

DISSERTATION

FROM EDUCATIONAL THEORY TO PROFESSIONAL PRACTICE:
ETHICAL REASONING IN STUDENTS AND GRADUATES OF
RADIOLOGIC TECHNOLOGY PROGRAMS

Submitted by

Bette A. Schans

School of Education

In partial fulfillment of the requirements

for the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Spring 2003

UMI Number: 3092694

UMI[®]

UMI Microform 3092694

Copyright 2003 by ProQuest Information and Learning Company.

All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

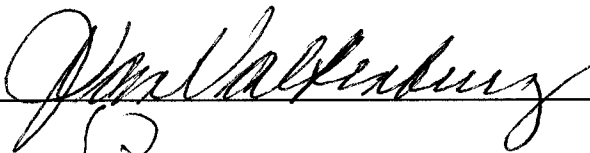
ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

COLORADO STATE UNIVERSITY

February 17, 2003

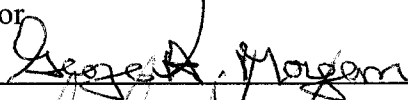
WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED
UNDER OUR SUPERVISION BY BETTE SCHANS ENTITLED FROM
EDUCATIONAL THEORY TO PROFESSIONAL PRACTICE: ETHICAL
REASONING IN STUDENTS AND GRADUATES OF RADIOLOGIC TECHNOLOGY
PROGRAMS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY.

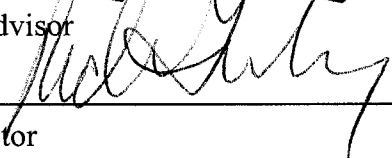
Committee on Graduate Work







Advisor 

Co-Advisor 

Director

ABSTRACT

From Educational Theory to Professional Practice: Ethical Reasoning in Students and Graduates of Radiologic Technology Programs

The purpose of this study was to compare postconventional ethical reasoning in three groups: the student beginning an associate or baccalaureate degree radiologic technology program, the student exiting the program of study, and the radiologic technology practitioner who is three to five years post graduation. The study also examined the relationship of levels of ethical reasoning with age and formal education and compared differences in genders. The Defining Issues Test-2, developed by Rest and Narvaez, was the instrument used in this study. Participants also responded to a survey regarding expected/perceived amounts of ethical education received and evaluation of ethical behavior.

Data were collected from 452 participants from radiologic technology programs in the Western United States. With one exception, there were no significant differences in levels of postconventional reasoning among beginning students, graduating students and technologist practitioners in the two types of programs. Practitioners graduating from baccalaureate programs had significant higher average postconventional scores than did practitioners graduating from associate degree programs. All groups had significant higher average scores in the maintaining norms schema than in the postconventional

reasoning schema. This could indicate a propensity towards following rules rather than basing ethical decisions on developed moral reflection.

A significant relationship was not found between postconventional ethical reasoning and age. Formal education was not examined due to the lack of variance in participants. Female participants averaged significant higher postconventional scores than did male participants.

In 11 out of 12 contrast comparisons, there was a significant decline in perceptions of ethical education and evaluation of participant ethical behavior from beginning to graduating students to practitioners. Perceptions also were negatively correlated in relationship with age.

Education in ethical theory and evaluation of ethical practice are required in radiologic technology programs. Further evaluation of educational methodology in programs across the country could be useful in explaining the results of this study.

Bette A. Schans
School of Education
Colorado State University
Fort Collins, CO 80523
Spring, 2003

ACKNOWLEDGEMENTS

First and foremost, I give thanks and praise to my God and Heavenly Father for instilling in me knowledge of right and wrong, and for giving me the wisdom and strength to follow in His ways.

There are many people whom I need to acknowledge for their help in seeing me through the past few years. Dr. Sharon Anderson provided guidance and enthusiastic encouragement in this effort. Dr. George Morgan gave much needed time and direction in preparing chapters 3 and 4. Thanks for the pep talks. Dr. Jane Van Valkenburg and Dr. David Greene, thank you for your expertise in health education and for service on the dissertation committee. Special thanks to Dr. Gene Gloeckner for his role in starting the Grand Junction Ph.D. cohort and seeing it through.

To the program directors in the radiologic sciences who willingly gave of their time to distribute and collect surveys, I couldn't have done this without your help. Thank you to all the students and technologists who were willing to be a part of this study.

I am very grateful to my family and friends for their help in so many ways. Thank you, Valley Church family, the special friends in the CSU Grand Junction Cohort, and colleagues at Mesa State College for your encouragement and support.

TABLE OF CONTENTS

Chapter		<u>Page</u>
I	INTRODUCTION	1
	Purpose Statement	4
	Research Questions.	5
	Definitions of Terms.	5
	Delimitations.	8
	Assumptions and Limitations.	8
	Significance of the Study.	9
	Researchers Perspective.	10
II	REVIEW OF LITERATURE.	12
	Introduction.. . . .	12
	Classical Theories of Ethical Reasoning and Judgment . . .	13
	Modern Application of Ethical Theories	15
	Moral Development Theory.	22
	Application of Ethical Theories in Health Education. . . .	28
	Application to Health Practitioners.	35
	Other Studies of Ethical Reasoning in Health Care. . . .	40
	Summary.	45
III	METHODOLOGY.	47
	Introduction	47
	Design of Study.	47
	Protection of Human Subjects	48
	Description of Participants.	48
	Demographics of Participants.	50
	Number of Participants and Return Rates.	51
	Hypotheses Testing	53
	Procedure.	53
	Instrument Used	54
	Scoring the DIT2.	56
	Data Analysis.	59

