APPRAISAL OF BUILDING TECHNOLOGY PROGRAMME IN THE POLYTECHNICS AT BIDA AND ILORIN.

BY

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PGD/ITE/2004/013

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION, SCHOOL OF SCIENCE AND SCIENCE EDUCATION, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF POST GRADUATE DIPLOMA IN INDUSTRIAL AND TECHNOLOGY EDUCATION (PGD-ITE).

NOVEMBER, 2009

Declaration

I **Udoh Charles Esakewere** Reg. No. **PGD/ITE/2004/013** a Post Graduate Student in Industrial and Technology Education (PGD-ITE) declare that the work embodied in this project is original and has not been submitted in part of full for any other diploma or degree of this or any other university.

UDOH CHARLES E.

Name

Sign

Certification

This is to certify that this project "**Appraisal of Building Technology programme in the Polytechnics at Bida and Ilorin, Nigeria"** has been read and approved by the undersigned persons as having been prepared in accordance with the regulations of project presentation and meeting the basic requirement for the award of Post Graduate Diploma in Industrial and Technology Education in the Department of Industrial and Technology Education (PGD-ITE), School of Science and Science Education, Federal University Of Technology Minna, Niger State.

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Dedication

This project is dedicated to God Almighty who alone gave me the grace and privilege to undertake and complete this programme. To him be all the glory.

Acknowledgement

My profound gratitude goes to my Head of Department, Prof. K. A Salami to whom words cannot express my appreciation for his encouragement and understanding in making this dream a reality. I am greatly indebted to my project supervisor, Dr. P.A Omozokpia who was there for me when I needed him most and devoted his time and attention by given me immeasurable assistance in the process of writing this research work.

I also wish to acknowledge the efforts of my entire Lecturers in the department of Industrial and Technology Education who have all worked tirelessly and for the various roles they played at one time or the other in impacting in me the desired knowledge during the pursuit of my course amongst whom includes: Dr. B.N Atsumbe, Dr. A.S Ma'aji, Prof. G. D Momoh, Mal. A. M Idris, Mal. G.A Usman. Mr. I.K Kalat and a host of other Lecturers too numerous to mention, to you all I say a big **THANK YOU.**

My gratitude will not be complete without acknowledging the efforts of my beloved wife Promise for standing by me and to my son Miracle for bearing with me, my beloved parents Mr. and Mrs C. S Udoh for given me the desired foundation to take off in life, my brothers and sister, friends and well wishers alike from whom I had a great deal of help, support and many useful suggestions. I appreciate you all.

Finally I wish to acknowledge all authors whose work helped invaluably in my research of which I have mentioned in my reference.

I say **God Bless you all.**

Abstract

This study was intended to appraise the quality of the Building Technology programme offered at Bida and Ilorin Polytechnics. The study was designed to: find out the Building Technology programme content adequacy to prepare students for the challenges of the contemporary built environment. It was also designed to find out the adequacy and effectiveness of facilities and equipment as well as discovering the attitudes of the students towards the programme . The population used for the study is 182 consisting of 160 students, 20 lecturers and 2 H.O.D's. The sample used for the study consisted of 102 respondents in three groups. 20 lecturers and 80 students of both polytechnics including two Head's of Departments, one from each institution. A structured questionnaire was used to elicit responses from the Polytechnic lecturers and students concerned. t- test statistical analysis was employed to find out if there is significant difference in the responses of both Lecturers and Students in the two institutions and simple percentage was used to analyze the responses given to the questionnaire. The results on findings showed that the current existing curriculum of the Building Technology programme is not adequate to prepare students for the contemporary built environment and needs to be reviewed to meet up with the current global trend in technological advancement and also facilities and equipment needs to be upgraded. The findings also revealed that the facilities and equipments are grossly in inadequate and those available are obsolete and abandoned. The findings however revealed that students have a favourable attitude toward the programme and are not just offering it as a last alternative. Based on the findings the researcher recommended among others that the Building Technology programme curriculum should be reviewed in line with global trend in ICT and technological advancement relevant to the built industry. Government at all levels as well as private sector should give more attention to the funding of technical courses in the polytechnics so as to facilitate the upgrading and replacement of obsolete equipment to allow for better learning and that the programme should be evaluated periodically.

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CHAPTER I

INTRODUCTION

Background of the study

Building Technology in one form or the other has been in the Nigerian Society a long time ago, but what is probably new is that Nigeria needs to modernize its technology to catch up with the contemporary world of technology. In effect an appropriate curriculum has been designed to be studied at the Senior Secondary School level as an 'integrated discipline' in the field of Building Technology. This implies that at the Senior Secondary School level, students will be exposed to the study of building construction. In fact many polytechnics have introduced the programme both at the National and Higher National Diploma levels.

However the educational planners and policy makers in most developing nations are faced with problems of serious magnitude caught amidst tremendous demands for educational facilities and scarce resources, they need the assistance of research and studies to help them out and such research and studies are now widely regarded as necessary tools for meaningful policy decision-making and planning on education, part of which this project hopes to address. Technology changes in Nigeria has also necessitated the changes in the Building Technology curriculum. The modern Nigeria is more sophisticated and inquisitive than the past years. Clearly what is needed is an overhaul of the Building Technology curriculum in the polytechnics in the light of the new technological needs of the country.

As a result, the introduction and implementation of the New Policy on Education added increased responsibilities both in scope and range of Technology Education. In an attempt to achieve the objectives of the New Policy on Education, the National Board for Technical Education (NBTE), a body charged by the Federal government of Nigeria to oversee the affairs

of the Polytechnics in the country, introduced a harmonized curriculum Model (1971) which observed that the real validation of any educational programme is made not when the students pass their examination but when the graduates succeed in the world of work. The primary purpose of the Building Technology programme in the Polytechnics is to promote and encourage the acquisition of skills in the industry with a view of generating a pool of indigenous trained manpower.

It is evident to stakeholders in technology education that the curriculum for Building Technology in the nation at most, only looks comprehensive on paper, but actual implementation is defective. Agunsoye (2005) observes that the present curriculum for technology education in Nigeria at whatever level is particularly deficient in the area of production engineering and entrepreneurship education. Furthermore there are defects in the use of guidance and counseling units of technology institutions for proper guidance of students.

He suggested making the curriculum effective by tailoring it to be in with stated policies of government on education; development of appropriate curriculum that centers on the teaching of industrial knowledge skills, techniques and utilization of local raw materials and promoting technical education to project the goal of technology for self-reliance, with the view of making graduates to be employment generating rather than white collar job seekers.

Ikeagwani (2007) identifies the present centralization of curriculum design for different programmes in the technology education as not allowing room for competition amongst the graduates of the various institutions. He suggested the liberalization of the curriculum of technological institutions to flow along with there immediate environment.

Availability of infrastructural facilities in terms of laboratories, workshops and necessary tools and equipments is a salient requirement for the progress of the Building Technology

education. Awe (2005) observes that students at Junior Secondary School who are supposed to be acquiring some basic technical skills that could afford them the required exposure to the basic technical skills could not do so because of absence of basic facilities, such as well equipped workshops and laboratories that can facilitate the teaching of such required technical concepts. Where such facilities exist, they are either obsolete, dilapidated or under-equipped and lacking modern tools or equipment.

The concern of this study is to appraise the worth or quality of such Building Technology programme. In particular the study will be conducted to investigate the quality of the Building Technology programme offered by the Federal Polytechnic Bida and the Kwara State Polytechnic Ilorin.

Statement of the problem

The Building Technology programme at the Federal Polytechnic Ilorin Kwara State Polytechnic Ilorin admits students both through the National Diploma (ND) and the Higher National Diploma (HND) levels. A greater proportion of the problems confronting the programme in the institutions today are rooted in their failure to impact appropriate skills, knowledge and attitude readily for gainful and self employment of the graduates. Awe (2005) observed that employers prefer workers with skill training to those with formal training in institutions. Other problems facing the institution he observed is that some of the trade courses workshop (example: Block laying & concreting, Architectural design, Carpentry & joinery etc.) are not well equipped for the translation of classroom theory into practice or stimulation of real work situations. In recognition of the existence of these lapses in the institution's programmes and the need to train competent men for the much desired technological take off, the Nigerian government formulated the National Policy on

Education in 1977, (Revised in 2004) in which the National Technology Education objectives were revised and specified to include:- The acquisition of appropriate skill, abilities and competencies both mental and physical and the equipment for individuals to live in and contribute to the development of the society.

