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ASSESSMENT OF CHALLENGES ASSOCIATED WITH TEACHING OF FISHERY IN SENIOR SECONDARY SCHOOLS IN KWARA-STATE, NIGERIA

BY

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Abstract
This study examined the challenges associated with teaching of fishery in senior secondary schools in Kwara State, Nigeria. Five specific objectives and four research questions guided the study. Descriptive survey research design was adopted. The population for the study comprised all 309 senior secondary school agricultural science and fishery teachers in Kwara State. Two hundred and fifty teachers of agriculture and fishery were selected as sample using simple random sampling technique. A researcher-designed questionnaire was used as instrument for data collection. The data collected was analysed using descriptive statistics of frequency count and mean scores. The results revealed that teachers' related factor is one of the factors hindering the teaching of fishery in senior secondary schools in the study area. The finding also revealed that poor attitude of students towards learning fishery, fear of fish, laborious nature of fish farming, students' poor perception about fishery, and students' inability to purchase learning materials also hinder the effective teaching of fishery. It was recommended among others that government and school authorities should organize training workshops and seminars for teachers on fish farming to help improve their knowledge in fish production in Kwara State.
Keywords: Challenges, Teaching Fishery, Senior Secondary Schools, Agricultural Science.

Introduction
Animal protein is essential in human nutrition in order to solve the problem of protein deficiency that arises from malnutrition. The direct and subsequent effect of the increase in Nigeria's human population is that demand for protein of animal origin in the country is greater than the supply. This is as a result of low level of animal protein intake protein production and high cost of animal products thus leading to low protein intake by an average Nigeria. This situation demands intensification of the production of highly reproductive animals with short reproduction intervals such as poultry, pigs, rabbits and fish. Fishery also called fish farming, pisciculture, and aquaculture is the scientific study of fish. Fish farming, according to Fish Farming Atlas, (2022) is the cultivation of fish life in water which are usually housed in ponds, United States Department of Commerce (2022) also sees aquaculture as the act and science of producing fish in ponds. The value that fish farming adds to the life of the individual and the nation at large cannot be quantified. Fish farming or culture helps to augment catch from rivers or seas (Belton, *et al.*, 2020; Costello, *et al.*, 2020). Fish production also helps in land management through integrated farming of fish with other livestock (Reddy *et al.*, 2018). Commenting on the nutritional value of fish, Alaku (2010) remarked that fishes generally have the same protein content as beef, pork or chicken but more than milk or egg and except for milk; its fat content is much lower than most animal products.

Ruxton, *et al.*, (2004) reported that the nutrient value of fish in respect to protein and healthy fatty-acids are high and provides a range of health benefits to man. These health benefits have heightened the demand for fish products against other animal sources of protein, hence the supply from the natural water bodies were no longer sufficient (Ruxton, *et al.*, 2004). Hence, the need for inculcation of skills on how fishes can be cultured in artificial ponds through the teaching of fisheries in schools. The innovation in the Nigerian educational sector has led to the review of senior secondary school curriculum which allows the inclusion of fishery as trade subject in the curriculum of senior secondary school in our educational system. Fishery was introduced as a trade subject in senior secondary school to ensure adequate supply of fish protein in the country (Asogwa, *et al.*, 2021). The benefits of fishery which were highly appreciated by the Federal

Government of Nigeria led to the development of curriculum contents and objectives for its teaching through the Nigerian Educational Research and Development Council (NERDC, 2022). The objectives of fish production in the curriculum for senior secondary school were to: have fishery as a trade for livelihood on completion of fish studies; produce fish that will increase the nutritive value of man's diet; be able to meet with the gap between the demand for fish and its supply; bridge the gap between poverty and hunger (Moldz, n.d.). As lofty as these curriculum objectives are, its achievement depends on several factors among which include availability of competent teachers to teach the subject; student readiness and interest in learning the trade; availability of instructional facilities to impart the skills (Ng'etich, 2015).

