The Role of Environmental Factors in the Education of African Pupils

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The soaring costs of education must cause political leaders in Africa to wonder whether the state is getting value for money. Why, for instance, is it that pathetically few scientists, agronomists, engineers, technicians and other key figures in a modern state are found among the African population? The weight of evidence suggests that there are no significant differences in the level of inherited intelligence between racial groups. Why, then, if the level of innate intelligence is spread over a similar continuum between races, does one find this potential being developed to a very different degree between races?

It seems fitting to use the term *potential*, implying that such abilities as exist are not fully developed. This introduces the concept of retardation, though one should distinguish between Primary Retardation, which is essentially of a biological nature and very difficult to alleviate, and Intellectual and Educational Retardation, which certainly is remediable.

As the development of human intellect is essentially an assisted growth, it seems right to infer that environmental factors are the key issues responsible for either retarding or enhancing this growth. The opposite view is the essentially romantic one of Rousseau — that of the noble savage.

Jensen (1967) hypothesises that "environment influences the development of intelligence as a threshold variable". That is to say, once certain kinds of environmental influences are present to a probably minimal degree, genetic potential will be realised to a greater or lesser extent. As far as educational potential is concerned, surely the sounder view is almost the converse of Jensen's hypothesis in that environmental influences very largely determine the attainment, intellectually, of the child's genetic potential.

The early years of childhood are the vital ones. As Bloom (1964) states, "In general, the findings reveal the tremendous importance of the first few years of life for all that follows. Change in many characteristics becomes more and more difficult with increasing age, and only the most powerful environmental conditions are likely to produce significant changes at later stages of life." These changes are not merely desirable, they are vital, being antecedent to the development of abilities.

An attempt is made to discuss these environmental factors under broad headings, giving some thought to ways in which remedial action might be taken.

Nutritional Factors

The extent to which severe undernutrition affects the child is debatable. Some, such as Biesheuvel (1967), Guthrie and Brown (1968) and Brown (1965), postulate that gross undernutrition leaves permanent brain damage even after nutritional rehabilitation, a contention which Nelson

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(1963) supports by proving the presence of EEG abnormalities in Kwashiorkor patients who have been dismissed as fully recovered. Professor Hansen* has disputed that these abnormalities persist after recovery. Whatever the answer to this contested point might be, it is a fact that 500,000,000 children are grossly under weight and under height for age. They are now coming to be referred to as *nutritional dwarfs* who suffer the consequences of marked undernutrition without showing the traditional oedema or other bodily changes. It follows that these children must experience other allied effects — lassitude, passivity, dullness, inattention. If one has suffered such undernutrition from birth or (probably more common in Africa) from the time of weaning, the consequent effects must surely become habitual, thereby presenting to the educationists a problem of considerable magnitude.

From Zambia, Fisher (1968) reported that 70 per cent. to 80 per cent. of a sample of urban primary school children suffer from some form of malnutrition because many do not even have two daily meals of porridge and vegetables, or because half of them have nothing to eat before going to school or because soft drinks and sweets are bought in place of nutrients or, more significantly, because priority is given to adults and visitors above children. In this vein, it is interesting to read the view of Professor H. Isaacs that "Africa is the most inhospitable of the major continents to human existence"; and most Africans, he says, are permanently undernourished and physically below par or distressed. (Quoted in *Time* (Atlantic Edition), 23.viii.1968, 20-21).

As a depressant to educational potential, the factor of nutrition becomes all the more relevant in the light of the contention of Wall (1958) that unless the basic human motives, such as hunger, thirst, fatigue, cold and fear, are continually satisfied, very little energy is available for learning. Is the need then to feed before one educates children?

The fact is that a cycle of poverty and cultural deprivation exists and the school will have to assume more of the responsibilities of good child-rearing. This is not, strictly speaking, a psychological or a scientific question but one of social policy which very much concerns the school system.

Motivational Factors

It is worth recalling Wall's observations on the basic human motives and adding a comment on Vernon's (1966) research among Canadian Indians and Eskimoes. He noted that though motivation was excellent in the early years, especially among Indians, there was a lessening of keenness as they grew older. Perhaps, he added, "with adolescence they come to realise how little the world holds for them and they react to the clash between tribal and Western values with apathy and withdrawal." They become disillusioned with the traditional way of life, aspiring to the high living standards of Western culture though their upbringing has done little or nothing to build up the internal controls of the alien, but desired, culture.

In Africa, certain parallels are seen. In an essay on "Tribalism as the Black Man's Burden", it has been said that, "Over most of Africa, false expectations of instant progress have incited unrest and power drives by rival tribes." Tribalism is seen as "the tenacious loyalty of 140 million Africans to primitive sub-groups that represent certainty amid bewildering social and economic upheavals . . . and therein lies its strength" (*Time* (Atlantic Edition), 23.viii.1968, 20-21).

