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RELEVANCE OF SOUTHWESTERN NIGERIAN UNIVERSITIES PHYSICS TEACHER EDUCATION CURRICULA TO SENIOR SECONDARY PHYSICS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

This study was carried out to examine the relevance of Physics teacher education curricula in Southwestern Nigeria universities to senior secondary school curriculum, with the goal of establishing if the design meets the needs of secondary school education. The study adopted the descriptive survey research design and Physics teacher education curricula (PTEC) used in the nine universities housing the programme. The instrument titled Physics Teacher-Education Curriculum Structural Adequacy and a Checklist (CSRAC) were used to elicit information for the study. Data were analysed using descriptive statistics of percentages. Major findings showed that out of fifty-five Physics topics in the five themes of the secondary school Physics curriculum, A, B, D, E, I, C, F, H and G were all relevant with the percentage frequency of (60% and above). The organisational structures of Physics teacher education curricula in southwestern Nigerian universities to secondary school Physics curriculum, universities A, C and D were relevant (<60% and above). The result also showed that only mechanics 22(26.5%) out of the seven branches of Physics listed in secondary school Physics appeared in PTEC, followed by laboratory skills with 17(20.5%), while heat, waves and sound, and electricity and Magnetism were equally at 11(13.3%) each.

KEYWORDS: Syntactical Structure, Substantive Structure, Physics Curriculum Structure, Sustainable Development, Human Development, Environment

INTRODUCTION

Sustainable development is conceptualized in many ways by different scholars. Most often it is seen as development that meets the needs of the present without adequate consideration of the future generations. Many at times one can see it in a dual form (Development and Environment) which are necessary for the growth of citizenry. The context of this research is based on the development of human (pre-service Physics teachers) under Nigerian University education in Southwestern Nigeria as proposed by Chinsman (1995). To him, sustainable development is all about the dynamic framework of human development which is embedded in Physics teacher-education in Southwestern Nigeria.

Teacher education majorly involves the process of learning the science and techniques of teaching. It involves making learners to master the subject matter, and to acquire adequate mastery of the preparation of lessons in the classroom or laboratory (Ojediran, 2015). Teacher education ensures that teachers are able to acquire knowledge that makes them relevant to teach effectively in secondary schools. Omosewo (2009) noted that the revised version of the National Policy on Education (4th edition section 8 subsection 70(a) FRN, 2004) states "that teacher education will continue to be given a major emphasis in all the educational planning since no educational system can rise above the quality of its teachers". The government is also convinced that if Nigerian universities are to make optimum contribution to national development in professional fields for her to achieve sustainable development in teacher-Education in Southwestern Nigeria, the course contents should reflect the national requirements. Sustainable development in the preparation of Physics Teacher Education must take into account the course content, its structure relevant to secondary school Physics curriculum. Physics is one of the core science subjects taught at the senior secondary school level of the Nigerian educational system. The philosophy of Physics Teacher Education Curricula (PTEC) is tied to the national philosophical objectives of science education in Nigeria which are related to the preparation of teachers for all levels of education (egalitarian and utilitarian philosophy). This philosophy is a discipline-oriented based on two philosophical schools of thought known as perenialism and essentialism (Ehindero, 1986 & Abanikanda, 2006). Perenialism simply recognises that what must be taught must emphasise the truth about the society, regardless of the circumstances and other contingencies. Therefore, perenialists advocate that rationality, logicality and ethical principles must be embedded in Physics teacher- education curricula while the essentialists advocate that there are essential things a child must know before he or she can be called an educated person. The essentialists look at the programme of study to see if there exists a discrepancy between the essential and the non-essential aspects of the programme that includes the core, the specialization and the electives.

