



AVAILABILITY AND UTILIZATION OF INSTRUCTIONAL MATERIALS FOR EFFECTIVE TEACHING OF FISH PRODUCTION TO STUDENTS IN SENIOR SECONDARY SCHOOLS IN BENUE STATE, NIGERIA

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ABSTRACT

This study paper assessed the availability and utilization of instructional materials for effective teaching of fish production to students in senior secondary schools in Benue State, Nigeria. Four specific objectives and four research questions were developed to guide the study. Descriptive survey research design was adopted for the study. The study was carried out in Benue State. The population of the study was 284 teachers of Agricultural science. The sample for the study was 142 teachers of Agricultural science obtained through stratified random sampling technique. A Fish Production Instructional Material Questionnaire (FPIMQ) was used for data collection. Six field work assistants helped in administering and retrieving the questionnaire. The data collected were analyzed using descriptive statistical tools such as frequency table, percentage, and mean scores. The results of this study revealed that out of all the instructional materials recommended for teaching fish production to students, 8 of them are available, 5 are accessible, and 8 are often utilized by teachers in senior secondary schools. The study also revealed that 12 challenges were encountered by teachers in accessing and utilizing available instructional materials in fish production in senior secondary schools in Benue State. It was recommended that teachers of Agricultural science should improvise some of the instructional materials lacking in the school locally, among others.

Keywords: availability, utilization, instructional materials, fish production.

INTRODUCTION

Fish is an aquatic “cold blooded” animal. It lives in water and the body temperature changes with the temperature of the surrounding environment. Fish is used primarily as human food because it is rich in protein, iron, zinc, magnesium, phosphorus, calcium, vitamin A and C while marine fish is a good source of iodine (Asogwa, 2012). The author added that fish is important in that:

- the skin of some cat fish makes useful leather and polishing material.
- the stem of fishes yield substances that when coated are used as glass beads to make beautiful artificial.
- fish oil is used for human consumption and manufacturing of soap.
- some species of fishes are used to beautify aquarium.
- fishes are used for educational and research purposes.
- whale fish especially clupeid, anchovy and other species are used for fish meal or condiment.

The consumption of fish is drastically increasing because it has low calories and cholesterol levels with high content of protein. The need to produce more animal proteins for human consumption has led to fish production in specially constructed ponds.

Fish production is the process of raising fish in an enclosed area for use (Benson, 2011). It is the principal form of aquaculture which involves raising fish commercially in tanks or enclosures, usually for food (Stephanie, 2011). (Oluwatomi, 2012) opined that fish production is ancient practice which has many

profitable opportunities because it involves raising fish in tanks or enclosures, usually for food or commercial purposes. Writing on the importance of fish production, Daramola, Igbokwe, Mosuro and Abdullahi (2008) stated that it is a source of food for man as it is a rich source of animal protein, supplying essential amino-acids and vitamins, serves as a source of raw materials for industries, income generation to producers, provides employment opportunities for interested individuals, serves as means of foreign exchange and efficient land utilization and conservation of natural resources. The Federal Government appreciates the importance and impacts of fish production in this country and reviewed its production in the curriculum of Agricultural Science through the Nigerian Educational Research and Development Council (NERDC, 2009). The objectives of fish production in the curriculum for senior secondary school are:

1. for students to have fishery as a trade for livelihood on completion of fish studies.
2. To produce fish that will increase the nutritive value of man's diet.
3. to be able to meet with the gap between the demand for fish and its supply.
4. to bridge the gap between poverty and hunger.

The achievement of these objectives depends on several factors among which include teachers' competence and instructional materials.

A teacher, according to Tarum (2009) is someone who impacts knowledge and skills to students and prepares them with the vision of being leaders of tomorrow through motivated educational system. Soni (2012) described a teacher as a leader who is always dynamic and believes in change and have the capacity to prepare future leaders and develop in them the skills that they may need to succeed. Teachers, in this context, refer to individuals who are trained technically and pedagogically in agriculture and are charged with the responsibility of impacting knowledge and skills in fish production to students in senior secondary schools. These teachers discharge their duties to students effectively with the use of instructional materials in fish production.

