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COMPUTER USE AND NURSING RESEARCH

CAI Versus Traditional Learning

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Acquisition and retention of nursing skills are important requisites for nursing practice. Yet, as with many of the 91 basic nursing skills baccalaureate nursing students need to master, instruction is often time consuming and costly (Larson, 1982). The current shift from traditional methods of instruction to computer-aided instruction is timely.

In reviews of educations (Kulik, Kulik, & Cohen, 1980) and nursing (Chang, 1986) literature, the use of computer-aided instruction (CAI) has been found to be just as effective as lecture and classroom methods in terms of knowledge and skill acquisition. The major benefit to the educational process has been the amount of instructional time saved. Some studies also provide anecdotal comments on the development of positive feelings and attitudes on the part of students. With the exception of a few studies such as Kirchhoff and Holzemer (1979), Lassen (1984), and McCabe (1985), learning styles have not been addressed in nursing.

The purpose of this pilot study was to examine the extent to which learning style (or styles) influence cognitive learning and retention in nursing students. Kolb's (1978) descriptions of styles of learning were used in this study: the (a) converger, (b) diverger, (c) assimilator, and (d) accommodator. The convergers include individuals who prefer abstract conceptualization and active experimentation. Divergers prefer concrete and reflective observation and are good at generating ideas. Assimilators prefer abstract conceptualization and reflective observation and excel at assimilating diverse items into an integrated whole. Last, the accommodators are those

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498
individuals who prefer concrete experiences and active experimentation. Researchers have demonstrated that when students’ learning style is matched with teaching strategies, academic success is positively influenced (Cranston & McCort, 1985). It seemed reasonable that students with an assimilator style of learning would prefer to use the computer as a learning tool.

HYPOTHESES

(1) The experimental and control groups will both demonstrate statistically significant increases in gain scores between pretest and posttest.
(2) The experimental group manifesting an assimilator style of learning will demonstrate significantly higher scores on an immediate and 6-week repeat posttest than control students manifesting an assimilator style of learning.

METHOD

Sample

A random assignment, two-group (experimental and control) pre and post repeated measures design was used. Twenty-three junior undergraduate nursing students who were enrolled in a baccalaureate nursing program at UCLA School of Nursing in the fall of 1986 were assigned randomly into either an experimental (CAI) or a control (lecture) group. The experimental group contained 14 subjects, who ranged in age from 20 to 24 years, with a mean of 21 years. The control group contained 9 subjects, who ranged in age from 20 to 28 years, with a mean age of 22.6 years. Students with or without previous CAI experience were nearly equally divided.

Procedure

The CAI module on range of motion was designed to include content units that covered a general review of the maintenance of mobility in the hospitalized patient. Content included information specific to the nurse’s role in patient assessment, and providing normal joint movement and therapeutic exercise. Content validity was achieved by a review of the literature and an expert panel of three undergraduate faculty members.

After the pretest was taken by the class, the students were randomly assigned to the experimental and control groups. After the experimental group received an orientation to the use of the computer, they viewed the CAI module on range of motion. The control group attended a 2-hour lecture that covered the same content area as the CAI module presented by an undergraduate faculty member. To avoid
contamination, students in the experimental group completed the program the same
day that the control group was given the lecture. The posttest and the retest were
completed by the entire class. The retest was performed 6 weeks after the original
pretest.

Instruments

Cognitive learning. This variable was assessed by a 20-item true-false and multiple
choice achievement examination that covered the content presented in either lecture
or CAI. A score ranging from 0 to 20 was possible. Content validity of the instrument
was assessed by a thorough review of the literature and an expert panel of five clinical
and academic faculty. Retention was assessed by the cognitive learning instrument
administered 6 weeks following the posttest.

Learning style. Learning style was assessed by Kolb’s (1976) Learning Style
Inventory (LSI), an instrument that assesses learner preferences for specific ways
of learning. The LSI is a nine-item self-description questionnaire. Respondents are asked
to rank-order four works in a way that best described one of the four learning modes:
concrete experience, reflective observation, abstract conceptualization, and active
experimentation. Split-half reliability measures were reported within the range of 0.37
to 0.86 across the four scales.

Results and Discussion

Analysis of t-tests revealed that there were significant increases in gain scores for
both groups. Therefore, Hypothesis 1 was supported: Students taught by lecture and
CAI equally learned range-of-motion content.

Hypothesis 2 was not supported. No significant differences were found in learning
scores on an immediate and a 6-week posttest for the experimental and control groups
manifesting the assimilator style of learning.

CAI was shown to be as effective a method as the lecture. Although the retention
scores at 6 weeks were not found to be significantly different between the groups, the
CAI group did learn the material in about one half as much time as the control group.
Savings of time would allow the instructor to spend more time with students who
need help.

Results of the study indicate that CAI in nursing school curricula can teach
required content as well as provide supplementary experience for students with
particular learning needs. Although the novelty of a new teaching strategy may add
significantly to an increase in scores over the lecture method, the effect may be only
temporary. Thus the need to assess various audiovisual forms that have an impact on
a learner’s style is apparent in order that knowledge retention be enhanced.

CAI as an instructional strategy has substantial potential for enhancing the
student-teacher ratio and improving the quality of nursing education by utilizing
reinforcement. CAI may lessen the problem of too much to learn in too little time.
NOTE

1 The support of an Educational Improvement Spencer Grant through the Department of Education, UCLA, is acknowledged; the first author was the principal investigator. Correspondence should be sent to Dr. Adeline Nyamathi, UCLA School of Nursing, 405 Hilgard Ave., 4-258, Los Angeles, CA 90024-1702.

REFERENCES