The knowledge of Physics is usually required to pursue courses like Astronomy, Geology, Chemistry, Biology and Engineering. The importance attached to Physics as one of

the core sciences, by the federal and state governments in Nigeria has been clearly stated that 'science education shall emphasize the teaching and learning of science principles' (FRN, 2007). Udoh (2012) established that learning of Physics offers the student an opportunity to think critically, reason analytically and to acquire the spirit of enquiry. This is why he asserted that:

> *Physics is crucial for effective living in the modern age of science and technology. Given its application in industry and many other professions, it is necessary that every student is given an opportunity to acquire some Physics concepts, principles and skills (p. I 3).*

Despite the importance of this subject, it is widely recognized that the teaching and learning of Physics has been fraught with challenges such as low enrolment, both in secondary schools and tertiary institutions in Nigeria (Daramola, 1982). Notable among the causes for low enrolment of students offering Physics in the schools include: poor Science and Mathematics background of students at the junior level of education, poorly equipped Physics laboratories, inadequate motivation of teachers, inappropriate teaching strategies employed by the teachers and insufficient number of qualified Physics teachers (NERDC, 2007; Jegedeand Adedayo, 2013). These factors have equally added to poor performance of students who enroll for Physics at the Senior Secondary School Certificate Examinations (SSCE). This is evident in their results in the past twelve years (WAEC, 2002 - 2013) as presented in Table 1.

Table 1: Trends in Students' Performance in Physics in the May/June West African Senior Secondary Certificate Examination (WASSCE) (2002-2013) in Nigeria

Year	Subject	Total No. of Candidates	No. of Credit Pass (A1- C6)	%Credit Pass	No. of Fail (below credit)	% Fail
2002	Physics	254,188	120,764	47.51	133,424	52.49
2003	Physics	270,474	130,982	48.43	103,508	51.57
2004	Physics	265,262	135,359	51.03	129,903	48.97
2005	Physics	345,640	144,132	41.70	201,508	58.30
2006	Physics	379,823	221,450	58.30	158,373	41.70
2007	Physics	419,245	181,092	43.19	238,153	56.81
2008	Physics	405,913	195,922	48.26	209,991	51.74
2009	Physics	454,802	146,341	32.18	308,461	67.82
2010	Physics	487,963	159,264	32.64	328,699	67.36
2011	Physics	587,772	157,543	26.80	430,229	73.20
2012	Physics	120,765	32,676	27.00	87999.0	73.00
2013	Physics	142,699	42,175	29.50	100524	70.50

Source: West African Examination Council, Research and Statistics Unit (2014)

Table 1 shows the SSCE Physics results in the past twelve years which indicates that it was only in 2004 and 2006 that over 50% of the candidates passed at the credit level. This implies that only a few students would eventually be able to pursue Physics related careers in higher institutions. A number of related studies have been carried out by Nigerian science educators (Ibidapo-Obe, 2007; Ajayi, 2007; Mankilik, 2006; Ajayi, 2000 and Abdulrahem, 2012;) on issues such as teaching methods, classroom interaction patterns, curriculum evaluation and implementation, conception of electromagnetic field held by college students in Nigeria and the challenge of teacher education in Nigeria but yet with little improvement in the performance of the students. Looking at all the aforementioned researches, it is quite clear that issue like the relevance of Physics Teacher Education Curricula to Senior Secondary Physics Curriculum calls for attention. Hence the Physics-teacher education curricula structure in the universities in Southwestern Nigeria is a factor to be examined for relevance in terms of subject- centered, spiraled, child-centered, societal-centered, syntactic structure process, substantive structure process and thematic structure approach.

Statement of the Problem

Physics education is one of the teacher-education programmes in Nigerian universities' faculties of education. Such Physics teacher- education curricula which were developed in line with the criteria established by the National Universities Commission (NUC, 2007) are meant to produce competent teachers for senior secondary school Physics teaching. The poor performance, low enrolment of Physics students in Senior Secondary Schools may be as a result of poorly equipped laboratories, inappropriate teaching strategies and insufficient number of quality teachers produced from one university to another may question the standard of such curricula and their processes of implementation in the faculties of education. Studies have been carried out on issues relating to teaching methods, classroom interaction pattern in Physics classrooms, curriculum evaluation and implementation in Nigeria but yet with little improvement in enrolment and performance (Abdulraheem, 2012; Ibidapo-Obe, 2007; Ajayi, 2007; Mankilik, 2006 and Ajayi, 2000). Therefore, there is a need to examine the programme across the universities by examining the structure of existing curricula for Physics education in Southwestern Nigerian universities with respect

to the secondary school Physics curriculum for relevance. Hence, this study.