Therefore, this study is designed to appraise the Building Technology programme of the Federal Polytechnic Bida and the Kwara State Polytechnic Ilorin because they have both benefited from the programme.

Purpose of the study

The study will be undertaken to find out the quality or worth of the Building Technology programme of the Federal Polytechnic Bida and the Kwara State Polytechnic Ilorin. In particular the study is designed to:

1. Find out the adequacy of the Building Technology programme content to prepare students for the challenges in the contemporary built environment.
2. Find out the attitude of students towards the Building Technology programme and the adequacy and effectiveness of facilities and equipment to ensure it's relevance to the programme objectives.

Significance of the study

It is expected that the findings of this study will assist government, especially the National Board for Technical Education (NBTE) to regulate and maintain the desired standards in our Polytechnics. The study will also assist the authorities of the Federal Polytechnic Bida and the Kwara State Polytechnic Ilorin to take steps in strengthening the Building Technology programme in their respective institutions as it is presently constituted as well as provide a suitable framework for other researchers who may wish to evaluate similar programme in

Nigerian Polytechnics. Furthermore this study will help students to be consciously minded in realizing the importance of been able to fit into to contemporary built environment which is ICT compliant upon completion of their programme.

Delimitation of the study

The study will be limited to the Building Technology programme of the Federal Polytechnic Bida and Kwara State Polytechnic Ilorin. The students used in the study will be those in the current 2007/2008 academic session. The appraisal of the programme will not follow a particular Model, rather it will be based on the perception of respondents used for this study.

Assumption of the study

The following assumptions were held for guiding the study.

1. That a significant number of the distributed questionnaires would be returned.
2. That utilization of questionnaire would be adequate for the collection of necessary data for the study.
3. That the questionnaires returned would be truthfully completed by classified categories of respondents.

Research Questions

This study will seek answers to the following research questions:

1. To what extent is the Building Technology programme content adequate to prepare students for the challenges in the contemporary built environment?

2. What is the attitude of students towards the Building Technology programme and to what extent is the equipment and facilities adequate and effective for the teaching of the course content?

Hypotheses

Based on the research questions the following hypotheses were tested at the 0.05 level of significance:

1. There is no significant difference in the mean responses of Lecturers in Federal Polytechnic Bida and Kwara State Polytechnic Ilorin on the adequacy of Building Technology Programme content, to prepare students for the contemporary built environment.

2. There is no significant difference in the mean responses of Students in the Federal Polytechnic Bida and Kwara State Polytechnic Ilorin on their attitude towards the Building Technology programme content and the adequacy and effectiveness of facilities and equipment

CHAPTER II

REVIEW OF RELATED LITERATURE

Review of related literature as it affects this research topic will be done under the following sub-headings.

1. Definition of concepts: Technology, Vocational Education, Technical Education and Technology Education.
2. The development of Technical Education in Nigeria.
3. The concept of evaluation. Evaluation in the decision making process.
4. Evaluation of on-going programme in the school system.
5. Criteria for judging evaluation studies.
6. The Building Technology programme curriculum content.
7. ICT and the Builder.

The Concepts: Technology, Vocational Education, Technical Education and Technology Education.

Technology, according to the international encyclopedia of the social sciences is defined as bodies of skills, knowledge or procedure for making, using and doing useful things; they are techniques, means for accomplishing reorganized purposes.

The appreciation of the concept of Technology is not as general as the acknowledgement of its impact on society. Yet if technology is to serve the best interest of society, if the sociological problems it generates are to be adequately controlled, there must be a clear understanding of what it implies. According to Wakama in Osifo (1981), technology was seen as to incorporate those set of activities related to and possibly within a circumscribed locality, which bring material benefits in the form of goods and services to the society of acceptable

economic levels which centered on design, development and production for the benefit of mankind (Osifo 1981).

Technology in one form or the other has been in the Nigerian society a long time ago, but what is probably new is that Nigeria needs to modernize it's technology to catch up with the contemporary world of technology. In effect, an appropriate curriculum has been designed to be studied at the Junior Secondary School level as an 'integrated discipline' in the field of technology. This implies that at the Junior Secondary level, pupils will be exposed to the study of metal and woodwork, general maintenance of machines, identification of basic tools, general engineering processes in the areas of Automobile Technology, Electrical/Electronics, Building Technology, Food Technology and Health Technology.

Adediwura (2000) cited Daramola (1981), identified the general objectives of the technology courses to include;

1. Developing a proper orientation and proper work habits towards technology.
2. Developing familiarity with various forms of technology available.
3. Developing appreciation for the significant roles played by the various technologies in national development; and
4. Acquiring knowledge of how to perform simple fault diagnosis of basic machines available for developing technology.

According to Daramola (1981)..."The technology curriculum should comprise activity and result oriented learning experiences". He further suggested that "in selecting approaches to teaching the 'integrated technology' a conceptual approach should be adopted while the major concern should be in the areas of general maintenance". In any case, he added "all these selection criteria calls for adequately equipped workshop in the technical institutions".

To ensure successful implementation of Building Technology programmes in various institutions however, there is need for sufficient and uniform distribution of qualified trained technology teachers to teach the course. It is in the same vein that Daramola (1981), argued that..."without adequately trained technology teachers, the equipment will merely lie in sealed boxes on the institutions corridor and would start rotting as a result of lack of use after sometime". This implies that before actions could be raised to implement this curriculum there must be some qualified Building Technology teachers ready for implementation.

The encyclopedia of Education Research defined Vocational Education in a broader sense as "any training programme design to impact knowledge, skills and attitudes to increase the individual's occupational competence".

Evans and Herr (1978) identified three main goals of Vocational Education which can be summarized as follows:-

1. Meeting society's needs for workers.
2. Increasing individual's option related to work and
3. Conveying knowledge or the relevance of general education work.

Technical Education on the other hand is defined as "that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge" (NPE). While Vocational Education emphasis is more on practical skills in ones occupational ability, the Technical Education on the other hand stresses the high level of coordination and application of scientific knowledge and principle in the demonstration of the given skill. However, Adeosun (1985) in Banjo (1974) stressed that "Technical Education is essentially Vocational Education. It is intended like Vocational Education to provide skills and the manpower for industries and other engineering and social services the society prices high for its socio-economic development."

The Federal Government in its National Policy on Education (NPE) identified the following aims of Technical Education:

1. To provide trained manpower in applied science, technology and commerce particularly at sub-professional level or grades.
2. To provide the technical knowledge and vocational skills necessary for industrial, commerce and economic development.
3. To provide people who can apply science knowledge to the improvement and solution of environmental problems for the use and convenience of man.
4. To give an introduction to professional studies in engineering and other technologies.
5. To give training and impact the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self reliant and
6. To enable our young men and women to have an intelligent understanding of the increasing complexity of technology.

Broadly, Technological Education can be defined as "all man's activities which enables him to acquire a particular skill dealing with scientific, industrial and commercial or even traditional methods of solving problems so that he may become a productive human being or citizen" .Technology Education is perceived as "all elements of knowledge needed for the creation and operations of production and marketing"...Adediwura (2000)

From the general point of view, Technological Education is therefore considered to mean all that man can do to live a successful life. It embraces proper utilization of his intellectual faculties in solving socio-economic and technological problems. It also emphasizes the need for proper planning, organizing and implementation of polices through Technical Education institutions such as Polytechnics, Colleges of Education and Universities of Technology.

The development of Technical Education in Nigeria

The period 1908- 1935 witnessed the beginning of organized Technical and Vocational Education in Nigeria. During this period, some missionary schools introduced farming, bricklaying and carpentry as part of their curriculum but these skills were not seriously regarded by pupils and parents as an integral part of Western Education and the practice virtually died out with the exemption of few schools.