Instructional materials are objects used by a teacher in passing across essential facts of a lesson to students to facilitate their understanding and appreciation of the objectives of the lesson. Onyemezi (1998) explained instructional materials as resources or teaching materials which a teacher utilizes in the course of presenting a lesson in order to make the content of the lesson understandable to the learner. Nwachukwu (2008) postulated that one of the principles of vocational agriculture is that the instructional materials to be used in training the learners should be a replica of what is obtained in the field or industry. Abimbola and Udonsoro (1997) posited that instructional materials are two or three dimensional aids used by a teacher in order to save students from wondering in imagination and to help their understanding. According to Agbulu and Wever (2011), instructional materials are important because they are used for the transference of information from one individual to another, help the teacher in extending his learner's horizon of experience, stimulate learners' interest and help both teachers and students to overcome physical limitations during the presentation of subject matter, among others. The instructional materials required for effective teaching of fish production to students in senior secondary schools include nursery tanks/ponds, demonstration ponds, scoop nets, hatching troughs, aquaria tanks, compounded feeds, charts and pictures, video clips (NERDC, 2009). It is the view of the council that the recommended instructional materials of fish production in the curriculum should be made available in schools by the school authority.

Availability, in the opinion of Ibrahim (2007) refers to the condition of being obtainable or accessible at a particular point in time. It expresses how a material can easily be gotten and used for a particular purpose and time. It also states how operable or usable resources are upon demand to perform its designated or required functions. In this study, availability means the condition with which teachers have access and make use of functional instructional materials for effective teaching of fish production to students in senior secondary schools. It refers to the quality, quantity, functionality and disposability of such instructional materials to teachers at every point in time for effective utilization.

Utilization, according to Raghu, (2009) is the primary method by which asset performance is measured and business determined. It is the transformation of a set of input into goods or services (Subba, 2009). It

involves creation of value in things. Utilization, in this context, refers to the rate or how often an instructional material in fish production is put into use or services by teachers of agriculture in senior secondary schools. Utilization of instructional materials depends on their availability in the school.

Due to the fact that fish production is given a specific curriculum with new objectives for senior secondary schools, it becomes absolutely necessary to ask: what are the instructional materials in fish production available in schools as recommended by the Nigerian Education and Development council (NERDC) in the curriculum, how accessible are they to teachers in schools and how often are they used by teachers for effective instruction? Positive answers to the questions could be used to predict the effectiveness of students' learning in fish production. This will likely enhance the performance of the senior secondary school students in both internal and external examination, their interest and employability in fish production industry on graduation.

Statement of Problem

The Agricultural science curriculum reform by NERDC (2009) made fish production a single subject for students in senior secondary schools 1 to 3 as against its initial position in the entire curriculum of agricultural science. This implies that new interest, knowledge, skills and instructional materials need to be acquired in order to achieve the stated objectives. On the contrary, the researchers observed that among all the elective subjects in agriculture, most secondary school authorities selected fish production for their student but still implement it the same way fish production was in the former curriculum. In an interaction with some agricultural science teachers in 18 secondary schools visited in a pilot study in Benue State, it was realized that many instructional materials in fish production are lacking. Even the few available in the schools are not in good condition while teachers hardly have easy access to the few available ones. This became a concern to the researchers because of what would be the interests, competence and performance of the students in fish production on graduation if they are not trained with relevant and current instructional materials in fish production.

Purpose of Study

The purpose of this study was to access the availability and utilization of instructional materials for effective teaching of fish production to students in senior secondary schools in Benue State, Nigeria. Specifically, the study determined:

1. available instructional materials in fish production in senior secondary schools.
2. extent to which the available instructional materials in fish production are accessible to teachers in senior secondary schools.
3. frequency at which the available instructional materials in fish production are used by teachers in senior secondary schools.
4. challenges encountered by teachers in utilizing available instructional materials in fish production in senior secondary schools.

RESEARCH QUESTIONS

1. What instructional materials in fish production are available in senior secondary schools?
2. To what extent are the available instructional materials in fish production accessible to teachers in senior secondary schools?
3. How often are the available instructional materials in fish production used by teachers in senior secondary schools?
4. What are the challenges faced by teachers in utilizing the available instructional materials in fish production in senior secondary schools?

