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1965
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https://hdl.handle.net/10539/27463
Barnett, W.G., & Proctor, L. (1965). Programmed instruction in a multicultural setting. Symposium: A Journal of Education for Southern Africa, pp. 130-133.

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PROGRAMMED INSTRUCTION IN A MULTI-CULTURAL SETTING

Paper given at the XVth International Congress of Applied Psychology at Ljubljana, Yugoslavia, by W. G. Barnett and L. Proctor of the Johannesburg College of Education.

THE awakening of the African giant, which we of this generation are witnessing, is an exciting, yet in some ways terrifying thing. The change from an agrarian community to a complex technological community, an expanding social and political awareness, a growing realisation that several centuries have been lost, characterize the so-called emerging or developing nations. In some ways South Africa typifies the evolution that is changing the whole continent, with the exception that she has a slight start on most other parts of Africa in that she has a longer record of European influence, with the result that the ratio of white to black is far higher than anywhere else and that she has more successfully developed natural resources. It is against this background that we should like to examine the implications of programmed instruction, with some theoretical accounts of work about to be undertaken and some tentative conclusions of work in progress.

Firstly, a brief account of the demographic make-up of South Africa. The so-called non-European group, none of them entirely indigenous to the country, comprises some thirteen million, and in terms of economic and cultural conditions stretches from, on the one hand, the primitive African living in rural squalor and poverty to the urbanised African on the other, who may be a successful businessman, professional or white-collared worker. This is not to suggest that there is no poverty or squalor in the cities. The so-called European group consists of three million inhabitants, most of whom are native in the sense that they were born in this country, descending from original settler stock. There are two main groups here, English and Afrikaans. Both groups cling tenaciously to their own language, the official use of both languages having been entrenched by the Act of Union in 1910. There is a steady stream of immigrants from most of the European countries. Most of these immigrants are loth to jettison their language or customs, even among the second generation.

Gold-mining plays a large part in South Africa's economy, as it does indirectly in the economy of all the countries surrounding South Africa. A large migrant labour force is employed in this country, 60 per cent being recruited from outside South Africa. This brings us to what we believe is the most valuable contribution that programmed instruction can make to a multi-cultural country like South Africa—language learning. In no other country in the world is the problem of effective communication so important as in South Africa. There are seven main Bantu languages in South Africa, with numerous dialects or smaller speech communities. (Henceforth we shall use the word Bantu to signify the largest of the non-European groups. Outside South Africa the terms black and white have a hazy definition line. The term Bantu, although not universally approved of by the Bantu themselves, seems the most convenient term in the present context.) These seven main language groups are distributed largely on a geographical basis.

Then there are the two main European language groups—English and Afrikaans, which are official languages of the country. Immigrants arriving into the country from European countries have often little knowledge of English and no knowledge of Afrikaans. The problem of communication at all levels—social, cultural, economic, legal and international—is great.

We must, in passing, refer to some of the so-called English programmes that have recently been published. We agree largely with a recent writer who stated that "the greatest challenge to the language laboratory comes from the field of programmed learning because of a strange alliance between the adherents of the time-honoured grammar-translation methods and the exponents of self-instructional techniques and devices". We think the writer had in mind such books as "English 2600" and "English 3200" published in America, and "First Year GCE English" by Hossack. These works are intended for first language teaching, admittedly, and we have in mind English as a second language, but we are of the opinion that Blumenthal and company are barking up the wrong linguistic tree.

By communication is meant the physical act of making contact with another person or persons through speech or writing—we do not have in mind the semantic aspect of language—or the misuse of language for propaganda purposes, etc.

We should like, at this point, to suggest what we call a datum line in this matter of communication. To the left of this imaginary line lies illiteracy, and to the right literacy of varying degrees. It is here, in our opinion, that the greatest discrepancy lies between theory and practice in programmed instruction. Most, if not all, of the programmes and/or self-instructional devices extant, as far as we are aware, have as their aim the achieving of well-defined terminal behaviour by symbolic means—a cybernetic control carried out by means of verbal or other symbols. The vast area to the left of the datum line has, as far as we know, received little attention. At the level of what we would call graphic cybernetics, there lies an enormous area unmapped, (we are referring here particularly to the Bantu field) an area which could yield research findings of immense significance to the psychologist, pure and applied. We should like to go much further to the left of this datum line, and refer to the possibility of exploring, through programmed instruction, the pre-graphic or pre-symbolic stage, the area, roughly speaking, of concepts and concept formation, if you like, a kind of Piaget-orientated research programme into African concepts, so that we can assert, with some foundation, whether there are cultural differences in intelligence, learning rate, two-dimensional vision, and so on.

