


THE INTERDEPENDENCE OF PUBLIC HEALTH ENGINEERING AND A SYSTEM OF LIFELONG EDUCATION

TERRY MURPHY Head of Adult Education Department, CAEES,
Ahmadu Bello University, Zaria, Nigeria.

This paper will claim that water and waste engineers and adult educators must be conscious allies. It will reiterate the importance of involving the people in the planning and implementation of projects. It will suggest that the present surge of interest in appropriate technology requires appropriate staff and that this in turn will require the replacement of much of present education by education for less prestigious schemes. Finally, it will survey the role adult education can play.

In northern Nigeria the drive behind mass education is to raise living standards. In adult education we see our first task as that of ensuring that people survive. At greatest risk are the under-fives whose swingeing death rate owes much to adults lack of understanding of the relationship between water, waste and disease. Thus adult educators have to bring about public awareness of the hazards to health of dangerous sanitation practices. On the other hand, it must be stressed that education in public health is of minimal value unless facilities are adequate. A close (symbiotic?) relationship is thus required between adult educator and public health engineer. I would also argue that where adults are exposed to health education, pressure for authority-provided facilities or the development of self-help schemes are likely to follow.

The developing countries may become the never-to-be-developed countries unless the burden of illness is greatly eased.¹

This pressure on authorities is much overdue for health expenditure has a low priority* and is heavily skewed towards prestigious urban-based curative services which are making little impression as rural-urban drift intensifies urban congestion.

Yet, typically, 80% of the population are rural dwellers existing in poverty, with its sequelae of chronic, synergetically related malnutrition and infectious and parasitic diseases. Research at Ahmadu Bello University indicates that the benefits of agricultural extension,

including home economics, leading to improved nutrition, is largely negated by preventable debilitating diseases.

Project Planning and Implementation

The concept of "growth with trickle down" is being displaced by "growth from below" where interdisciplinary teams cooperate with the client population in planning and implementation as it is recognised that technocratic solutions to problems are incomplete if they lack participation from the planning stage. Each problem raises its own questions and each has its own solutions. Discovery of these requires involvement of the target group. The participatory approach clarifies the responsibilities and duties of both clientele and support agencies, while engineers and other members of the interdisciplinary teams learn preferences. This multi-source input, in turn, encourages optimal use. In the process the masses become educated in the water, waste and health relationship.

Without this participation, paternalistic provision of projects leads to an "aid mentality". Tanzania provides a warning here where the administration had seen itself as custodians of the Ujamaa villages with the result of, "... a predominantly illiterate and long-suffering peasantry whose attitudes had crystallized into defeatism and scepticism".²

A participatory approach is required, not only for the feedback and cybernation necessary if projects are to serve the interests of the masses, but for the protection of basic biological systems. Involvement of the masses in this way also helps to ensure that the inevitable tensions caused by the interfacing of the traditional with the new will be productive rather than destructive.*

The appropriate technology which should emerge from well-informed discussion is likely to involve low-cost, and therefore non-prestigious, waste-disposal systems, for example, which civil engineers find unpopular with authorities. Participation will develop allies among the people.

*The Overseas Development Council estimates \$1.2 per capita per year in Nigeria. See Social Science and Medicine, Vol 14c June 1980.

*See the example of destructive tensions later in the discussion of Bakolori.

The multi-disciplinary, participatory approach is also necessary to minimise the effects of the inevitable contradictions.

A frequent consequence of big-dam development is therefore an increase in the incidence of endemic diseases, especially malaria which currently kills over 1 million African children every year.³

Fish pools - malaria (seasonal attacks become year round); irrigation - bilharzia; biogas replaces smoky, smelly open fires - more mosquitoes and wood-boring insects in the rafters; on-site waste disposal - physico-chemical and micro-biological pollution of ground water; pit-latrines - bioaccumable pollutants (e.g. nitrate* in wells); boiling water - concentration of nitrate; will supply of potable water encourage bottle-feeding?

