

VOLUME 8, NUMBER 1

JOURNAL OF INFORMATION, EDUCATION, SCIENCE AND TECHNOLOGY (JEST)

Website: www.futminna.edu.ng

Email: jiest@futminna.edu.ng

GSM: +2348033174958, +2348036276378



JUNE, 2022

Official Publication of School of Science and Technology Education,
Federal University of Technology, Minna, Nigeria.



ISSN: 2360-8846

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SCIENCE AND TECHNOLOGY
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A CORRELATIONAL ANALYSIS OF OUT-OF- FIELD SECONDARY SCHOOLS' BIOLOGY TEACHERS ANXIETY ON CONTENT MASTERY AND PEDAGOGICAL CONTENT KNOWLEDGE IN NIGER STATE

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Abstract

This study examined the relationship between the Out-of-field secondary school Biology Teachers' Anxiety on Content Mastery (CM) and Pedagogical Content Knowledge (PCK) in Niger State. The correlational survey was adopted for the study. The study population was 666 Out-of-field Biology Teachers' in 543 public and private senior Secondary Schools drawn from the Seven (7) educational zones of Niger State, Nigeria. Multiple sampling techniques were used in selecting the samples used in the research study. Two (2) objectives form the survey's focus: two research questions and two Null hypotheses. Out-of-field Anxiety Questionnaire (OFFAQ) developed by the researcher and validated by experts (educational psychologist and science educationist) were used for data collection. OFFAQ was found to have a reliability coefficient of 0.84 using the Cronbach alpha coefficient. The data collected were sorted and analysed for Means (\bar{x}), Standard Deviations (SD), Analysis of Variance (ANOVA), Pearson Product Moment Correlation (PPMC) Coefficient and Linear Regression for the research questions and null hypotheses raised in the study. In addition, Scatter Plots were used to further the homogeneity or otherwise to elaborate on the extent of the relationship between the significant variables in the study. Findings reveal a positive relationship between Content Mastery (CM) and Pedagogical Content Knowledge and between PCK and years of teaching experience and gender.

Keywords: Out-of-field, Biology Teachers, Content Mastery, Pedagogical Content Knowledge.

Introduction

It is a known fact that education is an instrument per excellence for change and development. To this end, educational processes bring about knowledge creation, attitudinal change, and social dispositions and skills development. According to United Nations Educational, Scientific and Cultural Organization (UNESCO, 2019), the Global Education 2030 Framework for All (EFA), which is championed by the Sustainable Development Goals (SDG), believes that education is a human right throughout life and that access must be matched by quality. Therefore, the teacher is at the heart of every educational system as he helps dispense knowledge, clear misconceptions and difficulties, and evaluate learning outcomes. Thus, science education is oriented towards teaching and learning science to even non-science taught pupils, students and adults within and outside the formal school setting. They are trained to instruct in subject-specific areas, design curricula, have analytical skills in assessing students learning progression and have an interpersonal relationship with students, parents, school administrators and stakeholders. In addition, they possess oral and written communication skills to translate the science curricula into teachable unit plans to attain overall educational goals and objectives.

The nature of how science education curricula are outlined and taught in schools does not differ markedly in the methodology and assessment of other subjects in our schools. The science education curricula are broken into chemistry (the science of physical elements), Biology (natural sciences) and physics (mechanics and laws of nature) for students to have an understanding of the nature of science. A robust understanding of the nature of science and its methodologies (processes) requires capable and informed professional Teachers. For the student to have awareness and scientific inquiry, he needs to be taught by experienced teachers, not by individuals who see teaching as a past-time activity or a stepping stone to greener occupations. The dearth in quality and supply of teachers is an issue that has continued to affect the smooth delivery of the content science curricula in schools. For instance, in the United States of America (USA), many states have become the practice of declaring teaching vacancies every year by subject areas, grade level, and geographical location. The scenario is almost the same in the United Kingdom (UK), where it is reported that the nation faces an uphill battle to fill all classrooms with qualified Teachers (Eurydice, 2002).

