DOCUMENT RESUME

ED 268 327 FL 015 672

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TITLE Facing the Challenge of New Technologies: Interactive Video and the AUTOTUTOR Project.
PUB DATE 86
NOTE 10p.; In: New Approaches in the Language Classroom: Coping with Change. Proceedings of the National Modern Languages Convention (2nd, Dublin, Ireland, January 31-February 1, 1986); see FL 015 669.
PUB TYPE Speeches/Conference Papers (150) -- Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Authoring Aids (Programing); *Autoinstructional Aids; *Classroom Techniques; *Computer Assisted Instruction; Courseware; Educational Technology; Independent Study; *Interactive Video; *Material Development; Second Language Instruction; *Teacher Developed Materials; Technological Advancement; Videodisks; Videotape Recordings
IDENTIFIERS *Autotutor

ABSTRACT

Interactive video allows the learner controlled access to data stored on videodisc or videotape and in the computer, by means of the keyboard. The technology has excellent graphic display capabilities and allows immediate access to any video frame. However, it is not yet possible to record directly onto the videodisc, there is no generally accepted standard system, and minimal materials are available for language instruction. The AUTOTUTOR system was designed specifically for language instruction, was developed from the video vailable technology, and allows simple instructional material development without need for video editing or computer programming. To use it, the teacher selects a video recording, divides it into learning segments, orders the segments, selects a method of presentation for each segment, devises the appropriate interactive routine in which to embed each segment, and decides how to move from segment to segment. The method is being pilot tested by a network of experimental users, and enhancements are being considered. (MSE)

FACING THE CHALLENGE OF NEW TECHNOLOGIES: INTERACTIVE VIDEO AND THE AUTOTUTOR PROJECT

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1 INTRODUCTORY

The title of this convention seems to us in its second part - "coping with change" - to imply the possibility of battle fatigue and perhaps even a little disillusionment among the population of language teachers. No doubt this was intended by the organizing committee, if only as an ironical provocation. After all, since the First National Modern Languages Convention in 1982, teachers have been called upon to intensify the fight to secure an aural/oral component in Leaving Certificate exams in modern languages; they have continued to be bombarded with propaganda on behalf of (various versions of) the communicative approach to language teaching; there has been no let-up in the stream of new course books and supplementary materials that eager salesmen would like them to buy; and now (rather suddenly, as it seems) they must live with the reality of oral exams and listening tests and the additional burden that these impose on an already overcrowded school timetable. Language teachers can be forgiven for feeling tired, as Mario Rinvolucri's title assumes they do.

In such a situation, a talk about interactive video might seem somewhat out of place. Many teachers still do not have ready access either to video or to microcomputers, so that they are at two removes from a medium that combines the two. However in our short presentation we hope to persuade you of three things:

- that interactive video in general is worth knowing about because it is a phenomenon that we are going to hear a lot about in the next few years;
- that the particular version of interactive video we have devised is worth knowing about because its potential can be explored and exploited by any teacher in any teaching situation (and when it is commercially available it will be well within the reach of any school whose board of management can provide video and microcomputers);
- that our version of interactive video poses some of the most urgent pedagogical questions that language teachers, and especially proponents of the communicative approach, have to confront, so that experimenting with it may produce answers whose relevance goes well beyond the limits of interactive video methodology.

We shall begin by explaining in general terms what interactive video is and how it is supposed to work; we shall then explain how our particular version of interactive video works; we shall go on to indicate briefly the kinds of fundamental question that must be confronted by anyone wanting to develop language learning materials in interactive video; and then we shall show you the system in operation. Those of you who are particularly interested in seeing the AUTOTUTOR close up will have an opportunity to do so: a system will be in operation on the concourse outside the lecture theatre during the coffee break this morning and during the lunch hour. Also, you can help yourselves to copies of our information leaflet on the AUTOTUTOR, which contains in a rather compressed form much of what you are going to hear.

2 INTERACTIVE VIDEO

Interactive video allows the learner controlled access to data stored on videodisc/videotape and in the computer. The learner gains access via the computer keyboard; his access is controlled (and the medium is interactive) in the sense that what is displayed to the learner is determined directly or indirectly by the input that the learner provides through the keyboard. That is, what happens next at any given stage in an interactive video programme depends either on a decision by the learner (e.g. "Do you want to see that again?" - "Y[es]") or on what the computer is programmed to do in response to the learner's input (e.g. "What was the main theme of the conversation you have just seen?" - "The budget"; but in fact it was the Book of Estimates, and so the computer presents the material again, perhaps drawing attention to features that make clear what the topic is).