METHOD

A descriptive survey research design was adopted for the study. This design, according to Nworgu (2006), is a design in which group of people or items is studied by collecting and analyzing data from a few people, or items considered to be representative of the entire group. The study was carried out in Benue State. The population of the study was two hundred and eighty-four (284) teachers of Agricultural science in senior secondary schools in the three education zones in Benue State. The sample for the study was one

hundred and forty-two (142) teachers obtained through stratified random sampling technique based on three (3) education zones in the State. Fifty-seven teachers were selected from Makurdi Education Zone, forty-five from Otukpo Zone and forty from Obi Zone. The total number of 142 respondents corresponds to a 50% sample size. This is in agreement with the statement of Boll, Boll and Gall in Uzoagulu (1998) which stated that when a defined population of a study is less than one thousand, 50% could be used to reduce sampling error. A Fish Production Instructional Material Questionnaire (FPIMQ) was used for data collection. The questionnaire contained 65 items which were grouped into four sections: A, B, C and D. The items in section A were structured based on a two-point rating scale of available or not available while items in sections B, C and D were structured on a four-point rating scale on the accessibility, utilization and acceptance thus: highly accessible/utilized/accepted, averagely accessible/utilized/accepted, slightly accessible/utilized/accepted and not accessible/utilized/accepted with corresponding values of 4, 3, 2 and 1 respectively.

Six field work assistants who were familiar with the zones were recruited and trained locally on what to do when administering and retrieving the questionnaire. One hundred and forty-two copies of the questionnaire were administered to the respondents but one hundred and forty-one were retrieved. The data collected were analyzed using descriptive statistical tools such as frequency table, percentage, and mean scores. In order to determine the degree of agreement or disagreement in each of the statements in the questionnaire, values were assigned to the scale used. The figure 50% and 2.50 were used to establish cut off points for judgment. The decision rule was that a percentage of 50% or above was considered available while a percentage below 50% was considered not available. A mean of 2.50 or above was considered accessible, utilized or accepted while a mean below 2.50 was considered not accessible, not utilized or not accepted.

RESULTS

The results of the study were obtained from the data collected and analyzed as shown in the tables below.

Research Question 1

What instructional materials in fish production are available in senior secondary schools?

Table 1 revealed that amongst the 22 instructional materials recommended by the NERDC (2009), as required by teachers for effective teaching of fish production to students, only 8 instructional materials were considered available in schools and they are: pH meter, Thermometer, Microscopes, Magnifying glass, Scoop nets, Plastic sieves, Compounded feeds, Charts and pictures. This is because the percentage availability of the instructional materials was 50% or above which were above the cut-off point. The remaining 14 instructional materials had their percentage availability below 50% which is the cut-off point. This indicates that they were not available on the average.

Table 1: Frequency and Percentage Ratings of the Responses of Teachers on the Availability of Instructional Materials in Fish Production.

S/N	Instructional materials	Available	Not Available	Percentage (%)		Decision
				A	NA	
1	DO(Dissolved Oxygen) meter	105	145	42	58	Not available
2	pH meter	190	60	76	24	Available
3	Conducting meter	65	185	26	74	Not available
4	Thermometer	180	70	72	28	Available
5	Water test kits	63	187	25.2	74.8	Not available
6	Microscopes	192	58	76.8	23.2	Available
7	Magnifying glass	175	75	70	30	Available
8	Aquaria tanks	65	185	26	74	Not available
9	Hatching troughs	83	167	33.2	62.7	Not available
10	Nursery tanks/ponds	20	187	8.7	90.3	Not Available
11	Demonstration pond	35	215	14	86	Not available
12	Scoop nets	203	47	81.2	19.8	Available
13	Aerators and accessories	10	240	4.0	96.0	Not available
14	Plastic sieves	209	41	83.6	23.4	Available
15	Compounded feeds	150	100	60	40	Available
16	Grinding machine	43	207	17.2	82.8	Not available
17	Charts and pictures	206	44	82.4	17.6	Available
18	Video clips in fisheries	75	175	30	70	Not available
19	Pelleting machine	67	183	26.8	73.2	Not available
20	Dissecting kits	98	152	39.2	60.8	Not available
21	Water pumps	100	150	40	60	Not available
22	Sec chi disc	66	184	26.4	73.6	Not Available

Research Question 2

To what extent are the available instructional materials in fish production accessible to teachers in senior secondary schools?

