ABSTRACT

This paper analyzes various kinds of student reaction to CAI materials: evaluations after the use of courseware, student feedback through a mail option for courseware on a main-frame computer, written comments solicited from students throughout the year, as well as information gathered from logs which were set up to collect, without the user’s knowledge, a variety of data.

Types of computer exercises are discussed as well as the use and integration of courseware into a college FL program followed by observations of a language coordinator, teacher, and software author.

KEYWORDS: Evaluation, motivation, drill-and-practice, corrective feedback, analysis, student records, German, Hewlett-Packard, courseware development, North Carolina State University, desk space, system log, network, host computer.

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Recent discussion of CAI have come out very strongly against drill-and-practice on the computer. In her discussion of LIESL, a conversational computer program based on Joseph Weizenbaum’s ELIZA, Karen Kossuth reaches the conclusion that "many CAI programs are in the pedagogical Dark Ages," or at best they may reach into the "transformational drills of the audiolingual Middle Ages...CAI may be good for our students but in most cases it is a crashing bore." However preliminary results of surveys of second-language teachers indicate that the teachers see a need for drill-and-practice and want computers to handle this function of learning. Barbara J. Agor refers to this study and to the arguments that the students will have more control over the drills on the computer than in classroom and lab, but expresses her disdain for such practice by saying: "Self-flagellation may be preferable to a whipping, but no matter who controls the whip, it still hurts."

Games

Many people who oppose drill-and-practice exercises end up promoting some kind of game-oriented programs. Thus Barbara Agor and her team developed The Refrigerator Game which encourages the students to guess which ten items are in the refrigerator. But here, too, voices of caution are heard. In a paper on the challenges and dangers of CAI presented at the Sixth International Conference on Computers and the Humanities, Constance E. Putnam discusses the fascination with computer games adapted for FL learning because they supposedly provide motivation. She warns against using either apparent or supposed student motivation as a major criterion for the development of programs, and she states:

In the first place, this is unlikely to work on a long-term basis. Even in the short run, we are about to face a generation of students who know far more about computers than most of us do, and who have experience with far more highly sophisticated games than the ones we are thrusting in front of them. What we think will motivate students may ver well appear laughable to them; the thrill, if any, will wear off fast.

Student Motivation

The question of student motivation has not yet been satisfactorily answered, but student evaluations of CAI material
authored by me as well as evaluations of borrowed courseware have been extremely positive. During the academic year '83-'84, CALIS (Computer Augmented Language Instructional System) was available to me for a one-year experiment. CALIS was developed by the German department at Duke University and is located on a Hewlett-Packard main-frame computer accessible both from Duke University and from the campus of North Carolina State University. I arbitrarily designated one section of beginning German students to be the experimental group of whom the computer work was required. It was a two semester requirement, with 23 students starting and 19 finishing the project. On the last day of classes, the students received an evaluation form in a stamped envelope addressed to the Department of Foreign Languages. They were urged not to complete the forms until they could look back at the experiment objectively. 17 of the 19 students submitted their evaluations, and the results are summarized below.

To the question: Should the computer component be voluntary? only one answered Yes. All others were strongly in favor of requiring the computer work and supported their vote with statements such as:
1) Those students who are slack would not use CALIS if it was voluntary and they are the people who need it most.
2) Some of the exercises were very difficult but very helpful, and I probably wouldn’t have done them if it were voluntary.
3) Required because it is so beneficial, I believe more beneficial that the foreign language lab.
   To the question whether they would have preferred a good workbook with key for correct answers all answered NO, even the one who rated CALIS lowest.
   One question was: Now that you have completed the course, how is your feeling towards the computer component:—ambiguous, —positive,—negative?
   Asked to point out weaknesses and strengths and to give CALIS a final grade from A—NC (no credit), one student had a negative feeling towards the component but nevertheless gave it a B; two felt ambiguous, one gave it a D, another a C; 14 felt positive, five gave it a B and nine an A.

