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ABSTRACT

To determine the effect of computer assisted instruction (CAI) on the learning of Associated Press (AP) style rules, a study compared students using CAI with students using the traditional pencil and paper method of style rule practice. Subjects, 49 college students in introductory journalism classes, were given a pretest consisting of ten sentences containing 27 style errors. Based on results from this test, students were randomly assigned to the traditional or computer treatment in a high knowledge or low knowledge classification. Students assigned to the traditional treatment were given a printed exercise of ten sentences containing 25 style errors relating specifically to capitalization and abbreviation rules. Using the AP Style Manual, students corrected the sentences, noting the time they began and ended the task. Students assigned to the computer group used the style manual to correct errors in the same ten sentences appearing on the computer screen. The computer program presented the sentences with three increasingly specific levels of feedback explaining usage errors. As students completed the practice exercise, they were given a printed sheet containing ten new sentences, testing the same rules. Using the traditional pencil and paper method, all students were asked to correct the errors without referring to the style manual. Results indicated that CAI had a significant effect on students' ability to apply correctly the AP style rules. The major difference appeared to be the feedback the CAI system provided. (Three tables of data are included, and 13 references are appended.) (MM)

COMPUTER ASSISTED INSTRUCTION IMPROVES AP STYLE SCORES

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Abstract

Computer-Assisted Instruction Improves AP Style Scores

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The rule-oriented, drill and practice type of learning the AP Style Manual necessitates lends itself handily to Computer Assisted Instruction. This paper describes a CAI program written in the Digital Authoring Language which presents practice sentences and three increasingly specific levels of feedback explaining usage errors built into the sentences.

An experimental test of students using the CAI program and those using the traditional pencil and paper mode of practicing style rules revealed the CAI program produced students better able to apply the style rules. A significant relationship between post test scores and treatment (computer or traditional) was found. Neither of the independent variables (time on task or previous knowledge of AP style) used in the analysis of variance and regression analysis was determined to be the cause of the relationship. The author concluded the effect was caused by the inescapable feedback built into the CAI program.

COMPUTER ASSISTED INSTRUCTION IMPROVES AP STYLE SCORES

Computer applications in journalism education exist in two distinct categories. The professional applications - information management, data bases, word processing programs and desktop publishing - have moved into classrooms and faculty offices with relative speed. Their acceptance is due to the availability of affordable priced commercial hardware, user-friendly software with increasingly specific applications and the clear advantage of time and cost savings to the user. Educators describe the teaching of writing (Oates, 1987; Renfro and Maittlen-Harris, 1987), student training in desktop publishing (Rubin, 1988), providing feedback on student work (Nager, 1984), grading (Rushing, 1987) and student record keeping (Taliaferro, 1984) as primary computer adaptions in journalism education.

The second category, interactive computer use for instructional support, is just beginning to become readily accepted. Although the technology has existed for many, many years, the cost of interactive hardware and the complexity of interactive programming languages have been two serious barriers to its acceptance. Major philosophical controversies about computer-assisted teaching caused problems for some instructors as did basic inexperience and lack of faculty and student comfort in computer use.

The acceptance of personal computers has helped change attitudes about the computer as an instructional tool and as the interactive hardware and software problems are being overcome, computer-assisted instruction (CAI) is making new headway in journalism education. Pavlik (1986) reports the availability of computer-assisted instructional programs to support the teaching of reporting, information strategies, public relations, advertising and graphics.

A recent article about Drake University's use of computers in journalism education focuses on word processing and desk-top publishing, but also briefly mentions a few CAI projects using the Apple Macintosh. One project combines information and simulation to teach the basics of television lighting. "Following a review by the program of the basic principles of lighting, students were required to light a television set on a computer drawn floor plan by using the mouse and cursor to place all of the major lights. The program scored the responses and prompted the student with additional information when asked" (Cheney, 1988)

Rayfield (1984) describes the instructional advantages of utilizing CAI as: the benefits of programmed instruction (including immediate feedback); demonstrated understanding of concept before advancing; unlimited patience at repeating lessons; automated record keeping for student and faculty; and freedom for the teacher to be involved in higher level instruction.

CAI programs range in complexity from simple information presentation and drill and practice exercises to sophisticated gaming situations and case simulation. Depending on the instructor's learning objective each level of complexity brings unique instructional support.

The CAI program examined here was written by the researcher in the Digital Authoring Language (DAL). It presents drill and practice exercises as instructional support for the teaching of *The Associated Press Stylebook and Libel Manual*. The requirement of a journalistic style competency is a basic learning objective for all journalism curricula and is one which lends itself readily to CAI programming because of the nature of the rule learning process.

Early style lessons focus on specific groups of rules, while later lessons draw from the gamut of AP style. The computer then reads the student's version of the sentence and responds in one of three ways.

If all of the errors in the sentence are properly corrected, the computer's response to the student is the phrase "Good for you." The program then presents the next sentence.