TABLE OF CONTENTS, continued

IV	RESULTS.	60
	Introduction	60
	Hypotheses Testing.	62
	Supplementary Analysis	70
	Summary.	80
V	DISCUSSION AND RECOMMENDATIONS.	85
	Introduction	85
	Discussion of Hypotheses.	86
	Supplemental Analysis.	92
	Limitations.	94
	Recommendations.	96
	Conclusion.	97
	REFERENCES.	98
	APPENDIX	107
	A: ARRT Code of Ethics	108
	B: Student and Practitioner Questionnaires.	110
	C: Letter to Program Directors.	114
	D: Letters of Cooperation.	117
	E: Cover Letters	119
	F: Permission to Use DIT2	122
	G: Program Director Questionnaire	124
	H: Letter of Instructions.	126

LIST OF TABLES

Table	<u>Page</u>
1 Number of Surveys Distributed and Percent of Return.	51
2 Demographic Characteristics of Participants.	52
3 Means and Standard Deviations for Data Before and After Excluding Subjects	61
4 Means and Standard Deviations for Participant Type and Program Type on N2 and P Scores.	62
5 Paired Samples <i>t</i> Tests of Scores in Ethical Reasoning.	64
6 Two-Way Analysis of Variance for Program Type and Participant Type on Levels of Ethical Reasoning (N2 Scores).	65
7 Means and Standard Deviations for Participant Type and Program Type on Stage 4-Maintaining Norms Scores.	67
8 Years of Formal Education.	68
9 Means and Standard Deviations for Levels of Ethical Reasoning and Gender in N2 and Stage 4 Scores.	70
10 Response to the Survey Question, "What is Your Perception of the Amount of Ethics Education Received/Delivered?"	71
11 Means, Standard Deviations and <i>n</i> for Participant and Program Types in Perceptions of Ethics Education in Radiologic Technology Programs.	72
12 Factorial Analysis of Variance for Perceived Amount of Ethics Education Received or Delivered in Radiologic Technology Programs.	72

LIST OF TABLES, continued

13	One-Way Analysis of Variance of Participant Type on Perceived Amounts of Ethics Education.	74
14	Contrast Tests for Participant Types in the Same Program on Perceived Amounts of Ethics Education.. . . .	74
15	Response to the Survey Question, "What is Your Perception of the Amount of Ethics Evaluation Received/Delivered?"	75
16	Means, Standard Deviations and n for Participant and Program Types in Perceptions of Ethics Evaluation in Radiologic Technology Programs.	76
17	Two-Way Analysis of Variance for Perceived Amount of Ethics Evaluation Received or Delivered in Radiologic Technology Programs.	76
18	One-Way Analysis of Variance of Participant Type on Perceived Amounts of Ethics Evaluation.	78
19	Contrast Tests for Participant Types in the Same Program on Perceived Amounts of Ethics Evaluation.	78
20	Summary Table of Analysis of Significant Differences and Correlations	83
21	Contrast Analysis of Beginning and Graduating Students, and Practitioners in the Same Program on Perceived Amounts of Ethical Education and Evaluation.	84

LIST OF FIGURES

Figure	<u>Page</u>
1 Comparisons of stage 2/3, stage 4, and N2 scores on the DIT2 with participant type.	64
2 Interaction of program and participant type on postconventional ethical reasoning.	66
3 Program and participant type on perceived amount of ethics education.	73
4 Participant and program type on perceived amount of ethics evaluation.	77

CHAPTER 1

INTRODUCTION

“What is a virtuous man, and what is a virtuous school and society which educates virtuous men?” (Socrates, 1984, p. xv). Everyday health care professionals are faced with decisions that will affect the welfare of the patients in their charge. Some decisions are based on the cognitive skills learned in classroom education. Other decisions are based on the technical (psychomotor) skills practiced in the clinical setting. The third set of decisions faced by the professional are in the affective realm and are acquired through individual moral development and ethical theory that is taught throughout the course of a program of study. It is here in the affective realm that virtuous people make ethical decisions.

Bloom (1956) described educational domains in terms of cognitive, psychomotor, and affective. As health care became more technical and scientific, emphasis was placed on the cognitive and psychomotor domains (Ford, 1983). Accrediting agencies such as the Joint Review Committee on Education in Radiologic Technology (JRCERT) require designing a curriculum to include all three domains but the assumption is that the students will learn ethics in a more informal manner in the classroom and clinical setting (Van Valkenburg, 1989).

Curricula in the affective domain also include concepts such as caring, beliefs, values, attitudes, ethics, and morality (Reilly & Oerman, 1992). These concepts can be

found in such documents as the Patient Bill of Rights, the Code for Nursing, the Code of Ethics for Radiologic Technologists, Social Policy Statements, and Professional Standards of Practice (Curtin, 2000; de Casterle & Janssen, 1996; Obergfell, 1995).

While all of the above concept terms are important, ethics and morality are generally discussed and reviewed in programs as an attempt to enhance the affective processes of students in health-care education and in graduates in professional practice.

Radiologic Technology is one of many health professions. Like any other health professional, the technologist must have a working knowledge of the scientific and technical information specific to the profession. Cognitive and psychomotor skills are essential to carry out the duties of the job. Additionally, the technologist is expected to maintain high standards regarding professional behavior, attitude and ethics.

Because members of a profession almost always are addressing vulnerable populations and making decisions daily that affect other peoples' lives more than their own, they are held to higher standards of accountability in their interactions with others (Curtin, 2000, p. 56).

Teaching and evaluating in the affective domain is a requirement of the Joint Review Committee on Education in Radiologic Technology (2002) accreditation standards for educational programs. The certifying organization, the American Registry of Radiologic Technologists (ARRT), developed a Code of Ethics approximately 15 years ago and all technologists must agree to abide by the principles set forth in that document in order to practice in the profession (Appendix A).