Most industrial interest in interactive video is focussed on systems that use videodisc rather than videotape. Videodisc has two clear advantages over videotape. First, it has excellent still-frame display, which means that it can be used to store large quantities of graphic material frame by frame (like a serie of slides), as well as conventional video (moving picture and sound). Secondly, it allows immediate access to any video frame. By contrast, most videotape systems have relatively poor still-frame display; and unless one has expensive and highly sophisticated tape-coding facilities one cannot search a tape with single-frame accuracy. Moreover, it takes time to get from one part of a videotape to another. The attractions that videodisc has specifically for developers of interactive video systems should be obvious enough. The still-frame facility of video disc greatly extends the means of graphic display available to the user; while having immediate access to any video frame means that interactive programmes can skip hither and thither across the video material without involving the learner in embarrassing delays of the kind that characterize materials developed for some of the earlier and less powerful educational microcomputers ("Loading - this will take several minutes - use your time profitably").

However, two serious disadvantages attach to videodisc. First, in the present state of videodisc technology it is not possible to record direct on to videodisc; the material must be recorded with broadcast-standard videotape equipment and then transferred to disc in a manufacturing process similar to the on involved in the production of compact audio discs. This situation suits holders of copyright on video materials, because it makes pirating more difficult; but there is no doubt that it helps to explain the failure of videodisc systems to supplant videotape systems in the domestic market. More than half the point of having one's own video, after all, is that it enables one to make video recordings. It has been estimated that the cost of manufacturing one videodisc is between £15,000 and £20,000. This puts the production of experimental materials outside the range of most educational institutions, and certainly beyond the reach of Irish schools and colleges. Secondly, no doubt partly because it does not offer the facility to record, videodisc has been a relative failure on the domestic market. This explains why so far no generally accepted standard system has emerged and why there are relatively few materials available on videodisc.

3 THE AUTOTUTOR

Most developments in interactive video and most of the growing body of theorizing have come from individuals and institutions interested in computer-assisted learning without any specific subject bias. That is, the video element has been seen as a means of enhancing computer learning programmes in any area of the curriculum. In developing the AUTOTUTOR we started at the other end, and in two senses. From the beginning we were concerned specifically with language learning (though that is not to say that our system could not also be used in other subject areas); and we began with the video rather than the computer component.

We were convinced that authentic video texts (in other words, video examples of the target language in use) have a central role to play in second and foreign language learning. They offer, after all, a unique means of providing the learner with input that locates the spoken language in a precise and visible socio-pragmatic context. In principle, many different kinds of video materials can provide the language learner with useful input, but they need to be presented to him in such a way that he can draw maximum benefit from them.

As far as self-instructional learners are concerned (and we began work on the AUTOTUTOR as part of a research project on self-instructional language learning), it is clearly possible to draw up written instructions and exercises to be used with video materials. But this approach has the considerable disadvantage of an operational disjunction between the video and the written medium. In other words, the learner has to derive from one medium his instructions for the operation and exploitation of the

other. At best this means that the learner's concentration on the source of input is likely to be broken every time he turns to his written instructions or exercises; at worst it could lead to confusion, impatience, and demotivation. The AUTOTUTOR makes it possible to present instructions and exercises through the same medium as the input and at the same time to give them a genuinely interactive character. Because the video component (as speech and moving pictures) is primary, videodisc has no practical advantage for us over videotape, for two reasons. First, there is no methodological need for the videodisc facility of perfect still-frame display. Secondly, there is no need to be able to gain immediate access to any video frame; for if the medium is to be truly interactive, the video material will be presented in relatively small segments (rarely more than two minutes at a time), which means that little time will be required for spooling the tape backwards and forwards between the different phases of the interactive routine.

We recognized from the outset that there was no point in our devising a system which would be too expensive or too difficult for others to use. Thus basic design requirements were (a) that our system should as far as possible use available technology, and (b) that it should be possible to develop learning materials without recourse to either video editing or computer programming. Our system meets these requirements fully. The AUTOTUTOR itself is an intelligent controller that interfaces with (i) a BBC Model B microcomputer with disk-drive and running MICROTEXT, (ii) a U-matic or VHS videocassette recorder, and (iii) a variety of monitors/television receivers.