The first major recommendation for the introduction of Technical and Vocational Education was made in 1945 when the commission on Higher Education in West Africa (Elliot commission) proposed that the first Technical Institution for Nigeria should be centered in Lagos at Yaba. The initial efforts towards reforms and improvement of Vocational and Technical Education system through the provision of adequate teachers include a proposed National Technical Teachers College and establishment of the Nigerian Technical and Commercial Examination Committee within the West Africa Examination Council (WAEC), UNESCO (1973).

A comprehensive Technical Education seminar established with a grant from the Ford Foundations which allowed Nigerian educators to study various foreign systems of Vocational and Technical Education as a concrete step towards establishing Technical Teachers Training College. The implementation committee that was set up in 1978 on the National Policy of Education to look into some National problems affecting Nigerian Education observed that the government was indifferent to the development of Technical and Vocational Education in the country. The key element in this problem being shortage of qualified teachers. The committee therefore recommended that as a short term measure, expatriates with appropriate qualification, training and industrial experience be recruited. The implementation committee also found out

that the Technical Teachers Training College were inadequate and suggested the NCE (Technical) should be introduced.

Further development was the Nigerian governments' participation in the Technical Teachers Training Programme (TTTP) in 1980, the Federal Government in cooperation with United States of America (USA) started the Technical Teachers Training Programme in USA. The programme which was originally operated in the United States was discontinued in 1989 following the introduction of the Second Tier Foreign Exchange Market (SFEM) which made it more expensive. But realizing its importance in the training of Technical Teachers, government decided to re-open its operations in Nigerian Universities thus making it less expensive and better adapted to suit local needs. Hence several Universities and Colleges of Education are operating the programme (Akujuo 1991).

In 1984 the Kaduna Polytechnic started the B.ED (Tech) in affiliation with Ahmadu Bello University, Zaria. While Kaduna Polytechnic offers only B.ED (Tech), the University of Nigeria, Nsukka offers B.ED, M.ED and Ph.d courses, Maiyaki (1987). At present there are many institutions running the Technical Teachers Programme and more, plan to run the degree programmes in Technical Education.

The concept of Evaluation

There have been varying definitions of Evaluation by several authors, evaluators and educationist. Adeosun (1985) in Harn (1983) as saying that evaluation is the systematic attempt to gather evidence regarding changes in students' behaviour that accompany planned educational experiences. This involves the input and output characteristics of the student. Evaluation cannot be equated to 'Assessment'. Assessment is believed to be a pre-requisite to evaluation. In other words, Assessment is the process which is concerned with quantitative as well as non-

quantitative description of objects, situations and people. Gronlund (1976) sees evaluation as a systematic process of determining the extent to which instructional objectives are being achieved by pupils.

Hopkins and Stanley, (1981) says, the word Evaluation designates a summing-up process in which value judgement play a large role whereas the development, administering and scoring of tests constitutes the measurement process. Interpreting such scores is part of the process of evaluation.

Gronlund (1976) says that evaluation includes both qualitative and quantitative description of pupil behaviour plus value judgement concerning the desirability of that behaviour.

Hence we say;

1. Evaluation = quantitative description of pupils (measurement) + value judgement.
2. Evaluation = qualitative description of pupils (non-measurement) + value judgement.

It implies that evaluation may or may not be based on measurement, but when it is, it goes beyond the simple quantitative description.

According to Orji (1986), Wiles and Bondi (1979) saw evaluation as a term that include research activities systemic testing of data, clarification of discrepancies between goals, objectives and decision making function. The primary aim of evaluation process however is the continuous appraisal of the students' outcome in school. Evaluation can thus be said to involve a process by which relevant data are collected and transformed into information for decision making. It is a process rather a product. It is a dialogue rather than a monologue. Adelma and Alexander (1982) refers to Educational Evaluation as the making of judgement about the worth

and effectiveness of educational intentions, process and outcomes about the relationship between these and about the resources, planning and implementation framework of such ventures. Stake (1973) says that Educational Evaluation has its formal and informal sides. Informal evaluation is recognized by its dependence on cause observation, implicit goals, intuitive norms and subjective judgement. Perhaps because these are also characteristics of day-to-day personal styles of living. Informal evaluation results in perspectives which are seldom questioned. Careful study reveals Informal Evaluation of Education to be of variable quality; sometimes penetrating and insightful, sometimes superficial and distorted.

Formal Evaluation of Education is recognized by its dependence on check-list, structured visitation by peers, controlled comparisons and standardized testing of students. In education, at least three different schools of thought about how evaluation should be defined have co-existed for at least thirty years. With ascendancy of the measurement movement, Evaluation came to be defined as roughly synonymous with educational measurement. This definition of evaluation is evident today in writings of such measurement specialist as Thorndike and Hagen (1969) and Ebel (1965). Concurrently, formulation of school and Universities accreditation procedures led to a definition of evaluation as synonymous with professional judgement. This view has continued and is evident in many current evaluation practices where judgements are based on opinion of experts. Whether or not the data and criteria used in reaching these judgements are clear. A third definition of Evaluation emerging during Ralph Taylor's work on the eight year study of the 1930's. In his work, Evaluation came to be defined as the process of comparing the performance data with clearly specified objectives. This view has continued and is reflected in several current approaches to evaluation.

During the last decades, new definitions of Evaluation have emerged, which included that

of Stake (1967) as stated previously. Provus (1969), defined the goal of Evaluation as the determining whether to improve, maintain or terminate a given programme. To reach this goal evaluation must;

1. Define programme standards.
2. Look for a discrepancy (thus, Provus's approach is often called Discrepancy Model) between observation about the programme and the standards or objective for that programme; and
3. Use the discrepancy information as feedback to the programme developers.

Although all these definitions have many adherents and are relevant to evaluation in that they describe or define part of the total evaluation process or activities attendant to evaluation, they seem to address only obliquely what is for us the touchstone of evaluation, the determination of merit or worth. Of all the definitions of evaluation above, only the professional judgement definition strikes directly at this issue. However in, practice, evaluation (seen most commonly in accreditation site visits, doctoral oral examinations, proposal review, procedures used by funding agencies etc) is generally unsystematic and a mild embarrassment to evaluation specialist.

The process of education depends extensively on measurement and related procedure-evaluation. The word Evaluation designates a summing up process in which value judgements play a large part as a grading and promoting students, whereas the development, administration and scoring test constitute the measuring process. Interpreting such scores is part of evaluation process.

The conversion of test scores to grades such as A, B, C, D, "Excellent", "Good", "Fair", "Poor" or "High", "Average", "Low", is referred to as Evaluation rather than Measurement, because value judgement are implicit in such conversion (Hopkins and Stanley 1981).

Evaluation in the decision making process

The product of any Evaluation is the provision of relevant information that will help in making decision. With a school, this usually means giving priority to assessing performance of pupils at the end of the course, a year or school career and comparing the benefit to the resource used. The judgements that leads to decisions are informed by evaluation. Cooley and Cohnes (1976) says' educational procedures are never completely and finally evaluated. Evaluation transcends research and extends to decision making. They are however devices that can be adopted to make evaluation more likely to be used in decisions. Firstly according to Edwards and Newman (1982), it is most important to involve the decision makers heavily in the Evaluation process. The second is to make sure that the evaluation is directly relevant to the decisions as much as possible. The third is to make the product of evaluation useful, that is making it readable and short. Exhaustive scholarly documents tends to turn busy decision makers off.

To draw attention to its full range of functions, "Evaluation" is defined broadly as the collection and use of information to make decisions about educational programme (Cronbach. 1963). This programme may be a set of instructional activities of a single school or the educational experiences of a single pupil. Cronbach distinguished among purposes of evaluation and relate them to historical development in testing curriculum making.

Three types of decisions for which evaluation is used may be separated:

1. Course improvement:- deciding what instructional materials and methods are satisfactory and where change is needed.
2. Decision about individual:- identifying the needs of the pupil for the sake of planning his instruction, judging pupil merit for purposes of selection and grouping, acquainting the pupil with his own progress and deficiencies.

