CONTRIBUTING FACTORS TO EFFECTIVE TEACHING AND LEARNING: IMPLICATIONS FOR CURRICULUM DEVELOPMENT AND QUALITY TECHNICAL TEACHER PRODUCTION IN NIGERIA

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Abstract

This study investigated some contributing factors to effective teaching and learning and discussed their implications for curriculum development and quality technical teacher production in Nigeria. The study adopted descriptive research design with four research questions guiding it. Six colleges of education were purposively sampled from Southwestern Nigeria. The sampled participants comprised 91 technical education lecturers and 197 technical education students, making a total of 288 participants Data were collected using Technical Observation Schedule (r = 0.76), Technical Education Curriculum Influencing Factors Scale (r = 0.79) and Test of Technical Education Students' Effective Learning (r = 0.78). The data were anlysed using inferential statistics of multiple regression analysis. The findings revealed that method of teaching, technical education students' gender, technical education lecturers' qualification, working experience, technical education students' area of specialization, college type and college facilities have position multiple correlation (R = 0.152) with technical education students learning and relative contributions to their learning respectively. Based on the findings, it was recommended that the factors which have been found to contribute to effective acquisition of knowledge and vocational skills in technical teacher production should be improved upon by giving adequate attention to them in specific terms both in curriculum development and implementation so that prospective teachers would learn effectively under the best situation possible.

Background

The expensive undertaking of curriculum task in its universality which is often a collaborative enterprise embraces a collective participation of all educational professionals, lay citizens and the utilization of resources. The emanating curriculum from collective efforts of stakeholders has the quality of dynamism and responsivity to the changing needs of the society where the products of a curriculum would eventually work. However, a well planned curriculum is not worth its candle until it scales the test of appropriate implementation, which is the determinant of its validity, reliability and index of success or failure in meeting the pre-determined objectives of education.

Viewed from the perspective of the entities involved in the curriculum making and implementation process, a number of factors have a say in effective curriculum planning and delivery. The ingredients for effective learning of the content of a curriculum are inexhaustible as the prevailing teaching-learning situations and dynamics of the classroom may prescribe. Prominent among such factors is the teacher. Okeowo (2009) identified the teacher and his key role in the school system, ie, to teach the learners and ensure that they are learning. Making learning in the classroom as effective as possible is a crucial function that a teacher must perform. Effective and skillful teaching guides the learning process. The basic factors in effective teaching and curriculum implementation include:

> *... teachers' skills in planning and presentation; classroom discipline and management; teacher participation in extra curriculum activities; cooperation*

with school authorities; concern for learners' needs; initiative and resourcefulness (Ike, 2007, p.66)

In a broader view, Alade (2006) asserted that several mediating factors account for the reason why students may differ in their academic performance in education. He identified gender, educational qualification, age, salary grade, income and other family resources, relationship and interaction between parents and the child, parental involvement in school-related activities and family moves as factors which could account for students' varied academic performance. Abayomi (2000) had earlier considered gender, educational qualification, age and salary grade as among the factors that could affect training objectives. In another study, students' academic ability, socio-economic status and motivation have been empirically proved to be among the factors which contribute relatively to students' academic performance in basic technology (Alade, 2010). All these factors are not necessarily mutually exclusive categories. There could be other factors that affect students' learning in schools.

In cooperative curriculum planning, the teacher and the learners have long been identified among the participants. The teacher is the actual implementer of the curriculum who should understand the tenets of the plan, while the learners are the recipients of the curriculum plan and thus must be co-opted in curriculum planning so that cognizance would be taken about their characteristics, growth, needs, experiences, attitude, aptitude, emotion, physical and physiological development. Slawin and Madden (1995), Ayodele (2000) and Fabayo (2000) have established the significant effect of class size and pupil-teacher ratio on students' academic achievement. Ike (2007) summarized the factors that promote effective teaching in job motivation and satisfaction, teacher training and qualification, and teacher participation in decision making.

