Do current educational programs address critical thinking in nurse anesthesia?

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Critical thinking skills are vital in any of the nursing and medical specialties. These skills can be taught using adult teaching methods and should be incorporated into all courses in the educational process. Unfortunately, some nurse anesthesia programs fail to adequately address critical thinking or the use of these skills. They often teach using rigidly structured models.

This descriptive study surveyed nurse anesthesia students (n = 197) and faculty members (n = 128) from 32 schools of nurse anesthesia. It was undertaken to determine the effect of using adult education principles on student satisfaction. Participants completed a survey that was designed by the investigator to determine individual perceptions of the program's teaching style, personal teaching and learning style preference, and, in the case of the students, satisfaction.

Results of this study suggest that anesthesia students are more satisfied if they are approached as adult learners. Critical thinking, a vital component of nurse anesthesia practice, is also reinforced by these same teaching methods.

Key words: Andragogy, critical thinking, pedagogy, satisfaction, teaching methods.

Introduction
The practice of nurse anesthesia has become increasingly complex. This complexity has been brought about in part by the increasing intricacy of anesthesia equipment, new techniques and pharmacology, and a progressively aging society. Although most practitioners have kept pace with the scientific and technical needs of safe anesthesia practice, some anesthesia educators have not embraced changes in their educational style that would help them educate the next generation of nurse anesthetists. For various reasons, many programs have maintained traditional, teacher-centered (pedagogical) educational paradigms that emphasize rote memorization of facts rather than encouraging understanding and questioning.

The aim of education is to facilitate change in a learner's behavior, goals, or values. By definition, education must go beyond the mere imparting of facts; it must aid in understanding as well as facilitate the student's ability to synthesize information from one situation to another.

To do this, education must teach and emphasize the acquisition of critical thinking skills in addition to mastery of factual information. Critical thinking skills are vital in the conceptualization and analysis of information used in handling both routine and critical incidents, which do not always follow prescribed algorithms.

Most adult students have been educated under very structured, teacher-centered, pedagogical systems, in which the teacher, as an "expert," was the focus of attention and told the students what was important and what to learn. The style is described in this quote from Barnard: "Miller notes that the current classroom model of instructional delivery dates from medieval Europe, when education was restricted to the sons of the aristocracy and the numbers of scholars and books severely limited. This preindustrial instructional paradigm has changed little in hundreds of years and often does not take into account changes in society, knowledge gained in human learning, or the development of communications technologies beyond the printing press.

In many of these systems, intuitiveness, creativity, and independence are not required nor encouraged. In their earlier education, many adults
may have not been taught to analyze and think critically. Therefore, adult educators should now encourage them to do so. Utilizing the work of Malcolm Knowles, who is considered to be the father of modern andragogy, Patterson compared styles that lead to effective student centered learning (andragogy) and creativity. The learner possesses:

1. Self-confidence and self-direction.
2. Varied experience that is used in learning.
3. A need and desire to learn.
5. Internal motivation to learn and the ability to visualize problems.

The connection between creativity and education is complex. Patterson feels that schools emphasize logic, facts, and details while ignoring creative skills such as intuition and that the corresponding drop in creativity is related to traditional pedagogical practices. Students must be taught to think logically, to analyze and compare, and to question and evaluate in every course, especially content subjects. To impart knowledge without first teaching students how to question what is taught is not preparing them to become independent; it is teaching them to be technicians or followers.

Unlike other academic skills, critical thinking cannot be taught merely by presenting a one-time course. Critical thinking is an attitude, a way of looking at a whole problem. It must be constantly reinforced and practiced. Instructors must be careful to incorporate teaching methods that encourage critical thinking into every learning module. Some of the teaching strategies that strengthen critical thinking skills are:

1. Case studies. Presentations of either actual or fictional scenarios that allow the student to interpret the data, analyze the situation, and determine the best solution. In many instances, life-threatening scenarios can be presented without risk to the student or anyone else.
2. Computer-assisted instruction (CAI). According to Verdune and Clark, “CAI involves the use of the computer as a teaching machine. There are six modes of CAI: drill and practice, tutorial, gaming, simulation, discovery, and problem solving.”
3. Journal club. Reading and summarizing articles in their own words enables learners to become critical of what is presented. Critiquing research allows the student to analyze what is said, determine its relevance, and verify its accuracy.
4. Debate. According to Weust, “debate is a speaking situation in which opposing theories are offered as possible solutions to a problem or question; the proponents of each theory attempt to convince others that their approach is preferable to those presented by their opponents.”
5. Writing. Like debate, writing allows the student to independently research a subject. The result allows the instructor to visualize the student’s thinking processes in concrete form.
6. Small group interaction. Small group or one-on-one discussions permit dialogue between participants. According to Perraton, “dialogue allows the learner and teacher to take off in directions which had not been forecast. This is desirable if the goal is to foster critical thinking analysis of known situations.”

Critical thinking skills are an important part of the practice of nurse anesthesia. These skills play an integral part in decision making and problem solving. However, if these skills are taught in isolation, very little will be accomplished. They must be incorporated into every part of the educational process. To determine how well nurse anesthesia programs incorporate critical thinking and adult learning into their curriculums, the author sought to determine:

1. What teaching methods are nurse anesthesia programs currently using?
2. What teaching and learning methods are preferable?
3. What is the level of student satisfaction with these methods?

Methodology

For this study, a quasi-experimental design was employed using two research questionnaires that were developed for this project. The first survey was a 60-item student questionnaire that was divided into three subscales:

1. Student’s perception of the program’s teaching style.
2. Student’s personal learning style preference.
3. Student satisfaction.

The second tool was a 50-item faculty questionnaire that was divided into two subscales:

1. Faculty member’s perception of the program’s teaching style.
2. Faculty member’s personal teaching style preference. The scores for each subscale were determined by a cumulative score from the related questions. Lower scores were considered pedagogical; higher scores were andragogical.

Prior to the start of the research, both tools underwent a pilot study to test their validity and reliability. The pilot study used students (n = 80)
and faculty members (n = 45) from four programs of nurse anesthesia. Scores from the individual scales were randomly assigned to two groups and tested by split-half reliability. Any question that did not have a 95% agreement was eliminated from the final survey. Content validity was provided by a review of the questionnaires by a panel of eight professional educators.

The questions for each survey were answered on a Likert-type scale with a range from one (strongly disagree) to five (strongly agree). Questions were randomly assigned to be either andragogical or pedagogical. To determine scores, the questions on the student survey were divided in the following manner: 25 questions to test the student’s perception of the program’s teaching style, 25 questions to assess the student’s personal learning style preference, and 10 questions to assess student satisfaction. The faculty survey contained 25 questions to test the faculty member’s perception of the program’s teaching style and 25 questions to assess his or her personal teaching style preference.

Assistance with this research was sought from program directors of civilian nurse anesthesia programs (only civilian programs were used, because the investigator did not know how motivation might differ in armed forces schools). Of the 72 programs that were asked to participate, 32 agreed. These included programs from across the country, with 15 from the eastern region (east of the Mississippi River), 15 from the Midwest (between the Mississippi River and the Rocky Mountains), and 2 from the western region (west of the Rocky Mountains). Research was carried out from September 1 to October 30, 1992. Student and faculty surveys were analyzed using descriptive statistics (frequency, percentage, mean and standard deviation), bivariate correlational analysis, and analysis of variance.

The questionnaires were distributed to 365 nurse anesthesia students and 342 faculty members from the 32 participating schools. Student participation criteria required at least 100 anesthetics prior to the starting date of the research. It was felt that students who had less than 100 cases would not be allowed sufficient autonomy in the clinical area and would confound the study. The participants were assured of confidentiality in the cover letter, and by returning the survey, they agreed to participate. Of those who were asked to participate, 197 (53.9%) students and 128 (33.5%) faculty returned their surveys.

Results

All nurse anesthesia students who participated in the survey had a minimum of a bachelor’s degree, and 12.7% had a master’s degree or beyond. Ninety percent of study participants anticipated receiving a master’s degree upon completion of their program. Sixty-four percent were 30 years of age or older.

