TEACHING STYLES: IS THE MODULAR METHOD MORE EFFECTIVE?

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At a time when nurse educators in academic and service settings are interested in fostering independent study, a number of teaching methods have been tried – among them, modular instruction. While believed to be valuable, the effectiveness of these new methods is seldom evaluated. The purpose of this study was to determine whether knowledge, level of perceived achievement, and use of and attitude toward the subject matter were greater with instruction based on modules or based on lectures.

Review of the Literature

A learning module is an instructional package that deals with a single conceptual unit of the content, and it contains the materials necessary for relatively independent learning (Bevis, 1973). In nursing education, modular learning has been implemented in a variety of universities and colleges. Modules provide opportunities for students to be responsible for their own learning; students are able to pace themselves within a framework set up by the instructor, and they become active participants instead of passive learners (Russell, 1974). Huckabay (1981) states that exposing students to independent learning, such as modular content, is essential in developing their abilities and desire to continue their education.

Furthermore, it is expected that the modular form of instruction will enable students to learn the subject matter more effectively, and that the students will have a more positive feeling of achievement and mastery than if the lecture/demonstration method alone is used (Huckabay, 1981). These ideas are premised on Bloom's (1971) theory of mastery learning, and Gagne's (1962) theory of the acquisition of knowledge.

However, the research findings on the effectiveness of modules are mixed, and the study designs limit the extent to which results can be generalized. With notable exceptions, there have been few studies that have looked at

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modular learning in nursing education. Of these, Furnell and Thompson (1976) examined independent study modules that were used in the third year of a baccalaureate program. They found that a large proportion of students completed the modules and generally expressed satisfaction with them. There was no difference found in relation to the length of time the modules were studied and term paper marks or examination scores. Similarly, Arnold (1978) studied three types of teaching strategies – programmed instruction, lecture/demonstration, and student choice – with 160 freshmen associate degree nursing students. Post-tests only were used to measure achievement, and there were no measurable differences between the mean scores of the three teaching strategy groups.

Blatchley, Herzog, and Russell (1978) developed and evaluated self-study modules in a medical-surgical nursing course for second-year associate degree students. Their results indicated that self-study proved to be as effective as the traditional lecture/demonstration, and most students enjoyed the former approach.

In 1981 Huckabay compared the effects of modularized instruction and traditional teaching techniques on cognitive learning and on the affective behaviours of graduate nursing students. The experimental design involved three groups of subjects, all of whom were pre- and post-tested. It was found that a teaching strategy that combines independent learning modules with lecture/demonstration generally produces more positive results than a strategy that concentrates exclusively either on a module or on the traditional lecture method.

The Study

The module design

The study of pain is a rapidly expanding area of nursing knowledge and experience. In order to be successful in providing comfort and relief from pain, a nurse must be familiar with pain theory and base actions on an understanding of the conceptual elements of pain. This was identified as a major concept that needed further development in our baccalaureate program. Thus, in consideration of the reports that this was an ideal teaching and learning approach, a module was developed for use in the third year of our program.

The module developed by Jerrett and Laschinger had three units: the concept of pain, assessment of children and adults in pain, and intervention with children and adults in pain. Each unit included objectives, readings, videotapes and/or audiotapes, exercises, and clinical experiences. The

theoretical framework for the pain content was primarily derived from Melzack and Wall (1982). Pre-tests and post-tests were also included as part of the module design. However, before adoption of this teaching approach, it was important to know whether it was better than the lecture/demonstration method we were then using.

Study questions

We sought to answer the following questions in our study.

Would students exposed to the modular method of instruction in addition to lecture/demonstration, as opposed to students receiving only the lecture/demonstration instruction:

(1) Have greater increases in knowledge regarding pain?

(2) Have greater changes in attitudes toward persons in pain?

(3) Be more likely to consider pain in their application of the nursing process?

(4) Be more favourable toward learning by module over time?

Instructional methods

This study had two phases, the first employed a two group pre-test, post-test, quasi-experimental design. The independent variable was the teaching method (module or traditional) and the dependent variables were student knowledge, attitudes, and applications of pain content, as well as preferences for one method over the other. For the longitudinal phase, the student perceptions of learning were retested twice during the following academic year.

Subjects

Only those who received lecture/demonstration instruction are referred to as "traditional students". This method involved integrated and incidental lecture content and seminar discussions of pain, which were relevant to pediatric, obstetric, surgical, and psychiatric nursing content and practice.

Those who were instructed by means of the pain module, as well as in the traditional method, are referred to as "module students". Although receiving instruction via the module only, with no traditional teaching, would have been methodologically superior, this was considered to be ethically unacceptable.