From the above, it could be deduced that numerous factors work together for effective teaching and learning, provision of effective education is intended to produce a cream of refined human species (Oyekan, 2007). The production of quality teachers, technical teachers inclusive, breeds quality teacher education products. Teachers' impact the worthwhile value to the learners and the quality of education of a country cannot rise above the teacher's quality. Therefore, teachers' qualification, attitude, experience, commitment level, among many other teacher factors, affect the teachers' teaching performance, which in turn, affect students' learning outcomes. Oyesiku (2009) believes that quality teacher education matters for quality teacher effectiveness. All put together determines the outcomes from classroom instruction.

Of much concern to the researcher in this paper is contributing factors to effective teaching and learning in respect of technical teacher production. Available research in this area appears meager. Another reason is to further establish their contributions or otherwise to students' learning outcomes. This is with a view to discussing their implications on curriculum development and quality technical teacher production in Nigeria. Of course, the provision of effective vocational and technical teacher education programme is highly essential for the survival of the skill-based programmes installed in the concerned institutions in Nigeria (Alade, 2009). It should be remarked that the heart of the Nigerian vocational aspiration and policies is the vocational/technical teacher.

Statement of the Problem

The education and economic empowerment of the child are mostly determined by myriads of factors within and outside the school. This observation among other things recognized the impact of learner factors, teacher factors, school factors and home factors on the learners' learning and behaviours. Perhaps, it has become outstanding to acknowledge

the need for repositioning some of these factors in curriculum development and teacher production in subject disciplines for better yield. Against this background, the study examined contributing factors to effective teaching and learning, and implications for curriculum development and quality technical teacher production in Nigeria. The factors are: technical education, students' gender, area of specialization, college type, technical education lecturers' qualifications, working experience, college facilities and method of teaching.

Research Questions

This study specifically provided answers to the following four research questions;

1. To what extent will the seven independent variables (technical education students' gender, area of specialization, college type, technical education lecturers' qualification, working experience, college facilties and methods of teaching), when taken together predict the students' acquisition of basic knowledge in technical education?
2. What is the relative contribution of each of the seven independent variables on the students' acquisition on basic knowledge in technical education?
3. To what extent will the seven independent variables when taken together predict the students' acquisition of vocational skills in technical education?
4. What is the relative contribution of each of the seven independent variables on the students' acquisition of vocational skills in technical education?

Methodology

The study adopted descriptive research design in which the independent variables have manifested themselves already, and they were not manipulated. The research only attempted to link some already existing observations to some variables taken as dependent. The conceptual framework of the factors considered in the study is as shown in figure 1 (Appendix 1). In the conceptual framework, the learner factors, teacher factors and school factors are taken to have a relationship with technical education students' acquisition of basic knowledge and vocational skills both jointly and relatively, and these have implications for curriculum development and quality technical teacher production in Nigeria as subsequently presented in this paper.

The target population for this study comprised all the Colleges of Education in Southwestern Nigeria where technical education is offered. They are six states Colleges of Education and one Federal College of Education purposively sampled. The participant /respondents comprised 91 technical education lecturers and 197 technical education students. The 300 level technical education students were preferred because of their exposure to the content of technical education curriculum for over a period of two years. In all, a total of 288 lecturers and students participated in the study. All the technical education lecturers and the level 300 technical education students on ground were focused and used in this study because the population of the teaching staff and the students in the area is generally not too large (See Appendix 2 – Table 1: Distribution of the participants used for the study). The instruments used are Teaching Observation Schedule (TOS), Technical Education Curriculum Influencing Factors Scale (TECIFS) and Test of Technical Education Students' Effective Learning (TTESEL). The Teaching Observation Schedule (TOS) designed by the researcher was used to observe the teaching exercise of technical education lecturers. It consists of six sections A to F ranging from adequacy of instructional objectives features, context, teaching methodology, teaching techniques, class room/workshop interaction assessment and evaluation practices of technical education lecturers.

All the sections (A to F) were based on a rating of 5, 4, 3, 2 and 1 representing Very Good (VG), Good (G), Fairly Good (FG), Fair (F) and Poor (P) for each of the lesson features

observed. TOS was given to experts for face and content validity. Its reliability was determined by giving it to five (5) guided research assistants who observed technical education teaching of ten lecturers in a college of education outside the scope of the study. Their ratings were compared using inter-rater reliability (Scott's II) in order to ascertain the level of agreement among the raters. The inter-rater reliability values obtained ranged between 0.71 and 0.81 for TOS in this study. Thus, an average reliability value of 0.75 in this case was considered adequate for the study.