In Africa, Nils

Forum in Dakar (2000) and noted that
Teachers, which hinders their efforts to achieve universal goals primary education. He stated that to
achieve EFA by 2015, African countries would need between an 18% (Angola) and 84% (Malawi)
increase in their current teacher supply, noting that most teachers in most countries are unqualified
national requirements. This similar scenario, if not worse, may be what is obtainable in Nigerian schools.
This inadequacy in teacher demand and supply cuts across all subjects and particularly the sciences.
Biology as a discipline is not spared from the rot taught by science. Teachers who are not in the 'core area
of Biology. In most schools, you have Teachers in other core areas of sciences teaching Biology at the
secondary level of education. These are described as Out-of-field (OFF) Teachers in a general sense. It
also describes the employment of Teachers who are not professionally trained to teach in subjects' areas
that they have little knowledge of.

Out-of-field teaching has become a syndrome bedevilling teaching profession. It is worth noting here
that, Transforming Education in Niger State (TENS, 2017) programme championed by Niger State
Universal Education Board (NSUBEB) reported that there are no enough science Teachers in our
classrooms for efficient and effective subject delivery of instructions (NSUBEB, 2018). This trend where
unprofessional Teachers have found their ways into the school is not an exclusive problem of Niger State.
Similarly, In Ekiti State, Adeyemi (2011) reported severe unfilled vacancies in Biology. He stated that, out
of the 2178 Biology Teachers needed in urban schools in 2011, only 762 Teachers were in post, leaving a
deficit of 1416 Biology Teachers. This shortage of qualified Teachers in Secondary Schools may have
resulted in not trained teachers' employment to teach outside their speciality areas, known as Out-of-field
teaching (Hobbs, 2012; Nixon, Luft & Ross, 2017).

Anxiety is an unpleasant emotional state or condition that includes feelings of uneasiness worry and
expressed by the teacher. Educational psychologists and educators thought that it tends to derail the
realisation of expected learning outcomes. According to the American Psychiatric Association (2013),
anxiety is a psychological and physiological state characterised by physical, emotional, cognitive, and
behavioural components. Jenaabadi, *et al.* (2016) attest that anxiety is a group of physical, behavioural,
and mental changes occurring in response to threat, resulting in ineffectiveness, wearing out, lack of
energy and power, and exhaustion of inner resources of an individual due to unsatisfied needs. The OOF
Biology Teacher includes; teacher readiness, the inadequacy of or insufficient knowledge of the subject-
specific area, inadequate understanding of teaching strategy, loss of confidence, jittery in the classroom
etc. In addition, the Anxiety construct is characterised by fear, panic, mental disorientation and
apprehension, increased respiration, rapid pulse, sweaty palms, stress, burnout and high blood pressure
(Cimen & Yilmaz, 2015; Jenaabadi, *et al.*, 2016).

A survey of the teaching force of many nations has shown that a very high percentage of teachers are
assigned to teach out of their field of specialisations (Cinkir & Kurum, 2015; Sambe, 2015; Subair &
Talabi, 2015). Out-of-field (OOF) teaching is a global trend that has been a phenomenon in Nigeria. The
trend has been on the rise occasioned by the government's ineptitude or willingness to arrest the situation.
Employment into teaching has been primarily reduced to the settlement of individuals that are used for
political thuggery. Weldon (2016) stated that OOF Teachers in secondary schools are Teachers teaching
subjects they have not studied above in their first year at university and have not studied their teaching
methodologies. Therefore, they face the problem of knowledge gap in the Mastery of the Content and
teaching methodologies. To a certain extent in Niger State, no school is spared this menace from public to
private schools and urban to rural schools. It is noteworthy that these Teachers may be ill-prepared to
teach effectively, which may eventually manifest in poor performances at external examinations. Poor
teaching may lead to a decrease in the standard of education and other unpleasant and scary situations.

There is a correlation between teacher Anxiety and Content Mastery (CM) and even their teaching
methodologies in the classroom. CM can be viewed as the profound understanding of subject-specific
curricula, regarded as Teachers' content-specific knowledge. It is a prerequisite for teaching any subject
and an essential requirement for teacher certification. Fernandez (2014) postulated that there is a
relationship between content knowledge and good teaching. Teachers with in-depth Mastery of their
subjects can draw links between different areas of expertise in the same issue. This implies that CM is the
conceptual understanding of the subjects teachers teach to help students change concepts from

unscientific concepts to acceptable scientific concepts. Teachers' lack of Content limits their ability to anticipate the directions in which students' learning might proceed. They may not be able to prepare effectively for lessons; a lesson that is not well prepared contains incomplete subject matter, incorrect facts, lacks the necessary details and suitable illustrations. As a result, the presentation in the classroom may become disorderly, haphazard and uncoordinated (Ambe & Agbor, 2014).

