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AUTHOR Bung, Klaus
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ABSTRACT

This paper considers the differences in the initial education and financial situation between industrial and developing countries. Programed learning (PL) techniques and PS research cannot be taken over wholesale from industrial countries, but techniques have to be adapted and the emphasis of research has to be changed. These principles are discussed with reference to the medium of presentation (teaching machines, book programs, tape-recorders, group teaching devices, visual aids, etc.) and to the subject matter. The subject matter has to be closely analyzed and a general theory and programing procedure to be developed which allows for the greater multiplicity of language, the greater multiplicity of specific learning purposes and the greater shortage of money in developing countries. The lack of task analysis and the universal cult of perfectionism in European language instruction are criticised. Methods for making the programs shorter and cheaper are proposed. The special problems of programmed instruction in a language which is to be used as a medium of instruction are discussed as well as the programing of vocabulary and the problems of dialect speakers who have to learn the related standard language for specific purposes. [Not available in hard copy due to marginal legibility of original document.] (Author/FWB)

from: Klaus Bung
13 Wisteria Road
London S E 13
England

Programmed language instruction for developing countries

by Klaus Bung, Dept of Linguistics, Cambridge University

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Contents

Technical terms

AALP-theory; 'Audio-Adapter'; dialects; delta-diagram; group teaching machines; India; intelligibility; Jamaica standard; language laboratories; medium of instruction; Nigeria; phoneme statistics; reading teaching; special purpose languages; structural comparison; teacher training; vocabulary programming; phonetics

Abstract

The paper considers the differences in the initial educational and financial situation between industrial and developing countries. Programmed learning (PL) techniques and PL research cannot be taken over wholesale from industrial countries, but techniques have to be adapted and the emphasis of research has to be changed. These principles are discussed with reference to the medium of presentation (teaching machines, book programmes, tape-recorders, group teaching devices, visual aids etc) and to the subject matter. The subject matter has to be closely analysed and a general theory and programming procedure to be developed which allows for the greater multiplicity of languages, the greater multiplicity of specific learning purposes and the greater shortage of money in developing countries.
The lack of task analysis and the universal cult of perfectionism in European language instruction are criticised. Perfectionism is necessary under certain conditions but cannot be justified as a universal teaching aim. As an example for how savings can be made by rigidly limiting the teaching target, intelligibility, as the minimum target in pronunciation, is discussed. Structural similarities between native and target language can be exploited by the programmer to make the programme shorter and cheaper. The special problems of programmed instruction in a language which is to be used as medium of instruction are discussed as well as the programming of vocabulary and the problems of dialect speakers who have to learn the related standard language for specific purposes

The medium of presentation

We can discuss the starting situation of programmed language instruction for developing countries from at least two different aspects:

- the medium of presentation
- the subject matter

As far as the medium of presentation is concerned, the starting situation in developing countries differs from the situation in industrial countries in at least two aspects. In developing countries we find

- a greater shortage of money
- a greater shortage of teachers

In this paper, I do not intend to deduce the consequences of these two basic facts in detail. They are largely valid for the whole field of programmed instruction, i.e. not only for programmed l a n g u a ge instruction, and will, no dount be dealt with by other contributors. I shall deal with these points in advance, and very briefly, before proceeding to the main topic of my paper

Proposals about the introduction of programmed language instruction have to take account of the fact that this form of instruction can possibly demand the provision of capital so great that it is often opposed even in industrialised countries. Mammoth language learning centres with generous technical facilities (such as, for example, the installation proposed by myself in 1966: cf 1967*, p 107-169) cannot be offered to developing countries as a g e n e r a l solution of their language teaching problems

If one considers that many village schools cannot even afford a single tape-recorder, one easily understands the madness of making the solution of all language teaching

*References to my own publications are normally made by citing the year of publication only. Other authors are cited by name and year

problems dependent on the introduction of language laboratories, of the type usually found at present, into a l l schools

Research therefore has to concentrate on the following questions:

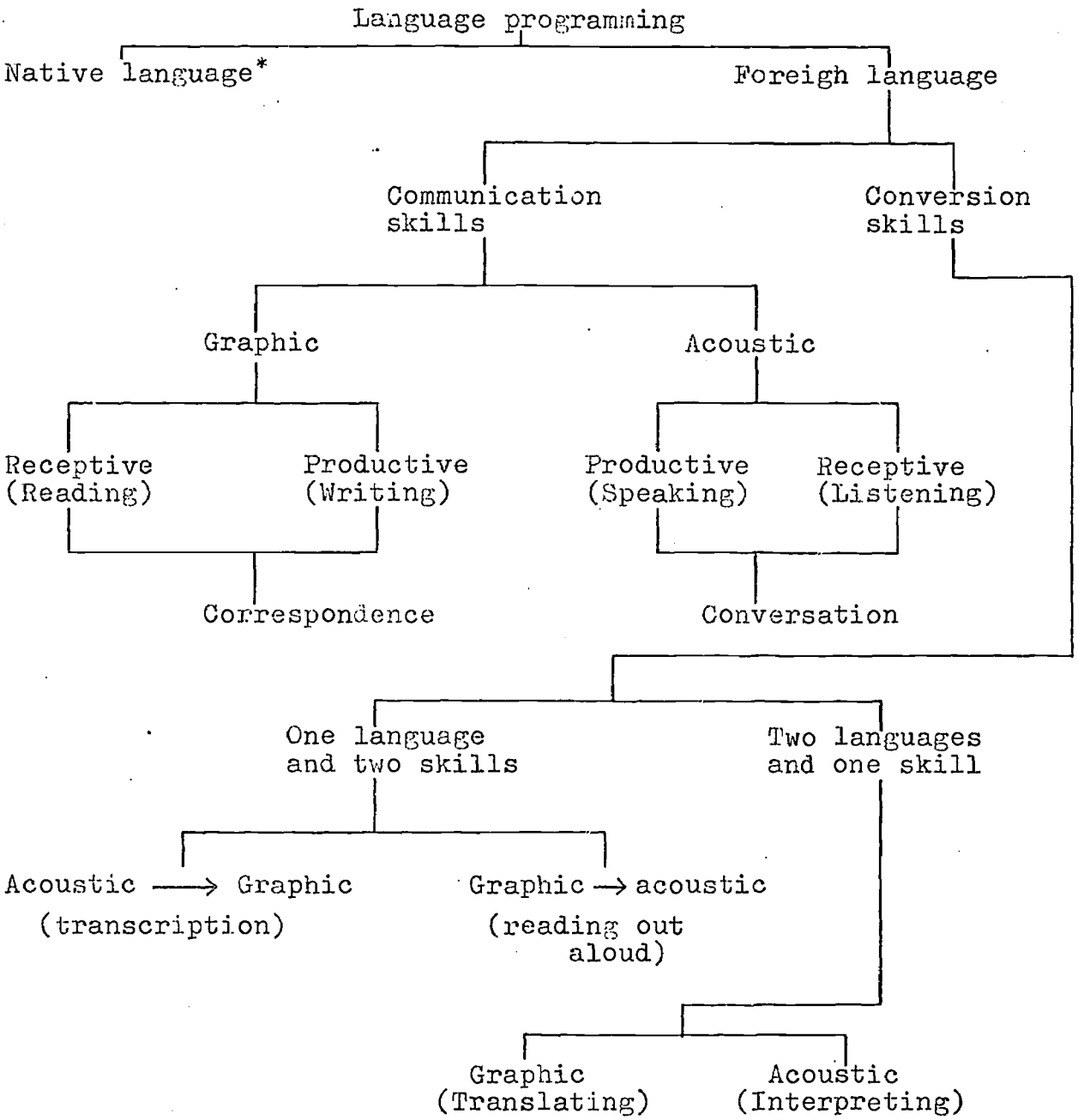
1 How can the technical equipment for the presentation of teaching programmes be reduced in cost and price
2 How can the technical presentation equipment be adapted in such a way that it can serve whole groups of students simultaneously
3 How can the principles of programmed language instruction be realised without the aid of technical media of presentation
4 To what extent, how and under what circumstances can mass media of communication be used for the presentation of genuine teaching programmes
5 How can the techniques of programmed language instruction help in the training of teachers
6 A methodology has to be developed which makes it possible to use these various means economically and optimally for the right purposes and under the right circumstances

First steps towards the development of such a methodology can be found in my paper of 1966 (1967, p 107-169). Here I only wish to recall the basic maxim:

> The various teaching topics (objectives) within a language programme are to be analysed and organised in such a way, that topics which permit group instruction with one machine are arranged in special programme sections and presented on group machines.

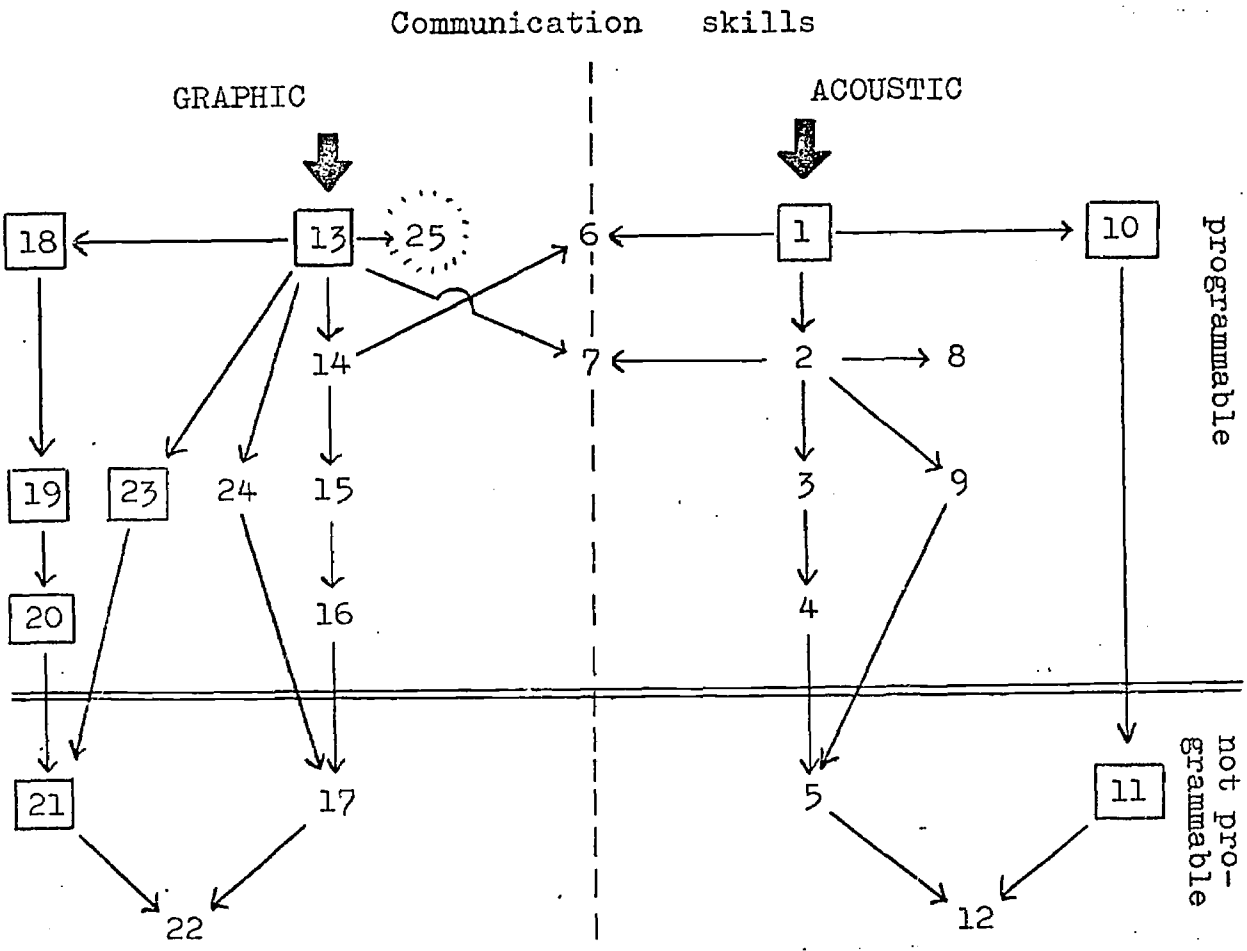
First steps to such analysis and organisation can be found in 1967, p 187-279 where, for instance, Section 3 (sentence fragments), Sections 8 and 9 (Fixed phrases, vocabulary and idioms), Section 10 (Aided auditory comprehension), and others, appear to be suitable for group learning