The demographics of the student surveys were compared with data from the database of the American Association of Nurse Anesthetists (AANA). Data from the AANA included all students who took the certification examination in December 1992. This data was statistically similar and allowed the results of the research to be generalized to the population of all nurse anesthesia students. No data was available to compare the demographics of the faculty survey.

Survey results indicated students perceived the school’s teaching styles as being more pedagogical (teacher-centered) than did the faculty (faculty = 58.5, students = 48.4, t = 7.5). Faculty members believed that their teaching style was andragogical (student-centered). Students represented themselves as being more andragogical in their learning style preferences than their instructors were in their teaching style preferences (students = 58.3 versus faculty = 53.9). The difference was not significant at the .05 level.

The survey asked students and faculty to indicate how often different teaching methods were used and their teaching method preferences (Table I).

| Table I |
|------------------|------------------|
| **Student and faculty perceptions of program teaching methods and personal teaching and learning method preferences** |
| Perception | Prefer | Perception | Prefer |
| by % | by priority | by % | by priority |
| Faculty | |
| Lecture | 54.7 | 3 | 56.0 | 1 |
| Student | |
| Lecture | 4.0 | 7 | 4.8 | 5 |
| Group discussion | 3.1 | 1 | 7.2 | 2 |
| Individual discussion | 1.2 | 2 | 2.8 | 4 |
| Self study | 10.7 | 5 | 4.6 | 7 |
| On-the-job training | 20.5 | 4 | 15.0 | 3 |
| Learning laboratory | 1.9 | 6 | 3.5 | 8 |
| Assigned reading | 5.2 | 8 | 4.3 | 6 |

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The faculty reported that the most often used teaching methods were pedagogical faculty lecture and on-the-job training, and generally, these were also the teaching methods that many of the instructors preferred. Students agreed with the faculty on the most often used teaching methods, but they were not the ones the students would prefer. Student responses showed they preferred classes that were centered around andragogical methods, such as small group discussion and case studies. Neither group preferred the use of self-study as a primary means of education.

There was a strong correlation (Pearson \( r = 0.72, P < .001 \)) between the students' perceptions of the teaching style of the programs and their satisfaction with them. When students felt they were being treated as adult learners, their satisfaction was higher. The student data also showed that satisfaction was higher if there was a closeness between the student's personal learning style preference and the program's teaching style. When comparing differences between the three regions of the country, there was no significant difference in teaching styles or personal teaching and learning style preferences.

Faculty members were asked about their level of preparation as educators. Those who had high levels of educational preparation as teachers were either program directors or assistant directors. Many of the other instructors had taken a limited number of classes, usually in evaluation. Other than the directors or assistant directors, few of the faculty had taken courses in curriculum, instructional design, or teaching methods.

The highest level of academic achievement of the instructor had little impact on his or her views of the program's teaching style (diploma = 59.2, associate = 57.3, bachelor's = 57.0, master's = 59.9, PhD = 59.3). Furthermore, those who had higher levels of teaching preparation tended to use adult teaching methods more than those who had more limited knowledge of learning theory (higher levels of educational theory = 59.6 versus lower level of educational theory = 48.5).

Generally, instructors with bachelor's and master's degrees preferred the use of more adult (andragogical) teaching methods. This rise in the use of adult teaching methods continued until the doctoral degree level, where there was a significant drop in the preference for these teaching methods (highest degree completed: diploma = 54.6, associate = 56.3, bachelor's = 58.4, master's = 59.2, PhD = 59.6).

Students were asked to indicate ways in which their programs could improve the educational climate. Very few of the suggestions were related to monetary compensation, but rather they concerned the quality and quantity of the educational experience. The top 10 suggestions for improvement were:

1. Instructors (both clinical and didactic) should be better prepared.
2. Students should have more independence in anesthetic selection.
3. Students should be treated more as adult learners.
4. Students should not be used as "slave" labor.
5. Competition between the students (both clinically and in the classroom) should be eliminated, including no posting of grades.
6. There should be less "putting down" of students, especially in front of others.
7. Instructors should place less stress on the students.
8. Students should be given more respect—they are people.
9. Student clinical and didactic evaluations should be fairer.
10. Less preference should be given to the anesthesia residents.

