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ABSTRACT

Advantages of computer-assisted instruction (CAI) for grammar-oriented exercises are considered, and a learning module to help the student prepare for the Test of English as a Foreign Language (TOEFL) exam is described. The exercises are modeled on the TOEFL exam: the student is given a sentence, one part of which is incorrect and is asked to determine where the error lies. In the first exercises, which deal with structural points, an incorrect answer is followed by a detailed explanation of the error. Students are also offered the opportunity to review all of the areas previously covered. Next, a practice/self-testing mode provides the student immediate feedback and reinforcement. Structural exercises also incorporate the elements of speed and pacing by allowing the student to choose the number of seconds allotted to respond to each question. It is suggested that standard exercises designed for vocabulary development and reading comprehension are also well suited to CAI. Another area not traditionally associated with CAI is the practice of language functions, and notional-functional exercises developed by Meloni, Thompson, and Beley are described. Brief guidelines for developing CAI are also included. (SW)

SKILL SPECIFIC CAI TECHNIQUES

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Christopher Evans in his book about the computer revolution and its impact on society, The Micro Millenium, discusses the relationship between technological development and the decline of various professions.[1] One of the professions of major interest to this audience is, of course, education. Contrary to what the layman might expect, Evans makes a convincing case for the compatability of technology and pedagogy, stating that computers will enhance not only educational research, but also classroom instruction.[2] While Evans cautions that with computer-assisted instruction the role of the teacher will change, he affirms that this change will be positive rather than negative. He goes on to state that the use of technology in education will ultimately "lead to major changes and advances in the teaching process itself."[3]

As CAI becomes increasingly popular it is imperative to establish sound principles and techniques for educational software. As Evans affirms, the value of computers "is not so much in what they teach as how they will go about it." He further states that the flexibility of a modern computer, small or large, is, to all intents and purposes, infinite, and the range of tasks it can perform is limited only by the range of programs which can be written for it."[4] It may be added that the flexibility and quality of the educational operations a computer can perform are indeed limited by the degree of excellence and appropriateness of the pedagogical techniques incorporated into the CAI program.

Certain guidelines for pedagogically sound CAI may be established.[5] These are not dissimilar to those which form the basis for classroom methodology. Perhaps the first of these is determining and limiting the focus of a specific CAI exercise, much as a teacher would in a classroom situation. It is, in fact, detrimental to the student, both in the classroom and at the computer, to teach or test too many skills at once. Secondly, directions for specific CAI exercises must be clear and concise. Pacing of the exercise must also be appropriate to the students' level of proficiency and the material covered. Furthermore, feedback--positive, negative, and corrective--so instrumental in the classroom setting is of equal importance in a student-computer relationship. In addition, reinforcement should be appropriate to the type and purpose of the exercise at hand. Gradation of materials, whether through sequencing and branching, or through the use of modules designed to initially isolate and ultimately integrate various facets of a more comprehensive skill, is as important to a CAI program as it is in the classroom. Finally, it should be born in mind that virtuosity of programming must, of necessity, be secondary to educational considerations at all times.

Grammar is the area which lends itself most readily to computer-assisted instruction.[6] The endless possibilities for rote drill and practice provided by the computer are known to all. However, more sophisticated and challenging types of grammar-oriented exercises, which go beyond the rote drill and

practice mode, are possible as well. The use of the correct verb tense, for example, may be approached in a variety of ways with CAI, just as it is in the classroom setting. Student answers in a verb tense exercise are immediately analyzed by the computer, as they would be by the classroom teacher. The computer, in fact, breaks the student answer into its component parts and is thus able to inform the student which component is incorrect and for what reason. For instance, if the student writes 'have written' instead of 'has written', he will be informed that, although the tense is correct, the third person singular is required in this item. Following this prompt, not dissimilar to one that a classroom teacher might utter, the student is asked to answer again. Clearly, the student, at this juncture, is not involved in a simple trial and error procedure. A CAI exercise such as this one requires the student to actively draw upon his store of knowledge.

In another exercise dealing with verbs, the tenses may be presented in a semi-tutorial mode, whereby a brief explanation of tense usage is given at the start of the exercise. Such explanations may or may not be based upon the particular text currently in use in the classroom. Individual student responses are then analyzed. If incorrect, the student is told which tense is needed and given the explanation as to why that tense is necessary in the particular sentence. The student is then asked to produce the correct answer. Here again, active student interpretation and production is required. The student is finally given the correct answer if

he is unable to produce it himself. In order to assist the student in internalizing at least the correct form, if not the reason for the usage of that form, the student is then asked to repeat the correct answer and is unable to continue until he has done so.

