

IMPELEMENTING TECHNICAL AND VOCATIONAL EDUCATION (TVE) FOR OPTIMUM PERFORMANCE IN THE 21ST CENTURY.

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Abstract

Technical and Vocational Education (TVE) profession must begin immediately to implement programmes that fully meet its stated goals and objectives. In the past years the degree of emphasis was to develop in students a measure of skills in the use of common tools and machines. This perception is extremely narrow and is not consistent with the broad meaning and purpose of TVE. Similarly, the primary objective of the Federal Ministry of Education: Vision and Action (2000) was "to reform and reposition TVE for optimum performance in the 21st century". This article intends to give a picture of how to implement TVE for optimum performance from traditional programme towards a technology-based programme. It takes time and a plan to change. However, change can occur if implementing TVE is perceived as a process and this process is pursued with a planned sequence.

Background.

The Federal Ministry of Education's National Seminar on Technical and Vocational Education (VTE, 2000), reported that systematic TVE started in the colonial time outside the formal school system as non-formal technical education. Furthermore, the focus then was not to provide the tradesmen needed by government establishments or private foreign enterprises. For example, the Nigeria Railway Training School was established in 1901; The Survey School Lagos in 1908, School of Agriculture at Samaru in Zaria in 1930 and the Public Works Department (PWD) Training School in 1931. The report also revealed that, the expanding colonial government and the economy created the high demand for both tradesmen and higher levels of technical and vocational manpower which the non-formal in-house training could not supply in adequate number, variety and levels of training. Consequently, the school setting had to be developed.

The schools that evolved from this demand pressure in the course of time included; Federal Technical College, Yaba (1948), Technical Colleges in Enugu (1950), Ibadan (1951), Kano (1953), Bukuru (1953), Sapele (1955), Ijebu-Ode (1959), Oshogbo (1959), Oyo (1963), Aba (1964), Abakaliki (1966) and Makurdi (1973).

The current state of TVE in Nigeria according to Towe (2000) cuts across the educational system and the economy at various levels. For example, the National Policy on Education (NPE, 1981) defined Technical and Vocational Education (TVE), as "that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge". On the other hand the National Board for Technical Education (NBTE), lists the following

technical and vocational fields as constituting Technical and Vocational Education (TVE). Agriculture and related Trades, Building and Wood-work Trades, Applied Science and related Trades, Engineering Technology and related Trades, Business Studies and related trades, Textile and related Trades and Home Economics Trades. Furthermore, the NPE (1981), lists the types of institutions where Technical and vocational education is to offered. There are four distinct types and levels of TVE in the Nigerian system of Education as follows:

1.Pre-Technical And Vocational Education

At the pre-primary and Junior Secondary School (JSS) levels, the general objective includes the exposure and general orientation of students to the world of work as well as the acquisition of technological literacy.

2. Pre-Professional Technical And Vocational Education

This includes Senior Secondary Schools (SSS), Technical Colleges and Technical

/Vocational Trade Centres for either pre-professional training or for the production of low-level manpower (skilled labour), for example, artisans, craftsmen for the labour market.

3. Professional Middle-Level Manpower Training

At the post-secondary (tertiary or non-university institutions), for example, polytechnics, monotechnics and colleges of education for the production of highly skilled middle-level manpower (technicians-technologists and technical/ vocational teachers).

4. Professional High-Level Manpower Training

Technical and vocational education at the University institutions is for the production of vocational professionals. The focus at this level requires highly complex cognitive and psychomotor abilities for mastery. It also deals in high levels of knowledge, scholarship and recondite expertise. Education at this level inculcates in the professional minds the ability to judge their standards of practice and assume full responsibility for the consequences of their professional decisions in the interest of their clients.

Adegbile (2000) expressed that if we agree with the definition of Technical and Vocational Education given by NPE (1981), as that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge, we have no choice but to reform and reposition TVE for optimum performance in the 21st Century. Nevkar (2002), observed that the quest for a reform to reposition TVE must be directed toward the student who must live and work in a society that is being transformed by technological advancements. However, the value of TVE will never be realised until the reform and re-position are observed in classrooms across the country. Furthermore, reform will not occur until there is a concerted effort by teachers to implement TVE programmes.

Realistically, TVE teachers face the most difficult task in the reform process as noted by Andural and Ortserga (2000). Implementing TVE programmes in the 21st century means more to teachers than a change in philosophy, content and activities, for example, teachers must change their attitudes as well that of their students and the government, in addition teachers must attend to their responsibilities such as classroom management, discipline, funding new resources, facility maintenance, and paperwork.

Given the complexity of the details teachers will face, those wishing to reform and reposition TVE can quickly become overwhelmed and discouraged. However, to reform and reposition TVE can occur only if implementing TVE in the 21st century is perceived as a process and this process is pursued by the following planned sequence.

