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The impact of active/cooperative instruction on beginning nursing student learning strategy preference

Kari Sand-Jecklin *

West Virginia University School of Nursing, P.O. Box 9620 HSS, Morgantown, WV 26506, United States

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KEYWORDS

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Summary Rapid changes in the nursing field and high demand for practicing nurses put pressure on nursing faculty to educate increasing numbers of nursing students, often without corresponding increases in resources. Although the use of active and cooperative instruction methods in the classroom has been associated with improved student learning, these practices require increased effort on the part of both faculty and students. In addition, little is known about whether these methods influence student nurses' use of these more elaborative processing strategies in their independent study. The purpose of this quasi-experimental investigation was to identify the impact of incorporating active and cooperative classroom instructional activities on student preference for teaching methods and use of learning strategies in independent study.

A convenience sample of beginning baccalaureate nursing students at a large Mid-Atlantic University was randomly assigned by the registrar to two class sections. Students in one section received primarily active/cooperative instruction, while the other received primarily traditional lecture-based instruction. Results indicated that student nurses exposed to active/cooperative instructional methods had an increased preference for these methods after a semester of instruction, while those exposed to traditional instruction had a higher preference for traditional methods. In addition, students participating in active class instruction reported increased preference for more elaborative independent study strategies, although overall preference for both groups indicated a reliance on surface study strategies of memorization and recall. Implications for use of instruction and student testing methodologies are presented.

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* Tel.: +1 304 293 1768; fax: +1 304 293 6826.
E-mail address: ksandjecklin@hsc.wvu.edu

Introduction

The world of nursing and healthcare is rapidly changing. The impact of these changes together with an acute nursing shortage puts pressure on nursing education programs to teach a larger number of students a greater amount of information in an efficient manner, toward the goal of graduating an increased number of nursing students adequately prepared to pass state licensure examinations and enter the nursing workforce.

The means to accomplish this goal often include increasing class size and presenting an ever-increasing amount of information to students. Increased class size and expanded course content may push nursing faculty to focus on the presentation of a large amount of information in theory courses, with little time being set aside for active and collaborative engagement of students in the learning process. However, current nursing practice requires the ability to interpret and analyze relationships between multiple pieces of information and to solve complex problems in an ever-changing environment (Rowles and Brigham, 1998). Students do not often develop these abilities independently, but rather, need instructor guidance in learning how to process information and learn in a manner other than memorization of facts. Given the increasing workloads for both faculty and students, we must be able to identify the potential student learning "returns" associated with the "time and energy investment" required when faculty use active and elaborative instruction methodologies.

Literature review

Learning strategies

Several studies have investigated nursing students' learning strategies, with the general consensus that students often take the surface approach to learning, even though the use of deeper elaborative strategies is associated with more positive learning outcomes (Cowman, 1998; Cust, 1996; Snelgrove, 2004). Several factors appear to influence student preference for learning strategies. Students who report mastery and meaning learning orientations are more likely to use an elaborative approach to learning (Somuncuoglu and Yildirim, 1999), as are students who report a higher amount of study time (Stiernborg et al., 1997). In addition, students having higher perceived abilities tend to use a wider range of learning strategies than those with lower perceived abilities (Braten and Olausen, 1998).

Research indicates that student perceptions of course format and demands also impact their use of learning strategies. When perceived workload is heavy and there is a high perceived emphasis on grades, students are more likely to use surface learning strategies (Cust, 1996; Karabenick, 1997; Snelgrove, 2004; Spencer and Jordan, 1999).

Instruction strategies

Literature in both the educational and nursing realms indicates that instructional methods requiring active student engagement in the classroom promote deeper processing of content material (Anderson, 1996; Cust, 1996; Spencer and Jordan, 1999). Examples of "active" instructional methods include: student identification of examples or illustrations of concepts being discussed (Rowles and Brigham, 1998), inclusion of case studies or problem-based learning strategies (Forbes et al., 2001; Spencer and Jordan, 1999), faculty and student development of concept maps to represent relationships between concepts (Forbes et al., 2001; Rowles and Brigham, 1998; Wheeler and Collins, 2003) and experiential strategies (Pugsley and Clayton, 2003; Spencer and Jordan, 1999). Use of cooperative and active learning methodologies are also reported to be rated highly by students (Clark, 1995; Thompson and Scheckley, 1997).