3. Administrative regulation:- judging how good the school system is, how good individual teachers are etc.

Course improvement is set apart by it's broad temporal and geographical reference. It involves the modification of currently used materials and methods. Developing a standard exercise to overcome a misunderstanding would be a course improvement, but deciding whether a certain pupil should work through that exercise would be an individual decision. Bloom (1961) made remarks that:-

> The criterion for determining the quality of a school and it's educational functions would be the extent to which it achieves the objectives it has set for itself...participation of the teaching staff in selecting as well as constructing evaluation instruments has resulted in improved instruments on one hand and on the other hand it has resulted in clarifying the objectives of instruction and in making them real and meaningful to teachers...Teachers who have become committed to a set of educational objective which they thoroughly understand and respond by developing a variety of learning experiences which is as diverse and as complex as the situation requires.

Thus "Evaluation" becomes a local and beneficial teacher-training activity. When evaluation is carried out in the service of course improvement, the chief aim is to ascertain what effects the course has that is, what changes it produces in students. The greatest service evaluation can perform is to identify aspects of the course where revision is desirable.

Evaluation of on-going programmes in the schools system

Evaluation is important to many facets of the schools programme. It contributes directly to the teaching learning process used in the classroom instruction and to a number of other school uses. Recently school programmes are marked by a lack of programme control and by measured outcomes that suggests there is greater programme variation within programmes than between programmes (Miles, 1964).

A clause of the 1995 Elementary-Secondary Education Act established evaluation as a

necessary building block in the design of American educational reform. The evaluation requirements of that act eventually may prove greater impact on education than the programme itself. Perhaps before an effective new programmes can be built, creative new ways to monitor and eventually judge the effectiveness of such programmes must be established. This capacity to evaluate programmes must ultimately depend upon a management theory that utilizes pertinent, reliable information as the basis for administrative decision.

The purpose of programme evaluation is to determine whether to improve, maintain or terminate programme. Evaluation is a process of (i.) agreeing upon programme standards (ii.) determining whether a discrepancy exists between some aspect of the programme and (iii.) using discrepancy information to identify the weakness of the programme.

Criteria for judging Evaluation studies

Set of standard for judging evaluation studies have been discussed by several writers. The set of criteria described as Guba and Stufflebean (1968) and Stufflebean, et al (1971) is the most inclusive of any set of criteria suggested. Although the criteria which they described were essentially intuitive, they are useful as guidelines for evaluating evaluation studies. The criteria are as follows:

1. Internal Validity:- Does the evaluation design provide the information it is intended to provide? The result of the evaluation study should present an accurate and unequivocal representation of the phenomenon under scrutiny.
2. External Validity:- To what extent are the results of the study generalize able across time, geography and environment and human involvement? In many small evaluation studies the concept of external validity will be irrelevant since the evaluator will be interested in collecting and interpreting information about a specific programme at one point in time.

However, the concept may be quite important in large scale evaluation studies where sampling is used and findings must be generalised back to the total population.

3. Reliability:- How accurate and consistent is the information that is collected? The evaluator should be quite concerned about the adequacy of his measures since his results can only be as good as the public information on which they are based.
4. Objectivity:- How public is the information collected by the evaluator? They strive to collect information and make judgements in such a way that the same interpretations and judgement would be made by any intelligent rational person evaluating the programme.
5. Relevance:- How closely do the data relate with the objectives of the evaluation study? Defining objectives for an evaluation enables the evaluator to check himself on the relevance of his/her activities.
6. Scope:- How comprehensive is the design of the evaluation study? The evaluator must consciously avoid the possibility of developing "tunnel vision" by taking a holistic approach to the programme.
7. Credibility:- Is the evaluator believed by his audience? Are his audience predisposed to act on his recommendations? The evaluator-client relationship is an important one if the evaluator wants his/her efforts to have some impact on the programme.
8. Timeliness:- Will evaluation report be available when they are needed? It has often been the case that evaluators missed the chance to influence action because they report much too late. The provision of interim and often informal reports will help to avoid this problem of being too late to influence the decision.
9. Efficiency:- what are the cost/benefits of the study? Have resources been wasted when they could have been avoided? The evaluator is expected to make the most out of the material and

human resources available to him.

The first four criteria are categorized by Stefflebean et al. (1971) as scientific criteria, being appropriate for any rigorous scientific study. The next four are labeled as practical criteria that are most applicable to evaluation studies. The practical criteria are extremely important standards to consider when planning evaluation study. The last criterion is referred to by the authors as a prudential criterion.

The Building Technology programme curriculum content

There are several factors which influence the setting up of a curriculum, amongst which include:

1. The National policy.

2. The societal needs.

3. Scope.

The curriculum is the totality of experiences that the school gives to it's students with the main aim of creating a change in learning. Thus curriculum is designed to have the overall National aim and objectives in mind (Onwuka, 1981)

The objective of Building Technology programme is to develop and produce professional Builders. On completion of the programme, the individual should be able to fit perfectly into the mainstream of the society and contribute to National development. Every society is dynamic rather than static, the society changes in terms of needs, values and goals, therefore if education is to serve it's course in the society, the school curriculum must also be constantly reviewed and modified in the light of changes as they occur (Harold ,1969).

Finch and Krumkilton, (1984) stated that a static curriculum is a dying curriculum. Just as Technology and Vocational Education is dynamic, its curriculum must likewise be dynamic.

Hauwa, (1992) stressed that since Technology Education are preparing the youth for work and for the occupational challenges of the future, the need for education that is more relevant to the contemporary situation in the Nation cannot be overemphasized. Thus, there is need for content modification and renewal.

ICT and the Builder

Oyenuga (2007) in a presentation on the Changing Role of ICT the Construction Industry stated that ICT (Information and Communication Technology) is an acronym for all that has to do with the transfer of information, verbal or writing form (reports, drawings, bills of quantities etc) using a system of a network of electronic gadgets such as satellite, the mobile telephone, the computer, the storage/retrieval system etc. The central objective is to make the information available for processing by the other party.

The construction industry professionals' consists:-

- The Architect prepares the architectural drawing.
- The Structural Engineer prepares the civil/structural drawing.
- The Service Engineer prepares the mechanical and electrical drawing.
- The Quantity Surveyor prepares the bills of quantities and cost estimates.
- The Builder, the project executor and building production manager.

The roles of these individuals or group, prior to now were carried out using cumbersome instruments such as the drafting pen, scale rule, sets squares, tee square, taking off sheet, etc. The changing role of ICT in the construction industries has made those wonderful instruments obsolete but a consulting firm should keep them because they become handy in some situations.

The changing role of ICT in each aspect of the building industry are now discussed.

A. BUILDING DESIGN

Generally in the Building industry the following designs are produced:

- Architectural designs.
- Structural designs.
- Electrical/Mechanical Engineering Services designs and
- Production of Bills of Quantities.

Each of the above designs can now be produced using one design software or the other. Some packages are for architectural design while others in the form of tools such as Ms Visio. Another major tool is the Auto CAD package and the 3D modeling. In areas of structural engineering many packages are also available such as SCALE, STRAND, SAP 2000 etc.

B. BUILDING DRAWING

All calculations and designs end up in the production of drawings which are used in the construction of the works. Auto CAD is the major software for such jobs. Other drafting software also exist but Auto CAD appears to be the most popular. Drawings produced by using computer software are neater and corrections are easily effected without defacing the drawings. The drawings can in addition be printed using different sheets such as;

A3 for tender drawings and

A1 for construction drawings.

Software are designed and drawn within the same computing environment while some are imported into the Auto CAD environment.

C. BILLS OF QUANTITY

The Ms Excel (spreadsheet) is one of the most powerful tools of the ICT of today. Excel can be used for the purpose of drawing up the bills of quantities of a project. One's the rate is entered the 'Amount' column is programmed to be a product of the rate and the quantity

automatically changes the amount and also changes the summary. Ms Excel based programmes can be used to carryout both technical and financial evaluation of contractors tendering for a particular job objectively. Ms Excel is also useful even in the design of structural elements. Some engineers in the country have written design (structural engineering) packages based on Ms Excel including drafting of bending moment and shearing force diagrams. Every Builder is encouraged to study the use of Ms Excel, a very powerful tool for design, drafting, presentation and even project management. Other quantity software includes WinQS32, QSPlus2001, QSCAD, CATO, Master bill etc.

