuigbetar u UBE nogo uhar u koloji.

APPENDIX VI

Kwaghgeren sha gbenda u tesen Mhii u mfeuigbetar

Subject: Mhii u mfeuigbetar

Nongo: uhar ken koroji

Anyom: 14years

Wer ayange: 23/05/2014

shighe: miniti akunduahar

Tinekwagh: mtebam man er igbe u akaa a lun a injaga aa due ken yol yo.

Kwagh u i soo er ifa: shighe u a bee tyesen ne yo mbayev vea fa u:

1. Telen aveer atar a mteba
2. Na atyoakyaa ayina ahar ga aduun akaa a lun a injaga ken yol i or
3. Telen igbyinda ihar i ka i nongo a or u nan gbe angev sha ahi yo

Ikyav mbi tesenkwagh: foto u ikpera mtebam shamin.

Ieren i nyoronker: mbayevmakeeranta fa er mtemban ma lu iliegh ki duun akaa a njaaga ken yol yo.

Iyolkaren sha ieren i nyoronker: ortesen una umbur mbayevmakeranta kwagh u alegh a duun akaa a lun a injga ken yol.

Tom u ortesen una lu eren, Tom u mbayevmakeranta vea lu eren

mhii**:** ortesen una nyor ken kelase man una pine mbayevmakeranta er ve tee ati a alegh a ka awase u duun akaa alun a injaga ken yol, a ve fe yo.

Higen ityesen a hii

Iaven i sha I

Mtebam man tom u ma: ortesen una or a mbayevmakeranta er mtembam ma eren tom er alegh agenegh a duun akaa a injaaga ken yol la nahan ga. Ma duun akaa a injaaga ma haan ken won jiilii ga kpa ka ma geman u chemical mbabov mba ken yol la ve

kera lu a akume ubo ga. Nahan mtebam ka ma eren akaa na sha u wasen uduun akaa a a lu a injaga ken iyol yo:
Ka ma gema red blood cells mba ve kpe la ve hingir mlem ma ma wasen mnyer u kwaghyan ken yol. Mtebam ka ma gema amino acids ugeen la ahingir ammonia man adue ken iyol sha mnyade a ichan shio sha iwasen i ahi.
Ka ma gema alcohol ulun a a megh, nicotine man pesticide ve hingir mba kera lun a a megh ga. Ortesen ator foto la atese mbayevmakeranta kwagh amin.

Iaven i sha I

Er igbe u akaa a lun a injaga aa due ken yol yo
ortesen una or mbayevmakeranta er gbenda u dughun akaa a alu a iwasen ga ken iyol i orumache kela la ka iyila er **mdugh u akaa a lun a injaga ken iyol**. Aluer gbenda udughun akaa ne ngu ga yo akaa a alu a iwasen ke yol ga aa kohol ke yol nahan alaaga aa va a angev, megh shin aa na vihiyol. Kwagh ne una fatyo unan mnyionom shin ku je kpaa. Negese ikyav, bar, mngerem man urea mbangeenganden ke awambe ka ve na yolmulan kwagh ne ka ana ku aluer ka a nenge shami tsembelegh sha gbenda u vesen uka iyila er dialysis shin u uduun ahi a adooga la sha geman dughun ihi mom idedoo ken orgen wan ga yo. Sha igbinda ihar isoron kwagh ne cii ka igba pe avihi inyaregh kpishi shi or u ange la ka aya ichan kpishi sha mnyion.
Mbayevmakeranta vea lu ungwan ken ortesen shi vea lu pinen akaa shi nan mba mlumun sha mba mpin.

Tom nengen:: ortesen una pine mbayevmakeranta akaa ne:

1. Tee aveer atar a mtembam a u fe
2. Na atyoakyaa ahar a mduu u akaa a injaaga ken yol i or a lu hange hange yo.
3. Tee igbyinda ihar i ka i nongo a or u nan gbe angev sha ahi yo

Asavasav: ortesen una ger kwagh sha kpande tionoon er mbayevmakeranta ve ger.

Tom u ken ya: ortesen una or a mbayev makeranta eer ve ker atyoakyaa agen kpa a a idoo u akaa a alu a injaga aa duen ken yol sha yo.