A type of cloze method for practicing and/or testing verb tenses in context is highly suited to the computer. Pedagogically speaking, such an exercise, encompassing a wide variety of verb forms, would prove difficult for the novice and would best be employed as the final step in a progression of exercises used in conjunction with classroom instruction concerned with the teaching of verb tenses. The student is presented with a paragraph in which the verbs are given in the base form. Upon surveying the paragraph in its entirety, the student may glean a preliminary idea of the tense, mood, and voice relationships of the verbs within that particular context. The computer then requires that the student use the correct form of the verb in the individual sentences which constitute the paragraph. The student may refer to the complete paragraph at any time in order to glean the correct form from the context. An exercise such as this, even were it to deal exclusively with the simple present and the present progressive tenses, for example, presupposes a working knowledge as well as a certain degree of mastery over the form and usage of these tenses. An exercise such as this is designed for the advanced student who needs to perfect his mastery of English verbs as regards not only tense, but voice, aspect, and mood as well.

In an effort to aid students in preparing for the structure and written expression portion of the TOEFL exam, several exercises can be combined into a module, carefully guiding the student through the different steps important to successful performance on this exam. The individual exercises are modeled on the TOEFL exam itself; the exercise presents a sentence, one part of which is incorrect. The student must then determine where the error lies. All exercises in this module, although structurally similar among themselves, are designed for a specific purpose and programmed accordingly. A typical combination of exercises into a TOEFL module is based on two principle factors--the development of both the student's accuracy and speed. Each exercise builds upon the previous one in a carefully planned progression, integrating an additional element at each juncture.

The first exercise in the module deals with the presentation of specific structural points. If the student answers the question incorrectly, a detailed explanation of the incorrect element in the sentence is provided. Since a predetermined number of areas is tested in this type of exercise, the feedback is designed to pinpoint a student's particular area of difficulty. The correct response is then provided if the student answers the question incorrectly a second time. Several of these exercises may be formulated to allow the student practice in a wide variety of content areas.

In the following exercise, the student is afforded the opportunity to review all of the areas previously covered. At this point, the student moves from a semi-tutorial mode that provides detailed explanations to a practice/self-testing mode. In the exercise, the student is provided with immediate feedback and reinforcement. He is not given detailed explanations as to the reasons for his errors, but is permitted two chances to answer the question correctly before the computer automatically supplies the appropriate response. In this exercise, as in all the others, a large data base allows the student to repeat the exercise several times, thereby assuring him the maximum degree of practice.

While the previous exercises focused upon the accuracy of student production, the subsequent TOEFL structural exercise in the module also incorporates the elements of speed and pacing. The student now moves from the practice mode into a practice/testing mode. Because the exercise presents questions in a structure identical to that of previous exercises, the student is not overwhelmed by the introduction of the new and difficult timing element. Although the student receives positive and negative feedback in this exercise, he is not encouraged to determine the reasons for his mistake, but rather to move quickly through the exercise in its entirety. To accomplish this goal, the student is allowed only one opportunity to choose the correct answer.

Although the TOEFL exam allows the student freedom in pacing, this particular exercise is specifically designed to emphasize a limited time element and therefore restricts the student's activity in this area. The computer allows the student to choose the number of seconds allotted to respond to each question. Because the computer sets the pace for the student, an inexperienced learner need not worry about spending too long a time on a particular item. In addition, as a choice of time elements--twenty-five, thirty, or forty-five seconds per question--is allowed, the exercise accomodates itself to all student levels.[7] While a bright student may choose to begin with the shortest span of time allotted for response, a slower student is able to progress at his own rate. Because this is the first TOEFL exercise in which speed is an essential element, several practice questions are provided to allow the student to gain confidence and familiarize himself with this type of exercise.

A final exercise in the module would provide additional emphasis on both accuracy and speed. However, in an effort to simulate the conditions of the TOEFL test, the student would be allowed to pace himself within a specified time limit.

On the surface it would seem that the use of CAI for either teaching or drilling reading skills would be somewhat limited. Nevertheless, the computer is well suited to handle the kind of intensely individual activity that reading involves. Reading skills such as skimming, scanning, reading for the main idea and even fundamental reading comprehension,

having been introduced by the classroom teacher, may be greatly enhanced by the student's individual interaction with the computer. Such recognized techniques are not, in fact, beyind the computer's capability.

In a graded exercise module, the student can practice various skills in a carefully designed progression. The skill of skimming for the main idea could constitute the first element in such a progression. The student is presented with a reading passage and given approximately thirty seconds to skim the selection. The introduction of the timing component here assists the student in truly internalizing the concept of skimming, in that it prevents him, by virtue of the limited time alloted, from reading every word. The computer then presents the paragraphs individually, allowing the student approximately fifteen seconds to skim each paragraph. The paragraph is then removed from the screen and the student is asked to identify the main idea of the individual paragraph. Upon the completion of the last paragraph, the student is once again presented with the entire essay and allowed approximately thirty seconds to skim it. Once the essay is removed from the screen, the student is asked to identify the main idea of the reading and to select the most appropriate title.

Standard exercises designed for vocabulary development and reading comprehension are also well suited to CAI. Vocabulary from context may be practiced and/or tested, as may reading for details. Using the same essay as that employed in

the previous exercise, but in this instance without limiting the time allowed for reading, vocabulary and detailed reading comprehension are practiced or tested as the next step in the graded progression. Once the student has identified the main idea of the selection through skimming, he is then in a position to perform the more specific operations of gleaning vocabulary from context and reading for detail.