The Technical Education Curriculum Influencing Factors Scale (TECIFS) was adapted from the sample assessment instrument for evaluating technical and vocational education programmes designed by Qlaitan (1996). It contains information on the socio-economic data of technical education lecturers, their qualification, working experience and area of specialization. It is followed by eighteen (18) items to gather information on factors perceived to be responsible for the lapses in the implementation of technical education curriculum in colleges of education. The ranking attracted 4, 3, 2 and 1 respectively for Very Serious Effect (VSE), Serious Effects (SE), Mild Effects (ME) and No Effect. Twelve copies of TECIFS were scrutinized by specialists in technical education for face and content validity. Cronbach Alpha was used to determine the reliability of the items and the value obtained was 0.79. The Test of Technical Education Students' Effective Learning (TTESEL) is in two categories, Section A and B. Section A was a test of the Basic Knowledge in Technical Education (TBKTE) while Section B was a Test of Vocational Skills Competence in Technical Education (TVSCTE). Section B consists of thirty five multiple choice items with four options (A-D) constructed to cover twelve (12) relevant topics selected from the five main technical education options available in the colleges of education and technical drawing which cut across every option.

The items were constructed based on Bloom's taxonomy of educational objectives and are synthesized to reflect three categories of cognitive levels, namely knowledge (Recall), Comprehension (understanding) and Application (thinking). The TTESEL was administered on twenty (20) technical education students of a college of education not included within the study to determine the difficulty index (easiness percentage) and the discriminating power of the test. The Difficulty Index (DI) obtained is 0.51 which shows that the test items were not too difficult not too simple. A value of 0.47 determined as the Discriminating Index (DI) was considered adequate because it showed that TTESEL was able to discriminate between very knowledgeable and less knowledgeable technical education students. The reliability of TTESEL was determined using Kuder Richardson formula 21 (KR-21) because the test was not scored dichotomously (Yes or No) but have more than two options. The reliability index obtained is 0.78,

Section B is a Test of Vocational Skills Competence in Technical Education. Each technical education student was observed on practicals in his/her area of specialization thus: Auto mechanics – Ability in components fixing on an engine block (four cylinder engine); Building Construction – Ability in concrete mixing and block laying; Electrical/electronic; Construction of a circuit board with a switch controlling two lamps; metal work; construction of a sheet metal box. It was a 3-hour practical work. The selected areas of practical for validity were based on technical education experts' recommendations that they were among the obvious practicals in college of education and were also dictated by the availability of tools, equipment, expendable items, finance and personal.

The selected areas of practical for validity were based on technical education experts' recommendations that they are among the obvious practicals in college of education, and were also dictated by the availability of tools, equipments, expendable items, finance and personal. The reliability of the practical test for the study was done by exposing ten (10) technical education students outside the scope of the study to the selected practical areas in

the technical education options, and were observed and rated by the researcher as well as four research assistants. The average rating of 0.78 of the raters was taken to be high and appropriate.

The six colleges of education involved in this study were visited and upon permission by their Heads of Department, the researcher, along with some research assistants administered the research instruments and the overall data collection covered a period of one month. Multiple Regression Analysis and Analysis of Variance were employed to provide information on the joint and relative contributions of the variables taken as causes (independent) in the variables take as effect (dependent) in this study.

Results

Research Question 1: To what extent will the seven independent variables when taken together predict students' acquisition of basic knowledge in technical education?

Table 2a (See Appendix 3) shows that the seven independent variables, viz: technical education students' gender, technical education students area of specialization, college type, technical education lecturers qualifications, working experience, college facilities and methods of teaching have a positive multiple correlation with technical education students' acquisition of basic knowledge in technical education ($r = .152$). Also, the seven independent variables have an adjusted R^2 value of .013 which implies that they account for 1.3% of the total variance in the dependent measure. The remaining 98.7% is due to many other factors which are not considered in this study. Likewise, their joint contribution in this respect is not significant at 0.05 alpha level (F_7' 196=.722; P (.640) > 0.05 (table 2b – Appendix 3).