Researched literature has shown that there are many teacher factors that influence teacher Anxiety in the classroom, which could relate to CM, PCK, teacher years of teaching, teacher qualification, and even gender. Inexperienced Teachers who are more likely to be OFF are less effective and more anxious than professional Teachers. Others reported that experienced Teachers do not feel anxious. However, some studies affirmed that experienced Teachers are anxious as a result of work overload. According to Rice (2010), the magnitude of the effect of teacher experience varies depending on the teacher's level of education and the subject area. Kaya (2009) and Van Driel and Berry (2012) found that content knowledge influenced pedagogical content knowledge and Anxiety level. They further stated that "Teachers without strong Content Mastery, strong Pedagogical Content Knowledge finds it impossible to achieve". Olugbemi (2011) carried out a study on the assessment of PCK of in-field and Out-of-field Chemistry Teachers in Abuja, Nigeria. The design of the study was a descriptive survey. The result revealed a significant and positive relationship between teacher pedagogical content knowledge and student-teacher learning in rural and urban areas. The in-field Chemistry Teachers had more experience in teaching Chemistry compared to the Out-of-field Chemistry Teachers. This indicates that the Out-of-field teacher had a higher level of presenting a good role model to the students.

The author further opined that experience gained over time enhances workers' knowledge, skills, and productivity. However, Ilugbusi, Falola, and Daramola (2007) reported that inexperienced Teachers are easily upset and destabilised by unfamiliar situations, leading to apprehension. This may imply that inexperienced Teachers could get confused, mixed up the Content of the topics taught to the students, and hence the students will receive wrong information, which may lead to poor achievement among the students. Furthermore, in their separate studies, Ameen, Guffey and Jackson (2002); Aynur and Aydin (2014) concluded that the younger and less experienced teacher feels greater anxiety and stress than their older and more experienced Teachers. This shows further that newly recruited Teachers, even if professional trained, are likely to be anxious in their early teaching days. Similarly, Clayford (2010) revealed that Teachers who have been in the teaching profession for many years are less prone to high anxiety levels. Hadley and Dorward (2011) showed that Teachers with less experience were more anxious than the more experienced Teachers teaching elementary Out-of-field, while male Teachers had lower anxiety than female Teachers about Out-of-field. On the contrary, Desouky and Allam (2017) emphasised that Teachers with higher teaching experience and higher qualifications exhibited higher levels of anxiety, stress, and depression, resulting from the challenges faced on the job. The gender-related factor is also thought to positively or negatively influence Out-of-field Anxiety amongst Teachers.

Gender issues are topical and generate more concerns and interest amongst stakeholders. The teaching profession is crowded today by more female's Teachers in urban centres than their male counterparts. Reports of the performances of each segment have also generated a lot of debate. This study is also interested in evaluating gender and other demographic factors in the school in relation to Out-of-field Biology Teachers on Content Mastery and Pedagogical Content Knowledge in Niger State.

Objectives of the Study:

The study's main objective is to determine whether there is a relationship between Out-of-field (OFF) Biology Teachers' Anxiety on Content Mastery and Pedagogical Content Knowledge and other related variables.

Research Questions

The following research questions guided the study:

1. What is the relationship between Out-of-field Biology Teachers' Anxiety on Content Mastery (CM) and Pedagogical Content Knowledge (PCK)?
2. What is the correlation between Out-of-field Biology Teachers' Anxiety on Content Mastery, school type, school location, gender, years of teaching experience, educational qualification on Pedagogical Content Knowledge?

Hypotheses

Two null hypotheses were raised and tested at 0.05 significance levels:

H_{01} : There is no significant relationship between Out-of-field Biology Teachers' Anxiety on Content Mastery (CM) and Pedagogical Content Knowledge (PCK)

H_{02} : There is no significant relationship between Out-of-field Biology Teachers' Anxiety on Content Mastery, school type, school location, gender, years of teaching experience, educational qualification on Pedagogical Content Knowledge.