In Education, there is a distressingly strong impeding influence in the very conformity which family and tribal life have fostered. Life in Africa is life in "a formal society marked by compulsory conformity and permeated by a sense of mystery" explains the African author Camara Laye (1954). A similar view has been taken by Gelfand (1959) who said that "the whole training of the Shona tends to encourage him to be the same as everyone else and to stifle ambition. His ideal society may be described as one of compulsory uniformity." To this one might add that it is also compulsive.

The essay in *Time*, quoted above, expands on this point: "Most African tribes talked out problems to the point of group consensus, and chiefs or elders demanded a conformity that made individualism as difficult then as it makes dictatorship easy now. Few bothered about how a decision should be carried out, the main goal was tribal equilibrium."

This stress on conformity is the very antithesis of individual progress and the African who seeks education has, as reported by Ashby (1964), to pass through "the painful apprenticeship to individualism". Thus, unrealistic goal aspirations, or failure to understand the purpose of education and the near absence of aggressive intellectual individuality might lead all too easily to a rejection of academic pursuits or, as we paradoxically find in Africa, to a heightened zeal for academic

*Professor Hansen of the University of Cape Town in a Guest Lecture at U.C.R. in August, 1968.

pursuits in the expectation of greater rewards than the effort will grant.

Nyerere (1967) wisely warns of this impending disillusion — perhaps we have a fine day of reckoning ahead of us!

Perceptual and Attentional Abilities

There seems to be a ready parallel between the Rhodesian scene and that of America where research findings reveal that low socio-economic-status children come to school, particularly at the most elementary levels, with less well developed visual and auditory discrimination abilities. Cynthia Deutsch (1966) explains that the lack of household objects, of toys and books, must cause restrictions in the visual field. Furthermore, these children tend to live under conditions of a noisy background and tend to learn at an early age to disregard many auditory stimuli rather than to be attentive to them. Their very mental health requires this negation of normal experiential learning practice.

It is a form of sensory deprivation which "has nothing to do with the educational quality of the stimuli available, but only with their variety, intensity and patterning" (Bereiter and Engelmann, 1966). In other words, it is not the quantity nor necessarily the quality of the available stimuli that matters, but their variety and the range of experiences they give rise to. Ferron (1966) points out, from his research in Freetown, that the observed differences between African and Western children might possibly be due to the fact that the young African child has less experience of even simple shapes like the square, the circle and the triangle than his Western counterpart. As he grows older, deficiencies may be made up, but the richness and variety in a Western environment probably again gives the Western child an advantage with increasing age. The deficit is cumulative.

These themes are repeated again and again. From his West African studies, Schwarz (1963) observes that "having had limited contact with pictorial representation, African children will often fail to recognize drawings of highly familiar objects for what they are." Both Hudson (1960) and Biesheuvel (1967) report similarly from South Africa.

One must appreciate that there is a distinction between looking and seeing; perception depends partly on a selectivity among sensory inputs, and this selectivity is all too often left underdeveloped. Lawes and Eddy (1966) explain how a whole generation of West African Standard 7 children accepted as accurate and reproduced in their examination answers, a text-book drawing of a scorpion which, through faulty printing, had one leg missing, though practically all the children must have seen a number of real scorpions.

This re-emphasizes the importance of the nature of the experience the children have. Thus, despite evidence to the contrary, the relative paucity of intellectually arresting objects is less crucial than the inability of parents and of peers to use to good effect what is available. How often, in Africa, is one not appalled at the apparent passivity of parents towards their children? It is hardly surprising, then, that these children reveal an inability to sustain attention in the classroom, particularly when structured cognitive demands are made upon them. In the typical Western middle-class home, activities tend to be mutually reinforcing: "attentional behaviour on the part of the child reinforces the parent's interaction with him and the parent's interaction with the child further reinforces and shapes the child's attention" (Jensen, 1967).

This, regrettably, is not characteristic of the bulk of African parents as evidenced by Munro (1968) who, reporting on a survey of pre-school children's environment in a Lusaka suburb of Zambia, contends that little time is available for parent-child interaction, particularly as children are usually sent outside when visitors are present, which is frequent. Choice and custom are the depriving tyrants, and when the child goes to school he is poorly prepared for the cognitive demands which the school should make on him. The tragedy is that, if the child cannot meet with successful performance the tasks set by the teacher, he will gradually develop aversion to the school-learning situation or, worse still, perpetuate the stultifying aspects of the docile passivity to which his home life has accustomed him and which crowded classrooms and low calibre teaching are almost powerless to counter. In Rhodesia, for instance, the Annual Report for 1967 of the Ministry of African Education reveals that 69.86 per cent of its African teachers have only Primary Teacher Level qualifications. (A two-year teacher training course for students with a Grade 8 academic qualification). Admittedly, the Primary Teacher Level course has now been phased out in favour of something much better but past products continue in the teaching service for many years.

