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ABSTRACT

This paper reports the results of observation skills training via an interactive multimedia training program for preservice teachers at Lincoln University (Missouri). The training program provides multiple videos for users to practice six types of observation methodologies, comparisons to "expert" data, and on-line access to procedural information. The study provides an analysis of audit trail records, user surveys, and pre-post testing of observer reliability to ascertain relationships between computer experience, prior classroom experience, learning strategies, engagement time, and program efficiency. Sample screens from the multimedia training program are included. Four tables present data on: observation reliability score outcomes for two observational methodologies; relationships between outcomes and learner differences; relationships between outcomes, learning style differences, and semester; and relationships between outcomes and practice strategy differences. (Author/DLS)

Multimedia Training in Classroom Observation: Pathways to Proficiency

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Abstract: This paper reports the results of observation skills training via an interactive multimedia training program for preservice teachers. The training program provides multiple videos for users to practice six types of observation methodologies, comparisons to "expert" data, and on-line access to procedural information. The study provides an analysis of audit trail records, user surveys, and pre/post testing of observer reliability to ascertain relationships between prior computer experience, prior classroom experience, learning strategies, engagement time, and program efficiency.

1 Background to the Study

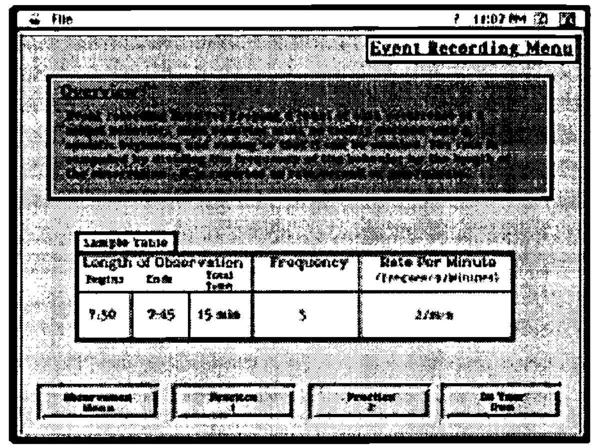
The purpose of this study was to examine the effectiveness of a multimedia training program to develop proficiency in classroom observation skills of preservice teachers. The training program was delivered through an interactive videodisc format which offers multiple videos for teachers to practice six types of observational methodologies: event recording, duration recording, latency recording, interval recording, time sampling, and A-B-C analysis [Fitzgerald 96] [Semrau 96]. For each video-based practice, the computer program controlled the start and stop frames, provided a timer, and provided user control over practice sequence. Users entered their observation results into the computer program and compared their data to that of "experts." Two unique features in the design of the multimedia training program are: 1) one video is "saved" to provide a constructivist experience for the user to define behaviors for each of the observational methodologies, and 2) procedural information for the six observational methodologies is available on-line for easy review.

Training in classroom observation skills is a complex and time-consuming process. To learn to code behavior reliably, an observer must learn to identify behaviors accurately, watch and code multiple behaviors in real-time, and apply these skills to varied and dissimilar settings. The usual training method involves an apprenticeship model where a teacher explains the procedure, demonstrates via videotapes, provides practices through videotapes and field assignments, and undertakes reliability testing with tapes, if at all. It is not feasible to spend the necessary amount of practice time for classroom observation training within most teacher education programs; thus mastery of methodology or reliability is rarely documented [Fitzgerald, 1995].

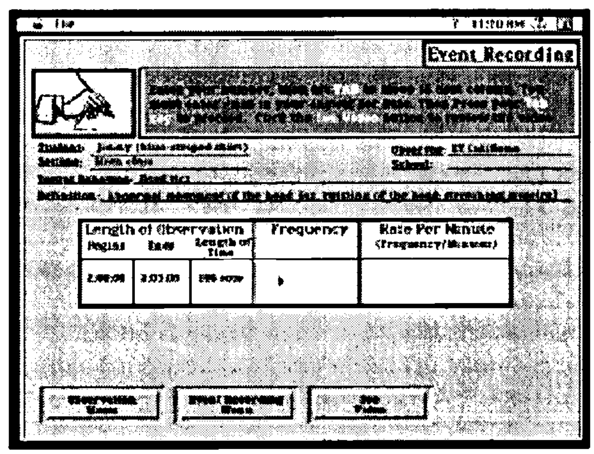
Interactive multimedia training provides one solution to the problem of observation training, practice, and reliability testing. Through repeated practice with videos and "expert" comparisons, a novice can practice until proficient and establish coding reliability. With the capability of accessing procedural information regarding observation methodologies, a novice can review procedures if questions arise during practice. Since a hypermedia format allows users to make personalized decisions regarding practice sequences and strategies, the format may provide an effective training alternative to the typical apprenticeship model in observation training.