APPENDIX VII

BASIC SCIENCE ACHIEVEMENT TEST (BSIT)

Name; _____ Class; _____ Sex; _____

Instruction: *Answer all the questions by marking this sign (o) on the letter that corresponds with the correct answer.*

1. The following are the waste products in the body except (a) protein (b) carbon (IV) oxide (c) urea (d) excess salt
2. Which of the following is not excretory organ (a) lungs (b) liver (c) tongue (d) skin
3. Excretory units in the kidneys are called (a) medulla (b) cortex (c) ureter (d) Nephrons
4. The liquid containing excess salts, excess water and urea that passed into the bladder is called (a) urine (b) sweat (c) water (d) salt
5. What passes out of the body through urethra (a) sweat (b) urine (c) carbon (IV) oxide (d) excess water
6. ----- causes cooling of the body (a) urine (b) sweat (c) excess water (d) excess salt
7. One of the following is not part of the skin (a) Nephrons (b) epidermis (c) dermis (d) sweat glands
8. Which of the following causes body odour (a) excess water (b) bacteria (c) excess salt (d) urea
9. Sweat passes out of the body through (a)sweat duct (b)sweat glands (c) sweat pore (d) granular layer
10. Which of the following parts of the skin serve to protect the inner structures (a) epidermis (b) dermis (c) muscles (d) sweat gland
11. When contraction of the chest cavity takes place what happens (a) carbon (IV) oxide flows from alveolus to the bronchioles (b) trachea burst (c) carbon (IV) oxide flows from bronchi to alveolus (d) carbon (IV) oxide flows from nostrils to trachea
12. Which of the following organs does not directly pass out excretory waste (a) liver (b) lungs (c) skin (d) kidney

13. The liver converted red blood cells into ------ (a) bile (b) urea (c) nicotine (d) ammonia
14. In the liver amino acids is converted into ----- (a) bile (b) ammonia (c) urine (d) nicotine
15. Which of the following is the function of the liver? (a) conversion of poisonous alcohol to non poisonous (b) protection of inner structures (c) removal of excess water (d) removal of excess salt
16. Indicate the waste product removed by the kidney (a) sweat (b)urine (c) carbon (IV) oxide (d) nicotine
17. The removal of harmful waste products of metabolic activities from human body is called …. (a) digestion (b) respiration (c) excretion (d) reproduction
18. Which of the following can result to abnormal swelling of the body parts (a) over feeding (b) excess blood in the body (c) insufficient food and blood in the body (d) excess of water, salt and urea in the body
19. One of the following is an advanced process of managing kidney problem (a) kidney planting (b) kidney transfer (c) kidney transplanting (d) kidney transportation
20. Waste accumulation in the body causes the following except (a) good health (b) sickness (c) death (d) body destructions
21. Human being has how many kidneys? (a) two (b) three (c) one (d) four
22. Which of the following purified blood in the body (a) lungs (b) liver (c) kidney (d) heart
23. Which of the following dissolves in the blood and is carried to the lungs through the blood vessels (a) plasma (b) carbon (IV) oxide (c) excess water (d) excess urea
24. Gas diffuses through the capillaries into ….. (a) alveoli (b) bronchioles (c) trachea (d) nostrils
25. How many regions have the kidney? (a) five (b) seven (c) four (d) three

26. Which of the following is the name of a region in the kidney (a) glomerunus (b) Bowman's capsule (c) medulla (d) nephrone
27. The blood filtration take place in the …. (a) medulla (b) ureter (c) glomerulus (d) cortex
28. Which of the following is the inner region of the kidney (a) medulla (b) cortex (c) ureter (d) blood vessels
29. The skin passes out the following waste products except (a) faeces (b) excess water (c) excess salt (d) excess urea
30. The following are excretory wastes except (a) urine (b) sweat (d) carbon (IV) oxide (d) faeces

APPENDIX VIII

Ikyaren i fan mzehemen u mbayevmakeranta ken mhii u mfeugbyetar

Iti; _____ Kelase; _____Nomsoor shin kwase;_____

Wakyo sha akaa ne:*Na mlumun sha mba mpin mban cii sha u eren ikyav ne (o) sha ishange baachaa i izua sha mlumun u alu shami la.*

1. Akaa ne cii ka alun a injaga ke iyol saa nyi tsee ilu a inja (a) protein (b) carbon (IV) oxide (c) urea (d) bar ungeenganden
2. Ka uhan alu iliegh ki dughun akaa a lun a injaga ke iyol ga (a) huhu (b) mtembam (c) nombor (d) kwavyolough
3. Ajighir adughun akaa alun a injaga a alu ke ahi la mba yer a er nyi (a) medulla (b) cortex (c) ureter (d) Nephrons
4. zaakwagh u ulu er ka mngerem nahan ulu a bar ugeenganden , mgerem ma ngeenganden man urea shami, ka uyem ke ikpamnyade la mba yer u er (a) mnyadem (b) iusa (c) mgerem (d) bar
5. Kanyi ka i due ke iyol i or sha iwasen i homnyade (a) iusa (b) mnyadem (c) carbon (IV) oxide (d) mgerem ma ngeenganden
6. Ka nyi ka ina iyol i dohor (a)mnyadem (b) iusa (c)mngerem ma ngeenganden (d) bar u ngeenganden
7. Mom ke akaa ne ka iliegh ki kwavyolough ga (a) Nephrons (b) epidermis (c) dermis (d) sweat glands
8. Ka uhan ke akaa ne ka ana iyol human (a) mgerem ma ngeenganden (b) mbaanyingor mbachukuchuku (c) bar u ngeenganden (d) urea
9. Iusa ka i due hana ke iyol (a) gbenda iusa (b) gland mba iusa (c) ananev mba iusa (d) kpar u granular
10. Ka uhan ken alegh a kwavyolough ka a wase u kuran akaa a ken atoyol (a) epidermis (b) dermis (c) mumnyam (d) glands mba iusa
11. Vanger ka una tsulen yo ka nyi ka i er (a) carbon (IV) oxide ka a kua a nyor ken alveolus adue a yem ke