The practice of ethics in health care or medicine has been the subject of studies since the time of Hippocrates (Bulger, 1987). Ethics has played a part in the knowledge base necessary to practice with justice and compassion. Codes of ethics are developed by individual professional organizations to define the duties and courses of action

professionals should consider for daily practice (Towsley-Cook & Young, 1999). Additionally, codes of ethics and ethical principles enable health professionals to understand individual responsibility for decisions that are made (Koehn, 1994). However, it is unreasonable to assume that because a code of ethics is in place every engagement with patients, peers and superiors will be performed in an ethical manner. Health care educators need to give students opportunities to understand ethical dilemmas, to work out the problems, and to own the responsibility for the decisions made (Krawczyk, 1997). A student usually enters into a professional health program without a clear understanding of professional ethics or knowledge of a code of ethics. Before students can consistently act on principles with high levels of ethical reasoning they must be able to adopt a new mind-set about ethics (Gonzalez & Colman, 1994). This can happen through consistent training in role-playing, case studies, and critical thinking situations about ethical dilemmas (Covey, 1990; Gonzalez & Colman, 1994) or through methods such as a multi-course sequential learning approach (Duckett & Ryden, 1994).

Within the last ten years, professional ethics in health care have taken on the form of caring as well as moral decision-making. The nursing profession, in particular, has embraced the concept of caring as part of its code of ethics and standards of practice. Care ethics also have been incorporated into the ARRT Code of Ethics. There has been a comparison of professional ethics to not only care ethics but also virtue ethics. Virtue ethics embrace Aristotle's claim that "the good of man is an activity of the soul in conformity with virtue" (Rachels, 1999, p. 175). A professional who combines practice of professional ethics with appropriate desires and motives will have a greater

understanding of what should be done and will do what is required (Beauchamp & Childress, 1994).

Recent research has focused on colleges in general, and health professions specifically, to determine the moral reasoning, moral behavior, and affective awareness of students (Cram, 1998; Cummings, Dyas, Maddux, & Kochman, 2001; Greene, 1997; Van Valkenburg, 1989). Other research has examined ethical reasoning in various health professions (Dieruf, 1998; Duckett & Ryden, 1994; Killen, 1998). For example, Kanny (1996) explored the difference in moral development of students and graduates of occupational therapy programs. However, very little research is available regarding a comparison between levels of ethical reasoning in the student and levels of ethical reasoning in the practicing radiologic technologist.

This study focused on levels of ethical reasoning in students and practitioners in radiologic technology, and evaluated the perception of the student and practitioner with regard to the emphasis of ethics education and evaluation in the radiologic technology program. There is interest in the professional community to investigate if successful teaching and evaluation strategies promote life-long learning and practice of ethics for students and graduates in radiologic technology programs.

Purpose Statement

The purpose of this study was to compare levels of ethical reasoning among and within three groups: students beginning a two-year program or four-year radiologic technology program, students exiting the program, and practitioners three to five years post graduation. Ethical reasoning also was analyzed with regard to amount of formal

education, age, and gender. Surveys were distributed to three groups of participants: students at the beginning of their educational program in radiologic technology, students at the end of an educational program in radiologic technology, and graduates who have been in professional practice as technologists for three to five years.

The survey instrument I used for the study was the Defining Issues Test-2 (DIT2) developed by Rest and Narvaez (1998). Statistical tests were one-way analysis of variance, factorial analysis of variance with contrast testing, independent samples t-tests, and correlation for comparison and relationship.

Research Questions/Hypotheses

The following hypotheses were postulated:

1. There will a be difference in the level of ethical reasoning when comparing three levels of participant type and two levels of program type.
2. There will be a relationship between the level of ethical reasoning and the amount of formal education.
3. There will be no relationship between levels of ethical reasoning and age.
4. There will be no difference in levels of ethical reasoning with regard to gender.

Definition of Terms

Accreditation. Voluntary peer review of and public recognition of a specialized program of study that meets established qualifications and educational standards.

Accreditation assures acceptable educational quality because accredited programs must

meet national standards established by professionals and communities of interest (JRCERT, 1998).

Affective Domain. One of the three evaluative domains in education as defined by Bloom (1956). Concept terms in the affective domain of health care are: caring, beliefs, values, attitudes, ethics and morality (Reilly & Oerman, 1992).

Certification. The recognition of individuals qualified to use ionizing radiation in diagnostic medical imaging to promote high standards of patient care. This recognition comes in the form of passing a credentialing examination upon completion of an accredited Radiologic Technology program (ARRT, 2001).

Code of Ethics. Set of principles that is developed by individual professional organizations in which the duties and course of action taken by the professional are defined by daily practice (See Appendix A).

Dilemma. A situation in which deciding in favor of one set of values is the equivalent of not deciding to favor another set of competing values. Deciding to preserve one value will include the sacrifice of another value (Callahan, 1988).

Ethical Reasoning. A process that requires an application of individual values about human welfare and social justice and (Rawls, 1971). It is the capability to distinguish between right and wrong (Webster's New World Dictionary).

Ethics. "The discipline or science by which we determine which human actions are good and which are bad" (deBlois, Norris & O'Rourke, 1994, p. 3). It is a study of acceptable conduct and moral judgment (Websters, 1982). The professional system or code of morals used by a particular group (Obergfell, 1995).

Morals. Of or concerned with the principles of right and wrong in relation to human action and character (Webster's II New Riverside University Dictionary). Morals and ethics are used interchangeably in this study.

Moral Development. As pertaining to this study, moral development is defined as the ability to educate students in higher levels of ethical reasoning through teaching moral values such as human dignity, fairness, justice and equity (Kohlberg, 1984).

Moral Judgment. After an individual is aware of how people are affected by actions, moral judgment determines which action is morally justifiable, that is, which action is just or right (Rest, 1994). This component, as part of the Four Component Model, is assessed by the DIT2.