Figure 1:



* e.g. German grammar for German children, standard Jamaican for Jamaican children (cf University of the West Indies 1966), the acquisition of a standard language by speakers of its dialects. This area, of course, has to be further analysed - just as the foreign language area

Figure 2: The Δ-Diagram*



The fat arrows on top of the diagram denote entry points, pre-supposing no prior knowledge except knowledge of the native language

Key to the Δ-Diagram

1 Sound discrimination	5 Free speaking
2 Imitative articulation	6 Dictation
3 Sentence fragments	7 Reading out aloud
4 Sentence structures	8 Fixed phrases

*The diagram is fully discussed and justified (with programming techniques for the various sections) in 1967, p 187-279, 1969b, and 1969c jointly

9 Vocabulary and idioms
10 Aided auditory comprehension
11 Free auditory comprehension
12 Conversation
13 Recognition and discrimination of signs
14 Sign production (copying)
15 Aided writing
16 Productive reference grammar
17 Free writing
18 Systematic guessing
19 Understanding a written text (reading)
20 Receptive reference grammar
21 Free reading
22 Correspondence
23 Use of dictionary for receptive purposes
24 Use of dictionary for productive purposes
25 Formal grammar

Concerning point 2, above, I refer to my 'Audio-Adapter' (1967, p 87-105, and 1968, p 221-232), which makes it possible for several students to use the same tape-recorder simultaneously, and the cheapest makes of tape-recorder at that, and which teacher and pupils can easily make for themselves in accordance with the published procedure. Thus a cheap tape-recorder costing, say, £25, together with a home-made 'Audio-Adapter' whose components cost less than £2 and, say, 6 head-phones from government surplus stock costing about 8s each, can present programmed language instruction in specific sections of the Δ-Diagram to many pupils in a village school provided the general plan of teaching is appropriately organised. I pre-suppose that at any one time a group of pupils is dispensed from classroom instruction and works in a corner of the classroom or outside the classroom with the one tape-recorder under the direction of one gifted pupil. Thus the tape-recorder can be kept working continuously and thus be economically used

Concerning point 3, above, I suggest that teachers can use the recording scripts, from which the tapes of language programmes have been made, in the normal classroom situation by taking themselves the role of the 'master voice' on tape and demand the responses from the pupils in turn. This situation is similar to that of conventional language teaching in many European schools today but can have the following advantages

Assume the teaching aim prescribed by the education authority is mastery of the s p o k e n language. It is known that many teachers in developing countries are not fully trained, that they often cling to an old-fashioned textbook, that teaching is often directed more at the written rather than at the spoken language and that even many of the fully trained teachers are comparatively unacquainted with the methodological advances of the last decade in the teaching of s p o k e n language

This view is supported by Widdowson (1968), writing about a project carried out in Madras State in 1962, when 30,000 teachers of English were trained in the 'structural/oral approach'.

P 147: '... it seems that the teachers trained in this way tend to revert to their old unregenerate methods as a reaction to the indifference or, in some cases, hostility of their colleagues, and to the demands the newly learned methods make on their time and energy.'

P 148: '... a method of teaching that relies for its effectiveness on the above-average gifts of the teachers, is not likely to be of very much value to average teachers, and probably unnecessary for the only ones able to apply it'

In such circumstances programmed (in the technical sense of the word; cf 1969a) recording scripts are a valuable aid for the teacher who has no access to a tape-recorder. He can benefit from using the carefully planned sequence of stimuli and responses. Since he does not have to invent the examples on the spot, the speed of work can be increased. If the teacher himself has only a limited command of the target language, the recording scripts save him from teaching wrong sentences. The recording scripts enable the teacher who is biased towards the written language to teach the spoken language without feeling insecure, and finally they acquaint him in a very direct and concrete way with modern methods of teaching the s p e a k i n g of foreign languages

