THE DEVELOPMENT OF A TEACHING MODULE FOR NURSING STUDENTS ON DRUG USE INFORMATION*

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One of the important factors in maintaining good health is the responsible management of one's body. Minor aches and pains can arise without endangering our health, but the treatment of these ailments can prove hazardous. †Increasingly, our society looks to over the counter (OTC) drugs as a panacea — a panacea whose drawbacks and possibilities are not widely known.

The fact that OTC drugs are used in large amounts in our society is well established. Di Palma (1974) states that the American public purchases 12,000 tons of aspirin annually, enough to provide almost 300 tablets per person. The people purchasing and consuming these drugs need information and guidance to use them properly. Without adequate instruction OTC drugs can become misused and pose a serious health hazard.

Medical intervention is therefore needed at the preventive stage. Nurses can help meet this challenge by stimulating public awareness of OTC drugs through educational programs.

The overall purpose of this study is to influence public knowledge by developing a teaching program which will result in the safe, responsible use of OTC drugs. The study will be developed in stages. First, it is hoped to develop a reliable teaching strategy which will prepare the nurse with adequate knowledge to teach OTC drugs effectively. Then community teaching programs will be developed for individual and group sessions, and the nurse's teaching strategies evaluated. Once effective teaching strategies have been established it is hoped to develop a variety of community programs for OTC drugs. Based on the results obtained in the initial phases of this study, it is hoped self-study instructional program and evaluation strategies will be developed to establish the effectiveness of these programs.

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*This research was supported by a grant from the Sterling Drug Company, Aurora, Ontario.

†For the purposes of this study OTC drugs will be defined as those items purchased for the alleviation of minor, self-limiting ailments without the advice or prescription of a physician.

A review of nursing curricula suggests that nurses may have limited knowledge of OTC drugs. Provision of educational materials which would be readily available in hospitals and in the community might help overcome this deficiency. For this reason instructional material in a programmed learning format was chosen for this study as a vehicle to impart the knowledge to the practicing nurse. Programmed learning is defined by Gibbons (1971) as "programmed teaching by text and machine with each segment of the course divided into small, but rigorous steps, each of which is rewarding." The written programmed learning format developed in this study provides all the information needed to prepare for teaching sessions with individuals and/or groups in the community.

The initial programmed instructional module was developed using Acetylsalicylic Acid (ASA) as the drug prototype because it is one of the most commonly used OTC drugs and because of the risks of misuse. Once the ASA program has been developed and the format tested, the results of this study will be used to develop programs for other widely used OTC drugs such as laxatives and vitamins. The problem identified for the first phase of the project was to determine the most appropriate teaching strategy to impart knowledge of an OTC drug, ASA.

A review of the literature indicates the development of programmed learning. Mager (1962) contributed to the development of objectives for programmed learning and Popham (1975) helped establish instructional sequences. As early as 1962, Brown applied programmed learning to mathematics with empirical data showing achievement equal to, but not significantly better than, traditional methods. More recent studies using the computer form of programmed learning show results similar to Brown's. Taylor (1974), Johnson (1966), and Katz (1971) all investigated the effects of programmed learning by computer and found no significant differences in achievements compared with traditional methods. Studies have been done using the computer form of programmed learning in nursing education. Bitzer (1973) and Collart (1973) used computer programmed learning in nursing with results similar to studies in other disciplines. Achievement was equal to traditional methods but not significantly higher.

It was concluded from a review of the literature that programmed learning has produced as much learning as traditional instruction, but further studies are needed to establish the effectiveness of this form of instruction. The first phase of the ASA project was then

instituted to determine the effectiveness of programmed learning as a teaching strategy to prepare the nurse to teach the OTC drug ASA.

Two assumptions have been made in the formulation of the hypothesis for this study. The first is that self-study in the programmed learning format will be an effective means of preparing the nurse to teach OTC drugs. The second is that the development of an effective teaching module using ASA as the drug prototype can be applied to other OTC drugs effectively.

A research hypothesis along with two null hypotheses have been formulated:

Research Hypothesis:

Nursing students using the programmed learning methodology will achieve significantly higher posttest scores than nursing students taught by the lecture method.

Null Hypothesis:

1. There will be no significant difference in the posttest achievement scores of the nursing students receiving a programmed learning module and the students receiving a lecture in ASA.
2. There will be no significant differences in retention by the nursing students receiving a programmed learning module than by nursing students receiving a lecture in ASA.

A volunteer sample from students throughout the four years of the baccalaureate program was used. Although subjects were at different levels in their nursing course, a gain in knowledge was demonstrated by a difference in the pretest posttest results of all students.

The program was available in French and English. The French program was a direct translation from the English, so test results were analyzed together.

The study sample began with 99 volunteers. Of this sample, 74 completed the pretest posttest, indicating a 25.25% drop out. Only the scores of those completing the pretest and posttest were studied for achievement as suggested by Campbell and Stanley (1972). Fifty-nine subjects completed the posttest for retention, indicating a 20.27% drop out from the posttest.