Moral Sensitivity. "An awareness of how our actions affect other people" (Rest, 1994, p. 23). It is a process that involves empathy and role-taking skills; and takes into account how actions would affect all concerned.

Radiologic Technologist. A practitioner in the art and science of diagnostic and therapeutic medical imaging. A graduate of an accredited program of study and certified by the American Registry of Radiologic Technologists (ARRT, 2001).

Rules of Ethics. "Standards of minimally acceptable professional conduct for all Registered Technologists and applicants" (ARRT, 2001, pg. 6). The Rules of Ethics are in place to protect, to provide safety and comfort of the patient. All candidates and registered technologists must comply with the stated Rules of Ethics in which the Code of Ethics is found.

Schemas. A knowledge structure that is kept in long term-memory and activated when current events resemble previous experiences. Repetition of these experiences lead

to expectations and concepts that, in turn, are elaborated into theories and beliefs (Rest, Narvaez, Bebeau, & Thoma, 1999). The three schemas in moral development are: Personal Interest, Maintaining Norms, and Postconventional.

Virtue Ethics. “A trait of character, manifested in habitual action, that is good for a person to have” (Rachels, 1999, p. 178). A trait that is socially and morally valued (Beauchamp & Childress, 1994) or acquired human qualities that are worth having (Gastmans, 2002). Four character traits of virtue ethics that have been identified are: courage, generosity, honesty, and loyalty (Rachels, 1999).

Delimitations

The following were considered delimitations of the study:

1. Data were collected only from students and graduates of associate and baccalaureate programs in the Western United States.
2. Data were not collected from students in hospital-based certificate or proprietary associate degree programs.
3. While all programs incorporate ethics in the curriculum, there was no assurance that a uniform method of teaching or evaluating ethics was used.

Assumptions and Limitations

The following assumptions were made in relation to this study:

1. It was assumed that the students and graduates participating in the study were representative of the general population, which had enrolled in and graduated from

accredited, two-year associate degree and four-year baccalaureate degree radiologic technology programs.

2. It was assumed that students and graduates of two-year and four-year accredited programs were presented with a course of study that included ethics and the code of ethics of the American Registry of Radiologic Technologists.

3. It was assumed that the participants answered truthfully and to the best of their knowledge regarding ethical reasoning.

Significance of the Study

The face of medicine and health care continues to change as new technologies are used in diagnosis and treatment of diseases. There can be a tendency to ignore patient care while focusing on the latest equipment changes. At times this allows procedures to happen with very little patient interaction. Although there have been numerous studies on ethics in the social and health sciences, there has been little research of ethical reasoning in the Radiologic Technology profession. This study will contribute to the body of information regarding the transition of an individual from a student to a professional technologist. It will examine the understanding of ethics by the student as well as the practitioner whereas other studies have focused on only one or the other. Additionally, health care professionals can apply the research results. Radiologic technology educators can use the research to examine if ethical principles integrated into the curriculum are effective in life-long learning and in increased levels of ethical reasoning. Furthermore, hospital administrators can utilize the research to support technologists in their effort to develop or maintain professional ethics and high levels of ethical reasoning. Finally, the

national professional society will be able to use the information to advocate and promote reform in education and practice, if necessary, for the members of the organization.

Researcher's Perspective

Having worked in the profession of radiologic technology for the past 30 years, first as a technologist, then a manager, and now an educator, I have experienced ethical dilemmas in all arenas of the field. From personal and professional observation, there is a concern on my part with what is perceived as a lack of ethical practice by peers, subordinates, students and myself as well. I have often wondered if what has been perceived as a breach of ethical practice is actually a lack of compassion that would fall more in the category of virtue versus ethical reasoning; or fall into the realm of moral sensitivity instead of moral judgment (Rest, 1994). I also wonder if the concept of the affective domain is so nebulous in our accreditation standards that radiologic science educators have a difficult time determining which ethical principles need to be taught or evaluated, and how to teach these principles. Educators may also have problems determining what is the level of ethical understanding in students when entering the programs and therefore choose ineffective means or pedagogy to facilitate students' moral development.

Over the last five years there has been an increase of ethical violations, resulting in certifications being revoked, and technologists being publicly reprimanded for unethical practices as determined by the certification body (ARRT communication, 2002). Many of these violations are in regard to mandatory continuing education violations, however, there are a number of work related violations as well. Even before

becoming an educator, I pondered the reasons for ethical violations for a long time. I am currently an Associate Professor of Radiologic Technology at Mesa State College. The program is a two-year associate degree program similar to those associate degree programs in the study. Part of my responsibilities includes maintaining the accreditation standards of the program. Teaching responsibilities include presenting a section of the curriculum dedicated to the affective domain and, in particular, teaching ethics. Students are given an introduction to the ARRT Code of Ethics and some class time is devoted to a discussion of ethical dilemmas. Little is done in the way of allowing student interaction or practice in taking a position on an ethical dilemma and defending that position (Krawczyk, 1997). There is an interest in the results of the research that could lead to a better way of teaching higher levels of ethical reasoning to students that will be instilled in them for life.

Health care professions have operated over the last two centuries with ethical theories from the last two millennia. From the first statement of 'do no harm' to the multifaceted, diverse ethics of care and virtue, there is a moral reasoning that rises above general ethical principles. Ethical development of the student may lead to higher levels of ethical reasoning in the practitioner. The continuing quest will be to discover ways to impart this vital information to the professionals of tomorrow.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

A review of literature in the Radiologic Sciences reveals a paucity of studies regarding ethical reasoning in both students and graduates of radiologic technology or radiologic science programs. Ethics, as a whole, is an important component of any business or profession and an indicator of standards that the employee will follow (Bayles, 1989; Windsor, 1999). In the medical field and in health professions specifically, codes of ethics are used as the standard to be upheld by workers in individual fields (Obergfell, 1997). Understanding professional ethics stems from the education and information one receives while in an educational program of study. Ethical reasoning, however, goes beyond an understanding of ethical theory and following professional codes of ethics. It contributes to functioning as an ethical person and requires a blending of cognitive and affective processes (Walker, 2002) as well as integration of moral judgment, sensitivity, motivation, and character (Rest, 1994).