The computer presents the reading and the exercise begins. Throughout the exercise the student is permitted to call up the reading selection at any time. The first portion of the exercise deals with vocabulary from context. Only synonyms or definitions appropriate within the specific context are regarded as correct. The second portion of the exercise tests reading comprehension skills in much the same manner as a standard proficiency test, or the TOEFL, would.

A module such as the one outlined above, which could be expanded to include virtually all reading skills taught in the classroom, is designed to enhance, through the use of tried and tested pedagogical techniques, the students' mastery of specific reading skills.

Another area not traditionally associated with CAI is the practice of language functions. However, as in the exercises previously described in this paper, CAI can prove a valuable tool in the learning and reinforcement of functional expresssions and language appropriateness.

As already mentioned, different computer exercises are designed to fulfill specific purposes. Such exercises may be used as general instruction or act as a complement to a particular text. The notional-functional exercises described herein manifest the potential not merely for general practice, but also demonstrate the compatability of CAI and a particular text, in this case Say the Right Thing by Christine Meloni, Shirley Thompson, and Andrea Beley.[8] The notional-functional CAI exercises are modeled on the language appropriateness exercises presented by the authors in each unit and act as a complement to this material.

The exercise begins by affording the student the opportunity to choose between either a tutorial or self-testing mode; the student is able, if he desires, to review those particular expressions used to articulate the different functions before the exercise begins. He may also recall these expressions at any time by typing the word 'help'. If the student does not desire to utilize the exercise in the tutorial mode, he may refrain completely from viewing the expressions.

The exercise then presents a series of situations in which different functional expressions may be used. The student is given a choice of rejoinders and is asked to choose the most appropriate response for the particular context. If the student chooses incorrectly, he is not immediately provided with the correct answer, but rather prompted to determine why his answer is incorrect using the guidelines

already studied in the text. In the case of the unit dealing with greetings, a response, as in the text, may be either too formal or informal, or simply inappropriate to the particular situation. The CAI exercise adds an additional criteria--that of degree of politeness.

Through a multiple choice device the student is guided in determining the reason for his error. If he correctly analyzes his mistake, he is provided with the opportunity to review both the situation and the choices, and prompted to answer once again. So as to minimize the student's sense of frustration, should the student be unable to determine the reason for his erroneous response, the computer readily supplies this information. The student then reviews the entire question--the situation and the choices--and tries again. Should the student answer incorrectly a second time, the computer supplies the correct response by reproducing the original situation and the correct rejoinder.

This exercise is clearly modeled upon an already familiar paradigm. In a graded functional module, other exercies might concentrate upon student production rather than recognition--perhaps in a student-computer dialogue simulating a particular situation. Another exercise might focus upon developing the discriminatory skills, allowing the student, as in the text, to 'listen in' on a conversation for the purpose of identifying inappropriate responses.

There is no reason why CAI should lag in the least behind advances in the classroom in terms of innovative teaching techniques, since it is, in fact, teachers who should determine the direction of the development of educational software. For this reason teachers must become more actively involved in CAI research and development. Such participation on the part of experienced educators will assure optimum use of the computer by students. There can be no doubt that students' response to well-organized and pedagogically sound CAI is overwhelmingly positive. Evans' observations, indeed, confirm this fact; he notes that "fears that . . . pupils would resent being . . . taught by a teaching computer have proved unfounded in experiments currently in progress in . . . schools."[9]

It must be remembered that although a computer can perform many complex tasks faster and more accurately than man, it is, in fact, nothing more than a TOM (totally obedient machine). Such a machine is clearly only as valuable in education as are the fundamental principles that support it.

NOTES

[1]Christopher Evans, The Micro Millenium, (New York: The Viking Press, 1979).

[2]Ibid., pp. 111 ff.

[3]Ibid., p. 119.

[4]Ibid., p. 123.

[5]See Appendix A for a summary of these guidelines.

[6]See the materials in Appendix B for examples of the exercises described herein.

[7]Twenty-five seconds per question is the approximate time alloted the student in this section of the exam.

[8]Christine Meloni, Shirley Thompson, and Andrea Beley, Say the Right Thing, (Mass.: Addison-Wesley, 1982).

[9]Ibid., p. 84.

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Appendix A

Guidelines for Pedagogically Sound CAI

1. Determine and limit the focus of a specific CAI exercise.

2. State directions clearly and concisely.

3. Pace the exercise according to the students' level of proficiency and the material covered.

4. Formulate appropriate feedback--positive, negative, and corrective.

5. Include reinforcement appropriate to the type and purpose of the exercise.

6. Grade materials, either through sequencing, branching, or through modules.

7. Maintain programming in a secondary position of importance to educational consideratons.

Appendix B has been omitted because of poor reproducibility.