Also concerning point 3, I propose to equip advanced students with recording scripts and let them conduct practice classes with less advanced pupils. In this way they can 'pay' for the instruction they themselves have received so far. The teacher thus trains assistants for himself, the effectiveness of his work is multiplied and the effects of his work can gradually and indirectly reach the whole population. These remarks apply in cases where there are no technical media of presentation available at all. In these cases the recording scripts should be accompanied by precise methodological instructions

On the other hand, in places where fully programmed instruction supervised by the teacher (concerning the function of the teacher see 1967, p 107-169, and 1969b) is possible, pupils trained by means of programmed instruction can in turn supervise other beginners during their programmed work: Since the programme has the methodological control in all sections of the upper layer of the Δ-Diagram (cf 1967, p 187-279, and 1969b), the methodological inferiority of the pupil who functions as a teacher as compared with the real teacher is only very small, especially as the 'teaching pupil' knows the programme very well from his own course

Concerning point 4, I mention radio, television, film and radio-satellites as research objects

Concerning point 5, I refer to the Nigerian experiment of 1966/67 (Van Syoc and Schwarz 1967), in which a fully programmed course for the training of teachers with prior knowledge of English was tried out. In teacher training, the technical apparatus proposed in my earlier papers is worthwhile, for instance the 'language learning centre' (1967, p 107-169)

The subject matter

I now come to the central problem of this paper, namely questions concerning the teaching topic or subject matter. In this area the starting situation in developing countries differs from that in industrialised countries in at least two basic facts:

a While in Europe combinations of at most ten or fifteen languages occur as common native languages or target languages, the number of languages to be considered for teaching purposes in developing countries is incomparably larger

b The number of significantly different learning purposes is much larger in developing countries than in industrialised countries

The consequences of these basic facts are to be deduced and discussed in the following sections of this paper

Multiplicity of languages

For several years now I have been working on the development of a general, explicit theory of programmed language instruction, presented in the so-called AALP-model (AALP = adaptive algorithmic language programming) (see 1967; 1968, p 233-243; 1969b and c; 1970a). The complex skill of language mastery is analysed into constituent skills (cf the Δ-Diagram in 1967, p 187-279, and Figure 2 above) and these in turn are analysed into smaller constituent skills, and so on, until elementary operations have been reached (cf 1969f)

Which constituent skills are to be taught and which is the optimal teaching sequence depends on the structure of the target language Z and the native language M. If a specific native language M_i and a specific target language Z_i are given, the constituent skills to be taught and their exact teaching sequence is represented in the specific D-Diagram

The analysis of constituent skills without regard to specific target languages and native languages is represented in the Δ—Diagram. Each section of the Δ -Diagram represents a hierarchy of partially ordered sets of rules, associated exercises and, ultimately, teaching steps (1970c). The task for which we want to find an explicit procedure is to convert the universal Δ -Diagram into the specific D-Diagram for a given pair of languages M_i and Z_i. For this purpose, the descriptive grammars of the native language (GM) and of the target language (GZ) are to be inspected systematically and to be compared with each other. Now we can briefly formulate the basic hypothesis of the AALP-Theory, thus:

$$D = f\ (\ \Delta\ ,\ GM,\ GZ)$$

(i.e. D is a funtion of Δ , GM and GZ)

The major aim in designing the AALP-Theory is to find this function and to develop from it an explicit procedure which enables us to derive, for any given pair of languages, a D-Diagram from the Δ-Diagram. This is a very high aim, some times the difficulties seem insurmountable, and the

question arises whether the benefits which can possibly be expected after the aim has been achieved justify the tremendous investment of effort,time and money into the development of the theory. Opponents of this theory, or of theory in general, can say: Why should we want a universal theory? After all, the theory could only help in the construction of language programmes for the combinations (in pairs) of 15 languages (i.e. altogether 210 directed pairs). The intuitive design of D-Diagrams for these 210 language pairs and the construction of language programmes for these language pairs by trial and error methods costs less than the development of the universal theory

This objection becomes invalid as soon as we free our thinking from European parochialism and take the language learning needs of developing countries seriously. Here the number of language pairs which have to be considered becomes so immense that a universal explicit theory must produce noticeable benefits and economies in the construction of teaching programmes

The situation of developing countries is not so much characterised by the fact that an immense number of languages has to be considered for all developing countries taken together. That is a banality, which is easily explained by the fact that the totality of developing countries constitutes the major part of the earth. What is characteristic is rather that in most developing countries we have a multiplicity of languages within one state and even within one town and that therefore there is a need for communication between the speakers of these different languages (and also dialects). The importance of foreign language learning is primarily due to this specific situation

We conclude from our point (a), multiplicity of languages within one state and corresponding multi-lingual situations in many states, that it is important to develop a universal, explicit theory of programmed language instruction

This, however, does not mean that practical programming work has to be postponed until the general theory has been completely developed. On the contrary, practical and theoretical work has to be carried on simultaneously and each type of work must stimulate the other and test its validity

Multiplicity of learning purposes

We now come to point (b), the multiplicity of significantly different learning purposes

Here I distinguish between at least four major categories, which can be subdivided into a large number of smaller categories:

1 Teacher training
2 Learning of an international language (e.g. English) with a view to using it later in secondary schools or at university as medium of learning and instruction for science subjects
3 Learning of a standard language in areas where the native language is a dialect. E.g. English instruction in the English-speaking West Indies (cf University of the West Indies 1966) and the teaching of the standard Regional Language in certain Indian states (cf Dakin 1968, p 16)
4 Others: e.g. Spanish teaching in Trinidad because of the geographical closeness of Venezuela and in the interests of trade. Or learning a second language spoken in the same state: e.g. Yoruba for Ibos. And finally also special-purpose languages (cf Trim 1969)