The role of teacher in the implementation of any curriculum is very paramount in core subject or trade subjects (Niemelä, *et al.,* 2018). Most teachers of agricultural science who are currently teaching fishery to students were trained before the introduction of fishery as a trade subject. This implies that their preparation in the university may not have been in line with the new curriculum neither were they given any in-service training to improve their professional competencies in term of technical information for effective implementation of fishery curriculum. This might be the major reason for the students' low performance and inability to establish fish production as a trade on graduation after being exposed to curriculum content of fishery in the secondary schools. Aside from the likely shortage or incompetence of teachers teaching fishery in schools, the readiness of schools in providing the needed facilities for the teaching of fishery is something that cannot be ascertained. This is because offering fishery as a trade subject will involve procurement of facilities and inputs that will aid practical skill acquisition in fish production. Where some schools in rural areas may have the land to support construction of fish pond others in the city may not have such space. Also, the issue of provision of money for feeding the fishes until table size before it is sold to bring income back to the school may also be an issue in teaching fish production in schools (Ahern, *et al.,* 2021). In addition, the environment where the school is sited may not be suitable for fish farming (Shava & Gunhidzirai, 2017). The atmospheric condition of some places as well as the nature of water could be a strong determinant to the type of fishes that could be reared and this may in turn influence the possibility of teaching fish farming in such area. Given that all conditions for teaching of fish farming in a school are met, the seriousness, interest and attitude of students who are the recipient of the skills are also paramount.

Several issues might be bedeviling the teaching and learning of fishery in secondary schools being a newly introduced subject (Asogwa, *et al.,* 2021). As is usually the case with any new subject. Moreover, most studies that had been done on the challenges associated with effective teaching of agriculture in secondary schools may not adequately address the peculiarity of fishery. The pioneer students of the fishery curriculum graduated in 2014 with very low achievement in the senior secondary school external examinations. It was observed that about 94% of the graduates lacked the entrepreneurial skills to embark on any fishery occupations such as fish production, processing, preservation and marketing which was one of the objectives of the reviewed curriculum. The finding was in conformity with the WAEC Chief Examiner's report (2017, 2018 and 2019) that only 48% of secondary school students passed Fishery in Nigeria (Asogwa, *et al.,* 2021). This study therefore deemed it necessary to assess the challenges associated with teaching fishery in senior schools in Kwara State, Nigeria.

Purpose of the Study

The purpose of the study is to examine the challenges associated with teaching of fishery in senior secondary school in Kwara State. The specific objectives were to find out:

1. teachers related factors hindering the teaching of fishery in senior secondary school in Kwara State;
2. students related factors hindering the teaching of fishery in senior secondary school in Kwara State;
3. school related factors hindering the teaching of fishery in senior secondary school in Kwara State;
4. environmental related factors hindering the teaching of fishery in senior secondary school Kwara State; and
5. differences in the responses of teachers on the factors hindering the teaching of fishery in senior secondary school based on teachers' years of teaching experience.

Research Questions

The following research questions guided the study;

1. What are the teachers related factors hindering the teaching of fishery in senior secondary school in Ilorin?

2. What are the students related factors hindering the teaching of fishery in senior secondary school in Ilorin?
3. What are the school related factors hindering the teaching of fishery in senior secondary school in Ilorin?
4. What are the environmental related factors hindering the teaching of fishery in senior secondary school in Ilorin?

Hypothesis

The following null hypothesis was formulated and tested at 0.05 level of significance:

$H0_1$: There is no significant difference in the responses of teachers on the factors hindering the teaching of fishery in senior secondary school based on teachers' years of teaching experience.

Methodology

The study employed a survey research design. The population for the study was all 309 agricultural science and fishery teachers in secondary schools in Kwara State. Simple random sampling procedure was used to select 250 respondents for the study. The study was guided with five objectives while one null hypothesis was formulated and tested at 0.05 level of significance. The instrument for data collection was a researcher-designed questionnaire developed based on extensive literature review in line with the research objectives. The questionnaire contained 31 items. The items sought to access the teacher, student, school and environmental factors that hinder the teaching of fishery in schools respectively. A five – point rating scale of strongly agree, agree, undecided, disagree and strongly disagree was adopted as the response option. The instrument was validated by experts from the Department of Agricultural Education to ensure content validity. The reliability co-efficient of the instrument yielded a Cronbach-alpha of 0.78. Data collected was analysed using descriptive statistics of mean and standard deviation for the research questions while the research hypothesis was tested using ANOVA.