Research Question 2: What is the relative contribution of each of the seven independent variables on students' acquisition of basic knowledge in technical education?

Table 3 (see Appendix 4) reveals that none of the seven independent variables made significant contributions to technical education students' acquisition of basic knowledge in technical education. Notwithstanding, the ranking of their insignificant relative contributions are presented in the following order: Methods of teaching ($\beta = .109$, $t = 1.501$; $P>.05$), technical education students gender ($\beta = .020$; $t = .280$, $P>.05$:; technical education lecturers' working experience ($\beta = -.011$; $t = .152$; $p>.05$); technical education students' area of specialization ($\beta = .008$; $t = .117$; $P>.05$) and college facilities ($\beta = .007$; $t = .097$' $P>.05$).

Research Question 3: To what extent will the seven independent variables, when taken together predict the students' acquisition of vocational skills in technical education?

From table 4a (see Appendix 5), the seven independent variables when taken together correlate positively with the dependent measure ($R = .140$). The adjusted R^2 value of -.017 implies that the seven independent variables account for 1.7% of the total variance in the dependent variables. It is therefore not significant ($F7; 196 = .540$; p (.804) > 0.05. It therefore means that the remaining 98.3% is due to other factors which are not considered in this study (see table 4b – Appendix 5).

Research Question 4: What is the relative contribution of each of the seven independent variables on the students' acquisition of vocational skills in technical education?

Table 5 (see Appendix 6) shows that none of the seven independent variables skills. However, the decreasing order of magnitude of the relative but none significant contributions of the seven independent variables to technical education students' acquisition of vocational skills are: technical education lecturers' working experience ($\beta = .083$; $t = -1.150$; $P>0.05$), college facilities ($\beta = .072$; $t = -.933$; $P>0.05$), college type ($\beta = -.068$; $t = .933$; $P> .05$), methods of teaching ($\beta = .042$, $t = .581$; $P>.05$), technical education lecturers' area of

specialization (β = .021; t = .295; P>.05), technical education students' gender (β = -.012; t = -.165; P>.05) and technical education lecturers' qualification (β = .011; t = .150; P>.05).

Implications of the Findings for Curriculum Development and Quality Technical Teacher Production in Nigeria

On the joint contributions of the seven independent variables to the technical education students' acquisition of basic knowledge, 1.3% (Adjusted R2 = -.013); Table 2a and Table 2b, make it evident that there are other factors that could contribute to effective teaching and learning. Still, the ones considered in this study are worthy of note, and could enhance technical education students' learning because of their relative contributions to the acquisition of basic knowledge. On the fact that the method of teaching being used to teach technical education courses in the colleges of education made the greatest relative contribution to technical education students' acquisition of basic knowledge, technical education lecturers as well as other personnel in teacher production field should be given more opportunities to participate in in-service training, attend seminars, workshops and conference (National and International) so as to update their knowledge and get accustomed to new methodologies, techniques and innovations that could enhance curriculum delivery.

This would reduce the use of old methods and techniques which are still more desk-bound in practice, and also enhance the attainment of quality technical teacher production objectives. For quality in education is the ability of an educational institution to fulfill its mission or programme of study to fulfill its aims (Ugodulunwa and Mustapha, 2005). Also, current and relevant pedagogical practices available in literature which have been found valuable for effective instructional delivery should be given a place or be accommodated in the curriculum development of technical teacher production in Nigerian tertiary institutions by the concerned commissions.

The contributions of the seven independent variables when taken together, to technical education students' acquisition of vocational skills with a percentage of 1.7% (Adjusted R^2 = -.017; table 4a and table 4b) further affirms the fact that there are also many other factors that could predict technical education students' acquisition of vocational skills in addition to the ones dealt with in this study. In relative terms, the prominent roles which technical education lecturers' working experience, college facilities, college type, methods of teaching, technical education students' area of specialization, gender and technical education lecturers qualifications play in preparing the recipients of the curriculum of technical education for their professional practice as teachers of basic technology and other vocational trades have been confirmed in this study with the ranking of their contributions to teaching and learning (Table 3 and Table 5) in this study. Technical education lecturers' working experience is found to have the highest relative contributions to technical education students' vocational skills' acquisition in technical education. It thus means that the use of experienced technical education personnel to always teach the content of technical education curriculum which is vocationally-based is very important for the objectives of the technical teacher production to be maximally achieved.