If the student's sentence is only partially correct, the computer provides individualized feedback for each error appearing in the original sentence. For example, if the first error in the sentence is accurately corrected, the programmed response is a positive comment identifying the error and the rule governing the correction. This feedback assures that a lucky-guess correction is identified and reinforced as to why the correction was accurate (Waldrop, 1984). If other errors remain in the sentence or have been inaccurately corrected/changed, the computer provides the first of three levels of response.

All three levels of response represent "information feedback," which "provides information that assists in correcting a previous error" (Carter, 1984). First level feedback offers a clue to the location of the error or errors remaining in the sentence.

After reading the first level responses for all the errors in the sentence, the student is asked to "Try Again" to type the sentence correctly. The process is repeated with the second level of feedback. A positive response to corrected errors is again provided while errors still remaining are now specifically identified. If the student fails a third attempt to type the sentence correctly, the final level of feedback provides the specific style manual rule needed to make the correction. The student then must retype the sentence correctly before moving on to the next practice sentence.

The program also calls attention to student-initiated typing errors and will not accept a sentence as correct if it includes any error.

THE EXPERIMENT

Given this carefully construction CAI program, the next step was to test its effectiveness as a teaching tool. Would practicing AP style rules using CAI do a better job of preparing students to apply those rules than the traditional pencil and paper practice method? The following hypothesis was tested.

> *Hypothesis:* Students in the computer treatment group will score higher on the AP style rule postest than students in the traditional (pencil and paper) treatment group.

This hypothesis was formulated based on two assumptions. The first assumption was that students using CAI would, because of the treatment, receive more feedback in the rule practicing process. They would be exposed to reinforcing feedback to correct answers and be required to read and respond to information giving feedback for incorrect responses. Students using the traditional practice method were reliant upon self-directed feedback.

The second assumption was that the more time spent on the practice exercises, the higher the score would on the post test. Because the computer treatment group would be forced to work through all the exercises and the necessary feedback levels, they would spend more time on the practice task than those using pencil and paper practice; therefore, the computer group would score higher on the post test.

The Sample

Student subjects (N=49) were randomly assigned from introductory public relations and advertising classes, two journalism department classes with large enrollments. These classes provided students at different points in their journalism studies representing all six of the department sequences.

Students were given a pretest consisting of 10 sentences containing 27 style errors. Those students scoring 50 percent or better on the pretest were classified as high knowledge, while those scoring below 50 percent were classified as low knowledge. Students were randomly assigned to the traditional or computer treatment within their high or low knowledge classification.

The Treatment

Students assigned to the traditional treatment, pencil and paper practice, were given a printed exercise of 10 sentences containing 25 style errors relating specifically to capitalization and abbreviation rules. Using the AP Style Manual, students were instructed to correct the errors in the sentences noting the time they began and ended the task.

Students assigned to the computer group were stationed at a computer terminal and assisted in logging onto the system. Their instructions, programmed into

the computer, were to use the style manual to correct the errors in the 10 sentences that would be appear on the screen. They were asked to note the beginning and ending times of their task. The practice sentences were identical for the two groups.

As each student completed the practice exercise, he/she was given a printed sheet containing 10 new sentences, but which tested the same rules on capitalization and abbreviation that the practice exercises presented. Students were asked to correct the style errors on the post-treatment sentences without referring to the style manual. All post-treatment tests were given by the traditional pencil and paper method.

Analysis

Using the BioMedical Data Program (BMDP), descriptive data was generated and the following analysis performed. In order to test the hypothesis, the effect of the independent variables (level of style rule knowledge and treatment group) against the dependent variable (score) was tested using an analysis of variance.

Because of the continuous nature of the time-on-task data, the ANOVA could not test this variable's effect on the score. Therefore, a Stepwise Regression was computed to determine the effect of time on the post test scores.

RESULTS

This study was conducted to determine the effect of computer assisted instruction on the learning and application of AP style rules. It was hypothesized that those students using CAI to practice style rules would be better able to apply those rules than students using the traditional pencil and paper method of style rule practice. The findings of the experiment support the hypothesis.

Descriptive data (See Table 1) revealed that high and low level of style rule knowledge made little difference in the time spent on the practice exercises. The mean time spent in practice by high knowledge participants was 41.2 minutes as compared to low knowledge participants who spent 38.5 minutes. There was, however, a great difference in the amount of time the two treatment groups took to complete the

practice sentences. Traditional treatment subjects spent 15 minutes on the exercises, whereas computer treatment subjects took almost four times as long to complete the same practice exercises.

Data describing post test scores revealed a one point difference between the mean scores for high (14.8) and low (13.7) knowledge level subjects. A difference in raw data scores exists between the treatment groups: the computer group's mean score was 15.6 and the traditional group's mean score was 12.6.