Research Methodology

The study adopted the Correlational research design, which seeks to explain the relationship between anxiety on content mastery and PCK. It aims to figure out if two or more variables are related and, if so, why. The study population was 666 Out-of-field Biology Teachers' in 543 public and private senior Secondary Schools were drawn from seven educational zones in Niger State, Nigeria. Multi-stage sampling technique was adopted in this research while stratified sampling technique was used in selecting 226 senior secondary schools from 7 educational zones after that simple random sampling technique was used in selecting 501 (private 246 & public =255) Out-of-field Biology Teachers' selected from seven educational zones in Niger State. Three research questions and corresponding three null hypotheses were raised to guide the study. Out-of-field Anxiety Questionnaire (OFFAQ) was used as the instrument for collecting data amongst secondary School Biology Teachers on Content Mastery and Pedagogical Content Knowledge. The instrument was a 5Point Likert scale graded into; Very High Anxious (VHA), High Anxious (H.A.), Moderately Anxious (M.A.), Low Anxious (L.A.) and Very Low Anxious (VLA) items. Experts validated the questionnaire in psychology and science education, and a reliability coefficient of 0.84 was obtained using Cronbach Alpha formulae. The data collected were analysed using Means (X) and Standard Deviations (SD) for the research questions, while inferential statistics (Linear regression) were used for analysing the null hypotheses formulated at alpha 0.05 levels of significance. Furthermore, scatter plots show the homogeneity of the relationships between the variables and Out-of-field Biology Teachers.

Data Analysis

The data collected were subjected to analysis and presented as follows:

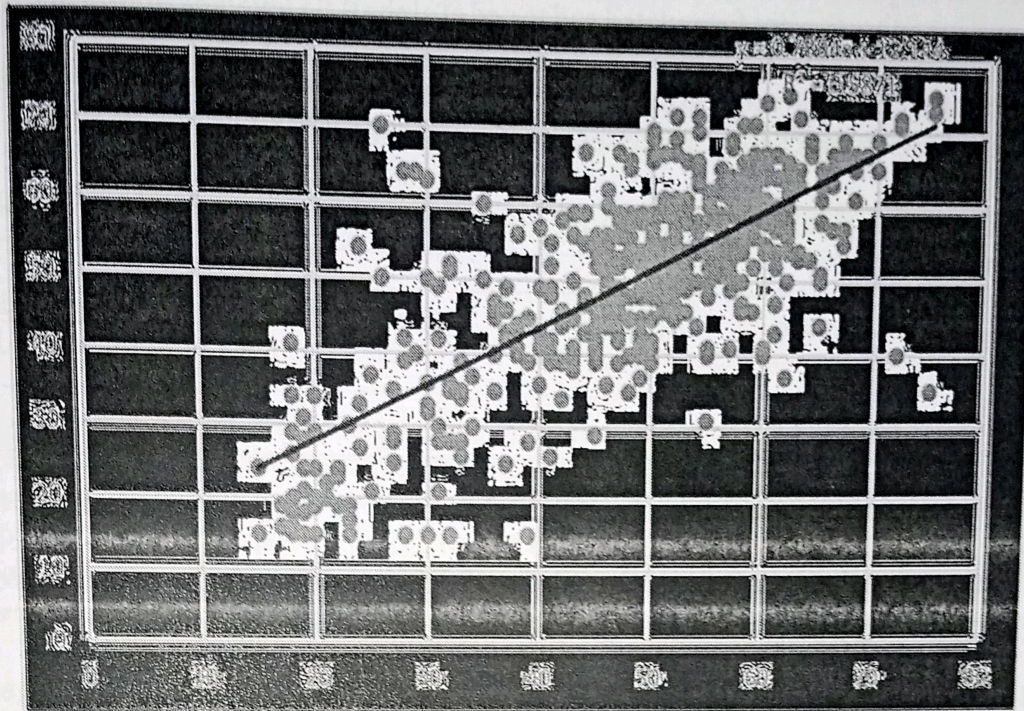
Research Questions

What is the relationship between Out-of-field Biology Teachers' Anxiety on Content Mastery and Pedagogical Content Knowledge (PCK)?

Table 1: Analysis based mean difference of Out-of-field Biology Teachers' Content Mastery and Pedagogical Content Knowledge

Variable	N	Mean X	Standard Deviation SD	Mean Diff. X
PCK	501	48.64	12.77	01.51
CM	501	50.49	13.14	

Table 1 shows the Mean (X) and Standard Deviation (SD) of Out-of-field Biology Teachers' Anxiety on Content Mastery and Pedagogical Content Knowledge. The result indicates that CM produces a Mean of 50.49 and a Standard Deviation of 13.14, while PCK had a Mean score of 48.64 and a deviation of 12.77, respectively. This further indicates a Mean difference of 01.51, suggesting no significant variation between the two variables. The data was further subjected to regression analysis to determine whether there is a relationship or convergence on the two variables to warrant a conclusion of the existence of a relationship. Hence, the description below using a scatter plot.



ig 1: Scattered Plot showing the linear Relationship between CM and PCK of Out-of-field Biology Teachers

Figure 1 shows the scattered plot, which indicates whether there is a relationship between Content Mastery and Pedagogical Content Knowledge of Out-of-field Biology Teachers' Anxiety. The figure shows a homogeneity or convergence of views which indicates a positive relationship between the two variables.