bronchioles (b) gongur u ombor ka a hembe (c) carbon (IV) oxide ka akua a nyor ke bronchi adue a nyor ke alveolus (d) carbon (IV) oxide akua anyor ke ahenga akar anyor ke gongur u ombor

12. Ka uhan ken alegh ne a dughun akaa a lun a injaga ken yol jighliiga (a) mtembam (b) huhu (c) kwavyoloug (d) ahi
13. Mtembam ka ma gema cells mba awambe anyian ve hingir ------ (a) mlem(b) urea (c) nicotine (d) ammonia
14. Mtembam ka ma gema amino acids ahingir ----- (a) mlem (b) ammonia (c) mnyadem (d) nicotine
15. Ka uhan ken akaa ne ilu tom u mtembam ke iyol (a) ugeman alcohol ulun a a megh hingir ulun a a megh ga (b) u kuran akaa a ken atoyol (c) udughun mgerem ma ngeenganden (d) udughun bar u ngeenganden
16. Ka kwagh uhan heen ahi ka awase u dughun ke iyol (a) iusa (b) mnyadem (c) carbon (IV) oxide (d) nicotine
17. Gbenda udughun akaa abo a a lu a injaga ke iyol la ka i yila er nyi …. (a) mnyer u kwagh yan ke awambe (b) mnyer man mdugh u ahumbe ke iyol (c) mdugh u akaa a lun a injaga ke iyol (d) mtser u tsombor
18. Ka uhan ken akaa ne ka ana iyolmulan (a) kwagh u yan kpishi (b) mnger u awambe ke iyol (c) myina u kwaghyan man awambe ke iyol (d) mnger u mngerem, bar man urea ke iyol
19. Mom ken akaa ne ka gbenda u vesen u soron or u nan lu a zayol sha ahi (a) uloon ahi (b) umusan ahi vea orgenegh (c) uduun ahi a adooga la sha geman duun ihi mom idedoo ke iyol i orgen wan (d) uzenden a ahi sha
20. Akaa a saanishe ka a kohol ke iyol kpishi yo ka ana akaa ne ke iyol saa nyi tsee ka ana ga (a) mkpeyol (b) angev (c) ku (d) vihiyol
21. Or umache ngu a ahi ame? (a) ahar (b) atar (c) mom (d) anyiin

22. Ka uhan ke akaa ne ka kile awambe awanger waen ke iyol (a)huhu (b) mtebam (c) ahi (d) shima
23. Ka uhan ka anyor ke awambe man awambe atoo ayem amin sha huhu (a) plasma (b) carbon (IV) oxide (c) mngerem ma ngeenganden (d) urea ungeenganden
24. Ahumbe ka anyor sha igbilaawambe man ayem hana ….. (a) alveoli (b) bronchioles (c) gongur (d) iho ahenga
25. Ahi nga aveer ame? (a) ataan (b) ataan karahar (c) anyiin (d) atar
26. Ka uhan a lu iti i veer u ahi (a) glomerunus (b) Bowman's capsule (c) medulla (d) nephrone
27. Ka hanma ijighir ka i tsaa awambe (a) medulla (b) ureter (c) glomerulus (d) cortex
28. Ka uhan ken akaa ne alu u kenato u ahi (a) medulla (b) cortex (c) ureter (d) blood vessels
29. Kwavyolough ka u dugh akaa ne ke iyol saa nyi tsee u dughunga (a) akongu (b) mgerem (c) bar (d) urea
30. Akaa ne nga a inja ke iyolga saa….. (a) mnydem (b) iusa (d) carbon (IV) oxide (d) akongu

APPENDIX IX

Marking scheme

1. A
2. C
3. D
4. A
5. B
6. B
7. A
8. B
9. C
10. A
11. A
12. A
13. A

14. B
15. A
16. B
17. C
18. D
19. C
20. A
21. A
22. C
23. B
24. A
25. D
26. C
27. C
28. A
29. A
30. D

Reference to this paper should be made as follows: Johnson Mhile Yaapera and Sunday Ade Adeniran (2019) Effects of Mother Tongue on Students' Achievement in Basic Science and Technology at the Upper Basic Education in Katsina-Ala Local Government Area of Benue State, Nigeria. *J. of Education and Leadership Development Vol. 11, No. 3, Pp. 23-60*