To reform and reposition TVE provides the profession with one of the most challenging, as well as demanding periods in its long history extending through the years of manual training and presently, to the age of technological development.

The urgency to reform and reposition TVE as contained in the report of the National Seminar on TVE in Nigeria; Vision and Action (2000) was generated by a number of important contemporary developments such as:

- a. Past reform reports.
- b. Technology's impacts on society.
- c. Transition from industrial to post-industrial to information age.
- d. Need for appropriate skills acquisition.
- e. Increase in emphasis on basis mathematics and sciences.

f. Need to strengthen the TVE profession's role in public education.

The dynamics to reform and reposition TVE has many implications such as replacing obsolete equipment, tools and facilities; updating and keeping teachers current; challenges of severe teacher shortage.

Framework for Reform

To reform and re-position TVE for optimum performance in the 21st century in a planned sequence reduces the complexity of the task, gives direction to the process and provides the means to achieve the desired outcomes of the programme.

In this article, a three phase plan of sequence is proposed or suggested: 1) **Gathering Information and Determining Curriculum Direction:** Will aid teachers interested in implementing TVE programmes in a base for

integrating technology units in the existing curriculum.

- 2) **Preliminary Curriculum Implementation:** In Phase Two the existing TVE program is expanded by preliminary implementation of activities.
- 3) **Sequential Curriculum Activities and Evaluation:** In the final phase, technology-based activities are sequenced into a logical TVE curricular sequence.

Phase One

Technological Literacy: Gather Information And Determine Curriculum Direction

The first step to reform and re-position TVE in the 21st century involves understanding and appreciating technology (Waetjeu, 1981), as it affects every man, woman or child in one way or another. The process is to enable the profession identify the subject matter to be taught in TVE. The National Policy on Education (NPE, 1981) has worked to define curriculum equipment and develop instructional activities to implement in TVE programmes. Contact the state Ministry of Education for help in providing direction for your TVE programme. Attend workshops, conferences and review publications. Seek information from periodicals. These magazines can provide information on state of the art technologies that will add to the content base of an activity in TVE programme. Gather information from these and other sources and their recommendations, your resources, and content base. If you are unsure of the best direction to pursue or how TVE should be, do not despair. Remember, the transition from the years of manual training to the information age is a learning process for everyone. Start a file for related material. As you continue to gather information on new curriculum and instruction, your ideas will develop.

Once the subject matter is identified, begin to identify and categorize some proposed activities. Identify activities that can be implemented in your existing TVE facilities. According to Todd and Todd (1986), many TVE activities require a change in content and teaching methods, but incorporate familiar skills and equipment requirements. Some activities however will be outside your workshop's tool and material resources. Identify activities that can be implemented with the purchase of equipment and materials that are within your budget. Other activities will require increased funding. List these requirements and consider them when preparing your budget. Search for alternative source of funding. Club activities and fundraisers can provide the needed money. Local organizations or business may be willing to contribute to your programme. Let your administration or Ministry of Education know what you are trying to do. May be they will keep you in mind when they are preparing their budget.

The final step of the first phase is to analyze your existing programme. Lauda and

McCrary (1986) observed that advancement in technologies a country

has experienced represents an increase in knowledge, which has altered tools, materials, processes and technical systems. To reflect this evolution in TVE programme, the teacher must increase student's experiences. Thus, the opportunity to learn new content and to develop new skills and problem-solving abilities. Identify the basic content and skills that are currently taught in your TVE classes, then begin to increase your students' experiences during the same time frame by teaching basic knowledge and skills more efficiently. Determine the workshop time period required to develop a skill then eliminate redundant tasks or plan to integrate skill development into a technology based activity. This step will provide class time for implementing new activities within the current TVE curriculum structure.

Phase Two

Preliminary Curriculum Implementation -Activity Selection

Nevkar (1994) observed that Nigerian education has had a long history of curriculum faddism. What is advocated is an emphasis on technology in the curriculum as a whole in TVE. Given the richness of technology in society, it is not surprising that it affects every aspect of our lives, and therefore it is convenient to think of technology as another curriculum integrator. From the file you started during phase one, select several technology-based activities that interest you and your students, then adapt these activities to suit your situation. Outline the content to be taught and consider the material, tool, and equipment availability. Determine the prerequisite skills required for students to participate in the activity. It is very important that each student possesses the entry level performance requirements for the tasks. Since TVE is an activity-based discipline, many of the skills that are now taught in the programmes, such as drawing, cutting, forming, assembling, etc. are prerequisites to perform technology-based activities. Other skills that may be needed must be taught. One basic skill often overlooked is to teach student how to think or apply knowledge to problem solving, situation. High level thinking, such as creating or problem-solving, requires the application of processes of thought. For example, Posner and Rudnisty (1982) observed that brainstorming is a method used to increase mental output when searching for proposed solutions to a problem. This mental process is a prerequisite thinking skill for many problem-solving activities.