Cooperative learning is becoming a favored strategy by educational experts (Elberson et al., 2001; Nolinske and Mills, 1999; Tanner et al., 2003), and can also serve as a means to incorporate other active learning methodologies into larger class environments. In cooperative learning, students are assigned in small groups to complete a task, solve a problem, analyze a case scenario, complete an in-depth project, or take a test. Each member of the group is responsible for a part of the work and students must work together to complete the assignment (Gumbs, 2001; Nolinske and Mills, 1999). Research indicates that student engagement and learning are facilitated and that this method of instruction is viewed positively by students (Elberson et al., 2001; Lusk and Conklin, 2003; Mitchell and Melton, 2003; Pugsley and Clayton, 2003; Tanner et al., 2003).

Although many nursing faculty acknowledge the importance of instruction methodologies being student-centered, they may not be using these methodologies in the classroom, particularly in large group settings. Using the Principles of Adult Learning Scale, Schaefer and Zygmunt, 2003 found that self-reported instruction style of U.S. nursing faculty was teacher, rather than learner centered, even though respondents acknowledged the

importance of student focus in instruction. Faculty identified several barriers to learner-centered instruction, including large classes, course type, curriculum mandates, and expected student outcomes.

Thus, the literature provides support for use of active and elaborative instruction strategies in the nursing education classroom setting, but several factors seem to be preventing translation from research to practice. In addition, little is known about how incorporation of active instruction strategies impacts nursing student preference for instruction methods or student use of learning strategies in the classroom environment and in independent study. This investigation was designed to address the identified gaps in the literature.

Research questions

1. What is the impact of incorporation of active and cooperative instruction strategies on student preference for instructional methodology?
2. What is the impact of incorporation of active and cooperative instruction strategies on student use of learning strategies in the classroom and in out-of-class studying.

Methods

Design and sample

A convenience sample of 104 beginning level baccalaureate nursing students who were enrolled in the initial nursing fundamentals course at a Large Mid Atlantic University was used for this study related to active and cooperative instruction. The sample was randomly assigned through the standard registration process into two class sections. One of these sections was designated as the traditional instruction methods group and the other as the active/cooperative instruction methods group for the purposes of the study. The course content was identical for both sections, including the course syllabus, homework and exams: however, the traditional instruction group received primarily lecture-based classroom instruction, while the active instruction group participated in cooperative and active learning activities during class.

A quasi-experimental pretest, posttest design was chosen for this study. A true experimental design was not possible, due to the possibility that the use of strictly lecture instruction methods with one group might put those students at a disadvantage in comparison with the other group in terms of course requirements and grading. Thus, both stu-

dent groups completed critical thinking homework exercises and a group paper, and both were given the opportunity to accrue bonus points through retaking unit exams in a group setting (cooperative testing) immediately after individually completing the unit exam. A lack of a "pure" control group prohibits qualification as a true experimental design. A longitudinal study was not undertaken at this time due to the lack of researcher control over upper level course design and instruction format.

The instructor for the active instruction methods group incorporated a variety of active and cooperative teaching methods into class sessions. These activities included Socratic questioning, paired discussion of homework assignments, paired pop-quizzes, small group discussion of case scenarios, paired concept-map generation exercises, student identification of examples for concepts being discussed, and think-pair-share exercises. The instructor for the traditional instruction methods group used primarily lecture/discussion format for class sessions.

Instrument

The Teaching and Learning Strategies Inventory was developed to assess student preference for classroom instruction methodologies and independent study strategies. The items requested respondents to rank (from 1 to 10) a presented list of teaching strategies, classroom learning strategies, and independent learning strategies (both individual and group), in relation to their importance in promoting learning. The forced-choice response lists were developed through review of the literature (Bastable, 2003; Rowles and Brigham, 1998; Somuncuoglu and Yildirim, 1999), and from results of a previous research study in which sophomore nursing students were asked to provide a description of how they studied for a test, to identify what they did in class to promote learning, and to list the type of instruction and classroom activities they found most beneficial to learning (Sand-Jecklin, 2002). The inventory was also reviewed by experts in educational methodologies.

Prior to signing the participant consent form and beginning the study, students were provided with both verbal and printed information about the research and their options to decline participation or to withdraw from the study at any time. Students participants completed the Teaching and Learning Strategies Inventory at the beginning and the end of the nursing fundamentals course, marking their inventories with a code that allowed comparison of student responses between administrations,

while protecting anonymity of respondents. Response options for questions related to teaching and in-class learning strategies were categorized as either "active" or "passive", based on whether or not they required active student participation or engagement in the activity. Response options reflecting strategies used in independent and group study were coded as either surface (focused primarily on information memorization and recall) or elaborative (focused on information analysis, processing, or application). A few response options, such as "reviewing old tests", "quizzing each other with practice tests", and "trading notes with classmates" could not be conclusively identified as either surface or elaborative, as the means in which they were implemented would impact the depth of content processing. These response options were not included in categorization. Mean response scores for active and passive teaching and in-class learning, as well as surface and elaborative learning strategies were then calculated.