Purpose of the Study

This study seeks to examine the relevance of Physics-teacher education curricula structure in Southwestern Nigerian universities to that of secondary school Physics curriculum. Therefore, the specific objectives of the study are to:

1. examine the relevance of content structure of PTEC in selected Southwestern Nigerian universities to the senior secondary Physics curriculum.
2. examine the relevance of organizational structure of PTEC in selected Southwestern universities to senior secondary school Physics curriculum; and
3. assess the adequacy of NUCPTEC content structure relevance to Secondary School Physics curriculum.

Research Questions

1. How relevant is the structure of PTEC in the selected Southwestern Nigerian universities to the senior secondary school Physics curriculum?
2. What are the organizational structures of PTEC in selected Southwestern Nigerian universities to senior secondary school curriculum?
3. How adequate are the NUCPTEC content structure relevance to Secondary School Physics curriculum?

Significance of the Study

The study gives information on the structure of the Physics Teacher Education Curricula in Southwestern Nigerian universities to that of Senior Secondary School Physics curriculum. It revealed the organisational structural deficiencies among the universities and NUCBMAS for relevance to secondary school Physics curriculum. Results of the study will close such a gap and rekindle interest of the barriers to implementing the core requirement of both the secondary schools and Physics teacher-education curricula. Results of the study can also lead to the reviewing of both curricula in a way that can facilitate their hitch-free implementation of teacher education in Nigeria for sustainable educational development.

GAP IN LITERATURE

Most researchers such as (Okodoko & Samuel, 2009) studied on NTI/NCE Mathematics curriculum implementation. Their study based on Mathematics education curricula for distance learning but not on the structure of Physics teacher education in Southwestern Nigeria to secondary schools curriculum. In the same vain, Omosewo (1991) investigate the relevance of the content of Physics teacher education in Nigeria without investigating into the structure of Physics teacher education programme in South western Nigeria Universities (Utilitarian structure) to senior secondary school curriculum (Egalitarian structure). Looking at the aforementioned gap in literature, it becomes imperative to embark on the study.

LITERATURE REVIEW

University operates a complex academic oriented curriculum structure. The structure combines remarkable stability and resilience. It has an internal structure with a characterized pattern organized with an in-built mechanisms for transformation of the society and individual development. Emphases on the structure of discipline are intensively established by Brunner (1974) and Schwab (1962) and the identification of Survival Logically Distinctively Forms Knowledge (SLDFK) are postulated by Hirst (1974), Pheniz (1964) in Ehindero, (2014). Ehindero (2014) was of the view that curriculum structure for each discipline especially Physics teacher-education programme should be the one to provide a fertile and complex framework for knowledge construction. He noted that each child or learner should learn how to construct their knowledge models of learning and understanding within the curriculum structure of its discipline. Hence, effective construction of knowledge has a lot to do in addressing the curriculum structure of each discipline. The Physics teacher-education curriculum is meant to train pre-service Physics teacher to teach Physics in secondary schools (NUC, 2007). It should provide a framework for student's construction of unique models of knowing the meaningful interpretation of experiences. It is organised to meet the essentials of the teachers' professional qualifications concerning the subject matters, as well as, didactical and their pedagogical competences. These will enable the Physics teachers after the training to become expert not only on the content knowledge of the subject matter but also paying attention to students' knowledge in the classrooms (Omosewo, 2009).

The philosophy of Physics for secondary education in Nigeria originates from the National Philosophy of Science Education (NPE) (FRN, 2004). The Nigeria's Philosophy of Education is based on the integration of the individual into a sound and effective citizen and equal educational opportunities for all citizens of the nation at the secondary and tertiary levels, both inside and outside the formal school system (Egalitarianism). Since the national policy on education is government's way of achieving that part of its national objectives that can be achieved using education as a tool. Therefore, no policy on education can be formulated without first identifying the overall philosophy and objectives of the nation.

