KLAVIER IM HAUS-AN INTERACTIVE EXPERIEMENT IN FOREIGN LANGUAGE INSTRUCTION

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Despite the steadily increasing use and interest of computer-assisted instruction (CAI) in foreign language education, there remains a shortage of information on its effectiveness. More specifically, empirical data on CAI-related studies in foreign language are almost non-existent. This article reports the results of CAI-based interactive video study designed to address this void and which was conducted by the German Section of the U.S. Air Force (USAF) Academy's Department of Foreign Languages.

Purpose of the Study

The purpose of this experiment was to measure any quantifiable advantage in learning outcome attributable to computer-assisted interaction. Specifically, what are the effects on learning outcome with the use of computer-assisted interactive video technology in foreign language instruction, as compared to more conventional presentations of video material?
The Department of Foreign Languages at the USAF Academy is planning to set up a language learning center, complete with microcomputers, videotape-disc players, voice synthesis, and voice recognition capability if the cost can be justified in terms of learning outcome. It is very important to justify the considerable costs involved by showing that this technology can improve learning outcome.

Of course there are other costs associated with a commitment to use computer technology in language instruction. These include the time spent by instructors who develop the necessary programs, as well as the time spent by students to evaluate those efforts. Although the student's time in an experimental program need not be considered as wasted, there is a definite risk associated with the high number of man-hours needed to design the courseware. When language instructors are tasked to design these materials, the normal teaching routine may suffer.

In light of these costs, the experiment at the USAF Academy was limited to a specific aspect of CAI and designed to investigate the potential of interactive video (IAV) for first year German students. Through this very limited scope, the lesson designers, instead of committing many man hours to design and teach an experimental, full course, tested the students in two existing courses on comprehension and retention of material contained in a short film. The film was presented in three different ways, one of which was completely non-interactive and one of which utilized IAV.

Limitations and Assumptions

The assumption was that any advantage in comprehension outcome that arises from the use of IAV in showing a single film could be applied to the use of IAV technology integrated into a full language course. the results of the experiment are therefore limited, by design, by the content of that film.

A more general limitation for any IAV program designer is the availability of suitable video material. There is videotape material available for most purposes, but videodiscs in foreign languages are almost non-existent. However, because this experiment was designed to test the effectiveness of the most advanced technology, the videodisc was used.

Ideally, the designer of an experiment (or a course) would produce his or her own video material-material required to support specific learning objectives. The high costs of videodisc production, however, make the IAV program designer dependent upon the work of others. This is another reason for the limited scope of the USAF Academy experiment.

Theoretical Framework and Related Studies

The theoretical basis for this experiment comes from the general observation that interaction is the key to learning, especially in learning a skill such as a foreign language. Modern language educators agree that there is a difference in learning outcome between those students who just observe and those who actually are engaged in interactive activities involving target-language production. The role of the computer in this experiment was to provide interaction with the film materials used. thus allowing comparison between teacher-controlled interaction, such as that found in the simple presentation of a film, and that provided by the computer. The approach used was patterned after previous work done in the field of biology education (Bunderson et al, 1981). Although the WICAT study was much broader in scope, its purpose was similar to that stated as a goal for this research. Although it was shown that there are significant advantages in the rate of learning that comes from computer-assisted interaction, such a determination was not possible in this experiment, because it dealt with a very limited video presentation rather than with an entire course. A thorough justification of such use in a foreign-language teaching setting appeared in a recent issue of the CALICO Journal (Stevens, 1983).

Procedures

The research plan was conducted in two phases. First it was necessary to develop an IAV program, and then set up an experiment to compare that program with conventional presentation methods. WE chose to use the film *Kalvier im Haus*, which was produced by the German Educational Television Network. This film was made available to the Academy through a research agreement with the Defense Language Institute's (DLI) Educational Technology Division, and had been placed on videodisc as a joint project of DLI and the Geothe Institute of the Federal Republic of Germany.

The first phase of the project actually began in February 1983, when the videodisc arrived at the USAF Academy from DLI. A new instructor of German, who had attended a one-day Interactive Video Survey presented by Sony Video Utilization Services (Dargan) volunteered to develop a 20 to 30 minute video-based lesson. After some brief instructions on how to use an authoring system written by Texas Instruments, he chose a fairly simple approach to exploit the 12-minute film. Aiming the program at a basic level for first-year students, he divided the story into short segments. Each video-sequence was followed by one or two basic comprehension questions.

The film itself is well-suited to such a treatment, since the plot contains several separate conversations. The story shows how a young couple move into a new apartment with their grand piano. The husband is a concert pianist and must practice several hours a day. The wife goes to several of the building's tenants asking for understanding in order to head off any future complaints. Although the dialogue is very predictable, with elementary introduction and question situations, the film was not produced for language instruction and several actors use colloquialisms with poor pronunciation. It would be a challenge for most intermediate students to understand all the elements of each conversation.