Results

Research Question 1: What are the teachers' related factors hindering the teaching of fishery in senior secondary school in Ilorin?

Table 1 presents the teachers related factors hindering the teaching of fishery in senior secondary school in Kwara State. From Table 1, the mean obtained for each item is greater than 2.50 which serve as the benchmark for affirming positive response. This implies that all teachers 'related factors hindered the teaching of fishery in Kwara State. These factors include: lack of innovative ideas and less resourcefulness about fish production; lack of interest in fish production, poor attitude towards teaching of fishery; lack content skills for practical oriented teaching of fishery; unavailability of qualify teachers in teaching fishery; insufficient pedagogical skill for effective teaching of fishery; and teacher's limited practical experience on fish production. The grand mean of 3.46 also shows that teachers' related factor is one of the factors hindering the teaching of fishery in senior secondary school in Ilorin.

Table 1: Mean responses and standard deviation on teachers related factors hindering the teaching of fishery in senior secondary school

	Teachers Related Factors Hindering the Teaching of Fishery	$\bar{x}$	SD
1	The teachers lack of innovative ideas and less resourceful about fish production	3.84	1.21
2	Some teachers lack interest in fish production and hence poor attitude towards teaching of fishery	3.34	1.19
3	Lack of content skills for practical teaching of fishery	3.92	1.00
4	Qualified teachers are not available in teaching fishery	3.00	1.40
5	Insufficient pedagogical skill for effective teaching of fishery skills	2.88	1.23
6	Teacher's limited practical experience on fish production	3.83	1.14
7	Poor knowledge of the course content in fishery	2.82	1.31
8	Teachers lack of skills in handling fishery equipment	3.97	1.13
	Grand Mean	**3.46**	**1.20**

Table 2 shows the students' related factors hindering the teaching of fishery in senior secondary school in Kwara State. The students factors hindering teaching of fishery in Kwara State include: lack of interest hence poor attitude of students towards learning fishery; fear of fish or dislike for touching live fishes; students' poor perception and mind-set that farming and its related occupations is meant for old people demotivates students; laborious nature of fish farming scares students from learning fishery hinders effective teaching of fishery; students' inability to afford learning materials (e.g inputs like feeds, drugs) hinders effective teaching of fishery; and lack of commitment to practical aspect of fishery. This is shown by their respective means of 3.96, 3.21, 3.73, 3.26, 3.81, 3.83, 3.72 which is above the2.50 benchmark.

Research Question 2: What are the students related factors hindering the teaching of fishery in senior secondary school in Ilorin?

Table 2: Mean responses and standard deviation of students related factors hindering the teaching of fishery in senior secondary school

	Students Related Factors Hindering the Teaching of Fishery	$\bar{x}$	SD
1	Lack of interest hence poor attitude of students towards learning fishery	3.96	1.18
2	Fear of fish or dislike for touching live fishes hinders students from learning fishery	3.21	1.21
3	Students' poor perception and mind-set that farming and its related occupations is meant for old people demotivates students from learning	3.73	1.20
4	Laborious nature of fish farming scares students from learning fishery	3.26	1.17
5	hinders effective teaching of fishery	3.81	1.15
6	Students' inability to afford learning materials (e.g inputs like feeds, drugs) hinders effective teaching of fishery	3.83	0.98
7	Students' laziness and lack of commitment to practical aspect of fishery serious	3.72	1.12
	Total	**3.66**	**1.14**

Table 3 shows the school related factors hindering the teaching of fishery in senior secondary school in Kwara State. The result reveals that all the items have mean values ranging from 3.26 to 4.41. This indicates that all the items have mean values above the 2.50 benchmark for decision. This implies that all the items contributed to student factors hindering the teaching of fishery in secondary schools in Kwara State. The grand mean of 3.83 also indicated that school related factor was one of the factors hindering the teaching of fishery. This finding shows that school related factors hindered the teaching of fishery in senior secondary schools.