The 58 female third-year baccalaureate students involved in courses on nursing adults and children participated in the study. Excluded were male, post-RN, and repeating students. Written informed consent was obtained.

Table 1

Study Design

Phases	Experimental						Longitudinal				
Independent Variable											
Pain module											
Module Group		***									
Traditional Group					***						
Month	1	3	5	7	9	.....	13	15	17	19	21
Dependent Variables											
Knowledge											
Pretest	**K1**										
Posttest			**K2**								
Attitudes											
Pretest	**A1**										
Posttest					**A2**						
Learning											
Time1			**L1**								
Time2								**L2**			
Time3										**L3**	
Nursing Process					**N**						

Procedures

After knowledge and attitude pre-tests were completed by all students, the module was given to half the students by Laschinger or by Jerrett. The students were randomly assigned to either the module or traditional groups for the first two of the eight six-week rotations of the academic year. Thereafter, the module and traditional students were systematically rotated and mixed with each other and with the other six teachers not acquainted with the module content.

Three months later (during their fifth clinical rotation), knowledge post-test data were collected. Later, toward the end of the academic year (early in the last clinical rotation), attitude post-test data and nursing care plans were collected. The students were not aware that these nursing care plans were to be analysed. This deception was necessary in order to isolate the module effect and thus to measure the application of general pain knowledge. In the consent forms, students had been informed that some deception was involved. After the deception was revealed, subjects were reminded of their option to withdraw, but no one chose to do so.

All teachers were blind to student data, and only two of the eight teachers were aware of the module content. The module students were asked not to share module content with the traditional students and both groups reported not having done so. Coding and analysis of the data were done by a research assistant and by Burke: both were unaware of the students' names and group placement, and neither was involved in clinical teaching.

At the end of the experimental phase (late in the last clinical rotation and after all aforementioned post-testing), the traditional students were also given the module. At the beginning and the end of the following academic year students were retested for perceptions of their learning by the modular method. Of the original students, 42 remained: some were no longer in the class, a few did not return the questionnaire, four reported not actually doing the module, and three did not consent to be a part of the longitudinal study.

Instruments

Knowledge. This is a brief 12-item true and false test to determine the students' knowledge of the content of the module. It was developed for the study by Jerrett and Laschinger and was considered to have face validity.

Pain attitudes. Twenty of the 60 items were selected from the Davitz and Davitz (1980) tool which describes a variety of adult and child patients with different illnesses and injuries that students were likely to encounter. Items were purposively selected to reflect the likely knowledge and experience of

students at this point in the curriculum. Item numbers from the 1980 Davitz and Davitz version were 1, 2, 4, 9, 11, 12, 15, 20, 24, 25, 29, 30, 33, 34, 42, 45, 46, 56, 58, 59. Students rated the degree of psychological distress and physical pain that they felt the person was experiencing in each situation.

This instrument has demonstrated concept validity in its ability to show significant differences in perceptions of pain in relation to the stage of illness and occupation of the perceiver (Lenburg, Glass, & Davitz, 1970). As well, it was used to measure whether or not the length of time a student nurse had been in an educational program was related to perceptions of physical pain and psychological distress (Lenburg, Burnside, & Davitz, 1970). Some evidence for face validity may be inferred because the tool was developed by experienced nurses with the aim of describing actual patient situations. Furthermore, the instrument has shown its robustness by demonstrating differences in study-specific versions of between 16 to 60 items.

Learning preference. Huckabay's (1981) affective measure was used to tap the students' satisfaction with the method of instruction. The wording was altered slightly to focus on the method of teaching of the pain content in the course. The instrument consists of 10 questions constructed on a 10-point Likert-type scale, ranging from unfavourable to most favourable.

Face validity of the instrument as a measure of the perceived mastery, based on Bloom's (1971) theory, was demonstrated with a 93 percent agreement between five judges. Test-retest reliability after 3 weeks for 20 of Huckabay's students yielded a Spearman rank correlation of .63, $p<.01$ (Huckabay, 1981).

Nursing Process Analysis for Pain (NPAP). The NPAP instrument contains scales to rate nursing care plans on the specificity and applicability of the data, diagnosis, intervention, and evaluation phases of the nursing process. Working from operational definitions, critical indicators were developed across a seven-point scale, ranging from unacceptable to excellent. Face validity was obtained by involving eight faculty members in the early developmental phases. Interrater reliability on 15 care plans showed 88 percent agreement within one scale point, and 92 percent within two scale points. The research assistant was trained to achieve 80% agreement with Burke and was monitored throughout the content analysis and coding.