How do we know whether there are deficiencies in the implementation of curricula in our schools? As it is hardly difficult to pick out deficient products from the factory assembly line, it is not difficult to see products of our educational system that are deficient in knowledge, skills and attitudes which the society wishes to promote through the intended curriculum, Sofolahan (1992). Okodoko and Samuel's (2009) study on evaluating the implementation of NTI/NCE Mathematics programme by distance learning system. Findings of this study revealed a significant relationship between structural facilities, teachers' qualifications and evaluation on the implementation of the NTI/NCE mathematics curricular by distance learning system. The paper therefore suggested among others the provision of adequate facilities and the training and retraining of teachers for the effective implementation of the curriculum. Omosewo and Ogunlade (2012) studied the attitude of teachers towards utilizing community resources in Physics in Abuja, Nigeria. The result showed that there was a significant difference between the attitude of qualified Physics teachers and unqualified Physics teachers towards the use of community resources in teaching. Boyo (2004)

carried out a research on identified problems associated with studying of Physics in Lagos state, Nigeria. The result of the findings shows that most of the challenges faced in studying of Physics are non- availability of facilities for teaching, Jack of classrooms, textbooks, journals and overpopulations of students. Omosewo (2000) found inadequate number of Physics teachers in the senior secondary schools in Kwara State unlike any other state in Nigeria as one of the problem facing study of Physics in Nigerian classrooms without investigating the structure, philosophy, implementation strategies under the Physics teacher education curriculum in universities, faculty of education in southwestern Nigeria.

METHODOLOGY

Research Design

The research employed the descriptive survey research design. This design affords the researcher tocollect data on, and describe in a systematic manner, the characteristics, features or facts about a given population (Nworgu, 2006). The design enabled the researcher to provide a systematic and accurate description of the variable of interest related to curricula issues in Physics education programme in the selected universities, in Southwestern Nigeria.

Population, Sample and Sampling Technique

The study population comprised all the Nine University Physics Teacher-Education Curricular (UPTEC) in Southwestern Nigerian universities, National University Commission Benchmark on Minimum Academic standard (NUCBMAS) for Physics Education programme and Senior Secondary School Physics Curriculum (SSSPC).The study sample consist of all the nine universities curricula for Physics Teacher-Education programmes in Southwestern Nigeria and the Senior Secondary School Physics Curriculum were purposively used for the study. It was purposive because not all the universities in Southwestern Nigeria housing the programme.

Research Instrument

The main instrument developed for this study is Physics Teacher-Education Curricular Structural Relevance and Adequacy Checklist (CSRAC). The extracts from relevant portions of the following documents were used for the construction of the instrument:

1. Universities' Physics Teacher-Education Curricula (UPTEC)
2. Senior Secondary School Physics Curriculum (SSSPC)
3.Universities' Physics Teacher-Education Curricula (UPTEC)
4. Benchmark on Minimum Academic Standard (BMAS)

Universities' Physics Teacher-Education Curricula (UPTEC) consists of the curricula for Physics teacher-education in each of the nine universities offering the programme in Southwestern Nigeria. The curricula are meant to be used in training Physics teachers. Only the Physics content of the curriculum was the used for this research against the secondary school Physics curriculum. The philosophy and structure of the course put in place (core course units, restricted electives units, specialization course units) were examined. Those three areas of senior secondary school Physics. The information needed was extracted by the researcher himself.

Senior Secondary Physics Curriculum (SSPC)

The Senior Secondary Physics Curriculum (SSPC) was produced by the Federal Ministry of Education. The 2007 edition of the curriculum was used in this study. It was designed to take Education of certain gaps observed in this area of study as one of the core science subjects. The National Physics curriculum is meant for the teaching of students at the senior secondary school teacher education curricula to secondary school Physics curriculum. The information needed was extracted by the researcher himself.

Validity and Reliability of the Research Instrument

The research instruments were validated through expert judgments by two curriculum evaluation experts, two science educators in the Department of Science and Technology Education, Faculty of Education, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria, two experienced Physics lecturers in the Faculty of Science of the same university, two experience Senior Secondary School Physics teacher for both face and content-validity. These are people who are sufficiently knowledgeable, versatile in the subject area and can assess the appropriateness of the instruments. They vetted the questions in terms of its relevance to the subject matter, coverage of the content areas, appropriate language usage and purpose clarity. The fact that the Physics curricula were written by subject experts and approved is given autonomy to structure their programme in line with NUC requirement for the award of the degrees. The Physics curriculum for the senior secondary school level was written by Tests and Measurement experts in Physics at the Federal and State Ministries of Education. Hence, must have gone through series of validity tests before approving it for use.