D. PROJECT MANAGEMENT

Every Nigerian Builder should be in a position to write a small report and print same through the printer. The most popular is Ms Words and this is used to produce this paper. Ms Words contains some little graphics that can produce some reasonable results. In addition, reports written and forwarded to the office can easily be opened up, amended and saved or printed for use. Other packages for report writing includes the Adobe Page Maker, WordStar (now nearly obsolete), Computer Aided facility management, project planning and programming software, etc.

E. WRITING OF PROGRAMMES

There are vast programmes already written for use. It is practically impossible however, for programmes written to cover all aspects of one's assignment in the market, hence the need to cultivate the habit of programme writing. Every Builder should cultivate the art of programme writing using any of the most common languages BASIC, FORTRAN, C, C++, PASCAL or JAVA are very good languages but a bit involving. Visual Basic (V-Basic) is another common language that can easily be learnt.

All the various things flying around on the computer are programmes and they are written by human beings, why not by a Nigerian Builder? Efforts should be made by all young Nigerians to develop the attitude of program writing. It task's the brain positively, enlarges the mind and horizon as well as enhances the level of intelligence since a level of intelligence has to be impacted into a robot (the computer). The world is a global village in the eye of ICT and the builder has to be 'ICT Compliant' in order to be relevant and move with time. Drawings and Tender documents are now forwarded through internet and the response is expected through the internet too. Software can now be purchased through the internet (e-payment) and also received through the internet too. The construction industry is the basis for all development and the changing role of ICT must be carried along by practitioners.

CHAPTER III

METHODOLOGY

This chapter focuses the research design, area of study, population, sample, instrument for data collection, validation of the instrument, administration of instruments, data analysis, and decision rule.

Research design

The design is a descriptive survey which studies the characteristic features of a group of people by collecting and analyzing data from only a few people considered to be representative of the entire group. The study was an appraisal of Building Technology programme in the Polytechnics at Bida and Ilorin .

Area of the study

This research is restricted to the Building Technology programme in two (2) polytechnics and in two states (Niger and kwara). These are the Federal Polytechnic Bida and the Kwara State Polytechnic Ilorin both located in the North Central region of Nigeria. The choice of these two institutions is as a result of proximity, financial and logistic constraints. The information gathered it is believed will be valid for making judgement on the quality of the Building Technology programme in allied institutions in Nigeria.

Population of the study

The population of the study is 182 and comprises all the lecturers including two H.O.D'S and all the students in both Polytechnics mentioned above. The students' population is 160 comprising of ND 1 to HND 2 students in both institutions and the lecturers' population is 20 and the H.O.D'S are 2 in number.

Table 1: Population of the study

S/NO.	ITEM	TOTAL POPULATION
1.	Students	160
2.	Lecturers	20
3.	H.O.D	2

Sample

The Sample used for this study is 102. This consisted of lecturers consisted of all 20 Polytechnic academic staff, 2 Heads of Department and a total of 80 students randomly selected. 10 each from every level from ND1 through to HND 2 from both polytechnics.

Table 2: Distribution and return rate of questionnaire

S/NO.	ITEM	TOTAL SAMPLE	SAMPLE PER SCHOOL
1.	Students	80	40
2.	Lecturers	20	10
3.	H.O.D	2	1

Instrument for data collection

For any kind of research, the appropriate data accumulation tool is influenced by the choice of design to be adopted. In this particular project however, the instrument used is presentation of questionnaire.

A set of printed questions considered relevant to the purpose of this project were delivered by hand to the lecturers and students in the department of Building Technology in both institutions. This questionnaire required the respondents to choose from a set of alternative answers to each of the questions provided for simplicity and to avoid undue delay. However the respondents were made to understand the need for absolute sincerity in the answering of the questions and also assured of absolute confidentiality. The questionnaire followed a structured

pattern.

Validation of instrument

The questionnaire was designed for this research and presented to the supervisor and two other lecturers in the department who are experts in the field for approval and necessary in-put before administration, so as to ensure its validity.

Administration of instrument

The questionnaire was personally administered with the co-operation of the Heads of Departments, lecturers and the students chosen for this study. The questionnaire is designed on the basis of the close ended technique in which case the respondent is restricted on the choice of response from alternatives, example; Strongly Agree, Agree, Disagree, Strongly Disagree unlike the open ended questionnaire technique in which the respondent is not restricted to any alternatives and it involves degree of agreement and free expression of views.

The two Polytechnics sampled represents a percentage of those institutions offering Building Technology courses. The study involves all level from ND

1 through to HND 2.

All the questionnaires given out to the H.O.D'S were retrieved, likewise all the twenty served to the lecturers were also retrieved and seventy-six out of the eighty

Students' responded.

Method of data analysis

The data collected was analyzed using simple percentages and t- test. The level of significance was fixed at 0.05. A four point rating scale was developed and used. Each response category was assigned values as follows;

STRONGLY AGREE ---------- (S.A) = 4

AGREE ---------- (A) = 3

DISAGREE ---------- (D) = 2

STONGLY DISAGREE ---------- (S.D) = 1

Decision Rule

If the results of the analysis falls below the chosen mean score, the result is rejected or otherwise upheld. A mean score of 2.5 was chosen as the decision point.

CHAPTER IV

Presentation and analysis of data

This chapter presents the result of data analysis and discussions of the result. The analysis is arranged according to the research questions and hypotheses formulated for the study.

Research Question 1: To what extent is the Building Technology Programme content adequate to prepare students for the challenges in the contemporary built environment?

Building Technology programme contents were appraised by the lecturers who were involved in teaching the Building Technology courses in polytechnics as presented in Table 3.

Table 3: Mean responses of Lecturers on the Building Technology Programme

S/NO.	ITEMS	MEAN RESPONSES			REMARK
		$\bar{X}_1$	$\bar{X}_2$	$\bar{X}$	
1.	Available facilities such as workshops and equipments are adequately equipped to take care of the curriculum requirement.	2.40	1.80	2.10	Disagree
2.	The content of the programme is capable of producing qualified builders.	2.50	3.30	2.90	Agree
3.	The content of the programme are relevant to the goals and objectives of NBTE.	3.40	3.20	3.30	Agree
4.	The standard requirement for admission into the ND programme is adequate.	3.00	3.80	3.40	Agree
5.	The Building Technology curriculum provides for general knowledge in other related disciplines.	2.69	2.65	2.69	Agree
6.	Administration of test in the Building Technology programme is done with thorough supervision.	3.15	3.30	2.23	Disagree
7.	Students tend to rely more on handout rather than well tested textbooks.	2.65	2.90	2.78	Agree

8.	A student that successfully completes the ND programme can successfully practice Building without the completion of the HND.	2.40	1.85	2.13	Disagree
9.	Being an internally conducted examination the validity of the final result cannot be said to be credible.ss	1.65	2.45	2.05	Disagree
10.	Some lecturers often give their students undeserved extra marks just to assist them to graduate.	2.12	2.30	2.21	Disagree
11.	A student that successfully complete the ND programme can easily proceed for HND in any other allied institutions.	3.40	3.15	3.28	Agree
12.	Performance in ND is a better performance predicator in HND.	2.00	3.20	2.60	Agree
13.	Qualified and experienced lecturers are involved in the Building Technology programme.	3.75	3.81	3.78	Agree
14.	The Building Technology programme needs to be re-structured.	3.10	3.80	3.45	Agree
15.	The Building Technology students are over tasked in terms of the work load they carry.	2.00	2.06	2.03	Disagree
16.	Building Technology examination questions are not usually subjected to standard validity item analysis procedures.	1.95	2.75	2.35	Disagree
17.	Building Technology examination questions and results are externally moderated to give necessary integrity.	3.10	2.85	2.98	Agree
18.	The number of courses offered in the programme is adequate.	2.10	2.05	2.01	Disagree
19.	Professional Building Technology lecturers are quite adequate in your school.	2.45	2.25	2.35	Disagree

20.	The curriculum does not provide adequate exposure of the students to the contemporary ICT revolution in the built environment.	3.15	3.70	3.43	Agree
	AVERAGE MEAN (X)	2.65	2.86	2.70	

KEY:

$\bar{X}_1$ = Mean response of lecturers in Federal Polytechnic, Bida.