The problems that arise while implementing new units can be very complex. Objectives, lessons, and tests must be developed. Equipment, material, teaching method and classroom management details must be finalized. The interaction of these variables in a crowded classroom can cause major problems. Fortunately, the complexities involved in implanting new instruction can be reduced by implementing prototype (piece-meal) activities.

One change process proven by industry (Jones and Wright, 1986), is to develop a prototype before "production". In the classroom, implement new units with a small group of students. Choose several interested students and / or allow your school's students' club to research and develop new activities. Get students

involved in the change process by allowing them to help. During this process you may not have all the answers, but tell your students (researchers) that "we will learn and solve problems together". This teachers/student relation in research and development process has valuable outcomes in itself. It will show your students how to learn, to experiment, and to create new devices and products - what a valuable experience in implementing TVE for optimum performance in the 21st century!

There is another valuable side effect of the preliminary implementation process. Students' attitudes toward your courses will begin to change positively, and not just a change in attitude of the students you work with but also in students exposed to these new activities. Maintain visibility by displaying projects or have special competitions for the school to see. Begin to develop strategies for marketing your new school local newspaper, to

photograph the new activities. Show administrators the changes that are being implemented and ask for opportunities to present your new TVE at in-service meetings.

Increasing visibility and marketing new activities in TVE has a synergistic effect on funding, recruitment of quality students/teachers, and administrative support. People will start to become interested in what you are doing. You will be surprised at the motivation you will receive to continue.

During preliminary implementation you should reflect on the value of the activity in terms of students outcomes as stated by Doll (1986). Remember, TVE activities have many facets. These activities are designed to provide experiences for developing students' technical/vocational knowledge and skills; skills as adaptor, creator, and problem solving as well as sensitivity to the impact and consequences of technology on society. Determine the effectiveness of the activity for nurturing these goals and, if necessary, increase the conflential base of the activity, alter teaching methods and /or instructional sequence.

Continue this process with new activities in the subjects that are of the TVE you decided on during phase one. Log the results of preliminary implementation to provide data for organizing your lesson plans.

Phase Three

Sequential Curriculum Activities

These are several factors that a teacher should consider when making decision on activity sequencing. The sequences must be logically consistent with the activities, conceptual properties, process of inquiry, process of learning, and order of knowledge utilization (Doll, 1986). To develop adaptive, creative and /or problem-solving skills, the activity sequence must require students to apply increasingly complex behavior to the task. Students must learn to work independently and become self-reliant. Before this can occur, the student must possess the knowledge, skills and attitudes necessary to perform (DeLuca, 1981). In essence, teachers must lead the students from dependence to independence. Identify a culminating curriculum activity that will require your students to apply high-level behavior, then select activities that will build the required knowledge and skills needed for optimum performance at this level. Continue this process sequence curriculum activities.

This sequencing technique will ensure that the desired student optimum performance is observed, which may not be the case otherwise. For example, the bridge building and testing activity has been labeled as structural problem-solving venture. However, if students are not taught the concepts of structural design and if students required to apply this knowledge to the problem, they may be simply imitating a bridge design that they have seen. There is a big difference between imitating and solving. Beware, curriculum activities can have many faces depending on how they are presented.

Once the units of instructions are organized, implement the new course to a class or several classes. There still will be some "bugs" to work out, student differences and classroom management will take on new dimensions, but a bit of trouble-shooting will lead to success.

During this third phase, evaluate student performance and determine if the TVE program is meeting the needs of students as defined by the goals and objectives of TVE as stated in the revised National Policy on Educational (NPE, 1981). Ask yourself these questions:

- i. Has the student developed technical / vocational skills in the use of tools and materials which are needed to create and solve technological problems?
- ii. Has the student refined his/her knowledge of how things work and his/her abilities by researching, constructing, analyzing, problem-solving, etc
- iii. Did the student learn about and experience the human process of creating technologies including; ideation, planning, experimentation, research and development, design, aesthetics, organization, and evaluation?
- iv. Was the student required to apply mathematical and scientific skills to solve technical problems?
- v. Is the student sensitive to the impact and consequences of technology on people and

society?

Some revisions will be necessary, but let's not forget that technology is consistently changing. To reflect technology a "dynamic TVE curriculum" is required-return to phase one and continue the process to widen the scope and update your TVE programme.

Conclusion

In conclusion, the advancement in technologies has repositioned. Technical and Vocational Education (TVE), requiring that technology-based courses be taught in schools and colleges. TVE teachers must address this growing need of our society. To reform and reposition TVE for optimum performance in the 21st century can be a very rewarding experience. It is hoped that this plan, which is in three phases will prove useful through experience, and will ease the transition from manual skills to industrial to post-industrial to information age, thus, increase the rewards for teachers and their students.

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