This chapter will include the following six major sections: 1) a theoretical foundation of ethical reasoning and judgment based on classical theories; 2) modern ethical theories; 3) a discussion of ethics and moral development theories based on the studies of Piaget, Kohlberg, Gilligan, and Rest; 4) the importance of application of ethical

theory in an educational program; 5) ethical reasoning in health care practice; and 6) a review of other studies in ethical reasoning in health care professions.

Classical Theories of Ethical Reasoning and Judgment

Greek Theorists

A review of books and journals indicates the development of certain themes throughout the history of ethics in general, and medical/healthcare ethics in particular. Classical ethics include the writings of Plato, Aristotle, Kant, Bentham and Mills. Plato's theory held that philosophical and contemplative thought is necessary to create a theoretical insight of ethics and that this insight is necessary before one can carry out good actions (Birkelund, 2000). Plato's theory stems from the idea that man should spend the day theorizing about life and good living. A limitation of this application today is that one cannot sit and contemplate all day; most people must do physical work and interact with others. Birkelund noted that one of the most common complaints among health students is the difficulty in connecting theory to practice, therefore it is difficult to design a practical curriculum based on Platonic logic.

Aristotle believed that virtue becomes an important part of one's life because the person who practices virtue will be better off in life, not in monetary gain, but in overall living (Rachels, 1999). The 'school of life' and the 'master-apprentice' philosophies of Aristotle have been an inspiration to health education programs because it is believed that moral aspects cannot be learned by theory but in the 'school of life', that is, through practice (Birkelund, 2000). Aristotle stated,

Virtue, then, is of two kinds, intellectual and moral. Intellectual virtue owes both its inspection and its growth chiefly to instruction, and for this very reason needs time and experience. Moral goodness, on the other hand, is the result of habit, from which it has actually got its name, being a slight modification of the word ethos (Trans. 1981, p. 91).

Utilitarianism

A new theory arose in the 18th century impacting ethical theories that had been in existence for centuries. Bentham and Mill discussed ethics in terms of one moral principle called the Principle of Utility or consequentialism (Rachels, 1999). When a choice is presented between alternative actions or social policies, the one that results in the best consequences for the majority of people is the right choice. Right actions result in the best consequences and the important issue in assessing consequences is the amount of happiness or unhappiness caused. This occurs when one realizes that every individual's welfare is of equal importance (Rachels, 1999). In matters of health care, utilitarianism is demonstrated in issues such as assessing cost-benefit analyses or lying to a patient if the result is beneficial and does not cause the patient harm (Obergfell, 1995). For example, utilitarianism would most likely be supportive of stem cell research. The ethical matter of the life of the embryo would not be in question if the research benefited the greater number of people. Bentham's principle would fit into the advanced technology of modern medicine (Jonsen, 1990).

Deontology

In contrast to the consequentialist theory, Kant (1724-1804), a renowned German philosopher, believed that consequences did not dictate morality and are actually seen as

secondary to the rules that guide the action. Kant theorized that the greatest good a human being can achieve is a good will, and a good will is one that is the result of respect for the basic moral law (Almeder, 2000). His contention is that law is good even if one does not wish to do what the law says. A moral person will have duties; and those duties require that certain things be done because duties are right regardless of derived benefits from the action. Where Mill believed that lying is acceptable as long as no harm is done, Kant would reply that the consequence of lying is not what makes it right or wrong but whether or not the law has been compromised. Kant further carried out his principle to the treatment of others. “Act so that you treat humanity, whether in your own person or in that of another, always as an end and never as a means only” (Kant, trans. 1959). Kant believed that human beings are here as more than mere instruments for the betterment of others (Almeder, 2000). The German philosopher would not agree with removing a patient from life support because universal law states that killing is immoral.

Ethical thought in health care held to these classical principles until medicine started advancing beyond the scope of theory alone. Dilemmas will arise that cannot be answered by theorizing a solution; action has to be taken to solve the problems involving physicians, health care workers, and the patients themselves.

Modern Application of Ethical Theories

The Belmont Report

In 1974 Congress formed the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. Its mission was to formulate policies that would protect the rights of human subjects involved in research. These policies were

based, in part, on the Nuremberg Code that was established following World War II as a result of the scientific atrocities of Hitler and his team of physicians in the concentration camps (Veatch, 1989). The Belmont Report was one part of the findings that came out of the four-year study of the Commission (Baker, et al, 1999). This report stated that four key ethical principles should govern human research: respect for persons' autonomy, beneficence, nonmaleficence, and justice. These principles have carried over from research to health care and are a mainstay part of the curriculum dealing with ethics. Many codes of ethics in the medical and health care professions are based on the Belmont Report.

The principle of autonomy dates back to ancient Greece and states that each person has the right to determine his/her own destiny with regard to that person's view of the world (Wright, 1987). Individuals have the right to make decisions concerning their own bodies and health care treatment. Health care students generally accept that the patient has the right to be informed of treatment and also has the right to refuse that treatment. The physician, with a paternalistic view, may get frustrated if the patient does not follow a prescribed course of treatment. "There is a temptation in medicine to use the authority of the physician's role to foster or perpetuate the dependency of patients, rather than to promote their autonomy" (Beauchamp & Childress, 1994). The health care professional, at times, gets caught in the middle of decisions that the patient is making which differ from those of the physician (Arras & Steinbock, 1995; Obergfell, 1995; Veatch, 1989; Wright, 1987). An understanding and appreciation of autonomy will help the professional to be an advocate for the patient (Obergfell, 1995). There are times,

however, when health care worker's decision must override that of the patient when it has been deemed that the patient is not competent to make decisions.