This brings us to the second point of discrepancy between theory and practice in our multi-cultural setting. The programmes and devices developed must and can only be determined against the background and environment in which they are going to be applied. It is not mainly a question of cost—although this is important—there is the point of source of power. There is no point in designing an Auto-Tutor type machine for distribution in those areas where there is no electricity. The same applies for language laboratories. A transistor-type tape recorder is the only possible type in a school or group which is a hundred miles from the nearest pylon. This is also true of machine design. A simple Skinnerian linear machine, such as we have designed, is excellent for the presentation of a programme which uses verbal symbols to achieve terminal behaviour, but it is of not much use as a device which has as its mode of presentation a multiple choice technique of matching, for example, pictorial presentation of real objects or of symbols, for some form of pre-literacy programme.

Programmed instruction has, as is well known, a two-fold function — actual teaching and research. The foregoing remarks apply to the first mentioned function. As regards research, most programmes and devices have concerned themselves with visual or auditory presentation of material. What about, for example, kinaesthetic presentation of a programme? A multiple-choice presentation of shapes embossed or impressed, hidden from the students' view, could be employed in sensory training at an early level. Or a multiple-choice presentation of different textures—varying grades of sandpaper, for example. Such programmes and devices could be used for establishing clearly cultural differences, if any, among the various peoples of South Africa. It is commonly averred by Europeans that African adults have difficulty in visualising a straight line and laying, for example, a course of bricks—that the motor-sensory control is not so firmly established in Bantu as in other races.

Let us now take a typical Bantu training problem. A number of Bantu mine labourers have been recruited from various parts of Southern Africa. They speak a variety of Bantu tongues or dialects. Some have had no contact with technical or mechanical terms or objects at all, coming as they do from extremely isolated spots where no car or bicycle or shovel have ever been seen before. They are transported in various ways—plane, canoe or Shank's pony, and when they arrive at the mine they are given an orientation period during which they are taught Fanagalo—a Bantu Esperanto or lingua franca derived artificially, mainly from English, Afrikaans and Zulu. This is entirely a master-servant language—in other words, the vocabulary, consisting of about 500 words, covers the kinds of articles and operations with which the Bantu will be concerned as a labourer, and of the most primitive structures (Bantu languages are aglutinative). Two days are spent in teaching the mine worker Fanagalo, largely by association of sounds with concrete objects, or simulated operation. (By the way, this is entirely a spoken language.) Occupational propaganda is taught by film or other pictorial stimuli—use of explosives, occupational safety, health, etc. It is our hypothesis that some of this training could be done at the point of embarkation, as it were, or even in the labourer's own village, under supervision of a headman, by means of simple self-instructional devices and programmes.

We must refer here to a project on which we are currently engaged—the language laboratory as a

teaching machine. We have devised a programme to attempt to find out how far language learning, especially at the oral level, can be entirely self-instructional. This experiment is being conducted with 30 college students who are learning French in the language laboratory with a programmed text-book for the written skills. The written programme is completely integrated with the taped material. The results of this experiment will suggest whether the tools for effective oral communication can be mastered by a primitive African suddenly transported into surroundings which are in every respect different from anything that he has been accustomed to before. Experimental work in this respect is being carried out by other people in South Africa but we believe the programming aspect to be deficient, if not lacking completely.

An interesting difference in the way in which perceptions are classified and structured is shown in the example of the spectrum or the rainbow. English classifies the broad divisions into six or seven, whereas, a speaker of Shona, a Rhodesian language, would use only four classifications, and a speaker of Bassa, a Liberian language, would make only two categories. Does this mean that visual perception differs amongst these three cultural groups? The same applies to number concepts in Zulu. Comparing the Zulu number system with English is like comparing the Arabic notation with Roman. Are we to infer that Zulu and Roman number concepts are inferior to English or Arabic? Applied programmed instruction will help us to find out whether different cultural groups have different learning processes or conceptualisations, or even, in support of Piaget's work, differing thought levels and processes according to age.