Data analysis

The pre-test/post-test data were analysed for differences between module and traditional students, using analysis of covariance with pre-test scores as

covariates and post-test scores as mean effects. For the nursing care plan data, t-tests were used to examine differences between student groups (Campbell & Stanley, 1970). Alpha was set at .05. For the NPAP a decision was made to accept as educationally significant only those differences which were two scale points or more and which were also statistically significant.

Results

Question 1: Knowledge

The students taught by the module method, as compared to those who received only lecture/demonstration instruction did not have greater increases in knowledge (as measured) with regard to pain. The knowledge questionnaire showed no significant differences between groups on total scores or on individual items before or after the module.

A post hoc analysis was done on two competing hypotheses. Specifically, a compliance hypothesis was examined (did the students do the module activities or not?). For example, with regard to viewing the three videotapes in the module, approximately 80 percent of the students reported that they saw the first videotape, and 50 percent saw the second and third. However, even taking the degree of compliance into account in an analysis of covariance, there were still no differences between groups for pain knowledge scores.

A second, competing hypothesis was that previous or current experience with pain affected knowledge. Thus, an analysis of covariance was done between the reported amount of prior experience and of current experience with people in pain. Results showed no significant differences.

Given the nature of the knowledge test it is possible that the non-significant results in the study are attributable to an unreliable, invalid test or to ceiling or inadequate variance problems. Thus, we conclude that Question 1 on knowledge was not adequately addressed with this measure.

Question 2: Attitudes toward pain

Each of the 20 Davitz and Davitz (1980) items has two ratings – physiological and psysiological. Thus, 40 comparisons were made on attitudes toward people with pain; of these, only four were significantly different between groups. Since the number of significant items could be accounted for by chance, they are not discussed.

Question 3: Nursing applications

Slightly more than half of both student groups included pain in their nursing care plans. The components of the nursing process examined by the NPAP between module and lecture/demonstration groups showed no significant differences between groups for means of instruction. However, when only statistical differences were considered, the specificity and presence of pain diagnoses and the applicability of pain interventions had statistically different means in the opposite direction of that hypothesized ($t = -2.3$, d.f. = 30, $p = .03$; $t = -2.8$, d.f. = 30, $p = 01$). Because the scale differences between these group means were less than the two-scale points judged educationally significant, and because the differences were not in the direction expected, it was concluded that the module students would *not* be more likely to have better applications regarding pain in their nursing care plans.

A further content analysis was done by searching in the data base for the words most frequently used as interventions in pain situations. There were no significant differences in the frequency of words used to describe pain, nor were there differences in the types of interventions used between groups.

Question 4: Learning preferences

At the end of the experimental phase (the end of academic year three) the module students showed a greater satisfaction than the lecture/demonstration students with the method by which they had learned. Of the ten items, nine were more favourable for module students than lecture/demonstration students. Of these nine items, five were significant at $p.<.05$ level or better and in the direction hypothesized. The significant items were the extent to which the students felt a sense of achievement or mastery, had a desire to learn more, and enjoyed the content on pain and felt that it was worthwhile.

This initial preference for the modular form over the traditional form of instruction faded during the next academic year, both for those initially in the module group and those who received it after the experimental period. This was a significant drop from the earlier perceptions of the combined group from the first to the second testing ($t = 3.56$; $p = .001$). There followed a slight, non-significant rebound at the end of the study. The pattern was the same for those who had been in the module group initially, but it was expressed slightly more strongly. Eight of the ten items show the same patterns, as can be seen in the average ratings on the Huckabay Learning Preferences Measure in Figure 1.