Non-specific objectives in conventional FL teaching

Concerning these problem areas we can say generally that learning purposes have never been taken quite seriously in conventional classroom instruction. This is partly due to the general teaching situation. When many pupils have to be taught simultaneously by one teacher, it is not possible (or hardly possible) to aim at different targets for different members of the class

But even in European foreign language teaching, we find at least three clearly distinguishable learning aims:

1 'General' language learning, as can be found in most secondary schools. The pupils are to learn to speak, to write, to understand the spoken language and to read. Usually dictation and reading out aloud are added as teaching aids
2 Scientists learn to read foreign language journals
3 In evening classes, intending tourists acquire some minimum knowledge of the spoken language with comparative neglect of written language, but not by-passing written language altogether

Even in its present stage of development, the Δ-Diagram (cf 1967, p 187-279, and 1969c) enables us to pin-point further learning aims which can be taught separately. For instance, it is possible to insert different vocabularies for special-purpose languages into Section 9, e.g. German for chemists (different vocabularies for organic and unorganic chemists), etc

Another aspect of the conventional attitude in European foreign language teaching is the standard of performance (as opposed to learning purpose) generally aimed at. After describing this, we shall investigate which different teaching attitude in respect of learning purposes and standards is required by the different situation in developing countries

The cult of perfectionism

European foreign language teaching at present is characterised by a cult of perfectionism which, in this generality, is unjustified even in Europe. In conventional classroom teaching this perfectionism shows itself in a romantic ideal, which is seldom explicitly formulated. Because of the absence of an explicit formulation, the supporters of this ideal seldom realise how far their actual results really are below their ideal. The ideal is as nebulous as the fact that they fail to achieve it

In language laboratory teaching (NB: that is not the same as programmed language instruction! Cf 1969a) this cult shows itself in the general demand that the student is to imitate the model until his performance is identical with the model performance, a demand which, for theoretical reasons alone (to say nothing of practical difficulties) can never be met

In programmed language instruction, the most prominent representative of such perfectionism is Rand Morton (1959), whose Spanish programme aims at developing in the pupil the linguistic behaviour of an 8-year old Spanish child. According to Morton's reports, this target has in fact been reached. According to oral reports of other owners of this programme, it is difficult to find volunteers willing to work through the programme from beginning to end because it is (they claim) so deadly and boring

I am now going to put forward a plea to give up this perfectionism, purposefully to act against it, in circumstances where the practical purpose of language learning can also be achieved without perfectionism. My plea is for a utilitarian attitude towards language instruction. The non-perfectionist attitude displays itself both in the limitation of the amount of material that is taught and in the lowering of the standard aimed at. However, this does not mean that I favour generally some 'low quality' instruction. Rather, the theory of

programmed language instruction must indicate for all possible circumstances which degree of perfection is to be aimed at and how it is to be realised. Then circumstances which demand 100% perfection are only a special case of the many other circumstances which demand different degrees of perfection (100%: cf teacher training; diplomats)

When the degree of perfection for given circumstances is determined, one has to take care that the specified degree can in fact be reached with the available means, in the available time and with the given pupils. It is nonsensical and harmful (!) to aim at a degree of perfection which is never achieved in the given circumstances

I cannot develop a complete theory of the limitation of the learning and teaching aim within the framework of this paper. I shall therefore confine myself to illustrating the principles stated above with only a few examples from the area of phonology (the teaching of sound discrimination and articulation; Sections 1 and 2 of the Δ-Diagram, Figure 2) (more about this ir 1969e). Analogous examples can also be found in other parts of the Δ-Diagram

Intelligibility: the minimum target in pronunciation

In the teaching of pronunciation we can distinguish at least two extreme working aims. Either the student is to achieve a minimum of intelligibility, or his pronunciation is to be perfected to such a degree that he can live in the country of his target language without being recognised as a foreigner on account of his pronunciation. The first working aim is that of an intending tourist, the second that of a future spy. In-between are other degrees of perfection in pronunciation which have yet to be explicitly defined with linguistic means and measures

Pronunciation mistakes can be described as distortions, as substitutions of wrong phonemes (or 'distinctive features') for correct ones, or generally as 'noise' as understood in information theory. Depending on the number, kind, position and combination of these substitutions, the intelligibility of the pupil decreases. We imagine a 'scale of intelligibility' whose lower end represents 0% intelligibility, i.e. absolute un-intelligibility

For instance the pronunciation of an Englishman whom I met in a pub recently and who wanted to discuss with me the beauty of the alleged German folk-song ['ɔudju:skɔ:nə'vɛstəvɔ:l] ; he meant [o: du: 'ʃøne 'veste'valt] (Oh, du schöner Westerwald)

and whose upper end represents 100% intelligibility, i.e. intelligibility always and everywhere. A pupil beginning to learn a foreign language is inclined to replace the sounds and phonetic features of the foreign language by sounds and features of the foreign language which appear to be similar to him. When a German who learns English proceeds in this manner, his English does indeed sound ghastly and offends the ear of the romantic but, nevertheless, he is still not yet completely and always incomprehensible, especially if other parts of his language skills (e.g. intonation, grammar, choice of vocabulary, etc) have reached a higher degree of perfection, which increases the redundancy of his speech and thus makes it easier for the English listener to guess the intended meaning. On the other hand, if we take a native speaker of the target language, even he is not intelligible always and everywhere: Sometimes the listener has to ask him to repeat, to confirm or to supply further information, not on account of grammatical and semantic ambiguities, but on account of features of pronunciation performance. In brief: even the native speaker is not 'perfect'; his phonetic intelligibility is b e l o w 100%. Therefore, since 100% is not a learning aim 'founded in nature', we have a perfect right to ask, at which percentage of

intelligibility we w a n t to establish our working target, and we have a perfect right to freely decide this question in accordance with the given circumstances