MICROTEXT is an authoring language developed by the National Physical Laboratory, Teddington, England. It is very easy to master, requiring no more than word-processing skills. Bevan and Watson (1983) describe its structure as follows:

> The over-riding design aim of Microtext is to make simple things simple to do, so that an author can in a few minutes learn how to set up a simple branching presentation. At the same time Microtext incorporates a wealth of more sophisticated features so that as an author gains experience he can implement more complicated applications tailored to specific needs.
>
> Microtext has been designed to allow the author to concentrate on the content and flow of his material, and the authoring process is centered around editing frames of text on the screen.
>
> Microtext has diverged from many other authoring languages in attempting to make ease of use rather than ease of implementation the ultimate criterion for system design. The end result is a pragmatic compromise with a simple and concise syntax for the most frequently used facilities, complemented by plain-language commands to exploit specialised features.

To this it should be added that MICROTEXT enables the user to exploit to the full the excellent high-resolution colour graphics that are a feature of the BBC microcomputer; also that it copes easily with the accents and umlauts that are a fundamental requirement of language learning materials.

Perhaps the two most significant developments affecting language teaching/learning in the past ten years have been (i) the emergence of the so-called communicative approach to the design of syllabuses and learning materials and (ii) the advent of relatively inexpensive microcomputers to aid the learning process. All too often teachers and course writers committed to the communicative approach have tended to dismiss the computer as having nothing to offer the language learner; while too many of the learning programmes developed for computers have shown little awareness of the new insights into language learning provided by research associated with the communicative approach. The AUTOTUTOR provides one means of trying to heal this breach. Self-instruction (which is part of every learning process, however that process may be organized) cannot ignore the potential of the computer as a learning tool; yet as long as the focus is on spoken language it is doubtful whether, in the present state of technology, the computer on its own can assist the cause of communicative language learning to the same degree as interactive video. For the starting-point of interactive video, at least in our version, is precisely language in use presented visually in its socio-pragmatic context.

4 CREATING LANGUAGE LEARNING MATERIALS IN INTERACTIVE VIDEO

A description of how the AUTOTUTOR is used to create simple learning materials is also perhaps the clearest way of explaining some of the things it can do for the learner and some of the methodological questions it asks of the teacher. For the sake of clarity we shall set out the steps involved as a linear sequence. But (of course) this is a simplification: in reality one shuttles back and forth across the different steps as one's programme develops.

The first step is to select a video recording. Your choice of video text will be determined by the same considerations as determine the choice of a printed text for use in language learning: topic and likely relevance/interest for the learner; linguistic and thematic complexity in relation to the level of competence that the learner has already achieved; what you expect the learner to get from the text and how you want him/her to exploit it.

The second step is to use the AUTOTUTOR to divide the video into learning segments of a length appropriate to the pedagogical purpose that the video is intended to serve. By and large the video has to be segmented according to a general sense of where one can appropriately insert breaks in its developing meaning. Thus one's first steps in authoring with the AUTOTUTOR tend to

reinforce the communicative intuition that meaning has priority over all other considerations. (Note that it is not obligatory to use the whole of the selected video recording; the AUTOTUTOR can be programmed to use only those parts of a recording that the author requires.)

Having segmented the video, the third step is to decide whether the segments are to be presented to the learner in the order in which they appear on the video recording or in some other order. Two factors have to be taken into consideration here, one linguistic/pedagogical and the other operational. First, if the original order of the video material is changed, the comprehensibility of the video segments may be adversely affected as the semantic context progressively established by that order is undermined. Secondly, a re-ordering of video segments will necessitate more spooling backwards and forwards, which of course takes time. The AUTOTUTOR is capable of spooling the videotape at the same time as the learner is interacting with the microcomputer; but the more changes you make in the original order of the video material, the greater the ingenuity you will need to exercise in order to create a programme that runs continuously, without any of those embarrassing pauses that are characteristic of the less powerful microcomputers used in education and training.

The fourth step is to decide how each segment should be presented to the learner. For example, you may want the learner to view the segment before he is presented with any information about it; alternatively, you may want to begin by providing the learner with a focus on the segment - by telling him what to watch/listen for, or by giving background or contextual information. One of the favourite techniques of communicative language teaching is the "advance organizer". The AUTOTUTOR is a good way of testing this technique, because the interactive routine inevitably provides feedback on how successful or otherwise an advance organizer really is. (And if the one you have devised doesn't work, you can easily devise another.)