Research Question 3: What are the school related factors hindering the teaching of fishery in senior secondary school in Ilorin?

Table 3: Mean responses and standard deviation of school related factors hindering the teaching of fishery in senior secondary school

	School Related Factors Hindering the Teaching of Fishery	$\bar{x}$	SD
1	Inadequate instructional facilities and materials in teaching fishery as subject in school	4.15	0.93
2	Inadequate lands for siting of fish ponds or placement of containers for practical lessons	4.00	2.95
3	Location of the school does not favour the teaching of fishery	3.26	1.32
4	period allotment to practical fishery Inadequate class/lessons	3.57	1.14
5	Inadequate fund to manage practical oriented fishery lessons	4.16	1.03
6	Lack of stable water supply to sustain fish pond to support practical	4.08	0.91

	skill acquisition for effective teaching of fishery		
7	School library does not contain up-to-date textbooks, manuals on aquaculture and other quality materials for effective teaching of fishery	3.86	1.09
8	School inability to sponsor field trip to visit successful fish farms to compliment practical teaching of fishery	4.12	1.08
	Total	**3.83**	**1.27**

Table 4 presented the environmental related factors hindering the teaching of fishery in senior secondary schools in Kwara State. The result showed that items 1 to 8 had mean value of 4.20, 4.21, 4.15, 4.17, 3.83, 4.09, 4.10 and 3.41 respectively. This shows that each of the factor constitute an environmental factor that hinder the teaching of fishery in the study area. Also, the grand mean of 4.01 implies that environmental related factor is one of the factors hindering the teaching of fishery in senior secondary school in Kwara State.

Research Question 4: What are the environmental related factors hindering the teaching of fishery in senior secondary school in Ilorin?

Table 4*:* Mean responses and standard deviation on environmental related factors hindering the teaching of fishery

	Environmental Related Factors Hindering the Teaching of Fishery	$\bar{x}$	**SD**
1	Poor security system in the school and community which exposes the fishes to theft hinders the practical teaching of fishery	4.20	0.91
2	Prolonged dry season which triggers water scarcity does not favour continuous water supply for fish farming in school	4.21	0.84
3	Lack of power supply to facilitate pumping of water to the fish ponds hinders practical skill acquisition lessons in fishery	4.15	0.98
4	Poor water quality, which may lead to death of fishes	4.17	2.35
5	Unfavorable environmental temperature in the area does not support practical fish production skill acquisition	3.83	1.17
6	Problem of fish predator (pests and diseases) of fish hinders the practical teaching of fishery	4.09	3.73
7	Fear of vandalization and poaching of fishery ponds	4.10	1.12
8	The topography and soil contents around the school cannot be used for aquaculture	3.41	1.36
	Total	**4.01**	**1.52**

Table 5 shows the differences in the responses of teachers on the factors hindering the teaching of fishery in senior secondary school based on teachers' years of teaching experience. The result revealed that the *P*-value (0.00) obtained is < 0.05 alpha value. Thus, there is significant difference in the responses of teachers on the factors hindering the teaching of fishery in senior secondary school based on teachers' years of teaching experience. This implies that teachers' years of teaching experience has positive influence on the factors hindering the teaching of fishery in senior secondary schools in Kwara State.

Research Hypothesis

There is no significant difference in the responses of teachers on the factors hindering the teaching of fishery in senior secondary school based on teachers' years of teaching experience.

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Table 5: ANOVA Summary of the Differences in the Responses of Teachers on the Factors Hindering the Teaching of Fishery in Senior Secondary School Based on Teachers' Years of Teaching Experience

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	8896.80	2	4448.40	12.77	0.00
Within Groups	68649.58	197	348.48		
Total	**77546.38**	**199**			

Discussions of Findings

The study examined challenges associated with the teaching of fishery in senior secondary schools in Kwara state. The findings revealed teachers' related factor as one of the major factors hindering the teaching of fishery in senior secondary schools in Kwara state. Among the teachers' related factors affirmed as the hindrances to the teaching of fishery in the study were teachers' lack of innovative ideas and less resourcefulness about fish production, teachers' personal lack of interest in fish production, inadequate content skills for practical oriented teaching of the fishery, qualified teachers are not available to teach fishery, insufficient pedagogical skills and teacher's limited practical experience on fish production. This finding is in line with that of Akoto-senaman, (2015) who reported that teacher's factor constraining fish farming in secondary schools include poor attitude of teachers, inadequate content skills for practical oriented teaching and inadequate content knowledge.