**Discussion**

Rapid technological advances in the medical field and evolving changes in the delivery of healthcare services mandate that anesthetists update and extend their skills. Since its inception, nurse anesthesia education has made great advances. As a profession, nurse anesthesia has progressed from apprentice-type training to a recognized profession, with a considerable body of knowledge needed to practice. Unfortunately, some nurse anesthesia educators may not be as well prepared for their role as instructors as they are as clinicians. These instructors may remember the way they were taught and continue in that same pedagogical pattern, using teaching methods that are not necessarily appropriate for educating independent, critically thinking nurse anesthetists. This does not make them "bad instructors," but it may make them less effective.

Analysis of the study data confirms that it is important that students be treated as adult learners, not children. In regressions of the student's perception of the program's teaching style compared with satisfaction, there was a strong correlation (Pearson \( r = 0.721 \)) between satisfaction and the perception of the use of adult teaching methods. The more andragogical (student-centered) the student's perception of the program's teaching style, the higher his or her satisfaction.

Many authors have pointed out that higher satisfaction can lead to improved conditions for
learning, more productivity, and decreased stress, all of which help empower the adult learner. Adult teaching methods are also those that are conducive to students learning to think critically. Use of adult teaching methods within a curriculum is more labor-intensive for the faculty, but it allows students to have more ownership in their education and, therefore, should be encouraged.

Use of pedagogical teaching methods corresponds with the belief of Rita and Kenneth Dunn that "teachers teach as they learned." In their investigations, the Dunns found that instructors believed the way they learned was the correct way and that their students should learn in the same manner. "Teaching style" therefore corresponds to how each instructor learned. It is difficult to change an instructor's ingrained learning style, but with exposure to adult learning theory and methodology, an educator can come to the realization that one teaching style may not be effective with all students. Provision of educational theory is needed for instructors.

Creativity and intuitive thinking are sometimes ignored in the rigid, scientific, and logic-oriented anesthesia curricula. Given the level of intelligence that is required for nurse anesthesia students to be accepted into a program, both critical thinking skills and the knowledge needed to pass the certification examination can be presented and mastered.

Education can foster critical thinking and independence, or it can suppress it. The choice depends not only on the student but also on the flexibility of the instructor. The attitude of faculty members can have a great impact on a student's creativity. Faulty assumptions by faculty can impair the development of critical thinking skills.

In his work with radiology residents and technicians, Dowd identified these faulty faculty assumptions:

1. Entry-level students do not know how to solve problems relevant to the material.
2. Mistakes are always bad.
3. There is a "best" way or an "only" way to think about or solve a problem.
4. Proficiency, that is, the ability to perform a task, signifies the understanding of that task.
5. Certainty is good whether in patient outcomes or student actions.
6. Content coverage is the first goal of education. Begin with the least complex aspects of learning and progress to the more complex ones.
7. Content mastery will translate into increased thinking ability.
8. Students should be able to work in any area upon graduation.
9. Faculty members know best.

Adults demand accountability in their education. Nurse anesthesia students bring with them a large body of knowledge and experience. They do not want to be retaught knowledge they already possess, and the content taught must have some immediate applicability. Educators in nurse anesthesia must remember that nurse anesthesia students are not children. They are healthcare professionals with needs, interests, and desires that are important. Most important, nurse anesthesia students are people who have interrupted their lives to further their careers and become nurse anesthetists. It is important to remember that they will learn more effectively if they are satisfied with their education. This satisfaction can be enhanced if students are:

1. Taught using adult teaching methods.
2. Given relevant educational content.
3. Not retaught what they already know.
4. Have their needs and interests assessed and included in the curriculum.
5. Taught some learning theory to help them understand how and why they learn.
6. Listened to. Suggestions should not be ignored or passed over simply because they are "only students."

REFERENCES


AUTHOR

Anthony J. Chipas, CRNA, MHS, received a bachelor's degree from the University of Kansas in 1973. In October 1977, he received a diploma in Nurse Anesthesia from Wesley Medical Center School of Nurse Anesthesia. After becoming interested in nurse anesthesia education, he returned to school and received a master of health science degree with a concentration in Education from Wichita State University in 1993. Currently, he is pursuing a doctorate in Adult and Continuing Education.

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