Reaction to CALIS
CALIS is by no means a sophisticated program. It is continuously being updated and improved, but at the time when I used it, it had almost no corrective feedback, and was absolutely rigid in its matching, not only requiring exact spelling, punctuation, and capitalization, but also exact spacing; it was sometimes agonizingly slow. Nevertheless it must have done something right to leave students feeling so positive about it. The main strength of CALIS mentioned by the students was the fact that the exercises were closely correlated to the text—"Everything we did on the computer would find some application in class and on tests"—is a comment expressing the sentiment of most of the students. Several students stated that they enjoyed CALIS more than homework, that CALIS put pressure on me to say something, much like an actual conversation with a German person, or Even though CALIS was just a program, I felt I had to respond and I probably wouldn’t have done them if it were voluntary.

Responses to Other Courseware
I have received similarly positive evaluations of courseware which I have developed for the Apple computer. Even when the use of the CAI material has been voluntary, it has been used extensively. There is, therefore, no doubt that the students liked computerized drill-and-practice material, but there is still too little research attempting to measure the effectiveness of it in second-language acquisition. Lacking, too, is information about how students actually work with the material: How do they work at the keyboard, what corrective feedback is necessary, how do typing skills or lack of them affect the practice, and which instructions are clear and unambiguous. On evaluations submitted some time after the use of CAI material, good specific critical statements are rare. To get quick feedback from students, CALIS had a mail program on which a user could register a complaint or problem immediately before leaving the computer terminal. With CAI on the Apple computer, I have used envelopes addressed to me, which the students could drop in any campus mailbox or leave at the departmental office any time. The information gained in this manner does not answer most of the questions raised above but does indicate that student frustration arises primarily from the following areas:
1. Lack of access
2. Technical problems
3. Ambiguous instructions
4. Rejection of correct answers (or, what they considered correct answers).

Collection of Additional Data
To gain more insight into how students work with CAI, and find answers to some of the questions raised, I turned to the APPLE SUPER PILOT AUTHORING SYSTEM. The file handling capability of that system offers an excellent opportunity to observe students at work and attain a record of their performance. With a simple K: -command, various kinds of information can be stored in the SYSTEM.LOG file. Since the students do not know of the existence of that file on their disk, their work habits are not affected by an awareness of being observed.

Seventy-two units of various exercises were set up for the experiment. They were closely correlated with the text
material for the first semester of German. Since the effect of typing skills was one of the objects to be measured, and since I am convinced that students learn from writing as well as from hearing, speaking, and seeing, all answers had to be written. This method was chosen not only because it suited the purpose of the project but also because I consider it pedagogically sound. Some commercial courseware tries to avoid typing, or else reduce it to an absolute minimum by creating exercises in which the vocabulary and the various forms of verbs are indicated with a number at the top of the screen. To translate an English sentence given, the user must select the correct word and form, then write the corresponding numbers. The German translation of the sentence "I see the teacher," for example, may then look like this: 3 14 9 4. For a college student this method is not only cumbersome, but it also robs the user of the learning experience gained from mentally and physically spelling out the German words.

Practice of vocabulary was mostly handled by having students identify opposites and contrasts or relationships such as for example gestern - morgen and Restaurant - Essen. This method is more efficient than the English to German flash-card routine because all the words are in the target language, but more importantly, it avoids a danger inherent in the flash-card method, namely that students are trained to assume subconsciously that each English word has an exact equivalent in German.

Other units consisted of various forms of completion exercises and transformational drills as well as of translations. The aim was to have exercises in which the student responses would range from a single word to a complete sentence. In some exercises a perfect match was required; in some, wild-cards permitted slight irregularities in spelling, and in others, certain key elements in the sentence had to match while other parts of the student response remained unchecked. Since I was interested in observing how students worked and what kind of mistakes they made, the exercises had only the most obvious corrective feed-back features, and the program was set up to store various kinds of information in the SYSTEM.LOG.vi

The first problem to arise was one of disk space. Lessons 1 & 2 filled 260 file blocks, leaving 20 blocks for the SYSTEM.LOG. This turned out to be inadequate for weaker students who went over the exercises more than once and made several errors. The next problem was the amount of disk storage needed for the log files from more than 30 students. The log files would range in size from 12 blocks to 60 blocks so that the logs of one lesson from 30 students filled three diskettes, making the project almost unmanageable.

