

TECHNOLOGY AS A GENERAL SUBJECT IN THE TANZANIAN EDUCATION SYSTEM

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1. Introduction

Technical education is organized and given in any country for either or both of the two objectives, namely:

- a) As part of the general educations, like any of the other well-known subjects such as Mathematics, Geography, physics, etc. and
- b) As a career or vocational geared programme to produce the required technical manpower at the three basic levels, viz:  
Craftsman  
Technician  
Engineer.

There is no doubt in Tanzania today that we have accepted as a matter of policy the need to emphasize Technology in our education system. (See Nyerere: Education for Self-Reliance, March 1974; Tanu Directive on Small Scale Industries, March 1973 and Resolution 29 of the 16th Party Conference, October 1973).

In spite of all these pronouncements, however, it is very sad to note that there is a very strong doubt as to whether our education and manpower planners, and the policy makers themselves are fully aware of the complexities and organization required to run a viable, successful Technologically based Educational system in a country like Tanzania at its present stage of development.

2. Definition of Technology

Technology in this context will be defined as that subject which facilitates the imparting of knowledge, attitudes,

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skills and confidence connected with the designing, making, operating, maintaining and repairing of an article as well as its improvement, either in part or as a whole, based on engineering principles. This technology is at four distinct but interrelated levels:

- 1) The General Elementary Level
- 2) The Craft Level
- 3) The Technician Level, and
- 4) The Engineer Level.

Objective (a) above is directed at the first level and objective (b) is directed at the second, third and fourth levels which are the career or Technical Manpower levels.

A viable successful Technologically oriented Education system cannot be set up without an understanding of the purpose, the relationship and the interdependence of all these four levels. Of course an understanding of the political-social-economic situation of the country is also necessary.

### 3. Confusion in the Present Structure of Technical Education

If one studies critically The Engineers Registration Act (1968), The Education Act (1970), The National Vocational Training Act (1974), The National Examination Council Act (1973) and the Act which established SIDO (Small Industries Development Organization) in 1973 coupled with the job descriptions of various officials in different Ministries of the Civil Service and the parastatals together with the Annual Manpower Reports to the President, one cannot help but come up with a very confused picture of Technical Education set-up in this country. It is clear that many organizations and officials are duplicating their efforts without a clear central directive as to what each is supposed to do. Worse still, these officials more often than not carry out their duties uncoordinated or in competition to each or some of each other.

The same unsatisfactory picture emerges when one observes the current pronouncements and activities on the Diversification of secondary schools, the TAPA (Tanganyika Parents Association), Technical Schools, SIDO Training Centres, National Vocational

Training Program, Tanu Youth League Technical Schools, Voluntary Urgency Vocational Training Centres and the two-year Post Primary Schools (four are to be started in each of the eighty-five districts).

4. Need for authoritative coordinated efforts

Clearly such a situation calls for clear and coordinated efforts at all levels of our society, otherwise we may fail not because of lack of the will and enthusiasm to promote Technology, but rather, inspite of it. Some of the people and organizations, if not all, are jumping on the popular bandwagon without a clear objective of what is to be achieved and the method to be employed in achieving it.

If these very commendable efforts are to bring the desired fruits of moving Tanzania away from the present position of Technology dependency (hence permanent economic dependency) to full political and economic independence, we MUST understand the two objectives of Technical Education and the four levels of Technology. So far our efforts are directed at producing the technical manpower at the craftsman, technician and engineer level.

This is good. BUT, and this is the main purpose of this paper, we cannot produce the required manpower simply by dealing with the second objective of technical education without at the same time dealing with the first, that is of introducing Technology as a general component of our education. Every boy or girl who goes to school must learn at least Elementary Technology as one of the subjects, and every effort must be made to teach Technology in the non-formal way. The Radio, the Newspaper, the Factory and all the other media of Adult Education must be mobilised to teach this important subject.

5. Objectives and Problems

Space does not allow me to go into detail on the objectives, problems, and solutions in introducing Technology as a general component of education, and of promoting it to each of the three

career oriented levels.

Let me briefly mention some objectives of teaching this subject.

Technology is an important preparation for life in the modern technological age. We are all surrounded by gadgets and tools which have become necessities rather than luxuries. Think of the family who could not hear our President's speech of the food situation in the country simply because the batteries of the radio were reversed, or of the outcry in the last budget session of our National Assembly when Ndugu Elinewinga was put to task on TANESCO failures. Twenty years from now electrification and water projects will be widespread throughout the country. Will that time find us capable of living safely and economically with electricity and water taps, pumps, etc., or shall we have to call special "fundis" even for the simplest technical jobs? And who knows, by that time we may well be required to interpret technical drawings and instructions correctly before we can do most of our things such as "rowing" our foods in our kitchen, using the correct fuel for our car when other fuels will have been developed, washing our clothes, etc. etc.