The subjects were randomly assigned to an experimental group and a control group. The experimental group was then assigned to the module and the control group to the lecture. The pretest was given to both groups before the experimental group was given the module. The experimental group was allowed a period of two weeks for com-

pletion of the module. The control group was given a 90-minute lecture at the beginning of this two-week period. Students attending the lecture were instructed to follow their established study style for lecture material with their knowledge of the lecture content to be tested in two weeks. They could take notes if they wished. At the completion of two weeks both groups wrote the posttest. Six weeks from the writing of the posttest, the postposttest for retention was written by both groups.

The module was written in programmed learning format with an instructional sequence for each of the 12 objectives of the program. The lecture was given using the 12 objectives of the instructional program in the module. In this way the content covered in the lecture was very similar to the content of the module.

The pretest and posttest were in the form of a case study questionnaire. The number of correct points given under each question was scored for a total mark. There was a possible total of 56 points on the pretest and 64 on the posttest. There was an eight-item difference on the posttest due to the possibility of identifying a greater number of adverse side effects. The postposttest was an objective recall questionnaire for a possible 17 points. The pretest and posttest took approximately 20 minutes to write while the postposttest took approximately 10 minutes.

The Campbell and Stanley (1972) experimental design number four was used, (i.e., a pretest posttest control group design with a postposttest for retention). Analysis was by pretest posttest gain scores to compute a t test result between experimental and control group to the 5% (p=.05) level of probability. A one tailed t test analysis was used to test for a significant difference between the experimental and control group.

Results:

Table 1 presents the mean experimental and control achievement scores for the students at the four levels of the nursing program for the pretest, posttest and postposttest. The use of a volunteer sample resulted in a difference in the size of the groups between each year.

Table 2 presents the total scores from the entire sample at the four levels. Scores from the entire sample were used to compute the standard deviation and t test for significance.

Table 3 shows that t ratios of significance at the 5% (p=.05) level of significance and at the 1% (p=.01) level of significance for the posttest and the postposttest.

TABLE 1

MEAN ACHIEVEMENT SCORES BY EXPERIMENTAL AND CONTROL GROUPS

GROUP	PRETEST	POSTTEST	POSTPOSTTEST
FIRST YEAR			
EXPERIMENTAL	8.11(18)	22.33(18)	12.31(16)
CONTROL	7.31(19)	22.42(19)	11.06(16)
SECOND YEAR			
EXPERIMENTAL	14.33(6)	30.00(6)	11.20(4)
CONTROL	15.00(5)	26.00(5)	9.35(3)
THIRD YEAR			
EXPERIMENTAL	16.75(8)	31.62(8)	13.33(6)
CONTROL	13.33(9)	29.00(9)	12.40(5)
FOURTH YEAR			
EXPERIMENTAL	16.75(4)	24.25(4)	9.00(4)
CONTROL	10.40(5)	27.80(5)	9.20(5)

NOTE: The numbers in parentheses indicate the number of students who completed the test.

We fail to reject both null hypotheses based on results of analysis disclosed in the one-tailed *t* test. Although the group mean was higher in the posttest and postposttest, analysis indicates the degree is not significant. We conclude that there is no significant difference in achievement by students receiving the programme learning module over students receiving the lecture in ASA. We also conclude that there is no significant difference in retention between students receiving a programming learning module and students receiving a lecture in ASA.

Certain problems in design and control of variables were recognized. First, the volunteer sample could affect internal validity by possibly drawing only high achievers to the program. Second, experimental mortality was a problem. This was mainly due to the timing of the project started in mid-February which was late in the academic year, and mortality rates reflect this. The project was completed in April which meant students had assignment and exam pressures during the project testing sessions.

TABLE 2

MEAN AND STANDARD DEVIATION OF TOTAL SAMPLE SCORES

GROUP	PRETEST	POSTTEST	POSTPOST TEST
Experimental			
Mean	10.97	25.88	11.93
Standard deviation	3.76	8.06	3.59
Number of students	36	36	30
Control			
Mean	10.15	25.15	10.78
Standard deviation	4.49	8.68	3.20
Number of students	38	38	29

Another recognized problem was the time involved for experimental and control groups. Students were asked to fill out an evaluation questionnaire at the completion of the program. Results showed the average time spent on the program for the experimental module group was eight hours compared to three hours for the control lecture group. The experimental group was asked if they found the module long and tedious. Forty-two percent agreed and fifty-seven percent disagreed. It was evident the programmed learning module was more time-consuming but the majority of students doing the programmed module said they enjoyed doing it and liked the freedom to work at their own pace.

Limited statistical analysis was another problem. Due to a lack of time and funds, only the t test of significance was done. Future phases of the study should include F test comparisons, correlation studies and item analysis.