Our research has to establish for every given pair of languages which pronunciation mistakes most effectively lower the student's intelligibility and with what investment of teaching and learning time, capital for teaching machines, cost of programme preparation, etc each such mistake can be eliminated. In the teaching of pronunciation, we have to raise the intelligibility of a pupil from a low initial state as far as possible, with a limited investment of work and money (as described above; as a cover term for these various factors, I suggest the term 'effort', where all factors are to be expressed in monetary units for the purpose of comparison). If we want to achieve the greatest cost-effectiveness, we have to concentrate teaching and learning work on those pronunciation mistakes which either diminish over-all intelligibility most or which can be eliminated with a comparatively small effort. There is, to my knowledge, at present no fully developed theory indicating by what methods one can locate just these sounds and mistakes by reference to the statistical description of the foreign language (Further discussion of these problems in 1969e)

The distinction between pronunciation mistakes which result in phonemic shifts and those which are only phonetic is known. An Englishman learning German who says [riçtiç] ('richtig' with English alveolar 'r') instead of [Riçtiç] ('richtig' with German velar 'r'), only makes a phonetic mistake: The word thus produced may sound peculiar but it cannot be mistaken for another German word. A mistake of the same nature is that of a German learning English who says [bɔe] instead of [bɔ:i] or [ae] (German 'das Ei') instead of [a:i] (English 'I'). But when the German replaces the English interdental fricatives /θ/ and /ð/ by the German alveolar fricatives

/s/ and /z/, this may cause the production of English words different from the intended ones: these are mistakes with phonemic consequences. Thus a pronunciation mistake can turn 'thick' into 'sick' or 'thin' into 'sin'. However, it is wrong to conclude from this that phonemic mistakes always result in misunderstanding. Language redundancy enables the English listener in many cases (presumably in most cases) to correct the mistake. In the case of 'thin' and 'sin', we have replaced an adjective by a noun. The noun will seldom fit into the same syntactic context as the adjective (to say nothing of semantic context): Thus we have an instance of automatic error indication (error warning). Even in the case of the two adjectives 'thick' and 'sick' the semantic context will often lead to an automatic error warning

Many,if not all, of the merely phonetic mistakes can be deleted from the learning aim from the start, if only a limited degree of perfection is aimed at. A further discussion is only required for the phonemic mistakes. Let us consult some language statistics. In American English (see Roberts 1965), the /θ/ occurs with a relative frequency of only 0.42%. The most frequent phoneme, /ə/, occurs with a frequency of 11.82%. If all phonemes occurred with equal frequency, the relative frequency of each phoneme would be 3.13%. Taken over the average of American English as a whole then, the /θ/ is very rare;its relative frequency occupies the last place but three. On the other hand, the /ð/ with 2.25%is rather more frequent. Is it worthwhile then, for the average pupil, to invest any effort into learning the pronunciation of the /θ/, especially since it is well known that most Germans in spite of all their efforts never learn this sound properly?

The importance of the various sounds changes with the frequency of the words in which they occur. If we confine our observations to the thousand most frequent words of American English, then the /ð/ occurs with a relative

frequency of 2.69% (this is presumably due to the presence of the very frequent words 'the', 'that', 'these', 'those' and 'this' in this group) and /θ/ with a frequency of only 0.44%. But in the second thousand /θ/ with 0.3% is placed in the last place but three and /ð/ with 0.1% in the last place but two

But it is just those words which raise the average frequency of these sounds in the first thousand and in the whole language, in which no misunderstandings due to mispronunciation are possible. The few misunderstandings that can be caused in the rarer words can easily be tolerated: they will not noticeably lower the average intelligibility of a pupil

I must admit, however, that the German [s] sounds very unpleasant and obtrusive in place of the English /θ/. One wonders why on earth almost all phonetically untrained Germans use just the [s] as substitute sound for the /θ/. If we investigate the pronunciation mistakes of other foreign learners of English, we also find the following substitute sounds: [f], [t] and [r] (alveolar trill). It is claimed that the foreigner, if his native language sound system does not contain a certain sound of the foreign language, replaces the foreign sound by the most similar sound of his native language. From this principle, we hear, pronunciation mistakes of our pupils can be predicted. In fact, this prediction is not possible as long as the concept of similarity has not been precisely defined. Is the German [s] really more similar to the English [θ] than the German [f] or [t] ? Let us compare the articulatory features of these sounds:

[θ]	fricative	interdental
[s]	fricative	alveolar
[f]	fricative	labio-dental
[t]	stop	alveolar

We see that the [t] differs in two articulatory features from the [θ] and that both the [s] and the [f] differ from the [θ] in only one feature. As regards 'similarity' then, both sounds can be considered equally suitable and likely substitute sounds. Moreover both substitute sounds occur in the phonemic repertory of the native German speaker, and therefore are also equally easy substitute sounds. Now, the [f] in place of the English /θ/ sounds much less obtrusive and offensive than the [s] . In many English dialects the [f] occurs in place of the /θ/, and the similarity of the two sounds [f] and [θ] for English (rather than German) ears is confirmed by the fact that English children learn the phonemic distinction between /f/ and /θ/ comparatively late in life. It would be easy to instruct all German teachers of English to tell those pupils who replace the /θ/ by [s] that they are to use an [f] instead. This is a realistic working aim, which requires hardly any effort, which can be reached with perfection and which increases the acceptability of the foreign pronunciation. Further research has to comb through all target and native languages, search for similar groups of sounds, develop the above suggestions into general principles and procedures and fit them into the theory of programmed language instruction