$\bar{X}_2$ = Mean response of lecturers in Kwara State Polytechnic, Ilorin.

$\bar{X}$ = Mean response of lecturers in Bida and Ilorin.

Lecturers' appraisal of the Building Technology programme content using Table 4 above reveals that respondents were largely agreed that the mean responses for item 2 and 3 are above the cut-off point of 2.5 mean. This suggest that the respondents agreed that the content of the programme is capable of producing qualified builders and it's also relevant to the goals and objectives of the NBTE to bring about the desired technical revolution in Nigeria. The respondents disagreed that: the available facilities and workshops were adequate; that the courses offered were adequate and that the professional Building Technology teachers available to take care of the curriculum requirement were adequate (item 1,18 and 19) even if it agreed that qualified and experienced teachers were available (item 13).

However it also agreed that the Building Technology curriculum needs to be re-structured and that the existing curriculum does not provide for adequate knowledge to meet up with the ICT revolution in the world today vis-à-vis the built environment.

Research Question 2: What is the attitude of students towards the Building Technology programme and to what extent are the equipments and facilities adequate and effective for the

teaching of the course content.

Students' attitude to the Building Technology programme was determined using a questionnaire which was administered on the students. The mean values of the students' attitude towards the programme is presented in Table 4.

Table 4: Mean responses of Students on the Building Technology Programme

S/NO.	ITEMS	MEAN RESPONSES			REMARKS
		$\bar{X}_1$	$\bar{X}_2$	X	
1.	The workshops are adequately equipped with basic equipments.	1.96	2.45	2.21	Disagreed
2.	The library is provided with adequate and suitable textbooks and journals.	2.40	2.14	2.27	Disagreed
3.	There is enough building and classroom space in the department of Building.	3.10	2.65	2.88	Agree
4.	All workshop equipments provided in the department are functional	2.30	2.19	2.25	Disagree
5.	Teaching materials are adequate.	2.40	2.15	2.28	Disagree
6.	The quality of instruction in the Building department appears to be very adequate.	2.50	2.64	2.57	Agree
7.	The demand for entry in Building Technology programme in polytechnics appears to be increasing.	3.20	2.75	2.98	Agree
8.	Building Technology department examinations are standard.	2.55	3.30	2.93	Agree
9.	Students admitted into Building Technology department tend to feel inferior to those of other related disciplines.	1.90	2.02	1.96	Disagreed
10.	Some students tend to influence their grades	2.65	2.48	2.57	Agree

	with the department's lecturers.				
11.	Students register for Building Technology because they are weak in other areas and it's the only alternative.	1.90	2.47	2.19	Disagree
12.	The Building Technology programme is very difficult compared to related disciplines.	1.91	2.23	2.09	Disagree
13.	Building Technology curriculum is adequate.	1.72	2.30	2.01	Disagree
14.	Building Technology lecturers appears less serious with the programme when compared with those of other related disciplines.	1.78	2.10	1.94	Disagree
15.	Building Technology students are not well treated by those of other related disciplines.	1.85	2.46	2.16	Disagree
16.	Building Technology programme is very expensive.	1.89	2.52	2.21	Disagree
17.	Building Technology programme is very difficult to study.	2.11	2.30	2.21	Disagree
18.	The curriculum adequately exposes students to ICT as it relates to the built environment.	1.90	2.15	2.03	Disagree
19.	Students who successfully complete Building Technology programme can proceed for further studies in other related disciplines if they so desire.	3.05	3.20	3.13	Agree
	AVERAGE MEAN ($\bar{X}$)	2.27	2.45	2.26	

Students appraisal of the Building Technology programme-See Table 5. Students both in Federal Polytechnic Bida and Kwara State Polytechnic Ilorin, were asked to evaluate the Building Technology programme.

When responses of students to individual items were analysed, aspects of the Building technology programme that were commendable and those attracting criticism became focused. For instance, the students generally have a favourable attitude towards the Building Technology

programme as students were of the view that students did not register for Building Technology programme only as a last resort because they were weak in other areas of discipline (item 11) and that they were not looked down upon by students of other disciplines (item 15). They also acknowledged the fact that the interest of students to study Building Technology has grown over the years (item 7) and that the lecturers handling the programme take it seriously (item 14) as well as the quality of instructions which is very adequate (item 6).

On the other hand there were aspects of the programme that the students did not see in good light. For example, they agreed that the workshops were inadequately equipped (item 1), the libraries lack adequate and suitable textbooks (item 2) and also agreed to the fact that some students influence their grades with some lecturers in order to have higher grades which they don't deserve (item 10). They were also of the view that there is need to re-structure the existing curriculum (item 13) and that the existing curriculum falls short of what is desired to prepare them for the current global technological advancement in ICT (item 18).

Hypotheses

A. Hypotheses One.

There is no significant difference in the mean responses of lecturers in Federal Polytechnic Bida and Kwara State Polytechnic Ilorin on the adequacy of the Building Technology Programme content. The data are presented in the Tables 5, 6and 7 below.

Table 5: t-test Analysis of the mean rating responses in Bida Polytechnic on the suitability and adequacy of the course content.

$\bar{X} = 2.65$, $N_1 = 11$

X	$X - \bar{X}$	$(X - \bar{X})^2$
2.40	-0.25	0.06
2.50	-0.15	0.02
3.40	0.75	0.56

3.00	0.35	0.12
2.69	0.04	0.002
3.15	0.50	0.25
2.65	0	0
2.40	-0.25	0.06
1.65	-1.00	1.00
2.12	-0.53	0.28
3.40	0.75	0.56
2.00	-0.65	0.42
3.75	1.10	1.21
3.10	0.45	0.20
2.00	-0.65	0.42
1.95	-0.70	0.49
3.10	0.45	0.20
2.10	-0.55	0.30
2.45	-0.2	0.04
3.15	0.5	0.25
	$\Sigma (X - \bar{X})^2 =$	6.442

$$SD = \frac{\sqrt{\Sigma (X - \bar{X})^2}}{N}$$

$$= \frac{\sqrt{6.442}}{20}$$

$$= 0.57$$

Table 6: t- test analysis of the mean rating of responses in Ilorin Polytechnic on the suitability and adequacy of the course content.

$X = 2.86, N_2 = 9$

X	$X - \bar{X}$	$(X - \bar{X})^2$
1.80	-1.06	1.12
3.30	0.44	0.19
3.20	0.34	0.12
3.80	0.94	0.88
2.65	-0.21	0.04

3.30	0.44	0.19
2.90	0.04	0.002
1.85	-1.01	1.02
2.45	-0.41	0.17
2.30	-0.56	0.31
3.15	0.29	0.08
3.20	0.34	0.12
3.81	0.95	0.90
3.80	0.94	0.88
2.06	0.80	0.64
2.75	-0.15	0.02
2.85	-0.01	0.0001
2.05	-0.81	0.66
2.25	-0.61	0.37
3.70	0.84	0.71
	$\Sigma (X - \bar{X})^2$	8.4221

$$SD = \frac{\sqrt{8.4221}}{20} = 0.65$$

Calculation of T-test between lecturers in Federal Ploytechnic Bida and Kwara state Polytechnic Ilorin.

Data: $X_1 = 2.86$, $X_2 = 2.65$, $N_1 = 11$, $N_2 = 9$

$S_1^2 = 0.4225$, $S_2^2 = 0.3249$, df = 18.

Using $$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2(N_1 - 1) + S_2^2(N_2 - 1)(1/N_1 + 1/N_2)}{N_1 + N_2 - 2}}}$$

$$= \frac{2.86 - 2.65}{\sqrt{\frac{0.4225\,(11-1) + 0.3249(9-1)(1/11 + 1/9)}{11+9-2}}}$$

$$= \frac{0.21}{\sqrt{0.0758}}$$

$$= 0.76$$

Table 7. Mean, Standard deviation and t- test on the adequacy of the course content.