The IAV program development took about 40 hours of the instructors' time. The end product, which was finished in mid-March, could be completed by the student in 19 to 37 minutes, depending upon the number of incorrect answers give by him. The program was designed for use on a TI-99/4A microcomputer, interfaced with a Sony LDP-1000 laser-optical videodisc player. IN March 1983 the Department of Foreign Languages at the USAF Academy had two such usable stations. Except for the videodisc players, all the equipment was provided by Texas Instruments through a research agreement.

The second phase of the experiment, the first-year students (about 210 total) of German were divided into four groups on a random basis. Ten percent of the students in two courses were designated Group A and asked to take the comprehension test without viewing the film at all. The reaming students (about 190) were placed into three equally sized-groups, each of which viewed the film at different times and with varying levels of interactivity. The experiment lasted 10 class days, from 28 March to 8 April, 1983. The short (8 answer) comprehension quiz was given during (or immediately after) the initial viewing of the film, and then again 6 to 8 days later. (See Appendix A for copy of the quiz). The various methods of presentation dictated the manner in

which the quiz was administered.

Group A was used to validate the quiz. The students took the quiz in class on the first two days of the experiment. Because the quiz was very short, it was necessary to determine the extent of any guess factor that might influence results in other groups. The size of Group A was minimized in order to provide maximum participation in the other groups.

Group B watched the film twice on a 27-minute videotape and then completed the short comprehension quiz. The average time spent by the students in Group B was 35 minutes.

Group C watched the film once in its entirety, and then-on the second time through-saw the same video segments that were used in the IAV program. At the end of each video segment, the students were given 30 seconds to answer, on their answer sheet, a question displayed on the screen. The questions were the same as those appearing in the IAV program, with the obvious distinction that there was no feedback on the answers. These students completed the task in 35 minutes-also at a location outside the classroom, with a moderator timing the question frames on the TV screen.

The students in Group D were scheduled to go to the language laboratory individually and complete the IAV program under the direction of the lab personnel. the average time for each student was about 25 minutes, and all students had completed the program in the first 5 days of the experiment. Group D students were not given the comprehension test at the time they completed the IAV program, but saw the test; for the first time 4-8 class days later, when all groups (except A) were tested again on the same comprehension quiz.

Analysis of Results

The experiment yielded two scores for groups B and C, and one score for groups A and D. The results were analyzed using the Academy's Burroughs 6900 with programs from the *Statistical Package for the Social Sciences* (SPSS) (Nie, et al, 1975). The following charts show the differences among the group means within each course. Group A scores indicated that the comprehension quiz was indeed a valid test, since the average scores were well within expected ranges for a multiple-choice measurement. (See Table 1) It is interesting to note that there was a statistically significant difference between the Group A results and the two course levels. The beginner level (German 132) guessed more accurately than the intermediate student sin German 142. It is appropriate to mention here that students are placed in these two courses during their freshman year at the Academy, based on performance in a placement/validation exam prior to the start of the academic year.

The results from the second test are the most important for the purposes of this experiment. the differences in group means are all statistically significant at or beyond the level of .05. These differences indicate a decided advantage in comprehension for those students completing the IAV program. (See Table 2).

The determination of significance was made through the use of the ONE-WAY Analysis of Variance program of SPSS. In addition, a T-Test program performed on pairs of scores showed that only Group B and the German 132 course had a significant difference between the means from the two measurements. This fact reinforces the significance of the advantages for students completing the IAV program, since there was no other evident that Groups B or C were affected by the week-long wait before the second measurement.

Discussion and Recommendations for Future Research

The experiment with *Klavier im Haus* clearly shows an advantage with IAV over conventional methods of presenting a short film to first-year students. The Group B participants, who only watched the film twice, had an average score about 40% lower than those using the IAV. This differential was the same for both course levels. The interaction variable appears to be an important factor, as the Group C students scored much higher than their Group B counterparts. However, the mean scores from both levels of Group C were nearly 24% lower than the IAV Groups.

In future research, a retention factor could be evaluated if the non-interactive test groups were given feedback from their initial tests. Then the difference between individualized, computer-assisted feedback and that from an instructor could be measured.

Along this same line, it would be desirable to test the IAV group immediately after the students complete the program. This would provide the basis to measure any changes in comprehension score over a period of time-the retention variable. Some changes to the test itself would allow more discrimination between student scores. If the test did not use the exact wording from the IAV program, as was the case with *Klavier im Haus,* then one group of students wouldn't have an advantage.