2 Description of the Multimedia Training Program

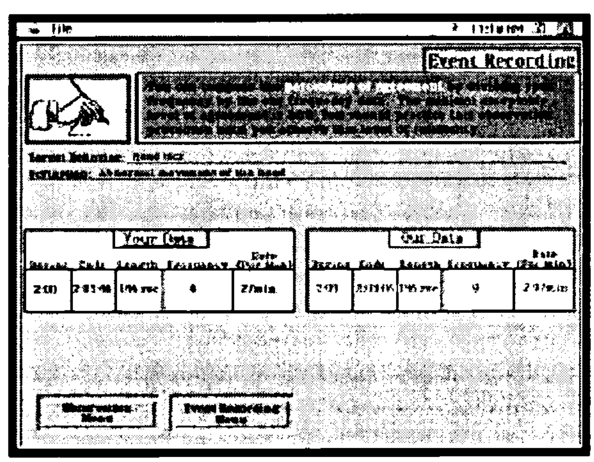
This screen introduces the user to the particular observational methodology to be practiced. In this example, the user is practicing Event Recording. A brief description of the methodology provides general information necessary to begin the practice. If the user requires further information, he/she may access procedural information from the on-line resource section of the program. A sample table gives the user an example of how event data are recorded. The user chooses from three possible videos for practice, two which include expert observation results and one that does not. The observation practice "Do Your Own" can be used as a constructivist activity for defining behaviors of interest to the user.



After the user runs the video and collects his/her observation data, the data entry screen appears. At this step, the user can elect to run the video again or enter the data which he/she has collected into the program. The computer screen provides the exact length of the observation period to enable the user to compute rate data for the observed behavior. These data entry screens are matched to each type of observation methodology which vary in the number of children and behaviors observed and the method for computing rate data.



After the user enters his/her data into the computer, the expert comparison data screen provides comparative results. The screen displays both the user's results and the results of experts who observed the same observation video. Information at the top of the screen explains how the user can compute his/her "percentage of agreement" (reliability) between the two sets of data. At this point, the user may go back and practice this observation segment again, select another segment to practice, or return to the main menu and select a new methodology for practice.



Audit Trail

The program records embedded data paths that are invisible to the user. These paths collect information such as the overall length of time the user engages in the program, the length of time spent in each methodological section, the number of times a video is accessed, and the observation results entered by the user for each practice. For example, in the above practice, the computer records the frequency and rate data entered by the user for that particular practice semester. The audit trail provides a cumulative record of all practices and observational results and enables the researcher to examine factors which may relate to successful learning.

3 Description of the Research Study

3.1 Research Questions

The study was designed to address the following research questions about the use of hypermedia-design practice materials for learning classroom observation skills:

(1) What effect does a hypermedia-designed practice program have on performance outcomes for preservice teachers learning classroom observation skills?

(2) Do performance outcomes for preservice teachers relate to differences in prior computer experience,
prior hypermedia experience, prior teaching experience, learning style preferences, or semester?

(3) What practice strategies predict successful performance outcomes for preservice teachers learning
classroom observation skills through a hypermedia-designed practice program?

3.2 Methodology for Implementing the Multimedia Training Program

The observation training program was integrated into special education methods courses during three semesters at Lincoln University. Following pre-testing, the instructor provided instruction in observation skills prior to the students' use of the multimedia program. The instruction included content and procedural information and a demonstration of each methodology. During these introductory sessions, students could ask questions about the observation procedure and clarify the required observation steps. Students were then required to practice the observation methodologies using the multimedia training program in the computer lab. The basic expectation was that each student use all available practices with the suggestion that practices be repeated if the user's data did not match the expert data by 80% agreement. Students received extra credit for their participation, but their level of proficiency was not used in computing the course grade.