GROUP	SCHOOLS	NUMBER	$\bar{X}$	SD
GROUP 1	Lecturers in Kwara State Polytechnic Ilorin	11	2.86	0.65
GROUP 2	Lecturers in Federal polytechnic Bida.	9	2.65	0.57

Calculated t = 0.76, df = 18

Calculated t- value (0.76) did not did not equal or exceed the t- critical value (2.10) necessary for the rejection of the null hypothesis at 0.05 level of significance for 18 degree of freedom. Therefore the hypothesis is not rejected. Thus there is no significant difference in the mean responses of lecturers in the Federal Polytechnic Bida and Kwara State Polytechnic Ilorin on the adequacy of the Building Technology programme content.

B. Hypothesis Two

There is no significant difference in the mean response of students in the Federal Polytechnic Bida and Kwara State Polytechnic Ilorin on their attitude towards the Building Technology programme and to what extent is the equipment and facilities adequate and effective in the teaching of the course content.

The data needed to test this hypothesis are presented in the table below

Table 8.t- test analysis of the mean rating responses in Bida Polytechnic on the programme and the adequacy and effectiveness of facilities and equipment.

$\bar{X} = 2.27$, $N_1 = 35$

X	$X - \bar{X}$	$(X - \bar{X})^2$
1.96	-0.31	0.10
2.40	0.13	0.02
3.10	0.83	0.69
2.30	0.03	0.001

2.40	0.13	0.02
2.50	0.23	0.05
3.20	0.93	0.87
2.55	0.28	0.08
1.90	-0.37	0.14
2.65	0.38	0.14
1.90	0.37	0.14
1.91	-0.36	0.13
1.72	-0.55	0.30
1.78	-0.49	0.24
1.85	-0.42	0.18
1.89	-0.38	0.14
2.11	-0.16	0.03
1.90	-0.37	0.14
3.05	0.78	0.61
	$\Sigma(X- \bar{X})^2$	4.021

$$SD = \frac{\sqrt{4.021}}{19}$$

$$= 0.46$$

Table 9: t- test analysis of the mean rating responses in Ilorin Polytechnic on the programme and the adequacy and effectiveness of facilities and equipment

$\bar{X} = 2.45, N_2 = 41$

X	$X - \bar{X}$	$(X - \bar{X})^2$
2.45	0	0
2.14	-0.31	0.10
2.65	0.20	0.04
2.19	-0.26	0.07
2.15	-0.30	0.09
2.64	0.19	0.04
2.75	0.30	0.09
3.30	0.85	0.72
2.02	0.43	0.19
2.48	0.09	0.01

2.47	0.02	0.0004
2.23	0.22	0.05
2.30	0.15	0.03
2.10	0.35	0.12
2.46	0.01	0.0001
2.52	0.07	0.005
2.30	0.15	0.03
2.15	0.30	0.09
3.20	0.75	0.56
	$\Sigma (X - \bar{X})$	2.236

$$SD = \frac{\sqrt{2.236}}{19}$$

$$= 0.34$$

Calculation of t-test between students of Federal Polytechnic Bida and Kwara State Polytechnic Ilorin.

Data: $X_1 = 2.45$, $X_2 = 2.27$, $N_1 = 35$, $N_2 = 41$

S_1^2 = O.1156, S_2^2 = 0.2116 , df =74

$$\text{Using } t = \frac{2.45 - 2.27}{\sqrt{\frac{0.1156(35-1) + 0.2116(41-1)(1/35+1/41)}{35+41-2}}}$$

$$= \frac{0.18}{0.10}$$

$$= 1.8$$

Table 10. Mean, Standard deviation and t-test on the programmme and the adequacy and effectiveness of facilities and equipment.

GROUP	SCHOOL	NUMBER	X	SD
GROUP 1	Students in Kwara State Polytechnic Ilorin	35	2.45	0.34
GROUP 2	Students in Federal Polytechnic Bida	41	2.27	0.46

Calculated t = 1.8 , df = 74

The table revealed that the calculated t-(1.8) did not equal or exceed the critical t- value (1.99) necessary for rejection of the Null hypothesis at 0.05 level of significance for 74 degree of freedom. Therefore the hypothesis is accepted. Thus there is no significant difference between the response of student of Federal Polytechnic Bida and State Polytechnic Ilorin on their attitude towards the Building Technology programme vis-à-vis other related disciplines as well as the adequacy and effectiveness of facilities and equipments.

Major Findings

The major findings of this research are summarized as follows:

1. Facilities such as workshops and equipments are inadequate to take care of the curriculum requirement.
2. The current curriculum does not provide the students adequate exposure to the contemporary ICT revolution as it relates to the built environment.
3. The students have a positive attitude towards the programme and do not perceive it as a last alternative or because they are weak in other areas but out of interest and the demand for entry into the programme is increasing.
4. The library is not well equipped with suitable and relevant textbooks and journals.
5. The quality of the instruction as well as the qualification of the instructors appears to be adequate.
6. The content of the current curriculum is still relevant to the goals and objectives of NBTE but needs to be restructured.
7. There is urgent need for government and private sector intervention in the improved funding of technical courses in the polytechnics.

CHAPTER V

Discussion, Conclusion and Recommendation

In this chapter discussion of findings, summary of the study, implication of the study, conclusion, recommendations and suggestion for further research are presented.

Discussions of findings

Analysis of research question two revealed that facilities and equipment are inadequate and ineffective for the teaching of the course content. It showed that many of the equipment and machine provided in the department are not functioning. Tools and consumable materials are inadequate. Also the library services are not adequate for the effective teaching and learning of the programme. The inadequate facilities and equipment led to the lecturers inability to deliver absolutely the technical knowledge desired to the students. Lovell, (1970) observed that no effective learning can take place where there is an inadequate training facility.

The hypothesis as shown in Table 7 indicated the comparison in the mean ratings of the respondents on the suitability and relevance of the content of the Building technology Programme and the adequacy and effectiveness of the facilities and equipment for the teaching of the course content.

The findings revealed that the results of calculated t-value of the two hypotheses were not greater than the t-critical value of 2.10, therefore, respondents
did not differ significantly in their response on the suitability and adequacy of the content of the Building Technology programme. Also they did not differ significantly on the adequacy and effectiveness of the facilities and equipment for the teaching of the course in Bida and Ilorin Building programmes.

The findings further revealed that there is the need for a new course content of the

Building Technology Programme: there is also the need to phase out some courses that are no longer necessary and introduce new ones. Okeke , (1989) supported that knowledge and technology are not static, they are growing and ever changing. In science for example new discoveries are made which set up a wave of changes in the subject matter of science. Ten years ago, the learning experience of students were purely memorizing of laws, principles and facts of life, especially in science. In support of this Bloom, (1971) postulated that with increase in facilities such as technological hard and software (programmed learning, teaching machine) ,there is need for the content modification and renewal as may be appropriate from time to time.

Another important result of the study is the student perception of the Building technology programme (table 4). Students who were admitted into the programme had a favourable or positive attitude towards the programme. The students generally believed in the programme and admitted that it is not very expensive but somewhat exploitative as they are made to rely on handouts than well articulated textbooks by some lecturers. However the students acknowledge that they are benefiting from the programme in as far as they are able to fit into the main stream of the built industry upon graduation besides monetary considerations.

The lecturers also agreed that the content of the curriculum is in relevant with the goal and objectives of NBTE and is capable of producing qualified builders. (table 3)

Summary of the study

This study evaluated the Building Technology programme in Federal Polytechnic Bida and Kwara state Polytechnic Ilorin. Eighty students were randomly selected as well as twenty lecturers and two H.O.D's to respond to a well validated set of questionnaire, which were used to collect data on the students perception and adequacy and effectiveness of equipments and facilities for the Building Technology programme and lecturers opinion on the adequacy of the

programme content.

Simple percentages and t- test statistical procedure were used to analyze the data according to each of the research questions. Two research questions were formulated to guide the study and also two null hypotheses and tested at 0.05 level of significance.

Based on the findings of the study, it was recommend that new courses should be introduced into the curriculum especially in the area of ICT as it relates to the built environment and also the facilities and equipment to be provided in the department should be adequate and effective for teaching and training to improve the students' performance.