The study revealed students' related factors to include poor attitude of students, fear of fish or dislike for touching live fishes, students' poor perception and mind-set that farming and its related occupations is meant for poor people, laborious nature of fish farming, students' inability to afford learning materials (e.g. inputs like feeds, drugs) and lack of commitment to practical fishery class. The finding is in agreement with Nnodim and Abbey (2019) who found that student factors were serious constraints to fish farming in senior secondary school. The study corroborated the findings of Nnodim (2016) who found that inadequate school infrastructures for practical could cause frustration and disillusionment among teachers.

The environmental related factors hindering teaching of fishery in schools which include poor security system in the schools, prolonged dry season, lack of power supply, poor water quality, unfavorable environmental temperature and pests and diseases . These findings is in consonant with the findings of Nnodim (2016) who found poor security, stealing and vandalization as some of the problems of establishing livestock farms in secondary schools. The finding is also in agreement with Oota (2012) who found that high cost of input is one of the problems facing fish rearing while Adewumi and Olaleye (2011) found lack of good quality seeds and poor environmental condition as constraints to fish rearing.

The study also found that there was significant difference in the response of experienced and less experienced agricultural and fishery teachers on the factors hindering the teaching of fishery in senior secondary schools. The finding revealed that teachers' years of teaching experience determine their responses to factors hindering the teaching of fishery in senior secondary schools in Kwara state. The finding justifies the place of experienced fishery teachers in the management of factors that could impede the teaching of fishery in senior secondary schools.

Conclusion

Based on the findings of the study, it can be concluded that teachers, school, students and environmental related factors posed major challenges to production of fish, teaching and academic performance of students in fishery in senior secondary school in Kwara State. This has also limited students' interest, career, quality of lesson delivery by teachers on fishery and quantity of fish production in schools.

Recommendations

The following recommendations were made based on the findings of the study:

1. Government and school authorities should organize training programmes such as workshops and seminars for teachers on fish farming to improve on their performance in teaching fishery in schools.
2. Fund and relevant infrastructure needed for fishery should be provided by the government to secondary schools to enhance teaching of fishery as trade subject in senior secondary schools.
3. Proper orientation should be given to students by the teachers on the prospect of fish farming to stimulate student interest in the choice of fish farming or fish related career
4. Qualified and experienced teachers should be employed by government and school proprietors to teach fishery in senior secondary schools.
5. Proactive measures should be taken by the government or school management on the provision of adequate security by erecting fences and employment of day and night guards to safeguard fish theft and vandalization of fish ponds in the schools.

References

Adewumi, A. A. & Olaleye, V. F. (2011) Catfish culture in Nigeria: progress, prospects and problems. *African Journal of Agricultural Research, 6* (6): 1281-1285.

Ahern, M. B., Thilsted, S. H., Kjellevold, M., Overå, R., Toppe, J., Doura, M., Kalaluka, E., Wismen, B., Vargas, M., & Franz, N. (2021). Locally-procured fish is essential in school feeding programmes in sub-Saharan Africa. *Foods 10*(9), 2080. **https://doi.org/10.3390/FOODS10092080**

Akintunde, O. E. (2016). Fish production among agricultural students in secondary schools in Oyo State. *International Journal of Educational Benchmark, 4*(3), 2016.

Akoto-senaman, M. (2015.). *Challenges in the Teaching and Learning of Practical Agriculture*. Retrieved December 25, 2022, from https://www.academia.edu/3446320/challenges_in_the_teaching_and_learning_of_practical_agriculture

Alaku, S.O. (2010). *Introduction to animal science*. Enugu, Nigeria: Jee Communications.