Some recommendations for further study with this same video material, but with different programs, are also in order. An IAV program could be developed for *Klavier im Haus* that exploits the many colloquial or idiomatic expressions. A program of 20 to 30 minutes aimed at more advanced students could teach these expressions and also explain some of the cultural aspects found in the film. Such a program would allow the designer to go beyond the elementary use of interaction seen in this experiment. The designer could move away from the basic sequences of 1)video, 2) test, 3) remediation, 4) retest, and 5) confirmation. The student could be given more choices to direct the course of the program. Others have already developed some different program formats for this film, and these should be included in future research (DeBloois and Grund).

Conclusion

Our experience from this experiment has reinforced an opinion already stated by other educators: The limiting factor is no the equipment or technology, but rather the available software (Jorstad, 1980). In this case, the software needs were most significant in the area of suitable videodisc material. The less expensive alternative of videotape brings an undesirable increase in program dead time when the student must wait for the machine to find the tape location. This waiting may reduce the student's motivation and consequently the learning outcome. This is definitely another area where more study is needed, since there are differences in the costs of equipment and software (especially in small quantities). It may not be cost effective to spend the additional funds for videodisc capabilities if the program designer can overcome the disadvantages of the longer search-times needed by a videotape player. In fact, there is some evidence that videodisc is only necessary when the program contains still pictures as well as video sequences (Walker, 1979).

Modern educators certainly need more statistical data with which they can evaluate the purchase of sophisticated computer equipment. They also need more data on the less tangible costs associated with developing pedagogically sound IAV programs. The experiment with *Klavier im Haus* is a step along the path toward building a useful database of replicable research. More studies a the USAF Academy by Spanish and French instructors will expand that base so that we will have the necessary information to provide our students with the best possible language instruction it the limited time available to us.

Table 1
Score 1 (from 28-29 March 1983)

Course 132				Course 142			
Group	**No.**	**Mean**	**%**	**Group**	**No.**	**Mean**	**%**
A	(15)	2.93	36.6	A	(6)	2.17	27.1
B	(41)	4.15	51.9	B	(6)	4.47	55.9
C	(44)	4.84	60.5	C	(16)	5.25	65.6

Table 2
Score 2 (*Klavier im Haus* Experiment at USAF Academy)

Course 132 (5-6 April, 1983)				Course 142 (7-8 April, 1983)			
Group	**No.**	**Mean**	**%**	**Group**	**No.**	**Mean**	**%**
B	(41)	3.61	45.1	B	(15)	4.07	50.9
C	(44)	4.95	61.9	C	(16)	5.37	67.1
D	(41)	6.80	85.0	D	(15)	7.20	90.0

END NOTES

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Appendix A

"Test for *Kalvier im Haus*"

1. What do YOU think is the story line in Klavier im Haus? this young couple just moved into a new apartment with the grand piano, and:
   a. they both feel threatened by older tenants who dislike loud music
   b. they decide to ignore their nosy, new neighbors.
   c. they want to be considerate neighbors
2. How does Frau Weber respond to Hannelore's request?
   a. She thinks the Klingers are way out of line.
   b. She has no objections.
   c. She will go along with whatever Herr Kurai desires.
3. Why did the Winters invite Hannelore into their apartment?
   a. Frau Winter wanted to discuss her childhood experiences as a pianist. serving Schnapps.
   b. They were planning a traditional acquaintance ceremony serving Schnapps.
   c. They wanted to discuss a practice schedule that wouldn't disturb Herr Kurai.
   d. None of the above.
4. What were the expressions used by the third tenant (an unnamed man) to agree with Hannelore's request for practice time?
   a. von mir aus spielen Sie ruhig!
   b. Ich freue mich, wieder einen Musiker im Haus zu haben.
   c. Both A and B
   d. Ich habe nichts dagegen.
   e. None of the above - he didn't agree to anything.
5. What do we know about Herr Kurai? (after Hannelore had visited three other tenants)
   a. He's a crippled old man with no friends in the building.
   b. He is the building' Hausmeister, who decides most of the issues among the tenants.
   c. He's an influential resident who dislikes loud noises.
6. The suggestion offered by Frau Winter was that -
   a. She can talk Herr Kurai into leaving twice a day.
   b. She can give a signal when Kurai leaves or returns.
   c. the Klingers could move the piano to a lower floor, away from Kurai.
7. Was macht Ernst, als Herr Kurai in das Gebaude kommt?
   a. Er verlasst die Wohnung, weil die Nachbarn kein Verstandnis fur Konzertpianoisten haben.
   b. Er spielt Klavier, damit Herr Kurai ihn hort.
   c. Er geht zu Herren Kurai, um mit ihm zu sprechen.
8. Was ist geschehen? (Was ist mit Herr Kurai passiert?)
   a. Herr Kurai liebt diese Musik. Ernst soll weiterspielen.
   b. Er ist hoch gegangen! Er konnte den Larm nicht ausstehen.
   c. Herr Kurai hat gasagt: Ein Klavier in DIESEM Haus kommt NIE in Frage!