The principle of nonmaleficence is expressed in the Hippocratic oath: physicians "...will use treatment to help the sick according to my ability and judgment, but I will never use it to injure or wrong them" (Beauchamp & Childress, 1994, p. 189). Aquinas (trans. 1964), with regard to beneficence, believed that the primary principle of ethics was to do good and avoid evil. In defining the two principles, the Belmont Report made it clear that risk of harm must be minimized and that research must not confuse the good of individuals for the good of society or scientific progress.

Beneficence differs from nonmaleficence in that it requires the individual to perform some action either to prevent harm or to do good. This may require the health care professional to take a stand against another or to intercede for the patient's well-being (Obergfell, 1995, p. 12).

Both beneficence and nonmaleficence have provided a basis for the principle of paternalism. In medicine, by having the power to do good and no harm, the physician can determine it is in the patient's best interest that certain information not be disclosed. This type of behavior can directly conflict with autonomy thereby creating another ethical dilemma.

The fourth principle is that of justice. This principle, based on earlier works of Aristotle, Kant, and Rawls (1971), defined those participants subjected to research that could not defend themselves: mentally retarded, prisoners, medically indigent patients, the dying, and uneducated black sharecroppers in the South (Baker, et al, 1999). Informed consent arises from this principle as well as from the principle of autonomy (Obergfell, 1995). In another form, justice carried over into health care to protect all the patients who would possibly be denied health care, including those who would be denied

equal access to medical treatment for lack of finances or insurance. The major question raised today deals with any person's right to health care and what constitutes the minimal amount of treatment and care necessary for those who cannot afford to pay. This construct was termed the maximum principle because it attempts to maximize benefits to those who are minimally advantaged (Wilson, 1997). Medical centers today must guarantee a certain amount of free treatment for those who cannot pay. The way in which health care professionals interact with these individuals runs in line with the principle of justice.

While not a specific part of the Belmont report, fidelity is an ethical principle that applies to health care as well. Fidelity involves issues of trust, loyalty, and patient confidentiality (Palmer, 1999; Towsley-Cook & Young, 1999). At times fidelity can create a personal dilemma for the professional when there are expectations of faithfulness to a patient's wishes which conflict with legal and professional responsibilities (Carlton, 1999). Often the professional is torn between loyalty to the patient and loyalty to the employer as well. Knowing the patient's rights and having an understanding of a code of ethics can aid in issues of fidelity. The duty of fidelity can be seen in the following patient expectations: respect for the patient, competence of the health professional, adherence to the code of ethics or conduct, adherence to state and federal laws as well as to the policies of the employer, and maintenance of confidentiality between the patient and the professional (Purtilo, 1993).

Biomedical Ethics

Following closely on the heels of the Belmont Report and as an answer to the rising concern with rapid advances in medical technology, ethicists realized the need to define ethics in a less theoretical and a more practical way.

Scientific, technological, and social developments during that time mid-twentieth century produced rapid changes in the biological sciences and in health care. These developments challenged many prevalent conceptions of the moral obligations of health professionals and society in meeting the needs of the sick and injured (Beauchamp & Childress, 1994, p. 3).

There are several conflicting choices in medicine where biomedical ethics may be used to resolve the conflict. A balance must be maintained between the rights of the individual and the rights of society and; problems must be solved in a very timely manner.

Additionally, the debates are not just between physicians and scientists; theologians, philosophers, lawyers, psychologists, and sociologists want their voices to be heard as well (Shannon, 1976). A long, slow process to resolution is out of the question when dealing with the ethical dilemmas of right-to-life or right-to-choose, euthanasia, stem cell research, organ transplants, or prolonging life. Biomedical ethics seeks to disclose all viewpoints to the issue and come to a mature resolution for the best of all concerned (Baker, Caplan, Emanuel, & Latham, 1999; Beauchamp & Childress, 1994; Shannon, 1976; Wilson, 1997). Health care students certainly will get caught up in these debates while working in clinical situations.

The Ethics of Care

Gilligan's work (1982) in psychology regarding care ethics moved easily into health care circles, particularly in professions that have predominantly female workers.

Nursing, Radiologic Technology, and other health professions emphasize demonstrating care when teaching about affective domain in the curriculum. The traits to be valued in care ethics are compassion, love, fidelity, discernment and sympathy (Gilligan, 1982). Since the early 1980's, the ethics of care has been contrasted with the ethics of justice. While justice ethics stress right actions, care ethics stress good character (Tong, 1998). It is an emotional and relational commitment that is demonstrated not only in what is said but what is done (Beauchamp & Childress, 1994). Baier (1994) sums up Gilligan's theory in this manner,

She (Gilligan) contrasts this progressive understanding of care, from merely pleasing others to helping and nurturing, with the sort of progression involved in Kohlberg's stages, a progression in the understanding, not of mutual care, but of mutual respect...where personal autonomy and independence, rather than more satisfactory interdependence, are the paramount values (Baier, 1994, p. 22).

Noddings (1984) viewed ethics as arising from a natural feeling of caring which motivates us to be moral. "We want to be moral in order to remain in the caring relation to enhance the ideal of ourselves as one-caring" (1984, pg. 5). Moral development springs from a need to be and remain related to other people. Ideal caring "seeks to maintain caring itself" (Noddings, pg. 107).

While the ethics of care has been brought to the forefront in health care and, indeed, is now being presented as a science (Watson, 1985); however, many would question if care is in and of itself a 'woman's ethics'. Beauchamp and Childress (1994) believed that care ethics would be found in nursing and primary care specialties because women are attracted to these areas and thus would not have an impact on the entirety of health care.