Procedure for Data Collection

The researcher(s) visited all the sampled universities to interact with the heads of departments offering Physics Teacher Education programme in southwestern Nigeria. Copies of University Physics Teacher-Education Curricula (UPTEC) were collected by the researcher from the departments housing PTEP. Two weeks were used for the exercise to cover up areas where unforeseen challenges have caused delay. The observed situation about the curricula structure as a whole was scored and subjected to SPSS analysis.

Data Analysis Technique

The data gathered were analysed using both descriptive statistics of frequency counts and percentages. Where needed, simple proportion, simple frequency counts or percentages and graphical representations were used. Simple frequency count and simple percentages were used to determine the relevance of the structure, in terms of content relevance and course structure, of each selected southwestern Nigerian universities to secondary school Physics curriculum.

RESULTS

Research Question One

In answering this question, the frequencies of content structure of secondary school Physics curriculum were collated and the topics were fifty-five (55). These 55 topics were varied for relevance among the selected universities Physics teacher education curricula. The percentage frequency of relevance among each university was calculated.

Table 2: Content Structure Relevance of Physics Teacher Education Curricula to Senior Secondary Physics Curriculum

Universities	**A freq(%) Relevance**	**B freq(%) Relevance**	**C freq/% Relevance**	**D freq/% Relevance**	**E freq/% Relevance**	**F freq/% Relevance**	**G freq/% Relevance**	**H Freq % relevance**	**I freq % Relevance**
SSSPC Topic % relevance Total Number of Topics = 55	34(61.8%)	34(61.8%)	46(83.6%)	37(67.3%)	37(67.3%)	44(80.0%)	41(74.6%)	40(72.7%)	34(61.8%)
Not Relevant	21(38.2%)	21(38.2%)	9(16.4%)	18(32.7%)	18(32.7%)	11(20.0%)	14(25.5%)	15(27.3%)	21(38.2%)

***Source**: UPTEC of various Universities and SSPC by NERDC 2004, (* Percentage in parenthesis)*

After looking at the structural relevance of universities Physics teacher-education curricula to SSSPC the following "Decision Rule" was adopted for the study: 60% and Above = Relevant. Using frequency counts as well as percentages, Table 2 presents the content structure relevance of universities Physics teacher education curricula (Physics courses alone) to senior secondary Physics curriculum. The result reveals that out of 55 Physics topics in the five themes of the secondary school Physics curriculum, A, B, D, E, I, C, F, H and G are all relevant with the percentage frequency of (60% and above). This indicates that the Physics courses in the various universities are not completely relevant to senior secondary school Physics curriculum. These meant that there are irrelevances in the courses presented to the pre-service teachers during the course of study in the various universities in southwestern Nigeria. Implication of which will affect both attitude to Physics teaching and learning in the schools and the performance of the learners.

Research Question 2

Six organizational structure of Senior Secondary School Physics Curriculumwere compared with PTEC in selected Southwestern Nigerian Universities for relevance here.

Table 3: The Relevance of the Organizational Structure of PTEC in selected Southwestern Nigerian Universities to the Senior Secondary School Physics Curriculum

S/N	Senior Secondary School Physics Curriculum Structure	A Curriculum	B Curriculum	C Curriculum	D Curriculum	E Curriculum	F Curriculum	G Curriculum	H Curriculum	I Curriculum
1	Spiral	R	R	R	R	R	R	R	R	R
2	Child Centered	NR	R	NR	NR	NR	R	R	NR	NR
3	Society Centered	NR	R	NR	NR	R	NR	R	R	R
4	Syntactic Structure	R	R	R	R	R	R	R	R	NR
5	Substantive Structure	R	R	R	R	R	R	R	R	R
6	Thematic	NR	NR	NR	NR	NR	NR	NR	R	R
Percentage Relevance		50%	83.3%	50%	50%	66.7%	66.7%	83.3%	83.3%	66.6%