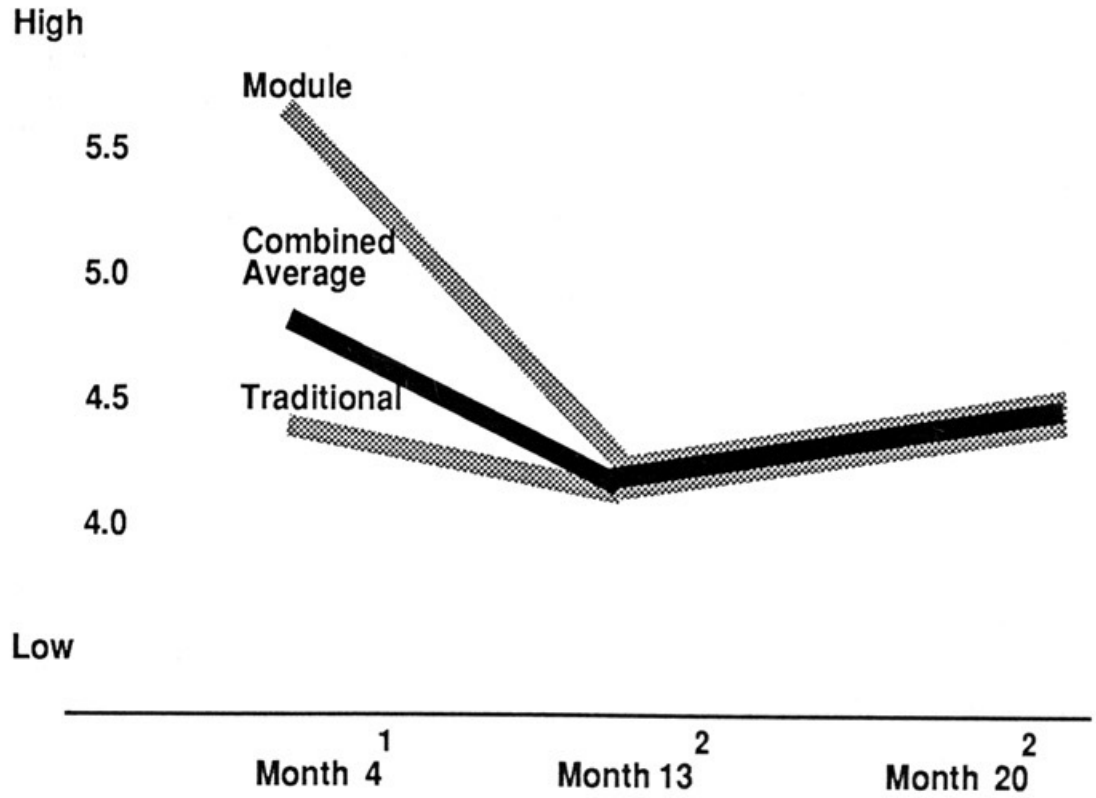

Figure 1: Students' mean degree of preference for modular or traditional learning over time

[1]At this point the modular students rated the modular method and the traditional students rated the lecture/demonstration method.

[2]At these points both groups had used the module and were all rating the degree of preference for modular learning.

Discussion

The students who were taught the pain content by module did not acquire greater knowledge or exhibit more changes in attitudes than did those who were taught through lectures and incidental teaching. This is surprising because the module students, in fact, had more experience with pain content. However, they were more likely to believe that they had learned more, and they tended to feel more satisfied with their learning.

Given the design of this study, it is not possible to ascertain whether the difference in student perception reflects learning not measured by our

instruments, or whether it reflects the students' attitude that a new teaching method is intrinsically superior. A study design with an alternate teaching method group would help to sort out this dilemma. Nevertheless, Rossi's (1968) honeymoon, plateau, and disengagement-termination stages could account for these effects, with the module students' initial perceptions representing the honeymoon phase. We have seen this pattern repeated many times with the introduction of other new teaching approaches or technologies. The longitudinal results show that these preferences level off and fade over time.

Summary

Although students preferred the module approach and thought they learned more with this method, no clear differences in knowledge, attitudes, or nursing process, as measured in this study, were found. The initial student perceptions paralleled those found by other investigators and those of many teachers who introduce a new teaching approach or use a new teaching technology.

Because knowledge, attitudes, and application of content is seldom tested beyond teacher or student preferences, the initially perceived benefits may not accrue despite large investments of time and money. This is not to say that student and teacher perceptions of learning and satisfaction with teaching approach are unimportant. But, rather, with the introduction of any new method, the enthusiasm generated should be considered separately from the learning of the content.

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RÉSUMÉ

Les méthodes d'enseignement: la méthode modulaire est-elle plus efficace?

Les chercheurs ont comparé les résultats concrets de deux méthodes pédagogiques: la méthode modulaire et le cours/démonstration, pour étudier l'efficacité de la méthode modulaire dans l'enseignement du concept de la douleur. Les sujets, 58 étudiants de baccalauréat inscrits à deux cours de nursing clinique, ont été affectés au hasard à l'un des deux groupes. On s'est servi d'un modèle quasi-expérimental à deux groupes pré-test et post-test. La méthode modulaire a fait ressortir une préférence initiale pour l'apprentissage autonome, mais n'a pas abouti à un niveau plus élevé des connaissances ou à un recours plus grand au contenu du cours pour dispenser des soins infirmiers aux personnes dans la douleur. Les différences constatées au niveau de la satisfaction perçue des étudiants d'apprendre par module reflètent sans doute leur engouement pour une nouvelle méthode d'enseignement qu'ils estimaient supérieure. Au bout d'un an, la préférence pour cet enseignement modulaire avait disparu.