Results

Ninety-six students fully completed the first survey, and 95 students completed the second survey. Due to inability to match some student identifiers between surveys, 87 complete data pairs were analyzed.

Although both the traditional instruction and active instruction student groups reported an overall preference for passive instructional methods, instructor demonstration/application, and interaction/discussion were ranked above lecture in terms of importance to learning by both groups. The traditional instruction group had a notably lower preference for active teaching strategies [t (df 44) = 3.32, $p = .002$] and a higher preference for passive teaching strategies [t (df 44) = -2.49, $p = .017$] at semester end, according to paired t -test analysis, indicating an increased preference for the traditional, passive instruction methods to which they were exposed. Between group comparisons indicated no differences in preference for active or passive teaching strategies between the traditional and active instruction groups on the first inventory administration, but at the end of the semester the traditional instruction group had a higher preference for passive strategies than the active instruction group [t (df 91) = 2.73, $p = .008$], and the active instruction group had a higher preference for active strategies [t (df 91) = -2.92, $p = .004$].

Both student groups indicated a preference for passive in-class learning strategies (see Table 1),

with highlighting notes, taking notes, and memorizing information being the highest ranked strategies for both groups. There were no changes in preference for these strategies from beginning of the semester to the end among respondents in either the traditional or the active instruction groups, and no statistically significant differences between the two groups.

Although students in both instructional groups preferred surface strategy over elaborative strategy use in independent study, the active instruction group ranking of elaborative study strategies increased on the end of semester survey: [t (df 41) = -2.78, $p = .008$]. There were no changes in the traditional instruction group preferences between the beginning and end of semester surveys. Reading and rereading notes and memorizing information were the highest ranked strategies among both groups.

Students in both traditional and active instruction groups reported most commonly studying with classmates prior to a test, with no changes in frequency of group study between the beginning and end of the semester. Students in both groups again revealed preference for surface strategy use in group study, with top ranked strategies being "quiz each other on facts" and "review class notes". Ranking of surface strategy use in group study by the traditional instruction group decreases from the beginning to the end of semester inventory [t (df 40) = 3.09, $p = .004$]; however, the traditional group had a higher preference for these strategies than the active instruction group at the beginning of the semester [t (df 81) = 2.70, $p = .009$]. Thus, at the end of the semester, surface strategy use in group study was similar for both groups.

Discussion and implications

Although beginning nursing students in both the traditional and active instruction study sections indicated a preference for passive instruction methodologies and surface learning strategies, some student preferences did change during the study time frame. Students who experienced traditional lecture-based instruction strategies had an increased preference for these passive activities and decreased preference for active strategies on the end of semester inventory administration—a negative change, if the pedagogical goal is active involvement of students in classroom learning. Given the movement toward passive instruction preference among the traditional instruction group, the lack of change in preference in the

Table 1 Comparison of passive/surface strategy and active/elaborative strategy mean scores

	Passive/surface strategy mean	Active/elaborative strategy mean	t (df)	p
<i>Traditional instr. group</i>				
Teaching strategies (admin. 1)	4.55	3.41	3.3 (44)	.002
Teaching strategies (admin. 2)	5.12	2.89	7.11 (46)	.000
In-class learning (admin. 1)	6.44	4.69	4.12 (43)	.000
In-class learning (admin. 2)	6.58	4.75	4.23 (45)	.000
Study strategies (admin. 1)	4.65	1.49	7.67 (43)	.000
Study strategies (admin. 2)	4.68	1.24	10.50 (44)	.000
Group study strategies (admin. 1)	6.15	2.16	8.67 (40)	.000
Group study strategies (admin. 1)	5.01	2.43	5.40 (45)	.000
<i>Active learning instr. group</i>				
Teaching strategies (admin. 1)	4.12	3.31	2.18	.04
Teaching strategies (admin. 2)	4.28	3.34	2.81	.007
In-class learning (admin. 1)	7.05	4.26	6.52	.000
In-class learning (admin. 2)	7.25	4.20	7.54	.000
Study strategies (admin. 1)	4.83	1.18	14.49	.000
Study strategies (admin. 2)	4.87	1.59	4.52	.000
Group study strategies (admin. 1)	4.63	3.13	5.19	.000
Group study strategies (admin. 1)	4.35	2.17	6.53	.000

active instruction group might be seen as a positive outcome. In addition students did indicate a preference for certain active instruction methods, such as interaction/discussion, and use of case studies and practice questions.