Table 2 revealed that 5 out of 22 items had their mean values ranged from 2.64 to 3.42 which were above the cut-off point of 2.50. This indicated that the 5 items are available and accessible by the teachers in schools. The table also revealed that 17 out of 22 items had their mean values ranged from 0.06 to 2.16 which were below the cut-off point of 2.50. This indicated that the 17 items including some available in schools were not accessible to teachers for effective teaching of fish production to students. The table also showed that the standard deviation of the responses of the respondents ranged from 0.38 – 0.94, indicating that the respondents were not too far from the mean and from the opinion of another in their responses.

Table 2: Mean Ratings and Standard deviation of the Responses of Teachers on their Accessibility of Instructional Materials in Fish Production.

S/N	Items	X	SD	Decision
1	Dissolved Oxygen meter	1.48	0.81	Not accessible
2	pH meter	2.20*	0.67	Not accessible
3	Conductivity meter	2.16	0.56	Not accessible
4	Thermometer	3.42	0.71	Accessible
5	Water test kit	1.06	0.38	Not accessible
6	Microscope	0.80*	0.89	Not accessible
7	Magnifying glass	0.64*	0.92	Not accessible
8	Aquaria tanks	0.96	0.55	Not accessible
9	Hatching troughs	2.04	0.73	Not accessible
10	Nursery tanks/troughs	1.70	0.72	Not accessible
11	Demonstration pond	1.44	0.90	Not accessible
12	Scoop nets	2.88	0.63	Accessible
13	Aerators and accessories	0.06	0.84	Not accessible
14	Plastic sieves	2.82	0.51	Accessible
15	Compounded feed	2.80	0.56	Accessible
16	Grinding machines	1.18	0.77	Not accessible
17	Charts and pictures	2.64	0.94	Accessible
18	Video clips in fisheries	2.22	0.67	Not accessible
19	Pelleting machine	0.88	0.43	Not accessible
20	Dissecting kits	1.52	0.62	Not accessible
21	Water pumps	2.12	0.74	Not accessible
22	Sec chi disc	2.07	0.92	Not accessible

X = mean, SD = standard deviation, * = available but not accessible.

Research Question 3

How often are the available instructional materials in fish production utilized by teachers in senior secondary schools?

Table 3: Mean Ratings and Standard deviation of the Responses of Teachers on the Accessibility of Instructional Materials in Fish Production by the Teachers

S/N	Items	X	SD	Decision
1	pH meter	2.92	0.57	Utilized
2	Thermometer	3.80	0.67	Utilized
3	Microscopes	2.24*	0.78	Not utilized
4	Magnifying glass	2.43*	0.93	Not utilized
5	Scoop nets	3.82	0.77	Utilized
6	Plastic sieves	2.96	0.83	Utilized
7	Compounded feeds	3.72	0.69	Utilized
8	Charts and pictures	3.56	0.54	Utilized

SD = standard deviation, * = available but not often utilized.

Table 3 revealed that 6 out of 8 available instructional materials in schools had their mean value ranged from 2.92 to 3.82 which were above the cut-off point of 2.50. This indicated that the 6 items are available, accessible and often utilized by the teachers for effective teaching in schools. The table also revealed that 2 out of 8 items had their mean value 2.24 and 2.43 which were below the cut-off point. This indicated

that the 2 items (microscope and magnifying glass) were available and accessible in schools but not often utilized by teachers for effective teaching of fish production to students. The table also showed that the standard deviation of the responses of the respondents ranged from 0.54 – 0.93, indicating that the respondents were not too far from the mean and from the opinion of one another in their responses.

Research Question 4

What are the challenges faced by teachers in accessing and utilizing the available instructional materials in fish production in senior secondary schools?

Table 4: Mean Ratings and Standard Deviation of the Responses of Teachers on their Challenges in accessing and utilizing Available Instructional Materials in Fish Production

S/N	Challenges	X	SD	Remark
1	The teachers' knowledge and technical know-how on the use of some of the instructional materials in poor.	4.00	0.31	Accepted
2	Many of instructional materials in the schools are out of use in fish industries.	2.79	0.90	Accepted
3	Most of the materials are under the custody of principal of the school which hinders utilization.	2.90	0.45	Accepted
4	The materials are not maintained for proper functioning during lessons	3.61	1.02	Accepted
5	Most of the available instructional materials are not in good working condition.	3.11	0.67	Accepted
6	There is no steady power supply in the school to operate some of the materials.	3.02	0.87	Accepted
7	The instructional materials are not sufficient for students to practice with during lesson.	3.00	1.00	Accepted
8	Students damage some of the instructional materials during instruction.	3.77	0.88	Accepted
9	The number of students is large too to evenly see the materials during instruction.	3.68	0.72	Accepted
10	The lesson duration on the time table does not favour the use of instructional materials.	2.55	0.41	Accepted
11	The interest and participation of students in fish production is low and does not favour the use of instructional materials.	1.97	0.34	Accepted
12	The value of fish in the society does not favour the use of instructional materials.	1.23	0.09	Not accepted
13	The female genders are indifferent on the use of instructional materials.	3.21	1.07	Accepted

X = mean, SD = standard deviation.