Belton, B., Little, D. C., Zhang, W., Edwards, P., Skladany, M., & Thilsted, S. H. (2020). Farming fish in the sea will not nourish the world. *Nature Communications*, *11*(1). **https://doi.org/10.1038/S41467-020-19679-9**

Brown, T. J., Agbulu, O. N., & Amonjenu, A., (2017). Approaches for enhancing sustainable fish production among farmers in Bayelsa State, Nigeria. *Journal of Fisheries & Livestock Production*, *05*(03). **https://doi.org/10.4172/2332-2608.1000245**

Costello, C., Cao, L., Gelcich, S., Cisneros-Mata, M., Free, C. M., Froehlich, H. E., Golden, C. D., Ishimura, G., Maier, J., Macadam-Somer, I., Mangin, T., Melnychuk, M. C., Miyahara, M., de Moor, C. L., Naylor, R., Nøstbakken, L., Ojea, E., O'Reilly, E., Parma, A. M., … Lubchenco, J. (2020). The future of food from the sea. *Nature*, *588*(7836), 95–100. **https://doi.org/10.1038/S41586-020-2616-Y**

Fish Farming Atlas (n.d.). Retrieved December 24, 2022, from **https://awionline.org/content/fish-farming**

Graham, L. J., White, S. L. J., Cologon, K., & Pianta, R. C. (2020). Do teachers' years of experience make a difference in the quality of teaching? *Teaching and Teacher Education*, *96*, 103190. **https://doi.org/10.1016/J.TATE.2020.103190**

Moldz, J. (n.d.). Availability and utilization of instructional materials for effective teaching of fish production to students in senior secondary schools in Benue State, Nigeria. Retrieved December 24, 2022, from **https://www.academia.edu/29192071/African**, *Journal of Agricultural Research*

Narayan, N. A. (2016). Factors influencing teacher career satisfaction, teacher collaboration and everyday challenges: an exploratory factor analysis. *Malaysian Online Journal of Educational Sciences, 4*(3),1-15.

Ng'etich T. H., & Chemwei, B. (2015). Availability and use of instructional materials in the teaching of conflict and conflict resolution in primary schools in Nandi North District, Kenya.*International*

Journal of Education and Practice, *3*(6), 224–234. **https://doi.org/10.18488/journal.61/2015.3.6./61.6.224.234**

Niemelä, M. A., & Tirri, K. (2018). Teachers' knowledge of curriculum integration: a current challenge for Finnish subject teachers. *Contemporary Pedagogies in Teacher Education and Development*. **https://doi.org/10.5772/INTECHOPEN.75870**

Nnodim A.U., & Abbey S. C. (2019). Constraints to fish farming among senior secondary school agricultural students in Degema and Akuku-Toru Local Government Area of Rivers State | *Journal of Education and Entrepreneurship*. Retrieved December 25, 2022, from **https://journals.co.za/doi/10.26762/jee.2018.400034**

Oota, L. (2012). Is Nigeria committed to fish production? Accessed Online from http://blueprint.com./2012/07/is-nigeria-committed-to-fish production/. Retrieved December 25, 2022

Reddy, P. R., Kishori, B., Reddy, P. R., & Kishori, B. (2018). Integrated rice and aquaculture farming. *Aquaculture - Plants and Invertebrates*. **https://doi.org/10.5772/INTECHOPEN.78062**

Ruxton, C. H. S., Reed, S. C., Simpson, M. J. A., & Millington, K. J. (2004). The health benefits of omega-3 polyunsaturated fatty acids: A review of the evidence. *Journal of Human Nutrition and Dietetics*, *17*(5), 449–459. **https://doi.org/10.1111/J.1365-277X.2004.00552.X/FULL**

Shava, E., & Gunhidzirai, C. (2017). Fish farming as an innovative strategy for promoting food security in drought risk regions of Zimbabwe. *Jàmbá : Journal of Disaster Risk Studies*, *9*(1). **https://doi.org/10.4102/JAMBA.V9I1.491**

US Department of Commerce, N. O. and A. A. (2022). *What is aquaculture? What is aquaculture?* (2022). Retrieved December 24, 2022, from **https://oceanservice.noaa.gov/facts/aquaculture.html**