To return to machine design. The error counter on the Auto-Tutor is of not much practical value. It is not sufficient merely to know how many errors have been made in working through a programme, but which errors, and their frequency. A complete analysis of student response is of vital importance in the evaluation of a programme—here the language laboratory has the edge on other devices because there is a complete record of oral responses, especially in respect of the sound spectrum between acceptable and non-acceptable pronunciations. If we may put this point into an African setting, the choice of material for a concept formation programme is obviously of critical importance. Let us take an extreme hypothetical case—we are concerned with the matching of two similar pictures of concrete objects and the elimination of a third. To proceed to the next frame the student has to press the picture of the odd man out and then the programme will automatically move on to the next frame. Let us assume that we have two pictures of an electric mixer and a single picture of a vacuum cleaner. At an early stage of a programme these would convey nothing to an African who was not familiar with these objects. He might see the similarity between two of these unfamiliar objects, but the terminal behaviour is not the mere matching of two similar shapes. In other words, the programme must initially be structured within the context of his own experience. We ought to mention in passing at this stage the problem of translation. How many programmes and what kinds of programmes can survive and achieve their aim by being transferred from one linguistic context to another?

There is a feeling amongst the Bantu that the kind of education and training that they are getting at the formal level is inferior to that of the Whites. The gap in achievement levels—professional and academic—between Bantu and European would suggest that there is some truth in this. The universality of programmed instruction means that this gap could be bridged completely in those subjects that lend themselves to programming: the most successful teaching and training techniques would be universally available.

Although our aim in this paper has been to try to suggest some of the discrepancies as far as African education and training are concerned, in the belief that they might be of interest to you because they are the kinds of experiences that do not normally come your way, we cannot leave out altogether the European side of the picture. South African society is a highly complex one, in every sense. Technologically, she is ahead of most other parts of the continent. Because of the shortage of skilled workers, teachers, instructors and so on (this for various reasons which need not concern us here) she is hard put to to maintain this advance in industry and technology. Although programmed instruction as such has not yet been adopted to any extent in schools and industrial training situations, research work of a limited nature is going on. The National Institute for Personnel Research is carrying out a research project into the programming of maths. Four full-time and twenty part-time programmers are being employed in this project. Some of the mining groups are writing and applying experimental programmes in, for example, elementary mining operations. The tentative results of this experimental work follow the established pattern—some saving of instructional time, no great discrepancy in amount or depth of learning. Here one must return to the programming of language learning, both oral and written

Educational authorities are just beginning to think of more effective techniques of language teaching and learning, especially for immigrants from Europe who have little or no knowledge of either of the two official languages—English or Afrikaans. Bantu languages for Europeans have received very little attention in the past, but there is a growing awareness of the part that programmed instruction could play here.

Finally, we are aware of the honour that has been bestowed upon us by being invited to deliver this paper. The political stakes that are being claimed on the continent of Africa by various pressure groups throughout the world are outside the scope of this paper. We know, however, that education, in every sense of the word, is the key to the future of Africa, and we hope that programmed instruction can and will contribute some solutions to some of the problems of emergent Africa, and that ultimately the complete awakening of the African giant will be a peaceful one.

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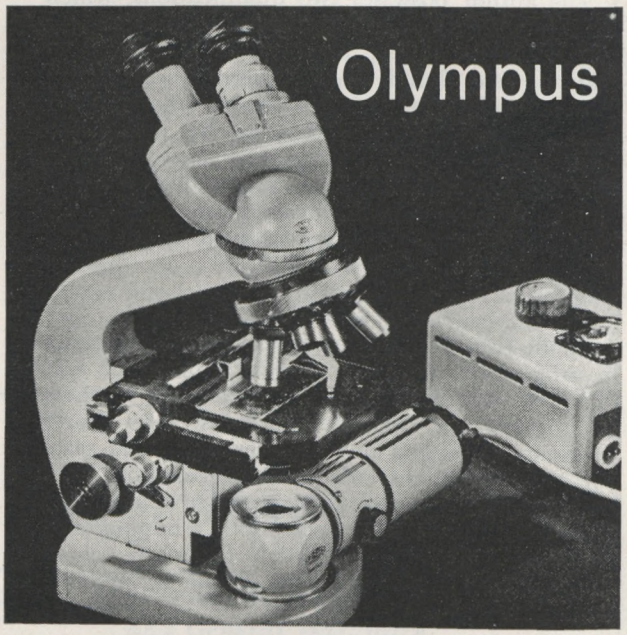
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