Virtue Ethics

The various theories of ethics have come full circle with the ethics of virtue. Aristotle's claim that the good of man is an activity that conforms to virtue, is the basis for the modern theory of virtue ethics (Rachels, 1999). Rachels also notes that modern philosophers believe that in order to salvage modern moral philosophy, one should return to the way Aristotle thought. With all that has been given over in present times to obligation, duty, and rightness, virtue should once again take center stage.

Virtue is made up of many character traits that are demonstrated over and over again, however, virtue is not to be confused with vices (Rachels, 1999; Steutel & Carr, 1999). It has been suggested that a virtuous person is one that would most likely be sought after instead of avoided. Virtue is socially and morally valued, and is used as practical wisdom to solve emotional and intellectual problems (Beauchamp & Childress, 1994; Rachels, 1999; Towsley-Cook & Young, 1999).

Virtue ethics incorporate elements of teleology (the study of ends, purposes, and goals) and deontology (duty-based ethics); and provide a holistic approach in solving ethical dilemmas (Steutel & Carr, 1999, Towsley-Cook & Young, 1999). Ethical virtue appears in at least four character traits: courage, generosity, honesty and loyalty (Rachels, 1999). The health care worker will want to demonstrate these traits in everyday relationships with patients, physicians, peers, and the public. Such demonstration will prove the practitioner to be successful as a member of society and of a specific profession.

A morally good person with the right configuration of desires and motives is more likely than others to understand what should be done, more likely to attentively perform the acts that are required, and even more likely to form and act on moral ideals. Not the rule follower but the person disposed by character to be generous,

caring, compassionate, sympathetic, fair and the like, is the one we will recommend, admire, praise, and hold up as a moral model (Beauchamp & Childress, 1994, p. 65).

Moral Development Theory

Piaget's Theory of Moral Judgment

With regard to teaching health care ethics, the instructor must be aware of theories of moral development that were first presented in the 20th century by Piaget (1932) and Kohlberg (1974). Research conducted by both psychologists focused on children and young adults but the results have implications for the ethical behavior observed in health care workers. Two thoughts emerge in studies of moral development: perception of reality is constructed cognitively and cognitive structures evolve through developmental progression (Rest, 1979). Both Piaget and Kohlberg established steps or stages in moral development. Piaget postulated that the respect a person holds for established rules is the essence of morality. He further breaks down respect and morality into two aspects: heteronomy (unilateral respect) and autonomy (mutual respect) (Duska & Whelan, 1975). Heteronomy is found in the early stages of childhood when the rules given to the child are followed without question because the rules come from adults. Children respond from obedience or a sense of duty and obligation in a unilateral respect from the child to the adult. A violation of the rules will result in consequences; however, children at this stage often believe that the magnitude of the lie or incorrect action is as equally important as the consequence is. As vital as heteronomy is in the initial growth stages of a child, it is equally vital that the child shifts from a unilateral to a mutual understanding of respect. "Reason works over moral rules, as she works over everything,

generalizing them, making them coherent with each other, and above all extending them progressively to all individuals until universality is reached” (Piaget, 1965, p. 376). As the child grows and develops mentally, moral judgment will shift as he interacts and communicates with peers. Morality needs to shift from constraint to a sense of cooperation and from retributive to distributive justice (Piaget, 1965).

Piaget’s research demonstrated that children naturally advance in moral development and move out of the realm of egoism (heteronomy) to cooperation (autonomy) when the child discovers that others think differently than he/she does (Duska & Whalen, 1975). In Piaget’s three stages, justice is characterized by: 1) fairness, to which a child is equal to whatever an adult requests; 2) intellectual development, in which fairness is based on equality; and, 3) fairness in which one takes into account all relationships and circumstances prior to making decisions. The child, when reaching ages 12 to 14, is free from influencing external forces and becomes autonomous in moral decision-making (Duska & Whalen, 1975). Piaget’s theory and research was limited to the understanding of moral development based upon cognitive and verbal ability. This cognitive development is a result of internal influences while other behaviorist theories explore moral development as a result of external influences (Rest, 1979). Piaget also believed that this development continues from childhood into adulthood (Carpendale, 2000).

Kohlberg and the Moral Development Theory

Relying on Piaget’s theories as a springboard, Kohlberg (1984) conducted research based upon the deontological principles of Kant and Rawls. He firmly believed

that the best way to understand the way a person developed morally was through observation and verbal responses to given ethical dilemmas. Kohlberg distinguished three levels of moral development derived from answers given by males between the ages of ten to twenty-eight. Each level had two stages as well, with the second stage representing a more developed pattern of thinking. The three levels are as follows (deBlois, et al 1994; de Casterle & Janssen, 1996; Fey & Kelly, 1996; Kohlberg 1984):

1. Pre-conventional (Stages one and two). Decisions are made based on the immediate consequences of the action. The results are rewards or punishment. People adhere to rules of conduct.
2. Conventional (Stages three and four). Decisions are made on the basis of social approval by parents or peers. Decisions can also be made according to rigid adherence to social norms or laws.
3. Post-Conventional (Stages five and six). Decisions are made based on personal standards. In separating themselves from expectations and rules, people can define moral principles within themselves. People are capable of giving a personal opinion about what they consider right and wrong and this opinion is based on justice, equality and respect for others.

Kohlberg firmly believed that during moral development a child utilizes a cognitive approach in understanding ways of organizing societal cooperation. The answer to a problem lies in how one makes sense of the world around him. The basics of morality are self-constructed by utilizing this understanding. Moral judgment develops as the individual takes individual concepts of justice, duty and rights, and correlates these concepts to community ideals (Kohlberg, 1984). Borrowing Dewey's democratic concepts, Kohlberg believed that real-life issues were decided by community decision-making (Henry, 2001; Jaeger, 2001).