***Source**: Extract from UPTEC, 2015. NR= Not relevant. R= Relevant*

Table 3 shows the relevance of the organisational structure of PTEC in the selected Southwestern Nigerian universities to senior secondary school Physics curriculum. Using Desk-work Analysis, Table 3 shows the organisational structures of Physics teacher education curricula in Southwestern Nigerian universities to secondary school Physics curriculum. The universities B, G and H were at 83.3%, universities E, F,G and I were at 66.7% and universities A,C and D were at 50% relevant to SSSPC structure. The structure of Physics at secondary school level is spiral, child-centered, society-centered, syntactic process, substantive process, and thematic. The structure of the university A Physics curriculum is spiral, syntactic process, and

substantive process in nature. The university B has no thematic structure and also the university C does not have child-centered, society-centered and thematic structures. The content of the university D Physics curriculum as shown in Table 3 indicates that it is spiral, syntactic process, and substantive structured. The structure of the university E physics curriculum is spiral, society centered, and substantive in nature. It can also been seen, that university F Physics curriculum is spiral, child-centered, syntactic, and substantive process in nature. The university G has no thematic structure. University H is spiral, society-centered, syntactic process, substantive process, and thematic in structure. The university I Physics curriculum is society centered, substantive process, and thematic in nature.The spiral nature of Physics curriculum at senior secondary school level is unique. It is probably so in order to see that senior secondary school students are likely to gain adequate mastery of the subject contents which they are supposed to learn and make use of, in the nearest future and to be able to compete with their peers in the society and explore their world.

Research Question 3

Adequacy of the NUCPTEC content structure relevance to Secondary School Physics curriculum were observed here.

Table 4: Content Structure Relevance of Secondary School Physics Branches Appearing in NUC UPTEC for Physics Courses Alone

Year	Secondary School Branches of Physics Adequate to NUC UPTEC Structure							
	Mechanics	**Optics**	**Heats, Waves and Sound**	**Electricity & Magnetism**	**Laboratory Skills**	**Atomic Physics**	**Others**	**Level Units**
1	4(28.6%)	(0.0%)	4(28.6%)	2(14.3%)	4(28.6%)	(0.0%)	(0.0%)	14(16.87%)
2	7(31.8%)	2(9.1%)	2(9.1%)	5(22.7%)	4(18.2%)	2(9.1%)	(0.0%)	22(26.5%)
3	5(20.8%)	(0.0%)	5(20.8%)	4(16.7%)	4(16.75)	4(16.75)	2(8.3%)	24(28.9%)
4	6(26.5%)	(0.0%)	(0.0%)	(0.0%)	5(21.7%)	8(24.8%)	4(17.4%)	23(27.7%)
Total Units	22926%)	2(2.41%)	11(13%)	11(13.3%)	17(2.8%)	14(2.8%)	6(16.87%)	83(100%)

Source: NUCBMAS and SSSPC.

Table 4 shows the content relevance of secondary school Physics to NUC UPTEC for Physics courses. Using frequency counts as well as percentages, the Desk-work analysis in Table 4 indicates that only mechanics out of the seven branches of Physics listed has 22(26.5%), followed by laboratory skills with 17(20.5%), while heat, waves and sound, and electricity and Magnetism are equal with 11(13.3%) each. The least appearing branch among all is optics with 2(2.41%). The total units for graduation of Physics courses alone equal 83 units. Philosophical structure of secondary school Physics states that it should provide basic literacy for functional living in the society (NERDC, 2007). Therefore, for the need of the society, electricity which is the source of energy is just sparingly presented with 11 units out of 83 Units. Also laboratory skills which is meant to equipped the student on essential scientific skills and attitudes as a preparation for technological application of Physics is also with 14 units out of 83 units. These are not enough to produce individual to be self-reliant and creative to develop the society. The philosophy need to be reviewed in terms of course contents or units for relevance by NUC. Substantively, the curriculum is comprehensive while syntactically not comprehensive enough.

DISCUSSION OF FINDINGS

From the results, 55 topics of Physics in senior secondary school Physics curriculum for secondary schools were viewed against each university PTEC. The percentage relevance of the topic revealed that five universities Physics courses in Southwestern Nigeria were not relevant to secondary school Physics content structure (A, B, D, E and I) while C, F, H and G had high degree of relevance of Physics courses relevant to secondary school Physics. This corroborates Ivowi's (2004) study that the content of the science component in the present model of science teacher education programme in our universities is unable to produce a science teacher. Bruner, (1974) also noted that for the needs of the country, students in secondary school should understand scientific facts and principles, acquire scientific skills and develop scientific method. He therefore, stated that it is common knowledge that one can only give out what one has. Universities should embrace unified curriculum structures that are substantively and syntactically relevant.