3.3 Participants

Subjects included 29 preservice teachers enrolled in special education methods courses. All students were undertaking foundational coursework prior to student teaching; students in the summer session had prior knowledge of special education methodology; fall and spring session students had little prior knowledge. Demographic information was collected via user surveys and served as independent variables.

Prior Computer Experience. All but two participants had a moderate level of experience using computers across a number of areas of computer applications; the remaining two had minimal experience. Based on a scale where students rated their experience from 0 = "no knowledge" to 9 = "expert knowledge" on 9 categories of computer applications (total score possible = 81), the mean prior computer experience score = 29.7, standard deviation = 14.6 , range = 2 to 53. Most students had never experienced hypermedia, and those that had, indicated they had limited knowledge of hypermedia. Using the sub-scale for rating experience with hypermedia (item score possible = 9), the mean prior hypermedia experience score = 0.9, standard deviation = 1.4, range = 0 to 5.

Prior Teaching Experience. Since the subjects were enrolled in an initial teaching certification program, few had direct, salaried, classroom teaching experience. Of the seven with teaching experience, they had been primarily employed as teacher aides or substitute teachers. The mean years of prior teaching = .88, standard deviation = 2.03, and range = 0 to 7 years.

Learning Styles. Participants represented a mix of learning styles as assessed with the Kolb *Learning Style Inventory* (McBer & Company, 1981). Using the 4 learning style types defined on this instrument, there were 9 students identified as assimilators, 9 as divergers, 8 as accommodators, and 3 as convergers.

Semester. Participants were included in the study over a three-semester duration. The numbers of students for the semesters are: summer = 7, fall = 16, and spring = 6. There were some implementation differences across the semesters particularly affecting the duration of practice time prior to post-testing.

4 Data Collection for the Dependent Variable

The dependent variable for the study was observation proficiency measured by *pre- and post-testing* on two different types of observation methodologies—event recording and interval recording. Matched pre- and post-tests were administered using original videos controlled by the computer to standardize test administration. In the event recording test, subjects watched 5-minute videos and recorded the frequency of occurrence of a defined behavior. In the interval recording test, subjects watched 5-minute videos and recorded on-task in each of 50 six-second intervals. Percentage of agreement scores (reliability) were computed for each of the pre- and post-tests.

Path analysis data were compiled from the on-line audit trails and user practice logs. Through these logs, practice strategies were examined by analyzing each user's number of repeated practices, total practice time in the program, number of times the procedural information module was accessed, total time spent reviewing procedural information, and proficiency on two related observation practices: *interval practice #2* and *time sampling practice #2.* These two internal practices were used to ascertain proficiency of users during practice.

5 Data Analysis, Results, and Interpretation

5.1 Question 1: Performance Outcomes

A paired t-test was applied to the pre- and post-test results to determine the effect of the hypermedia-design practice program on observation skill proficiency. The scores represented the percentage of agreement (reliability) to expert data. Pre-to-post test results were not significant for <u>event recording</u> (t (24) = .959; p = .35) but were found to be significant for the <u>interval recording</u> methodology (t (24) = 3.88; p =.001). Table 1 displays the means and standard deviations for the reliability scores.

The small variation found in pre- and post-scores for both event and interval tests suggests the difficulty level of these tests is not high enough to provide accurate assessment of observational ability by the participants in these areas. In addition, the narrow range of scores exhibited limits the effectiveness of the regression analysis. In the future, more robust pre/post measures might ensure greater assessment of proficiency.

Further recommendations include increasing the number of practices available to users within the program. The ability to check one's scores with the results of the "experts" is an integral and essential part of the program; however, once these results are seen, repeat practices are compromised, essentially allowing for only two "unique" practices in each observational method. Additional practices would increase the amount of unique experiences available.

	Pre-test Reliability		Post-test Reliability	
	Mean	S.D.	Mean	S.D.
Event Recording	79.74	20.16	85.78	14.14
Interval Recording	78.98	7.02	84.32	5.06

Table 1. Observation Reliability Score Outcomes for Two Observational Methodologies

5.2 Question 2: Relationships between Post-test Outcomes and Learner Differences

Simple regressions were run to evaluate whether outcomes of the observation training program were related to learner differences. Table 2 presents the regression results for the post-test outcome scores related to three independent variables. No significant relationships were found to indicate that prior computer experience, prior hypermedia experience, or prior teaching experience with children predicted the outcomes for learning observation skills.