When you have provided for the learner to see the segment - once, twice, or as often as you determine; with or without introductory material presented through MICROTEXT - the fifth step is to devise an appropriate interactive routine in which the segment can be embedded. Clearly the mode of presentation will depend on your pedagogical purpose, which will also determine the kind of interactive routine you will use. Essentially your routine will be built around two forms of learner response: (i) the learner can be presented with (say) a series of statements about the segment and must say whether each statement is true or false by using two keys (perhaps Y[es] and N[o], or T[rue] and F[alse]); (ii) the learner can be asked an open-ended question to which he responds via the keyboard. MICROTEXT is so structured that the author can determine not only what elements are essential for a correct/appropriate reply to the question but also what kind and degree of error should be allowed in the learner's reply. When we first began to experiment with the

AUTOTUTOR we found open-ended questions an attractive challenge both to ourselves as programmers and to prospective learners. But we had not reckoned with the fact that few learners are likely to come to the AUTOTUTOR with well-developed keyboard skills. If the learner needs a lot of time to type in the answer to an open-ended question, the interaction quickly loses its immediacy. More recently, as you will see in our demonstration, we have tended to concentrate on asking questions that can be answered with a single key-stroke. We are also intent on avoiding too many echoes of programmed learning: on devising ways of asking questions and (more especially) presenting answers that do not undermine the learner's sense of autonomy and that demand as much concentration as the input itself. Again our demonstration should show more clearly what we mean.

The sixth and final step in our authoring sequence is to decide how to move from segment to segment, and in particular what to do at the end of a segment if the learner performs the interactive routine unsatisfactorily. For example, you may want simply to give the learner the right answers; or you may want to take the learner back to the beginning of the segment and present him with further introductory/focussing information; or you may want the learner to view the segment again and then follow a different interactive routine. Or, as increasingly we have come to believe, you may think it preferable to let the learner be the best judge of what to do next.

At this point it is appropriate to show you a video of the AUTOTUTOR in action. It lasts about seven minutes and as it is playing we shall draw your attention to features that illustrate the main points we have made.

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One of the things that most people know about computer learning programmes is that they take a long time to write. Last week we showed the AUTOTUTOR to a visitor who had some experience of developing computer-assisted learning materials. We demonstrated the programme you have just seen and asked him to guess how long it had taken us to write from beginning to end, bearing in mind that we began with a fairly clear idea of what we wanted to do. He estimated six weeks; in fact it took one afternoon. This is worth emphasizing, because if do-it-yourself interactive video has any kind of future in schools and colleges it must be not only easy to master but quick to program.

5 CONCLUSION

In a short talk like this it is impossible to do more than introduce in a compressed and inevitably simplified way something as complex - both technically and methodologically - as interactive video. But we hope we have said and shown you enough to persuade you that interactive video in general and the AUTOTUTOR

in particular are indeed worth knowing about and that experimentation with the AUTOTUTOR may well provide insights that have general relevance for language learning and language teaching.

We have established an international network of experimental AUTOTUTOR users who (we hope) will provide the first assessment of interactive video by people centrally involved in the language learning/teaching process. Among the things members of the network are interested in doing are: using the AUTOTUTOR as a project resource in second-level language classes (in other words, having the learners make up their own interactive programmes) exploring the possibility of applying the same MICROTEXT routine to more than one example of a particular text-type (in order to reduce authoring time); building up various kinds of database in Basic to which the learner can be referred at selected points in an interactive routine; looking for ways of using the AUTOTUTOR as a communicative testing tool (MICROTEXT can be programmed to store and analyse test scores).

In this talk we have deliberately concentrated on what might be described as the basic AUTOTUTOR system. But that basic system can be enhanced in various ways. For example, it is already possible to add on a Tandberg AECAL audio cassette recorder as an additional or alternative source of audio input; and one of the manufacturers of video monitors promises us in the near future a monitor that will make it possible to overlay text on video, which will open up a whole new range of possibilities for presentation. At the moment the AUTOTUTOR runs only with the BBC microcomputer, but we hope in due course to make it available for other operating systems. The possibilities for extending and elaborating the system are almost literally endless. However, we shall do our best, with the help of our network of experimental users, to ensure that the onrush of technological development does not preclude or obscure serious experimentation with the basic system.

REFERENCE

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