Table 4 revealed that 12 out of 13 challenge items had their mean values ranged from 2.55 to 4.00 which were above the cut off point of 2.50. This shows that the teachers accepted that the 12 items were the challenges they face in accessing and utilizing instructional materials in fish production. The table also revealed that 1 out of 13 challenge items had its mean value 1.23 which was below the cut off point of

2.50. This shows that teachers rejected that the item (number 12) was a challenge they face in accessing and utilizing instructional materials in fish production.

The table also shows that the standard deviation of the items ranged from 0.09 – 1.07, indicating that the respondents were not too far from the mean and from the opinion of one another in their responses.

DISCUSSION OF FINDINGS

The results of this study revealed that out of all the instructional materials recommended by the NERDC (2009) for teaching fish production to students, 8 of them are available, 5 are accessible, and 8 are often utilized by teachers in senior secondary schools. It implies that teachers probably improvise for the 3 instructional materials that were not easily accessible to them but were often utilized. The study also revealed that 14 recommended instructional materials in fish production were not available in schools while 12 challenges were encountered by teachers in accessing and utilizing available instructional materials in fish production in senior secondary schools.

The findings of the study are in line with related findings of Nwosu (2010) in a study on utilization of information and communication technology (ICT) as a tool and strategies for improving teacher professional development for effective service delivery, where it was found out that teachers can, to a very low extent, utilize 10 ICT resources for their professional development to enhance service delivery in schools. It also revealed that slow access to ICT equipments, low internet connectivity, lack of sufficient computers and high cost of laptop, lack of qualified personnel, interrupted power supply among others constitute a hindrance to ICT usage. Enwereuzor (2011) in a study on utilization of antenatal care facilities in Ikeduru Local Government Area, Imo State, found out that women of child bearing age in Ikeduru LGA do not effectively utilize antenatal care services during and after pregnancy. It also revealed that the level of educational attainment, poor staffing of the maternal health facilities, distance, cost and preference for traditional birth home go a long way to determine the extent of utilization of maternal centres for antenatal services. The study is in consonance with the findings of Daudu (2012) in a study on assessment of availability and use of information resources and services in the Institute of Education Library, Ahmadu Bello University, Zaria, who found out that human resources of the library are quite adequate. Materials resources are not very current except for newspapers. Equipment such as photocopying machine though essential is not available in the library. The findings of the authors cited above help to add credence to the findings of this study.

CONCLUSION AND RECOMMENDATION

In 2009, the NERDC reformed the curriculum of Agricultural science in senior secondary schools. The reform made some components of Agriculture single subjects for the students among which include animal husbandry, fish production. This development demands that the teaching of fish production takes a new dimension with regards to the competence of teachers, duration of lessons, ratio of theory to practical, instructional materials and so on. Even though, fish production is optional, it was observed by the researchers that many secondary schools selected this option without any adjustment to provision of instructional materials and other relevant factors as recommended by the NERDC. This suggests that the interest and competence of the students in fish production on graduation may be equivocal. It then becomes necessary to assess the availability and utilization of instructional materials for effective teaching of fish production to students in senior secondary schools in Benue State. The study found out that out of all the instructional materials recommended by the NERDC (2009) for teaching fish production to students, only 8 of them are available, 5 are accessible, and 8 are often utilized by teachers in senior secondary schools. It also revealed that 12 challenges were encountered by teachers in accessing and utilizing available instructional materials in fish production in senior secondary schools. Based on this, it was recommended that:

1. teachers of Agricultural science should improvise some of the instructional materials locally.

2. the school authority should provide and make accessible to teachers those materials that are lacking in the school.
3. the Federal and the State Ministry of Education should provide instructional materials in fish production to schools in the State especially those that cannot be afforded by the school authority.

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