	Post Event Recording			Post Interval Recording		
	r	*F*-value	*p*	*r*	*F-value*	*p*
Prior Computer Experience	.115	.293	.59	.088	.173	.68
Prior Hypermedia Experience	.195	.271	.36	.112	.281	.60
Prior Direct Teaching Experience	.241	1.361	.26	.176	.704	.41

Table 2. Relationships between Outcomes and Learner Differences

To evaluate whether outcomes were related to learning styles or differences across the three semesters, ANOVAs were run learning style and semester as factors. As shown in Table 3, no significant differences in learning outcomes were related to learning styles of the participants or to semester.

		Post Event Recording			Post Interval Recording		
	n	Mean	*F*-value	*p*	Mean	*F*-value	*p*
Learning Style Type			1.303	.30		.443	.72
Assimilator	8	87.94			84.75		
Diverger	8	79.69			83.50		
Accommodator	7	88.50			83.71		
Converger	2	100.00			88.00		
Semester			1.78	.19		1.37	.27
Summer	7	92.86			86.57		
Fall	12	80.79			84.17		
Spring	6	87.50			82.00		

Table 3. Relationships between Outcomes, Learning Style Differences, and Semester

The subject pool for this study exhibited a high level of homogeneity in prior computer experience, prior hypermedia experience, and prior teaching experience. As a whole, most subjects had a moderate amount of computer experience, minimal hypermedia experience, and little, if any prior teaching experience. This limited range of experiences negatively impacts the effectiveness of the regression analysis. The small number of subjects also limits accurate evaluation, particularly with regard to subjects' learning styles. Further studies, therefore, would greatly benefit from a larger and more diverse subject pool.

5.3 Question 3: Relationships between Outcomes and Practice Strategies

Path analysis data were used to examine relationships between successful learning outcomes on the interval post-test and strategies used during practice on the multimedia program. Simple regressions were run to evaluate whether outcomes of the observation training program were related to differences among the subjects in how they utilized the program capabilities, amount of practice time, and proficiency levels during practice on the more rigorous methodologies. Table 4 presents the regression results pertaining to audit trail data. No significant relationships were found to indicate that different ways subjects utilized the program affected their performance outcomes.

The number of practices and amount of total time spent in the program exhibited a better distribution among the subject group. However, both were found to be insignificant to successful learning outcomes.

The available review section in the hypermedia program was largely unused by the subjects because of the amount of procedural knowledge provided by the instructor. This reduced the importance of such a knowledge source in the hypermedia program. Therefore, it is recommended that hypermedia developers consider the environment in which the program is to be used and determine the necessity of such a

	Post Interval Recording		
	r	F-*value*	*p*
Number of Repeated Practices	.233	.974	.34
Total Practice Time	.091	.143	.71
Number of Accesses to Procedural Information	.082	.155	.70
Total Time Accessing Procedural Information	.028	.018	.89
Proficiency on Interval #2 Practice	.226	1.243	.28
Proficiency on Time Sampling #2 Practice	.057	.055	.82

Table 4. Relationships between Outcomes and Practice Strategy Differences

6 Summary

Interesting questions emerge regarding the effectiveness of an interactive multimedia training program for developing observation skills. Because the program allows users nonlinear access to practice segments, expert comparisons, and access to procedural resource information; the learning strategies of users differ. The findings from this study provide multiple data points from audit trail records, user surveys, and pre/post testing in observation skills to examine the correlates of observation proficiency: prior computer experience, prior classroom experience, learning strategies during training, and total engagement time with the program.

Students utilizing this program appeared to learn observation skills equally well, regardless of different learning styles or their prior experiences with computers or in the classroom. Given the limiting factors of a small and homogeneous subject pool, this study nevertheless suggests that a hypermedia-based practice environment minimizes the effect of learning style and experience differences between users in terms of overall outcome of observation proficiency. This study therefore lays the groundwork necessary for further study of the equalizing potential of hypermedia-based learning.

The study is important in establishing how preservice teachers utilize an interactive multimedia learning environment for observation skills training, the resulting outcomes for observation proficiency, and overall training efficiency of the multimedia program.

7 References

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