On the whole, the variables which have been considered in this study ought to be improved upon by being given adequate attention. Professionally qualified technical education lecturers should be made to handle all the technical education options in the technical teacher productivity tertiary institutions. The few non-professionals who are already in the teaching position in the training institutions should be mandated to go for Postgraduate Diploma in Education for relevance and enhanced quality.

On area of specialization, the certificate of technical education lecturers and other working staff should be in line with the department they are being offered employment and this should be made clear to the body or management responsible for the appointment of staff

in the tertiary institutions. Concerning college type, there should not be bias on college type in federal governments' responsibilities to the technical teacher training institutions on any issue of teacher production, allocation and disbursement of resources in Nigeria. Also, college facilities should not only be made available but should be made adequate and there should be proper monitoring of their utilization. When all the variables and many others which have been found to be effective in teaching and learning are given due consideration as indicated, the fitness of the teacher trainees would be undoubted

It needs be emphasized that the factors which contribute to teaching and learning are the strong determinants of the outcomes of a developed curriculum vis-à-vis the quality of its products. They are thus the determinants of excellence, for the ancient Greek philosopher called "arête" excellence. That is, to him, "arête" of knife is to cut as sharply, neatly and economically as it is possible and just as the 'arete' of disease is to kill its victims, 'arete' of medicine is to heal disease. In education therefore, the 'arete' of education is to improve, reform and make its recipients better (Akinpelu, 1997).

In essence, quality technical teacher production in Nigeria, that is, the excellence and maintenance of high standards can be achieved through a number of factors, the ones treated in this study inclusive. This assertion is in line with one of the definitions of quality as given by Balogun (1999), that the excellence or the exceptional maintenance of high standards is enhanced by excellent inputs (staff, students, facilities, etc.) through put (instructional transactions), hopefully, leading to excellent output (graduates). In short, the actualization of the curriculum objectives for quality teacher production in Nigeria, technical teacher production inclusive, for the manpower needs of the society at large would no longer be a mirage where contributing factors are not treated with laxity.

References

Abayomi, O. (2000). Evaluation of a management training program in Oyo State. PhD Thesis. Department of Agricultural Extension Services, University of Ibadan, vx+190pp.

Akinpelu, J. A. (1997). Equity and quality in University continuing education. inaugural lecture, University of Botswana, Gbaborne, Botswana.

Alade, I. A. (2010). Relative effects of socio-economic status, academic ability and motivation on students' academic performance in basic technology: Proceedings of International Conference on Development Studies, 5(6), 77-83.

Alade, I. A. (2009). Administration and curriculum development of vocational/technical education in Nigeria, Ibadan: Higher Ground Publishers.

Alade, I. A. (2006). Evaluation of technical education curriculum in colleges of education in Southwestern Nigeria. PhD Thesis, Department of Teacher Education, University of Ibadan, Ibadan xxii+257, pp.

Ayodele, J. B. (2000). A comparative study of educational wastage in urban and rural primary schools in Ondo State, Nigeria. AJEPPS.

Balogun, T. A. (1999). Dimensions of quality and excellence in higher education. paper presented at the Workshop on Work Ethics, Time Management, Culture of Quality and Workload, National University of Lesotho.

Fabayo, D. A. (2000). The relationship between resource use, efficiency and schools in Kwara State. PhD Thesis, University of Ibadan.

Ike, P. O. (2007). The role of effective teaching in curriculum implementation. *Nigerian Journal of Curriculum Studies*, 14(2), 65-71.

Okebukola, P. (2005). The state of University of Education in Nigeria, Abuja: Nigeria University Commission.

Okeowo, O. (2009). The teacher in the school system. K. Oyesiku, S. Ogunsaju and J. Oni (eds.). Contemporary School Administration in Nigeria, Ijebu-Ode: Tai Solarin University of Education, Press.