In summary it appears that the programmed learning teaching module is at least as effective as the lecture method. Results did not show a significant difference in achievement but the programmed learning module should be accepted as an alternative to traditional teaching methods.

TABLE 3

t RATIOS FOR THE POSTTEST AND POSTPOSTTEST

Group	t test results	99% levels confidence	95% levels confidence
Posttest			
Experimental M 26 S 8.06 N 36	.59	99 t 72	95 t 72
Control M 25 S 8.68 N 38		2.65	1.99
Postposttest			
Experimental M 11.93 S 3.59 N 30	.78	99 t 50	95 t 50
Control M 10.78 S 3.20 N 29		2.68	2.01

NOTE: M represents mean of total scores
S represents standard deviation of total scores
N represents total number of students in the group

On the basis of the results received, it can be concluded that the teaching module developed could prove to be an effective means to prepare the nurses to teach OTC drugs. Revision of the material should be considered to reduce the length of the module and to eliminate repetition where possible. Projects should be implemented earlier in the year, so as not to coincide with final exams.

Following correction and revision of the teaching module developed, the project will move into the next phase. The ASA module will be studied for effectiveness by application in the community. The ASA teaching module developed in the first phase of this study will be used to develop educational programs for other widely used OTC drugs and to promote safe, responsible use of these drugs.

REFERENCE LIST

Bitzer, M.D., and Bitzer, D.L. Teaching nursing by computer: An evaluative study. *Computers in Biology and Medicine,* 1973, *3,* 187-204.

Blatchley, M.E., Herzog, P.M., and Russell, J.D. Effects of self-study on achievement in a medical-surgical nursing course. *Nursing Outlook,* 1978, *26* (7), 444-447.

Brown, O.R. A comparison of test scores of students using programmed instructional material with those of students not using programmed instructional materials. *Technical Report University of Illinois,* 1962, *3,* 1-25.

Campbell, D.T., and Stanley, J.C. *Experimental and quasi-experimental designs for research.* Chicago: Rand McNally, 1972.

Collart, M.E. Computer assisted instruction and the teaching-learning process. *Nursing Outlook,* 1973, *21,* 527-532.
DiPalma, J. Aspirin, wonder drug or placebo. *RN,* 1974, *37,* 55-62.
Gibbons, M. *Individualized Instruction: a descriptive analysis.* New York: Teacher's College Press, Columbia University, 1971.
Johnson, D.C. *Computer-mediated instruction in mathematics.* (Preliminary reports No. 1 and 2), University High Schools. University of Minnesota, 1966.
Katz, S.M. *A comparison of the effects of two computer augmented methods of instruction with traditional methods upon achievements of Algebra-two students in a comprehensive high school.* Unpublished doctoral dissertation, Temple University, 1971.
Mager, R.F. *Preparing instructional objectives.* Belmont, Ca.: Flaron, 1962.
Popham, J.W. *Educational evaluation.* Englewood Cliffs, N.J.: Prentice-Hall, 1975.
Robinson, L.A., Roper, K.E., and Fischer, R.G. Nursing considerations in the use of non-prescription analgesic-antipyretics: Aspirin and Acetaminophen. *Pediatric Nursing, 3* (4), 18-24.
Romankiewicz, J.A., and Gotz, V. To improve patient adherence to drug regimens: An interdisciplinary approach. *American Journal of Nursing,* 1978, *78, (7),* 1216-1219.
Taylor, S. et al. *The effectiveness of CAI.* Paper presented at the Annual Convention of the Association for Educational Data Systems, New York, May 8, 1974.

RESUME

ENSEIGNEMENT PROGRAMME A DES ETUDIANTES-INFIRMIERES SUR LES MEDICAMENTS VENDUS SANS ORDONNANCE

Plusieurs médicaments se vendent couramment sans ordonnance (VSO). Leur utilisation inutile ou excessive peut nuire considérablement à la santé de la population renseigné inadéquatement. Cette étude constitue la phase 1 d'une recherche dont le but global consiste à éclairer le public sur l'usage responsable et judicieux des VSO.

Comme l'infirmière exerce ce rôle préventif, l'auteur a préparé à l'intention d'un groupe expérimental d'étudiantes (GE) un module d'enseignement programmé se limitant à l'acide acétyle salicylique (AAS) fréquemment vendu dans le commerce.

L'hypothèse voulait que les sujets du GE obtiennent des résultats supérieurs comparativement à ceux d'un groupe témoin (GT) apprenant par une méthode magistrale.

Les 74 étudiantes volontaires dans les quatre années du baccalauréat subirent un pré-test. Le GE reçut ensuite l'enseignement programmé de douze objectifs et de douze séquences alors que le GT recevait 90 minutes de cours magistral.

Chaque groupe se soumit à un post-test deux semaines plus tard. Finalement, une seconde vérification de la rétention fut opérée après six semaines.

L'analyse des données au moyen d'un test t unilatéral ($p = .05$) montra des résultats comparables chez les deux groupes.