Structural similarities between native dialect and target language

In an analogue way it is possible to capitalise upon the peculiarities of a pupil's native language and even of his native dialect. I shall only briefly suggest this for dialects. For the European standard languages it is anyway generally known. Assume we want to watch television. The play is called 'Bonanza'. We are considering a German pupil from the province of Hesse trying to learn English. German 'Jeden Sonntag sehe ich mir "Bonanza" an' = English 'Every Sunday I watch"Bonanza"'. Two basically different constructions: ich sehe mir ... an = I watch ... . But the native dialect consutruction for the man from

Hesse is 'congruent' with the English target construction. In Hesse one hears: 'Ich kucke Bonanza' (I watch Bonanza). This similarity makes it easier to learn the English expression. Similarity in Hesse: 'Die sieht doch wie der Vater' closely resembles English 'She looks like her father', whereas the English construction is quite unlike its standard German equivalent: 'Die sieht doch wie der Vater aus'. (The same construction also occurs in classical German literature, e.g. Goethe's 'Clavigo', Act 4, Sophie: 'Du siehst blaß' - 'You look pale', instead of 'Du siehst blaß aus'.) And finally we hear in Hesse: 'Ist das Buch dir?' (Does the book belong to you?), whose construction is congruent to its Latin equivalent 'Liber tibi est?' but not to its standard German equivalent 'Gehört das Buch dir?'

Limited learning aims

It is clear beyond doubt that programmed language instruction can be used in order to achieve perfection where perfection is needed (e.g. in the training of teachers and diplomats). In the present context it is important to realise that it can also be used for limited working aims and that for such limited aims it is superior to conventional instruction because in programmed instruction it is easier to analyse and define these limited aims precisely and then to stay within the boundaries of these limitations. Again and again 'Romantic' reasons (urges) make the teacher inclined to break through these boundaries; often he is not even aware of the fact that he is breaking through such a boundary

On the question of special-purposes languages I quote Trim (1969, p 21f):

> More radically restricted languages are also conceivable. One might envisage a restricted language with no means of embedding sentences, so that all relations between sentences were shown by

sequence and the use of sentential adverbs. Or in which yes-no questions were always distinguished from statements only by a high rising intonation as opposed to a fall. In a restricted German, the complexity of the noun phrase morphology might be reduced by allowing only predicative and not attributive adjectives and by eliminating the genetive. Again, a highly restricted language might be acquired without tense differences or number differences, relying on numerals and quantifiers as necessary

These latter possibilities raise a far more controversial question - whether it may, under severe conditions of restriction, be admissable to present features of linguistic organisation so incomplete - in extreme cases only a limited lexicon - that the learner cannot produce well-formed sentences at all, but only those ad hoc semi-grammatical fragments by which monolinguals of different mother-tongues rapidly learn to communicate if forced together by circumstances. In such cases, the speaker's contribution to the speech-event is minimised and the load transferred to the listener, who exploits the redundancy of the situation, including non-verbal cues, in order to construct what would be the semantic content of the appropriate well-formed sentence in his language. This task is not impossible, despite extremely limited linguistic means, in a highly concrete situation, given that the non-verbal cues are common to the two cultures and that the partners are prepared to "try, try again"

So far as I know, no course at present deliberately sets out to communicate so restricted a competence. It is always presupposed that correctness or grammaticality is, in principle, inviolable

For some classes of learner that universal assumption m i g h t be challenged

Medium of instruction

A working aim that is of no interest in European language teaching but which is central and characteristic for many developing countries (e.g. India, Pakistan and the West African States) is the learning of an international foreign language (e.g. English) with a view to using it as a medium of instruction in science subjects at secondary school and at university. Tiffen (1968, p 91) comments on this: 'If the student is to pursue his higher studies profitably, his mastery of English must approximate to that of the native speaker.' If this is so, then the methods which I have proposed in earlier papers for programmed language instruction in European countries can also be applied to this situation. However, we have to investigate if certain constituent skills of the native speaker are not of greater importance, while others are of lesser importance when a foreign language is to be learnt with a view to using it as a medium of instruction. I suggest, for example, that the receptive skills of the Δ-Diagram (the boxed-in sections of Figure 2) may be more important than the productive ones and that, among the receptive skills, reading comprehension may be more important than listening comprehension. The special importance of the graphic component of the Δ-Diagram and of the receptive strings is supported by Widdowson (1968, p 164): 'The Indian University student, for instance, will read far more English than he will speak.' Widdowson (p 133) also mentions '... the unwarrantable assumption that learners of English aim at a complete and comprehensive mastery of the language'. For reading comprehension the technique of 'redundancy programming' (Δ-Diagram, Section 1.9; cf Schaefer 1963 and Bung 1967, p 233-237) is available. This technique urgently awaits the establishment of a solid theoretical base and a large-scale testing of its potentialities and limitations