2. What is the correlation between Out-of-field Biology Teachers' Anxiety on Content Mastery, school type, school location, gender, years of teaching experience, educational qualification on Pedagogical Content Knowledge?

Table 2: Analysis of Out-of-field Biology Teachers' Anxiety on Content Mastery and Moderating Variables and Pedagogical Content Knowledge^a

Moderating Variables	N	Mean (\bar{x})	SD
Pedagogical Content Knowledge	501	48.64	12.77
School Type	501	1.48	0.52
School Location	501	1.52	0.52
Gender	501	1.33	0.47
Qualification	501	4.31	2.32
Year of Experience	501	1.87	0.78
Certificate	501	1.47	0.50
Content Mastery	501	50.49	12.75

Key: \bar{x} = mean, SD = Standard deviation, N = Number.

Table 2 shows the Mean and Standard Deviation of Out-of-field Biology Teachers' Anxiety on Content Mastery and demographic school factors. The analysis shows a Mean Score of 48.64 and a deviation of 12.77 for PCK. At the same time, School Type, School Location, Gender, Teachers Qualification, Years of Teaching Experience, and Certificate have Means (\bar{x}) of 1.48, 1.52, 1.33, 4.31, 1.87, 1.47, 50.49 and SD; 0.52, 0.52, 0.47, 0.32, 0.78, 0.50 and 12.75, respectively. This shows that there is a correlation from the distributed Mean Scores on each of the moderating variables.

Analysis of the Null Hypotheses

The following null hypotheses were formulated and tested at alpha 0.05 levels of significance:

H₀₁: There is no significant relationship between Out-of-field (OFF) Biology Teachers' Anxiety on Content Mastery and Pedagogical Content Knowledge (PCK).

Table 3: Linear Regression Analysis Model on Content Mastery on Pedagogical Content knowledge

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.766 ^a	.587	.586	8.219

Table 3 shows the regression coefficient for the independent variable, Content Mastery. The result shows $r(1,499) = 0.766$, $r^2 = 0.587$. This indicates that 58.7% of the total variance in Out-of-field Biology Teachers' Anxiety on Pedagogical Content Knowledge (PCK) is accounted for by Content Mastery. To determine whether the model was a good predictor, the ANOVA result is presented in Table 4.

Table 4: Regression ANOVA of the Content Mastery and Pedagogical Content Knowledge

Model		Sum of Squares	df	Mean Square	Fcal	Sig.
1	Regression	47920.993	1	47920.993	709.469	.000
	Residual	33704.891	499	67.545		
	Total	81625.884	500			

Table 4 displays the ANOVA analysis on whether the linear model was a good predictor of correlation between CM and PCK. The Table shows a significant relationship between the predictor (Content Mastery) and the criterion variables (Pedagogical Content Knowledge). The results showed an $F(1,499) = 709.469$, $p(0.00) < 0.05$, which indicates that the model is a good predictor; hence, there was a relationship between the variables.

Table 5: Linear Regression Coefficient between Content Mastery and Pedagogical Content Knowledge

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t cal	Sig.
		B	Std. Error			
1	(Constant)	11.040	1.458		7.569	.000
	Content mastery	.745	.028	.766	26.636	.000

Table 5 further shows the regression coefficient between Content Mastery and Pedagogical Content Knowledge. The result indicates that Out-of-field Biology Teachers' Anxiety on content mastery is a significant predictor of their anxiety in pedagogical content knowledge ($B = .75$, $t_{cal} = 26.63$, $p(0.00) < 0.05$). Furthermore, the regression coefficient indicates that for any increase in one unit of Out-of-field Biology Teachers' Anxiety in Content Mastery, there will be a corresponding increase in anxieties in Pedagogical Content Knowledge (11.04).

H₀₂: There is no significant relationship between Out-of-field Biology Teachers' Anxiety on Content Mastery, school type, school location, gender, years of teaching experience, educational qualification on Pedagogical Content Knowledge.