Currently there is strong political pressure for more wells and bore-holes in semi-arid northern Nigeria - it is to be hoped that a massive public hygiene campaign accompanies any provision as the wastes of a fast rising population accumulate in the sub-soil and increase pollution risks.

"Barefoot" Public Health Engineers?

As it is increasingly recognised that prestigious technologically sophisticated schemes for public health are unfitted to the realities of the developing world the call comes for technology with simpler to produce, and simpler to operate, systems. Thus, in considering the training of local people there is surely less need to consider an "extensive training programme over a long period of time."⁴ Traditional training would "overeducate" as far as the active productive role of the trainee was concerned. "Barefoot" civil engineers, sub-professional public health aides, could carry out numerous operations with minimal specific task training, including simple maintenance, repair and servicing, on-site nitrate testing (especially where chemical fertilizers are being used), monitoring filariasis in soakage pits and record-keeping.

The introduction of this cadre of lower-level sub-professionals would render more flexible the mobilization of scarce skill resources and raise the elasticity of substitution between the highly skilled and less skilled (as the division of labour led to the semi-skilled engineering worker who made such a contribution to the Industrial Revolution). This cadre would also serve as an important link between the masses and the highly trained who are, typically, quickly absorbed and desk-bound by

*"Nitrate reduces to nitrite by entero-bacteria in the stomach leading to methaemoglobinanaemia and carcinogenesis. Methaemoglobinanaemia can act synergistically with other diseases - diarrhoea and anaemia. Methaemoglobinanaemia can also be transmitted from mother to foetus".

the administration and bureaucracy.

If the semi-professionals were locally recruited, as are the medical aides in China, the participatory process would not be impeded by cultural and linguistic barriers. This would also aid local production of parts as this closeness to the masses would encourage articulation of grass-roots ideas. In itself, this lends commitment to the project as Freire et al have found in retention of literacy when the masses produce their own materials. Indeed, Professor P.D. Dunn includes Paulo Freire's literacy methods in his appropriate technology.⁵

The recognition of the need for local involvement and for education now permeates the literature but the latter seems to be left to rather vague references to "health education". In fact adult education sub-systems provide ready-made structures upon which to build mass participation and enlightenment in public health.

Some Areas Where Adult Education Could Aid Public Health Engineering

First of all, let me lay the myth that adult education is synonymous with literacy teaching. It includes adults engaged from post-literacy to higher degree programmes as well as non-formal education. It includes the education being given to adults in management and trade union courses, vocational training and re-training, agricultural extension, community development and community health activities, workshops and symposia.

In northern Nigeria we embrace the universality of knowledge and reject the encapsulation of knowledges and so adopt a multi-disciplinary approach. Participants in our courses (who are employed as organisers of adult education programmes) are encouraged to see themselves as "animateurs", as change-agents working in multi-agency teams - community development, agricultural extension, community health, etc.

.... now that it is becoming fashionable to criticise the top-to-bottom, centre-to-periphery, unidirectional planning and plan implementation and replace it with a participatory approach, adult education methodology in itself prepares the masses for participation (it) emphasises discussion techniques; rejecting teacher oriented pedagogy, it encourages participant oriented pedagogy where the teacher is, at most, primus inter pares. Recognizing that human survival depends on daily success in problem-solving its approach is heuristic. Thus it attempts to restore the balance between education and the real world by reintegrating learning and living.⁶

Adult education is in the persuasion business, concerned with loosening constraints to development (cultural, behavioural, attitude, values and skills). A very considerable body of research findings into adult learning problems and communication techniques in the transmission of new ideas has become absorbed in the methods

and techniques in adult education. Learning-by-discussion has been shown to be more likely to bring attitude change as participants do not simply retain knowledge, as tends to be a result of pedagogy, but are more likely to believe what they learn.