Data from the Logs

The logs below are from an exercise practicing both reading comprehension and structure. In a view-port at the top of the screen there were 10 German words in their basic form. The user then received a situation with an incomplete sentence, for example, item 1:

Die Frau: Wo Kann ich Kassettenspieler kaufen?

Der Verkäufer: Im zehnten Stock. Die Rolltreppe geht nur zum vierten Stock. Sie Mussen mit ___ fahren.

Among the words supplied at the top of the screen, the user should select der Fahrstuhl and write the correct form after the preposition mit.

The users whose logs are presented in Figure 1 represent three types of students you may find in most beginning FL classes. A is a solid student with good work habits, well prepared for and active in class. According to a questionnaire at the beginning of the semester, she took typing in high school but forgot it all, now she types with three fingers but considers herself quite good at typing. B is a very poor student, often unprepared. He took typing in high school and considers himself good at typing. C has obviously had German before and often depends on his prior knowledge rather than study the material assigned. He has never had typing and considers himself to be a poor typist.

The program was set up to record the following information in the SYSTEM.LOG: student’s name after the letter p (K:p, ____); all unanticipated answers after item number and the letter u (K:item number, u, ____); 3 points for correct answer on first try, 2 points on 2nd, and 1 point on 3rd try after item number and y* (K:item number, y*__); as well as the number of attempts and the time spent on each item (K:item number, number of tries/number of seconds). If they missed the item on the third try, they received the correct answer and were asked to write it before they could proceed to the next item.

Although the logs contain no typographical errors, they still afford some information about typing. Thus A used 37 seconds to give a response to item 1, B 53, and C 61. This, naturally, includes the time to search for the correct word at the top of the screen as well as the writing of it. Notice for example that A—who considers herself quite good at typing—changes her answer on item 1 in less than ten seconds.

The logs further show that there is an obvious problem with item 3 since all three users got it wrong. The item is: Ich habe Hunger, Gehen wir in ____! Here the student needs feedback concerning the gender of restaurant and the case after the preposition in as well as information about Ein-word endings. Another problem is in item 8 where two of the users missed the umlauted ae.

Another observation to be made from these three logs is that some students will always find a way. After user C had item 3 incorrect twice, he quickly—in less than one second—hits return, receives the correct answer and writes it. He mulls over item 6 for 144 seconds, then quickly hits return twice to get the correct answer. Many students used that approach on the first go-around and would then repeat the exercises several times.

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User B is obviously floundering somewhat through the exercise. The vocabulary given at the top of the screen is *der Fahrstuhl*; but he attempts various other forms. He selects *ein Restaurant* both for item two and item three. This floundering is partly due to the type of exercise, but it is indicative of a problem to be discussed below.

The Typing Problem

While critical literature warns against extended student responses because students cannot be expected to possess typing skills, and while authors produce material which requires a number or a single letter as responses instead of a real answer, I found that typing was much less of a problem than I had anticipated. Of the 30 students who completed the experiment, only 7 had taken a typing course in high school, all had done some typing before, six considered themselves good typists, the others either quite good, or poor.

A careful analysis of 28 logs for a translation exercise containing en brief sentences to be translated into German reveals 42 rejections of student responses due to minor discrepancies. Of these, however, only five can be considered typographical errors (*Dakn—Dank; machen—machen; germ—gern; Autreden—Ausreden; Entschulgen—Enshuldigen*); the others were quite obviously structural or spelling errors.