Table 1

Descriptive Date for Variables:
Time on Practice and Post Test Score

Time-on-Task*	**Mean**
High Knowledge Level (N=19)	41.158
Low Knowledge Level (N=26)	38.500
Traditional Group (N=19)	15.053
Computer Group (N=26)	57.577
Score on Post Test	**Mean**
High Knowledge Level (N=21)	14.857
Low Knowledge Level (N=28)	13.750
Traditional Group (N=23)	12.652
Computer Group (N=26)	15.615

*Number of minutes spent on practice exercises

The analysis of variance, using the post test score as the dependent variable, revealed one significant correlation. The relationship between the participant scores and their treatment group was significant ($p<.005$) and is summarized in Table 2. The fact that subjects in the computer group had scores significantly higher than those in the traditional group supports the experimental hypothesis.

A regression analysis was performed using the post test score as the dependent variable and time-on-task, knowledge level and an interactive variable, created by multiplying time-on-task by skill level, as independent variables. Table 3 shows there to be no significant relationships in the regression model. The

Table 2
ANOVA - SCORE AS DEPENDENT VARIABLE

Variable	Sum of Squares	Degrees of Freedom	Mean Square	F	Probability
Knowledge level	8.512	1	8.512	0.74	0.3948
Treatment	106.588	1	106.588	9.24	0.0039
Know/Treat	4.871	1	4.871	0.42	0.5190
Error	518.829	45			

correlation between time and the score obtained by the subjects was .1678, (R-SQUARE = .0281), indicating that less than 3 percent of the variation in the scores can be attributed to the amount of time the subject spent on the drill and practice exercises. All together the three variables entered into the regression accounted for 7 percent of the variance in the dependent variable.

DISCUSSION

The use of the computer as a teaching tool for AP style rules has a significant effect on the student's ability to apply those rules. As the analysis rules out any correlation between the time spent on the practice exercises and the

Table 3

Regression Analysis
Time-on-Task, Knowledge Level and Score

Variable	Multiple R	Multiple R Squared	F to Enter
Time-on-Task	0.1678	0.0281	1.25
Knowledge Level	0.2368	0.0561	1.24
Time/Knowledge	0.2802	0.0785	1.00

F = 8.59 df = 3,41

treatment groups, the differences between the treatments must be examined for an explanation of the significant finding.

The novelty of using a CAI program could have accounted for some of the higher performance displayed by the computer group; however, witnessing the group's frustration caused by their weak typing skills this explanation is not practical. On the other hand, the advantage of familiarity, which should have been with the traditional group, did not affect their performance positively.

Technology aside, the major difference between the two treatment groups is feedback. In order to complete the task, those students working on the computer were forced to pay attention to reinforcing feedback, when they accurately applied style rule and informational feedback, which pointed out unfound errors and forced the students to respond to that feedback by correcting the errors.

Those student using the traditional mode of learning were limited to the feedback they chose to provide themselves. This self-provided feedback is subject to several constraints. First, the student must recognize the existence of an error if he/she is to respond to it. If he/she does not recognize the error, the self-provided feedback system will not be initiated. Secondly, if the student recognizes the error, but makes a correction which is inaccurate, the student does not know his/her response is incorrect.

A third pitfall of self-provided feedback lies in the student's own ability to correctly interpret a style rule once he/she has determined the need to look it up. An incorrect interpretation may yield an incorrect response.

Finally, a student must be motivated to seek feedback in order to benefit from it and some students never seem to reach the motivational point for self-provided feedback.

The feedback provided in the CAI program follows a model of "modified program control" whereby the student chooses to enter the learning module, but can not exit until it has been completed (Waldrop, 1984). This limitation on learner control assures that accurate feedback an important component in the instructional goal, is viewed.

Further research to refine this program's instructional capabilities will test the length of the modules, the optimum amount of feedback, the organization of lessons and reviews and long-term retention of the style rules.

APPLICATIONS FOR PRACTICE

With the profession adopting computers in all areas, universities stressing computer literacy and journalism departments facing overflow enrollments, the application of CAI is a logical step in journalism education.

For mastery of rules learned through repetitive practices, like those necessary in teaching style or spelling or grammar, the interactive computer becomes the expert, providing relief to the instructor from the time consuming, individual coaching of students and grading of exercises.

For professionals, a CAI program like this one can provide a quick brush-up or first-time training skills to the non-journalistically trained person who must rapidly learn to use a journalist style.

Beyond simple drills and exercises, the future of CAI holds complex case study opportunities which can realistically reflect a variety of outcomes based on a variety of possible decisions. One day soon, a computer programmed with expert opinions will be able to judge a student's ability to prioritize facts in a news story; to evaluate a student's skill in cropping a photograph for emotional impact, to provide evaluation of a student's budgeting decisions for a public relations campaign; or, in some other way, provide expertise which will aid the student in the learning process.

Applications for all of the areas encompassed by journalism education will benefit from computer-assisted instruction as time and resources become available to journalism faculty to make computer-assisted instruction an important part of our tea[illegible]ire.

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