I stress reading comprehension because I believe that lectures as a rule are uneconomical, both in developing countries and in industrial states. Lectures should only

deal with topics which cannot yet be found in standard textbooks and journals. At present, many lectures contain only routine information. This information is partly misunderstood by students and is written down in lecture notes which are incomplete and partly wrong. Then often a neat copy of the wrong and incomplete lecture notes has to be made by the student and this in turn always has to be committed to memory, and the same uneconomical and wasteful process is repeated year after year in countless universities all over the world. Worst of all, in countries where the medium of instruction is not the native language, the effort in learning the medium has to be extended to the acoustic component of the medium only to enable students to take part in this process which is wasteful in itself. Large-scale abolition of lectures would therefore not only make work at university more efficient but also ease the work load on teachers and students preparing for university entrance, by allowing them to concentrate on the graphic component of the medium. Even before programmed instruction in science subjects is introduced at university, the teaching procedure can be made more efficient if, in place of routine lectures, the students received duplicated hand-outs which refer them to certain parts of standard textbooks and journals and make appropriate comments where necessary; lectures only take place when the lecturer has something quite new to say, something that could not yet be published or duplicated. Other lectures can be replaced by 'classes' or 'seminars' and admission to these can be restricted to students who know prescribed books, articles or hand-outs. I am quite aware of the fact that many students rather listen to (or sleep in) lectures than read books and that some lecturers rather give routine lectures than write books or hand-outs. But I believe that such preferences, motivated by the laziness of lecturers and students, should be firmly ignored. In brief, I propose to pay special attention to the programming of reading ability

Vocabulary

Another area in which it is already possible to use programmed instruction very effectively is the fast learning of vocabulary (cf Bung 1967, p 23-41 and p 171-186; Frank 1967a and b)

Future research has to establish in detail in which cases and for which purposes an extensive vocabulary is more important than precise knowledge of grammatical structures

Further areas of this kind on which programmed instruction can concentrate in certain cases can be discovered by precise task analysis of the situations and purposes for which foreign languages are to be learnt (on the importance of task analysis in general, see Gilbert 1969). Here is an example from Europe; analogue examples from developing countries should not be difficult to find. An English engineer visits an exhibition or a factory in Austria. He does not speak German but knows the German technical terms of his special field. The host factory supplies him with an interpreter who knows German and English conversational language (i.e. also the language structures) but not the technical terms of the engineer in question. The two persons together will manage very well, as I can confirm from my own experience as an interpreter. The romantic assertion that knowledge of vocabulary is useless without knowledge of structures is therefore not true. Assume that such an engineer has only a few hours available for foreign language learning (say between 10 and 30 hours, or less) before he has to leave for abroad; then one should not waste any time with grammatical and phonetical niceties but should only teach him (via programmed instruction) those parts of phonology and those aspects of pronunciation which are absolutely essential for his limited purpose and then direct him immediately into Sections 8 and 9 of the Δ-Diagram, where he can learn 20 or more words per hour. A corresponding situation would be that of a housewife who is transplanted into a different language or dialect region and therefore has

to learn urgently the vocabulary which she needs in order to be able to do her shopping in the market. Tiffen (1968, p 85) remarks concerning the neglect of vocabulary learning: ' ... there is usually too much emphasis on structural progression and too little on vocabulary building'

Dialect and standard language

In Europe most speakers of dialects also understand the standard language and can even speak it more or less when strangers come into the village. Dakin (1968, p 16) describes quite a different situation in parts of India where the rural population cannot even understand radio broadcasts in the regional standard language or printed government announcements when they are read out to them: ' ... few speakers in each region use the standard forms of the regional language in their daily lives and many cannot perfectly understand the literary standard in particular. Gumperz ('Language problems in the rural development of North India', in: JOURNAL OF ASIAN STUDIES, Vol 16, 1957) describes an experiment in a Northern Indian village investigating how far villagers could understand a Community Development pamphlet announcing a local fair. The villagers spoke a dialect that closely resembled the spoken standard Hindi. But the literary style of the pamphlet was adequately understood by only the tiny proportion of literates in the village. The illiterates were able to obtain only the vaguest notion of its contents when read aloud to them. These were people who "do not ordinarily listen to the All-India radio news broadcasts because they say the language is too difficult for them"'

In such circumstances it would be madness to try to solve the problem by trying to give the potential pupils, i.e. the dialect speaking villagers, a native-like mastery of the 'foreign language' 'i.e. the regional standard language). Here the teaching programme can take advantage of the similarities and of the r e g u l a r differences between

native dialect and target language. Moreover the programme can leave out the graphic component of the Δ-Diagram and confine itself to the receptive string in the acoustic component. (NB: These remarks do not go against literacy training. If literacy training is required either together with mastery of the receptive skills in the acoustic component of the standard language, or if literacy training alone is required, we have a different learning purpose, a different situation, and we have to consider different means for solving the problem in question.) In the present version of the Δ-Diagram, this string is represented by section 10 alone (i.e. it is hardly analysed as yet) because precise programming techniques for these skills have yet to be developed

Conclusion

In this paper I have tried to sketch the specific problems in applying programmed language instruction in developing countries and to suggest directions in which research has to move in order to solve these problems. The topic under discussion was so large that I was forced to treat the problems in a rather general and abstract manner. I should be most grateful to receive further concrete problems, solutions and criticisms of the present paper from readers in developing countries

I hope that one point has been clearly established in the minds of my readers: Work on programmed language instruction can be done in developing countries and not only in industrialised countries. Such work can be done now: It does not have to be postponed until vast sums for the purchase of ready-made language laboratories of the popular commercial brands are available. Language laboratories or similar installations can be developed even with small means on the spot to suit the precise local conditions (this has, for instance, happened in East Germany). Work on programmed language instruction does not have to wait until vast sums of money are available for big research projects: Enterprising lecturers and teachers can usefully

do some small-scale research now and begin to collect experience with programmed language instruction. Even their day-to-day teaching will benefit from the mental discipline that such work involves. All the provisional, semi-private and small-scale work suggested in this paragraph will not only improve teaching now but also be invaluable when money for more sophisticated equipment and research or for a larger number of installations becomes available

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