Olaitan, S. O. (1996). Vocational and technical education in Nigeria: Issues and analysis, Onitsha: Noble Graphics Press Publishers.

Oyekan, S. O. (2007). Relevance of effective teacher preparation to national development. *Nigerian Journal of Curriculum Studies*, 14(2), 9-16.

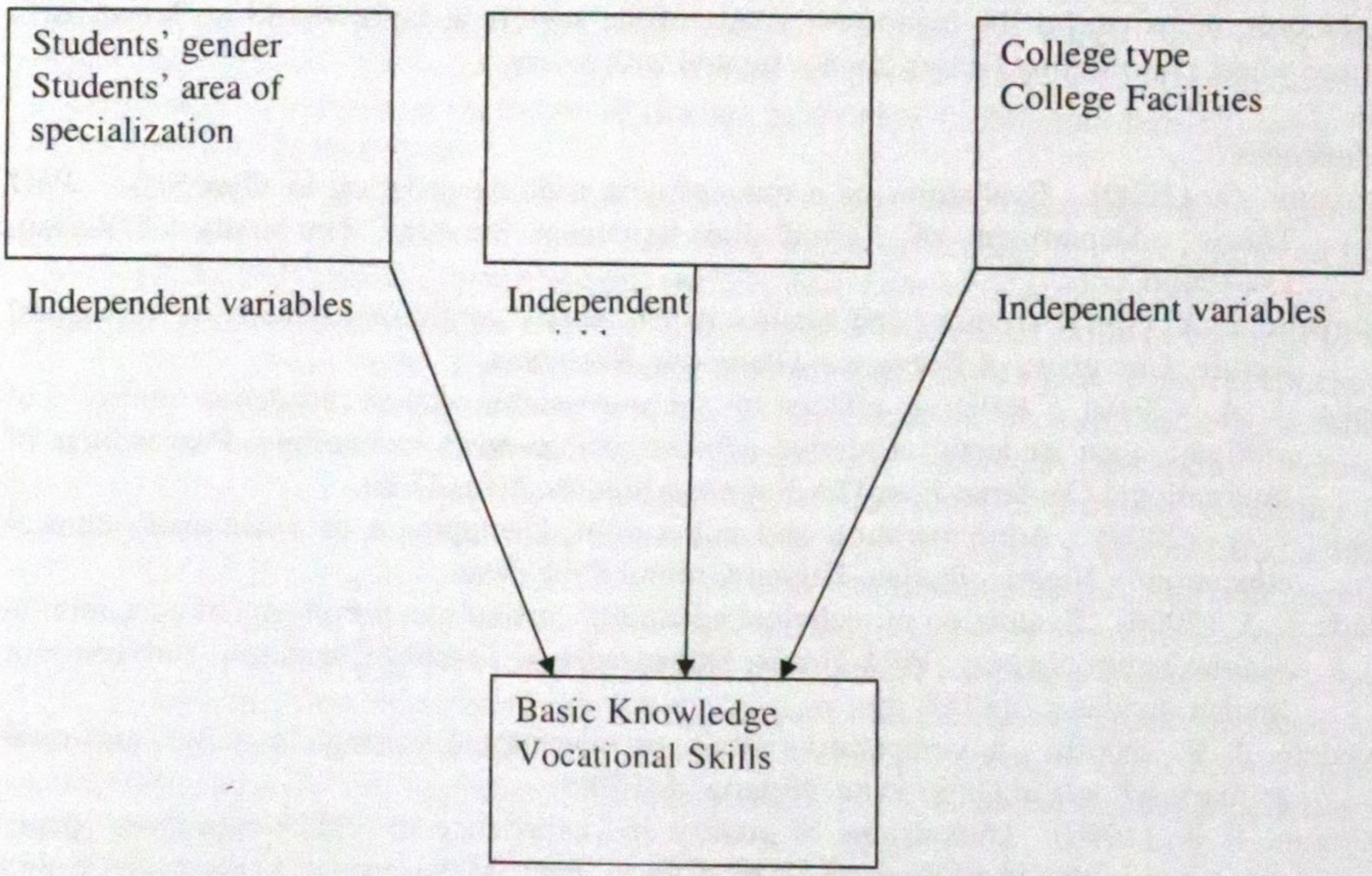
Oyesiku, K. (2009). The changing structure of teacher education in Nigeria, K. Oyesiku,, S. Ogunsanu and (Eds.). Contemporary school administration in Nigeria, Ijebu-Ode: Tai Solarin University of Education Press.