Linguistic Factors

Probably the most serious handicapping deficiency is in the realm of language, which not only serves a social function as a means of interpersonal communication but is also of crucial impor-

tance as a tool of thought. There is no such thing as a *primitive* language, for a language is more or less adequate for the environment which produced it, but it is true that thinking must be relative to the language used. "We do not only think by medium of language, but the language we grow up in determines what we will think." (Sapir, 1956) Perhaps 'how' should replace 'what' in order that one can appreciate how limiting could be the language originally developed by a basically rural, pastoral people now striving for education in a Western technological-type environment.

In the multiplicity of theories in the fields of psycho-linguistics, two main theories seem to be of major significance to Africa:

1. Whorf (1956) holds that higher levels of thinking are dependent on language and that the structure of the language one habitually uses, influences the manner in which one understands one's environment.
2. The view of Bernstein (1961) is that the child's whole social environment conditions his language and his learning. Thus, in his view, the lower working class child has not only to learn *what* is to be learned, but also *how* to learn and a *new language* for that purpose.

This is important in Rhodesia and in Zambia where the medium of instruction is English, and in other African states where a multiplicity of dialects must give way to a more dominant vernacular for instructional purposes.

As Jensen (1967) points out, conceptual learning (which includes much of school learning), involves the ability to abstract and to categorise things in terms of various abstracted qualities. Biesheuvel maintains that Africans are incapable of abstraction — an extreme view which is still to be exhaustively tested. However, in research among 160 Grade 7 African pupils in the town of Harare, Salisbury, the author found not one instance of a pupil's ability to abstract a common property (e.g. roundness) from the following objects: a ball of string, a bun and a tennis ball. Another interesting group was that of a plastic knife, a comb and a tea-spoon. Many children could explain the grouping on the grounds of material ("They are all plastic."), a few on grounds of use ("They are for use in the house.") but never because of their shape.

The ability to disassemble what is registered by the senses into various conceptual attributes is an important ingredient of the capacity to be educated, and is probably strongly dependent upon verbal behaviour, either covert or overt. In Rhodesia, as elsewhere in South and in Central Africa, the indigenous languages are based on a class system. As Professor G. Fortune* wrote, "The Shona noun class system segments the world into a number of classes, a number of which have a common characteristic or a number of characteristics in common." He then details the eleven main classes, e.g. class 3 consists of trees and long things, class 7 of long thin things, class 8 of small things. He goes on to explain how an item which departs from the norm "may be indicated as big, small, long, thin, short and squat or big and useless by use of the appropriate secondary prefix which either replaces or is added to the primary prefix." Thus the categorising of items might tend to be limited to their descriptive or functional properties rather than in terms of truly abstract qualities of a higher order of conceptual thought.

*Personal letter dated 30 October, 1967.

Remedial Action

In South and Central Africa the normal school environment is not sufficient to compensate for early losses because, in their quest for the Western technological type of education, the African child enters the school situation "so poorly prepared to produce what the school demands that initial failures are almost inevitable, and the school experience becomes negatively rather than positively reinforced." (Deutsch, 1963)

The issue, though, is confused by the fact that the children most in need of help live, outside school hours, in that very non-supportive impoverished environment which produced the circumstances that so depress educational potential. To take over in the home is out of the question, and to provide intensive out-of-school tuition and experiential opportunities is beyond even abnormal financial and human resources in Africa. The gap grows as Deutsch (1960) stated in his cumulative deficit hypothesis. He saw the problem (1962) with great clarity when he stated it as "one of the unprepared child coming into the unpreparing school".

A number of lines of remedial action suggest themselves. First, the functions of the school might be widened and its efficiency thereby improved. Thus the school might assume greater responsibility than at present for overcoming the problem of gross undernourishment. Where, for example, pilot school-feeding schemes have been tried, marked improvement has been reported, even where the nourishment has been limited to an inexpensive protein drink. And since the efficiency of schools depends in very large measure on the quality and the attitudes of their teachers, the education of teachers might include training in

the early identification of underachievers and inculcating in them a keener sense of their role and responsibilities in attempting to overcome the handicaps, in their children, arising from an impoverished environment.

In the same way, wise decisions as to the use of such desperately limited financial and human resources as may exist should result in a significant reduction in the degree of environmental handicap. Emphasis should probably be placed on pre-school projects emphasising the development of skills in language usage, concept formation and sustained attention. Naturally, research, especially of the longitudinal type, has a vital role to play.

If environmental factors do severely impair the development of inherited — yet latent — intellectual capacity, our society could well face the spectre of many minds "never flowering but remaining trapped for a lifetime in the dark world of ignorance and lack of opportunity". (Reinhardt, 1969) To combat this is of the highest national importance, for no society can face with equanimity any such darkness in its local world.

One might conclude that, after the attainment of a minimal nutritional standard, the acquisition of language skills in the medium of instruction is the key. Surely this medium should be a language which is capable of sustaining those high-level concepts which have given rise to the modern technological age. As Ashby (1964) wisely comments, one cannot import the products of such an age and ignore the philosophy of the culture from which the products come. In Central Africa, it seems that the practice of using English as the medium of instruction from Grade I is very soundly based.

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