The active instruction group had a significant increase in preference for elaborative independent learning strategies at the end of the semester, while the traditional instruction group preferences did not change. We might infer that exposure to and experience with these active learning strategies in class contributed to increased student use of these strategies in independent study. The traditional instruction group reported a lower preference for surface strategy use in group study on the second inventory administration, but this group had a significantly higher preference for these activities than did the active group on the initial inventory. The use of elaborative strategies in group study did not change for either group. It seems that students most commonly quiz each other on factual information in group study, probably an activity that they are most familiar with in the group study environment.

A finding of note was that mean scores for active teaching and active in-class learning strategies were higher than those for elaborative independent study (both individual and group). Perhaps students recognize the benefit of these strategies and are willing to use them when guided in by the instructor, but are not yet comfortable using them independently. The literature indicates that students do recognize positive effects of active/elab-

orative strategy use on learning (Carver, 1996; Cheung and Kwok, 1998; Clark, 1995; Thompson and Scheckley, 1997), but that they may require frequent and repeated exposure to and practice with these strategies before they become comfortable in using them. Otherwise, they tend to use strategies with which they are most familiar (Entwistle and Tait, 1995; Rowles and Brigham, 1998).

Several factors aside from instructional methodology may have impacted student use or non-use of active/elaborative learning strategies. Although course examination questions were designed to require students to analyze, relate, and apply information, the items were presented in traditional NCLEX-type, multiple-choice format. Many nursing faculty use multiple choice examination format in order to prepare students for the type of questions that still represent the majority of licensure examination items. Research indicates that perceived testing format impacts student use of learning strategies (Cowman, 1998; Snelgrove, 2004; Thompson, 1993). Student respondents in this study may have continued to use primarily surface learning strategies due to perceptions that these strategies would be most highly rewarded in course examinations.

Research also indicates that students tend to use surface strategies when workload is heavy and the amount of information to be processed/learned is very high (Cust, 1996; Snelgrove, 2004; Spencer and Jordan, 1999). The majority of sophomore nursing students at the study university were also enrolled in a physical assessment course, a clinical

nursing course, an anatomy course, and a microbiology course while enrolled in the beginning nursing concepts course under study. The semester course load was quite heavy, and testing format for the two courses outside of nursing was primarily of the memorization/recall type. The workload factor, together with the perception that memorization/recall would be the most highly rewarded means of study may have influenced student choice of use of surface learning strategies in independent study.

Implications for nursing education and future research

Nursing faculty must understand students as learners, as they are the focal participants in the teaching-learning process (Rowles and Brigham, 1998). Having an understanding of student learning and study strategies can assist faculty in developing instruction methods to broaden students' repertoire of strategies (Braten and Olaussen, 1998). Although nursing students participating in this study and others (Sand-Jecklin, 2002; Snelgrove, 2004) may predominantly use superficial learning strategies, instructors should promote active student relation and application of content, through use of examples, diagrams, case studies, analogies, and cooperative learning (Thompson and Scheckley, 1997). Students may need repeated encounters with active learning activities throughout the nursing curriculum, in order to develop comfort with these strategies (Rowles and Brigham, 1998).

In addition, it would behoove faculty to consider whether current testing formats reinforce student use of deeper processing strategies or more superficial information reproduction strategies. Although preparation for licensure examination is important, exclusive use of NCLEX-type multiple-choice test item format may reinforce student use of superficial study strategies. Further research related to the influence of testing format on student use of learning and study strategies is warranted.

Faculty might also consider whether the current nursing education curriculum content is so information laden, that attempts to cover all "necessary" content result in an extremely heavy student workload and prompt student use of surface/passive learning strategies. Perhaps we need to reconsider the focus of the curriculum, and its impact on the student learning process and outcomes. Given the rapid advances in healthcare and increasingly interdisciplinary focus, it may be more effective to focus on the learning process and problem solving, rather than on rote learning of information that can rapidly become obsolete.

Limitations

This study used a convenience population of students from one university. Therefore, results are not generalizable to other populations. In addition, there was no true control group in the study. In order to maintain equity in workload and grading criteria among the two groups, some cooperative assignments and activities were required of students in both sections. Exposure of both student groups to these active learning strategies may have limited potential differences between groups on the end of semester Teaching and Learning Strategies Inventory. Other uncontrolled factors may have also influenced student study/learning strategies, such as the type of learning promoted/rewarded in other courses.

Despite the above limitations, the study does point to important issues that nursing educators need to address: nursing students appear to prefer predominantly surface and passive learning strategies, but nursing faculty can promote use of more elaborative strategies through use of active instructional methods. In addition, we should consider whether our testing format and overall curriculum focus contribute to student preference for and use of rote learning strategies or whether they promote student critical thinking and analysis of information.

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