Slavin, D. & Madden, L. (1995). Class size reduction in grade K3, USA: Buffalo State University.

Ugodulunwa, C. A. & Mustapha, A. Y. (2005). Strategies for quality assurance in educational assessment at the University level. *Nigerian Journal of Curriculum Studies*, 12(3), 10.

APPENDICES

Appendix 1
Figure 1 – Conceptual Framework of the Factors



APPENDIX 2

Table 2: Distribution of the Participants used for the Study in the Colleges of Education

Sn	Participants	Population on Record	Available Population on Ground	Percentage Population Used (2)
1	Technical Education Lecturers	115	91	79.1%
2	Technical Education Students	237	197	83.1%
	Total	**352**	**288**	**81.8%**

APPENDIX 3

Table 2a: Summary of Regression Analysis on Data (Basic Knowledge Acquisition)

Multiple Correlation R	Require	Adjusted R2	Standard Error of the Estimate	F-Change	Sig. F. Change
.152	.023	-.013	8.31252	.640	.772

Table 2b: Analysis of Variance (ANOVA) (Basic Knowledge)

Source of Variance	Sum of Square	Df	Mean Square	F	Sig.
Regression	309.572	7	44.225		
Residual	1309.666	189	69.099	.640	.722
Total	13369.239	196			

APPENDIX 4

Table 3: Relative Contributions of the Independent Variable on Technical Education Students' Acquisition of Basic Knowledge in Technical Education

Model Independent Variables (Predictors)	Unstandardised Co-efficient		Standard co-efficient	Rank	T	Sig.
	B	Std. Error	Beta			
Constant	46.889	10.353	-	-	4.323	.000
Technical Education Students' Gender	-2.918	2.496	-.085	2nd	-1.174	.242
Technical Education Students' area of specialization	6.099E-02	.522	.008	6th	.117	.907
College type	-.830	1.197	-.050	3rd	-.694	.489
Technical Education Lecturers' Qualification	.472	1.684	.020	4th	.280	.780
Technical Education Lecturers' Working Experience	-1.573E-02	.103	-.011	5th	-.152	.879
College Facilities	9.888E-02	.102	.007	7th	.097	.923
Methods of Teaching	.451	.300	.109	1st	1.501	-.135

APPENDIX 5

Table 4a: Summary of Regression Analysis on Data (Acquisition of Vocational Skills)

Multiple Correlation R	Require	Adjusted R2	Standard Error of the Estimate	F-Change	Sig. F. Change
.140	.020	-.017	10.31989	.540	.804

Table 4b: Analysis of Variance (ANOVA) (Vocational Skills)

Source of Variance	Sum of Square	Df	Mean Square	F	Sig.
Regression	402.415	7	57.488		
Residual	20128.539	189	106.500	.540	.804
Total	20530.954	196			

APPENDIX 6

Table 5: Relative Contributions of the Independent Variable on Technical Education Students' Acquisition of Vocational Skills in Technical Education

Model Independent Variables (Predictors)	Unstandardised Co-efficient		Standard co-efficient	Rank	T	Sig.
	B	Std. Error	Beta			
Constant	37.791	13.474	-		2.805	.006
Technical Education Students' Gender	-.508	3.087	.012	6th	2.805	.869
Technical Education Students' area of specialization	.191	.648	.012	5th	.295	.769
College type	-1.386	1.486	-.068	3rd	-.933	.352
Technical Education Lecturers' Qualification	.314	2.091	.011	7th	.150	.881
Technical Education Lecturers' Working Experience	-.148	.127	-.083	1st	-1.150	.252
College Facilities	.127	.126	.072	2nd	.933	.317
Methods of Teaching	.217	.373	.042	4th	.581	.562