Conversely, the relevance of the organisational structure of PTEC in selected Southwestern Nigerian universities to the senior secondary school Physics curriculum were also considered. The secondary school Physics curriculum has graduated to thematic approach, it is spiral in structure, child-centered, society-centered, syntactic process and substantive process (FME, 1985; David, 2004; NERDC, 2007,&Ehindero, 2014). The results revealed that only I PTEC is not spiral with respect to content organisation, while the remaining eight (8) universities PTEC is organised in a spiral form. It is also revealed that six (6) universities (A, C, D, E, H and I) PTEC are not child-centered while B and G are relevant in terms of child centeredness. The PTEC were also viewed in relation to the society centered. Four universities PTEC (A, C, D and F) appear not relevant while B, E, G, H and I appear to be relevant to the needs of the society.

Syntactically, only University (I) PTEC is not relevant to secondary school Physics curriculum while substantively, all the universities sampled were relevant. Monk and Osborne (1996) reports that many curricula have forgotten Schwab's (1962) important distinction between syntactic (the rules of knowing) and the substantive (the meaning of knowing) that is not only epistemology of science but also an interpretation of phenomenon which must be embedded in any subject curriculum. They also submitted that the substantive structure need to be subjected to syntatic structure which is a process based. The process has to do with methodological concerns such as the identification and control of variables which are of utmost importance to Physics teaching. The content or specialization structures of Physics were also viewed as not adequate to secondary school Physics in some universities in the study area. This is contrary to the opinion of Walvood and Anderson (2010) who stated that a Physics teacher, who is well equipped with specialized content knowledge, process skills and high level of imaginative thinking capacity, and permits acceptable form of interaction in his or her classroom, is likely to engender meaningful teaching-learning process.

CONCLUSION

The study concluded that the structure of Physics Teacher Education Curricula (PTEC) are not adequately observed by universities curriculum developers in selected Southwestern Nigeria universities to be relevant to the established standard by National University Benchmark on Minimum Academic Standard (NUCBMAS). A reasonable conclusion one can drawn is that National University Commission (NUC) policies (NUCBMAS) have been clear and consistent over the years and there is a well-designed curriculum for PTEC by NUC aimed at satisfying the needs of the society especially at the secondary school level, but findings of this study showed NUC standard have not been articulated enough by the universities. At this juncture, the difference in structure among the universities will result in unequal production of Physics teachers with professional training in the three domains of learning.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

1. The Physics component of the course must be well structured substantively and syntactically to meet the objectives set out so that teachers produced will be able to teach Physics students in secondary school to excel in their educational attainment (Utilitarian and egalitarian philosophy).
2. The programmme course content should be activity-oriented and the content must be relevant to secondary school physics curriculum.
3. The universities and NUC need to build strong and viable curricula that can proactively respond to the needs of senior secondary school Physics teaching.

IMPLICATION FOR FURTHER RESEARCH

The findings of the study have been able to provide information on the structures of PTEC in Southwestern Nigerian universities. It has also shown the relevance of PTEC to senior secondary school Physics curriculum. Furthermore, it has also give information on the required inputs for the implementation of PTEC in the different institutions. It also revealed the existing gap in the structure of PTEC in the various universities in Southwestern Nigeria. This study should be replicated time to time so as to be able to confirm this study and if possible the region not covered in this study can be covered.

LIMITATION OF THE STUDY

This study was carried out on the structure physics teacher education curricula in Southwestern Nigerian universities. This study is limited to Physics Teacher-Education Programmes (PTEP) offered in some purposively selected Southwestern Nigerian universities in the states (Oyo, Osun, Ogun, Ondo, Ekiti and Lagos). The Benchmark Minimum Academic Standards (BMAS) of the PTEP issued by the National University Commission (NUC, 2007) and the new Nigerian Educational Research and Development Council (NERDC) senior secondary school Physics Curriculum were used..

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