Implication of the study

1. The study has the implication for improving the quality of the Building Technology programme in the polytechnics, hence the result of the study would serve as a feed back to government to make adequate provision for the financing of the programme.
2. The findings will also enable government to make provision for upgrading and providing sufficient facilities and equipment.
3. With the result of this study, the private sector and stake holders will be encouraged to give more attention to the funding of the programme.
4. The authorities of this institution will be able to access the quality or worth of the programme in their various institutions.
5. Education planners and policy makers will be more informed on the need to restructure the existing curriculum

Conclusion

Based on the results of this study, the following conclusion were drawn:

1. Both student and lecturers have a favourable attitude to the Building Technology programme

despite certain lapses that the programme has. It strength includes the availability of qualified and competent manpower although inadequate and the current coverage of the content which is still relevant in fulfilling National objectives but still needs to be reviewed.

2. The future growth of every society depends largely on the quality of its youth, and to obtain quality means to educate functionally. Philosophically, to educate the youth functionally is to start laying a foundation by uplifting the standards of facilities and equipment used in the teaching process which are presently inadequate and ineffective for the teaching of the course content.

Recommendation

On the basis of the findings of this study the following recommendations are made:

1. Government at all levels should give more attention to the funding of technical course in the Polytechnics, so as to facilitate the upgrading and the replacement of obsolete equipment to allow for better learning.

2. Private sector participation should be encouraged in the funding of our tertiary institutions.

3. More qualified personnel should be recruited to handle the Building Technology programme in areas where there are short falls of teaching personnel in the programme area.

4. Step should be taken urgently and as a matter of necessity to renew the existing curriculum and ICT relevant to the built industry should be introduced at the beginning of the programme in line with the global trend in technological advancement.

5. The programme should be evaluated from time to time.

Suggestion for further research

This author wishes to suggest that similar evaluation study should be carried out to assess this programme in other Polytechnics where it is accredited as this research is only limited to two

states. Likewise it may also be carried to cover other programmes such as Statistics, Food and Nutrition, Science Laboratory Technology etc being offered in other state of the federation to make this research generally acceptable.

The suggested topics are:

1. Evaluation of Science Laboratory programme in the Polytechnics.
2. Appraisal of Statistics programme in the Polytechnics.

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Appendix A

Formula

The mean $\bar{X} = \sum X/N$

Where; $\sum$ = sum of

X = nominal value

$\bar{X}$ = mean

N = number of items

The mean value = $\frac{4+3+2+1}{4}$

$= \frac{10}{4} = 2.5$

The mean score of each item, formular

$\bar{X} = \sum FX/N$ was used

Where $\bar{X}$ = Mean sample

Σ = sum of

X = Nominal value

N = Number of responses

For the Standard Deviation the formular

$SD = \frac{\sqrt{\Sigma(X - \bar{X})^2}}{N}$ was used

Where N = Total number of items

X = Means of each items

$\bar{X}$ = Average means of all the items

$\sum$ = Sum of

The t- test was used to compare the means of the groups. For instance, the mean response of

lecturers and students in Niger and Kwara are compared separately.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(N_1 - 1)S_1^2 + (N_2 - 1)S_2^2)\ 1/N_1 + 1/N_2}{N_1 + N_2 - 2}}}$$

Where t = Test of significance

X_1 = Average means of group 1

X_2 = Average means of group 2

N_1 = Number of respondents in group 1

N_2 = Number of respondents in group 2

S_1 = Variance of group 1

S_2 = Variance of group 2

N_1+N_2-2 = Degree of freedom

Appendix B

Dept. of Industrial and Tech. Education
Federal University of Technology
Minna, Niger State.
10th November, 2008

Appraisal of the Building Technology programme in Bida and Ilorin Polytechnics.

Below are some statements meant to find out the appraisal of the Building Technology programme of the Federal Polytechnic Bida and Kwara state Polytechnic Ilorin. Please respond to each item by ticking only one. The responses are for research purposes alone and will be kept confidential.

Thanks for your co- operation.

Charles E. Udoh.

Section A

Personal data

Sex: Male ( ) Female ( )

Designation: H.O.D ( ) Lecturer ( )

Marital Status: Married ( ) Single ( )

Highest Qualification: HND/B.Sc. ( ) Masters ( ) Others (Specify) ( )

Section B:

The following statements represents a sample of your opinion about the Building Technology programme content adequacy to prepare students for the challenges in the contemporary built environment. Your response will be determined on the basis of a 4 rating

scale. Please kindly tick the response you think is most appropriate to each item.

The ratings are:

SA = Strongly Agree

A = Agree

D = Disagree

SD = Strongly Disagree

A. Lecturers Perception on the Building Technology Programme content adequacy to prepare students for the challenges in the contemporary built environment.

S/NO.	ITEMS	RESPONSE			
		MEAN	S		
		SA	A	D	SD
1.	Available facilities such as workshops and equipments are adequately equipped to take care of the curriculum requirement.				
2.	The content of the programme is capable of producing qualified builders.				
3.	The content of the programme are relevant to the goals and objectives of NBTE.				
4.	The standard requirement for admission into the ND programme is adequate.				
5.	The Building Technology curriculum provides for general knowledge in other related disciplines.				
6.	Administration of test in the Building Technology programme is done with thorough supervision.				
7.	Students tend to rely more on handout rather than well tested textbooks.				

8. A student that successfully completes the ND programme can successfully practice Building without the completion of the HND.
9. Being an internally conducted examination the validity of the final result cannot be said to be credible.
10. Some lecturers often give their students undeserved extra marks just to assist them to graduate.
11. A student that successfully complete the ND programme can easily proceed for HND in any other allied institutions.
12. Performance in ND is a better performance predicator in HND.
13. Qualified and experienced lecturers are involved in the Building Technology programme.
14. The Building Technology programme needs to be re-structured.
15. The Building Technology students are over tasked in terms of the work load they carry.
16. Building Technology examination questions are not usually subjected to standard validity item analysis procedures.
17. Building Technology examination questions and results are externally moderated to give necessary integrity.
18. The number of courses offered in the programme is adequate.
19. Professional Building Technology lecturers are quite adequate in your school

20. The curriculum does not provide adequate exposure of the students to the contemporary ICT revolution in the built environment.

APPENDIX C

Instruction: The following assessment is meant to illicit students' appraisal of the Building Technology programme and the adequacy and effectiveness of facilities and equipments.

Please respond to each item by ticking only one that represents your opinion. The response is for research purposes alone and will be kept confidential.

The ratings are:

SA = Strongly Agree

A = Agree

D = Disagree

SD = Strongly Disagree

Section A

Personal data

Sex: Male ( ) Female ( )

Level: ND 1 ( ) ND 2 ( ) HND 1 ( ) HND 2 ( )

Section B

Students perception of the Building Technology Programme and the adequacy and effectiveness of facilities and equipments.

S/NO.	ITEMS	MEAN	RESPONSES			
			SA	A	D	SD
1.	The workshops are adequately equipped with basic equipments.					
2.	The library is provided with adequate and suitable textbooks and journals.					

3. There is enough building and classroom space in the department of Building.
4. All workshop equipments provided in the department are functional.
5. Teaching materials are adequate.
6. The quality of instruction in the Building department appears to be very adequate.
7. The demand for entry in Building Technology programme in polytechnics appears to be increasing.
8. Building Technology department examinations are standard.
9. Students admitted into Building Technology department tend to feel inferior to those of other related disciplines.
10. Some students tend to influence their grades with the department's lecturers.
11. Students register for Building Technology because they are weak in other areas and it's the only alternative.
12. The Building Technology programme is very difficult compared to related disciplines.
13. Building Technology curriculum is adequate.
14. Building Technology lecturers appears less serious with the programme when compared with those of other related disciplines.
15. Building Technology students are not well treated by those of other related disciplines.
16. Building Technology programme is very expensive.
17. Building Technology programme is very difficult to study.

18. The curriculum adequately exposes students to ICT as it relates to the built environment.

19. Students who successfully complete Building Technology programme can proceed for further studies in other related disciplines if they so desire.