The null hypothesis was analysed using a multiple regression test and the summary of the results presented in Table 6

Table 6: Multiple Regression Model of Content Mastery and Demographic factors on Pedagogical Content Knowledge

Model	R ^a	R Square	Adjusted R Square	Std. Error of the Estimate
1	.767 ^a	.589	.583	8.252

- a. Predictors: (Constant), Content mastery
- b. Certificate, School Location, School Type, Gender, Year of experience, Qualification

Table 6 shows the regression coefficient for the independent variables; Content Mastery and PCK on moderating variables; school factors (school location, school type), demographic factors, gender, years of experience and qualification. The result shows $r(1,499) = 0.767, 0.589$. which indicates that 58.9% of the total variation in Out-of-field Biology Teachers' Anxiety on Pedagogical Content Knowledge (PCK) is accounted for by one or two or more dependent variables. To determine whether the model was a good predictor, the ANOVA result was presented in Table 7

Table 7: Regression ANOVA of Content Mastery, School Factors and Demographic Factors on Pedagogical Content Knowledge

Model		Sum of Squares	Df	Mean Square	Fcal	Sig.
	Regression	48058.413	7	6865.488	100.83	.000
1	Residual	33567.471	493	68.088		
	Total	81625.884	500			

- a. Dependent Variable: Pedagogical Content Knowledge
- b. Predictors: (Constant), Content Mastery, Certify, School Location, School Type, Gender, Year of Experience and Teacher Qualification

Table 7 displays the ANOVA result. The result shows that there is a significant correlation between the predictors of content mastery, school factors, demographic factors and the criterion variables (pedagogical content knowledge) $F_{cal}(1,499) = 100.83, p(0.00) < 0.05$. This indicates that the model is a good predictor.

Table 8: Multiple Regression of Content Mastery, School Factors and Demographic Factors on Pedagogical Content Knowledge Coefficients

Model	Unstandardized Coefficient	Std. Error	Standardized Coefficient	t-cal	Sig.
(Constant)	13.570	3.335		4.069	.000
Sch. Type	.218	.736	0.009	0.296	.768
Sch. Location	.157	.727	0.006	0.216	.829
Gender	.014	.812	.001	0.017	.987
Qualification	-.086	.187	.016	.462	.644
Year of Exp.	-.037	.516	-.039	1.233	.218
Certificate	-.782	.901	-.031	0.868	.386
Content Mastery	-.722	.030	.758	24.944	.000

- a. Dependent Variable: Pedagogical Content Knowledge

Table 8 shows the analysis of PCK on school type, school location, gender, qualification, year of experience, certificates and content Mastery. The result indicates that school type is a non-significant positive predictor of Out-of-field Biology Teachers' Anxiety on Pedagogical Content Knowledge (PCK) ($B = .218, t = 0.296, p(0.76) > 0.05$). Similarly, school location, gender, qualification, year of experience,

certificates are not significant predictors of Out-of-field Biology Teachers' Anxiety on Pedagogical Content Knowledge (PCK). However, content mastery is a significant predictor of Out-of-field Biology Teachers' Anxiety on Pedagogical Content Knowledge (PCK) ($B = .737, t = 24.99, p(0.00) < 0.05$) while holding constant teacher characteristics; gender, qualification, year of experience, certificates and content mastery and school characteristics; school type and location. This indicates an increase in one unit of Out-of-field Biology Teachers' Anxiety in content mastery will increase by 0.737 units of their Anxiety in Pedagogical Content Knowledge (PCK).

Discussion of Findings

The descriptive analysis of the quantitative collected with the Anxiety questionnaire showed a correlation between content mastery and pedagogical content knowledge amongst OFF Biology Teachers. The scores of Biology Teachers on the variables measured indicate a very insignificant difference of 01.51, implying a positive relationship. The descriptive analysis using the scatter plot further showed the convergence of the two variables, confirming a relationship between CM and PCK amongst OFF Biology Teachers with Anxiety. To determine how significant the correlation between CM and PCK is, inferential statistics using linear regression was used to analyse the raised hypothesis. The result shows $r(1,499) = 0.766, r^2 = 0.587$. This indicates that 58.7% of the total variance in Out-of-field Biology Teachers' Anxiety on Pedagogical Content Knowledge (PCK) is accounted for by Content Mastery.