In opposition to the suggestion in a paper read at the 6th WEDC 1980, health education need not, in fact must not, be the exclusive domain of ministries of health. Much can be done through all of the agencies involved in educating adults. Our participants study, among other sources, the W.H.O. manual for primary health workers, concentrating on the prevention chapters. In the project work they must complete, several are surveying the provision of health facilities in local government areas thus building up a profile of needs and drawing out the roles of adult education in development. The Chemical Engineering and Biological Sciences departments of this university are engaged in a joint project on biogas production. Some of our participants are carrying out the preliminary surveys for this. While making their surveys they are, in the process, spreading to the masses the public health and fertilizer by-products of this form of energy. A spin-off we expect from this is an improvement in environmental awareness and perhaps a change of attitude towards handling human excreta as people become familiar with the use of bio-degraded material for fertilizer. The time may be ripe as the Green Revolution introduced farmers to, now, prohibitively expensive artificial fertilizers.

Attitude change of course is crucial to development. Adult Education could play a crucial role in bringing the attitude change necessary for optimal use of projects. Poor maintenance standards are not due simply to paucity of skills but by attitudes to work and property. The participatory approach brings a proprietary sense to the group and helps change the psychonormative pattern as each member recognizes his importance in success or failure.

The mass public hygiene campaign mentioned above in association with the pressure for wells and bore-holes needs public discussion of what are functional in the current culture of northern Nigeria; whether these remain survival oriented or are in danger of becoming pathological. An informed participatory public can initiate political action towards provision of appropriate technology and press that rhetoric is the prelude to action. As they are in contact with the masses, adult education agencies are valuable links which should be included in interdisciplinary project planning and implementation.

If a "barefoot" cadre is, along with other change agencies, going to take an active role in educating adults, its training should include some methodology on communicating with adults. At the same time, if the participatory approach is adopted in its own training, the self-discipline required for a minimally supervised repair and maintenance system is more likely to be inculcated. If, in turn, the cadre adopts the same techniques in communicating, the masses too will be likely to be more

convinced of the need for user discipline. In order to improve on the low rate of acceptance of composting toilets, users must be educated that misuse is not only aesthetically unacceptable but dangerous.

We can "train-the-trainers" in the methods and techniques in the teaching skills appropriate to adults and for communicating with client populations. For example, we ran three workshops for extension workers at the Bakolori scheme the 6th WEDC visited in March 1980. Unfortunately, as I pointed out in my 1977 report, we should have been brought in much earlier as an authoritarian tendency had produced a sorry state of relations with the intended beneficiaries. Since the 6th WEDC visit many farmers died in a serious clash with the authorities. The resettlement village, planned without user participation, nor of the most elementary of sociological principles, I am told is a disaster.

Other areas where adult educators can help include the probability that potential "barefoot" engineers can be identified in adult classes and, of course, help in training these could be given. Another is that research conducted by adult educators into visual perception can warn of errors made in communication exercises using, to the literate, "obvious" illustrations. Adult education has also amassed expertise on the use of the mass media, an important channel of non-formal education for adults.

A system of life-long education, with adults and young learning together helps to ensure that the acculturation necessary in the development process will be gained without loss of enculturation of old and tried ideas, (e.g. of traditional life-support systems). At the same time it will reduce the vulnerability of people previously directly involved in their bio-technical systems, for it must be recognized that for a long time yet these latter are going to be subject to inevitable, all too frequent, breakdown.

Although I have argued above that literacy does not necessarily prevent non-formal education, it does become a necessary minimum for effective implementation of legislation on dangerous substances, especially where agri-business grows around projects.

In the longer run, water engineering and pollution problems require international agreements. The use of the Niger river, for example, requires agreements among Nigeria, Dahomey, Niger, Mali and Guinea. Informed public opinion is a prerequisite for both reaching agreements and implementing them.

However, I must conclude by saying that the problems of civil engineers attempting to move decision-makers away from prestigious but inappropriate projects, ring familiar to the adult educator whose experience is similar. Although, worldwide, lip-service is paid to the necessity of adult education, funds made available to adult education are the last to be considered in expansionist economic periods and the first to be cut in recessions. If its

crucial partnership rôle with public health engineering is recognized, perhaps political action may follow rhetoric.

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