Benefits from the Logs

Due to problems with the sorting program, no good statistical data was attained about timing versus linguistic ability, typing skills, and other aspects with a well-developed data base. The extensive work with the student logs, however, was very revealing. The most immediate benefit was quick identification of items needing corrective feed-back and of units requiring more exact instructions. In addition it became obvious (and that doesn’t surprise any language teacher) that good students would work effectively with the kind of drill-and-practice exercises I had developed. What about the weaker students, however, the ones for whom this tool is really intended because it is patient, never tires and permits unlimited repetition? Are the benefits commensurate with the time invested by the students who flounder through the exercises? If they are, it is because the students voluntarily do the computer exercises and do end up seeing and using linguistic patterns in a structurally and contextually correct manner, which is not always the case when they do the work in a traditional setting. I am confident, however, that the computer can play a much more significant role in FL learning than it did in the experiment dealt with here.

The Role of the Computer in FL

For a university which handles a large number of elementary level FL students, most of whom are in the language classes because of a requirement, it is imperative that we make the most out of the two to three semesters we have them, and that we do not give borderline students a passing grade in the first semester, only to flunk them repeatedly in the second or third semester, simply because they never grasped the basics. Drill-and-practice exercises still present one
method of internalizing basic linguistic patterns and vocabulary, and when the program is on the computer, we have the means to assure that a student does not simply skim over the material without accomplishing certain minimum objectives. Until we have found a better method to accomplish these goals with large numbers of students who are motivated primarily by the pressure of requirements and grades, we have to use drill-and-practice while making every effort to improve the learning efficiency while minimizing the drudgery. Drill-and-practice, however, should not stand alone, at least not when we are dealing with college students who have already been trained to reason and compartmentalize, who want and deserve to know the shortcuts in learning a second language which has many similarities to their own. CAI material consisting of drill-and-practice alone, if not carefully integrated into the course work, could have a negative effect on the elementary FL program.

As the evaluation indicated, students place a lot of value on the computer exercises and prefer them to homework. They therefore may neglect the learning aids and explanations of structure presented in their textbook and assume they can pick up the language by doing the drills. For some students this trial and error method does not lead to comprehension. Moreover, the instructor may depend too heavily on the CAI material to do the basic drilling and use the class periods entirely for conversational practice and cultural enrichment, thus leaving the student who floundered through the computer exercises to muddle as well through the class work without any real comprehension. To minimize the danger of this happening and to maximize the effectiveness of the time spent at the computer, the exercises should contain extensive corrective feedback, leading the user to produce the answers instead of giving them to him. In some cases branching to a tutorial may be more efficient than repeated feedback messages, as for example a tutorial on adjective declension after a certain number of mistakes. Branching should furthermore be used to permit the fast learner to complete an exercise quickly while affording the slower learner as many items as necessary to accomplish the goals set for the unit. While some students may be forced into a tutorial after a certain number of errors, the availability of these tutorials on the system affords other students the option of voluntary access for quick review of structural items if a question arises during a practice session.

Unfortunately, the capacity of a single disk permits only a very limited number of help and tutorial programs along with practice units. For this reason many colleges, including North Carolina State University, are establishing networks with a large hard-disk host computer. With all the courseware and student logs on one computer, this system affords both excellent control over large numbers of students and great flexibility. The floundering student may be branched into a variety of help and tutorial programs, while interested students have the option to use at will any of the available programs.

4 Although access and technical problems normally are beyond our sphere of influence, we can reduce them by informing students about locations of computers or terminals. At North Carolina State University we have a listing of all terminal clusters on campus and of the computer labs. I had the Computing Center supply a list of APPLE computers in science, engineering, and design labs and found that there were more APPLE computers in non-computer labs than in designated computer labs. When students have their own disks, they can often find easier access to these computers than to the ones in the computer labs.
6 I had intended to use the APPLE SUPER-PILOT LOG program to sort the information for me. Although it worked well on individual log files, it would not read the joined files. Whether this was due to an error in the operation of the program or an error in the actual Apple Superpilot Log Program itself has not been determined.

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