Patra and Guha (2017) compared the PCK and self-efficacy of geography Teachers in India. They submitted that PCK and self-efficacy of geography Teachers were positive and significantly related. In the same vein, this study supports the findings of Haciomeroglu (2014), which examined the structure of elementary preservice Teachers' Out-of-field Anxiety and Out-of-field teaching Anxiety in Turkey and found a significant relationship between predictors (i.e., test, course, and computation) and PCK, thus implying that Anxiety influences Out-of-field teaching. This only confirms that the 'Anxiety construct' affects its comparison variables within any learning setting. This finding can be attributed to Out-of-field Biology Teachers' inability to transfer the subject content effectively to the students and engage the students effectively in the learning process; inability to prepare or set laboratory properly before demonstration this will inhibit effective teaching and practical demonstrations; being unable to effectively prepare, plan and write lessons efficiently. On the contrary, Mutodi and Ngirande (2014) study that explored students' Teachers' Out-of-field Anxiety levels at a selected tertiary institution in South Africa found no significant correlation between home language and math Anxiety levels.

The result of analysis on the relationship between CM and PCK on other teacher factors (such as years of service, gender, qualification, school type and location). The Means obtained indicated that there is a relationship between the factors and OFF Biology Teachers Anxiety. Further analysis of the hypotheses raised in the study stated a regression coefficient for the independent variables; Content Mastery and PCK on moderating variables; school factors (school location, school type), and demographic factors gender, years of experience and qualification to be $r(1,499) 0.767, 0.589$, which shows 58.9% variation in Out-of-field Biology Teachers' Anxiety on Pedagogical Content Knowledge (PCK) is accounted for by one or two or more dependent variables. Hadley and Dorward (2011) and Aynur and Aydin (2014) studies revealed that Teachers with fewer years of teaching experience were more anxious than experienced Teachers. This may be because new entrants in teaching have not gathered expertise to have confidence during teaching. On the contrary, the study of Desouky and Allam (2017) reported that Teachers with higher teaching experience and higher qualifications exhibited a higher level of anxiety, stress and depression than those with lesser teaching experience.

Nisbet (2015) investigated the teaching experiences of six elementary preservice Teachers (EPTs), three with high Out-of-field Anxiety and three with low Out-of-field Anxiety, during their student teaching semester. The collected data were transcribed, and findings revealed both similarities and differences across EPTs. The study showed that EPTs with high Out-of-field Anxiety were weaker with respect to content knowledge and pedagogical content knowledge. In a related study, Uusimak and Nason (2004) investigated the causes underlying a sample of eighteen third-year Australian preservice primary Teachers' negative beliefs and Out-of-field Anxiety. The design of the study was qualitative. Data collection was through semi-structured interviews. The result indicates that the participants felt most anxious about Out-of-field when they had to communicate their mathematical knowledge in some way (48%).

Similarly, Houlihan (2009) examined the personality effects on teaching anxiety and teaching strategies in University Professors in Canada. The design of the study was a descriptive survey. Data were collected through an online medium using survey monkey. The collected data was analysed using multiple regressions. Results revealed a positive and significant correlation between Anxiety and teaching strategies such as student-to-student discussions.

Gender-related was considered in this study, which also showed a significant relationship between CM and PCK. Gender factor analysis showed $B = 0.001$, $t_{cal} = 0.017$, $P(0.987) > 0.05$. This meant that there was a significant relationship between gender and OFF Biology Teachers on CM and PCK. Aftab (2016) stated that males display more occupational stress/ Anxiety towards teaching than females. Similarly, Desouky and Allam (2017) reported gender differences in anxiety and depression in their study. Female Teachers showed a higher rate of very severe anxiety and stress than their male counterparts.

Conclusion

The study's result revealed a significant relationship between Content Mastery and Pedagogical Content Knowledge. Therefore, Out-of-field (OFF) Biology Teachers in Niger State have shown a strong connection between Anxiety on CM and PCK. Thus, we could assert that OFF Biology Teachers have indicated that their anxiety affects their CM and PCK, which inevitably translates to poor classroom content delivery. Furthermore, Anxiety on CM and PCK had a significant influence on gender, teacher qualification and other related teacher factors examined in the study

Recommendations

It is thus recommended that; government enact a policy that will stop the further employment of Teachers not professionally trained to teach. In addition, Teachers should be assigned to teach in subjects' areas they have Mastery of and be trained on teaching methodologies that are continually evolving.

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