Most of our buildings, furniture, home appliances, driving instructions, motor cars, type-writers, etc. etc. do require at least some elementary technical knowhow to be able to use them properly. With the advent of more development these requirements will increase. Yet we are prepared to spend years in school, sometimes sixteen to eighteen years, without learning that subject (technology) which finds immediate and continuous application in our everyday life.

Technology helps to create the right attitude and assists the appreciation of the value and problems of organizing a viable successful structure for the advancement of industry. Of course there will be specialised teachers and students of technology, but without the rest of us having an idea of technology we shall not be able to assist these specialised personnel to advance themselves. Good music is played by musicians but it cannot be appreciated by the uninitiated listeners. Footballers play better football and advance themselves if the spectators

know at least the elementary rules of the game, such as how the goals are scored, when the ball is out of play, what is a foul, a corner kick, a penalty etc. Without such an appreciative public the game would not have advanced at all. Similarly, without an understanding public, technology will continue to be given low priority in practice, although it will be highly regarded in TANU conferences and elsewhere.

It took twelve years before the Faculty of Engineering was established in our University and TANU has never really come up with a thorough going policy paper on technology, despite last year's guidelines on small scale industries which resulted in the establishment of SIDO. But can SIDO in its present structure and strength be able to really coordinate and promote heavy industries based on steel and machine tools, or will this country continue to pride itself only on Makonde Carvings, handcraft work, etc. These are works of art. They are not the basis for industrial revolution.

#### 6. Underutilization of Local Productive Resources

Again consider the number of misplaced, underutilized and idle craftsmen, technicians and engineers in this country. Consider the abolishment of the former Moshi and Ifunda Trade Schools; consider the shortage of basic hand tools in our technical training institutions; consider the importation of foreign goods and manpower for purposes which can satisfactorily be met in this country, for example the designing and building of school workshops, simple pumps, simple laboratory and workshop equipments etc. Consider all these and many other cases, and the conclusion must be that our policy makers and planners only pay a lip service to technology.

Without introducing Technology as a general subject in all our schools this apathy, these mistakes will continue to be made. The fact is that scientists and technologists (of all shapes and sizes) require wholehearted support and motivation from all corners before they, in their turn, can use their knowledge and gifts to lift this country from her present position of weakness

and economic dependency to one of strength, confidence and full independence based on self-reliance in both agriculture and industry.

The necessary support and motivation cannot be forthcoming without changing the pattern through changing our attitude by introducing technology as a compulsory subject in our schools and colleges. Then our politicians, directors and managers will at least be initiated in technology, if not technologists per se, able to appreciate the value and problems of technology and willing to apply the necessary solution not out of pressures but because of understanding.

#### 7. Foundation for Subsequent Training

A general Technology in schools is a necessary foundation for any subsequent training in technical education. The first year of the four year engineering course is necessary only because the entrants to the course do not have this foundation from schools. Again some of the students may well have entered the faculty out of curiosity or misguided notions, but they have no aptitude for an engineering career. It is important to sort out the gifted from the misguided and determine, at least attempt to determine, students inclinations before they enter a specialised training.

Technology does promote the sense of imagination and improve childrens interest in creativity. Thus it is the basis for do-it-yourself hobbies and activities, such as painting the walls of ones house, modifying our kitchens, greasing our cars, or indeed, even improving our technology in evening classes.

Modern teaching demands that lessons be illustrated by aids as much as possible. Technology is therefore necessary for the better preparation of teachers.

#### 8. Reducing Maintenance Costs

It must also be pointed out that technology in schools and colleges is very necessary if we are to reduce maintenance costs of these institutions. In one year alone (1970/71) the Ministry

of National Education spent over 3½ million shillings on the upkeep of schools and colleges by Comworks and 1.8 million on the maintenance of plant and vehicles assigned to these institutions. In 1973 the Dar es Salaam Technical College was spending 9,000/- every month for hiring Co-Cab buses because the College's own bus and truck were very often in Comworks workshops. The buses were required to transport students from their hostel in Keko National Housing Estate (at 8,000/- a month).

This hiring continues to this day because due to bureaucratic red tapes at high government levels the college somehow has to wait for the World Bank and the Netherland Government to build sleeping places (and workshop area), a job well within the technical capacity of the college itself.

What is lacking is the necessary backing and understanding at the high levels of the government, the required administration and organization and somebody with authority to cut these red tapes which is the cause of many of our failures today especially in the technical fields. We have the manpower and other resources to reduce maintenance and other costs but the necessary organization is lacking.

#### 9. Conclusion

Many other reasons could be given as to why it is important to introduce and develop technology now at all levels and all forms of education and training (formal as well as non-formal), not least the first most important level of general elementary technology. Failure to deal with this level now will result into frustrating our otherwise well intentioned efforts to produce the required specialised careers in the three other levels of craftsman, technician and engineer. Let us hope that Tanzanians will pull themselves together and rise to the occasion. They will mount their energy and other resources to the establishment, promotion and maintaining of a viable successful structure for this task, based not on political emotions but on realistic understanding of what is required.

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