Moral judgment also must shift from very simple ideas to more complex ideas as a person's moral reasoning expands. Thus one's conventional moral thinking of doing

things "because that's the way it's done" leads into post-conventional thinking that rules, laws and institutions are really a part of an ideal of cooperation (Rest, Narvaez, Bebeau, & Thoma, 1999). Rest (1994) also viewed the six stages of moral development as six conceptions of organized cooperation and an individual's understanding of how this is possible.

Gilligan's Different Voice in Moral Development

Health care ethics began to take yet another turn in moral development when studies conducted by Gilligan (1977) identified a limitation of Kohlberg's study related to the moral judgment of women. Kohlberg used only male subjects in his study. When female subjects were analyzed, scores on the test were consistently no higher than stage three or four (conventional level) because decisions were based on social interactions instead of personal standards in the area of justice. Gilligan (1982) took exception to this staging of moral development – she postulated a theory that conceptions of morality are different for women than for men; therefore, moral development would have to be described differently in women.

While Kohlberg approached morality from a justice reasoning, Gilligan placed attachment and care as the primary reason for moral decisions. "...Women understood the moral problem confronting them not in terms of abstract considerations such as rights, duties and justice, but in the more concrete and contextual terms of their perceived responsibilities to care for and avoid hurting those in relationship to them" (Kuhse & Singer, 1997, p. 226). Gilligan (1982) determined that the premise of equality (everyone is treated the same) leads to the ethics of judgment. The premise of nonviolence (that no one should be hurt) leads to the ethics of care. Women are more likely to resolve moral

dilemmas from a care orientation rather than the fairness orientation of men (Gilligan & Attanucci, 1988). This 'different voice', as Gilligan has coined it, is the center of much discussion and debate in moral development as well as in health care. Rest argues that, while Gilligan attempted to challenge Kohlberg's theory, very little research has been continued or completed to support her theory, therefore, the popularity of Gilligan's theory pales in comparison with the evidence that Kohlberg produced for his theory (Rest, 1994). Walker, et al, (Armon, 1998) concluded that, while gender differences may exist in abstract moral reasoning, there is little gender difference in moral reasoning development.

Rest's Four Component Model of Morality

Moral development theory continued to evolve in the 1970's when Rest (1979) developed the Defining Issues Test (DIT). This survey was a multiple-choice alternative to the individual interview procedure that Kohlberg was using in establishing the stages of moral development. As more studies were produced using the DIT, some of Kohlberg's theory had to be reconsidered. Rest believed that moral development did not occur one step at a time but was a gradual evolution from lower forms to higher forms of thinking. Moral development was not to be isolated within the individual as Kohlberg thought. Instead, the formation of consensus by a group or society had a great influence in how ethics and ethical reasoning was determined (Rest, et al, 1999).

When examining concrete issues such as the theories of the Belmont report and the principles that arose from that report (confidentiality, autonomy, codes of ethics, etc.) Rest concluded that Kohlberg's six-stage theory had a very broad level of abstraction.

He then proposed a neo-Kohlbergian schema approach to moral development that was much more concrete. A schema is “a general knowledge structure, residing in long-term memory, that is invoked by current stimulus configurations that resemble previous stimuli” (Rest, et al, 1999, pg. 136). The six stages were compacted into Rest’s three developmental schemas: personal interest (stages 2 & 3), maintaining norms (stage 4), and postconventional (stages 5 & 6). The Defining Issues Test is designed to activate the moral schemas and the process of activation is not necessarily conscious or reflective (Rest, et al, 1999).

The Four Component Model of Morality (Rest, 1994) goes beyond the moral judgment concept developed by Kohlberg. For example, moral judgment is the cognitive justification in performance of a particular act while moral sensitivity is a personal skill in which one realizes that actions have moral implications (Jaeger, 2001). After reviewing the literature, Rest determined that morality was a multifaceted phenomenon that encompassed cognitive development, social learning, behavior, and social psychology. The Model is a theory of what determines moral behavior based upon the four internal psychological processes that must take place in order for external ethical behavior to be seen. The four components of morality are: having an awareness that various actions will have an affect on others (Moral Sensitivity); deciding what line of action is more just or right (Moral Judgment); selecting moral values above other values to benefit others or whose interests are best being served (Moral Motivation); and, having the perseverance or conviction to follow through upon the line of action chosen (Moral Character) (Bebeau and Thoma, 1999; Rest, et al, 1999). As opposed to Kohlberg’s rigid six stages in which the subject would only move forward a step at a time as morals

developed, the Four Component Model flows in either direction at any time through all components (Rest, et al, 1999).

The concept of the Four Component Model of Morality is not without its critics. Currently, the most tested component of the Model is moral judgment and the majority of studies using the DIT have focused on the cognitive process in determining moral judgment. Walker (2002) makes the point that if the Model is to be a comprehensive demonstration of moral functioning, it must commingle cognitive and affective factors. Emotional reactions and intuitions should be examined for significance before cognitive processes are evaluated. There is little empirical research in the other three components of sensitivity, motivation, and character. Walker suggests that additional research needs to be done to determine the interactions between each concept in explaining ethical behavior and how educational programs can integrate all four components to promote ethical practice.

Application of Ethical Theories in Health Education

Affective Domain

Benjamin Bloom (1956) was the first to discuss teaching and evaluation of education in three domains: cognitive, psychomotor and affective. The first, cognitive, is relatively easy to teach and evaluate as it is education in knowledge. The second domain, psychomotor, is also an area where demonstration and evaluation of skills are easily identified. The affective domain remains the most difficult of the three to not only teach but also evaluate due to the subjective nature of the material being presented. Krathwohl (1964) further divided the affective domain into five categories: receiving, responding,

valuing, organization and characterization by a value or value complex. Moving education into healthcare, Sadlick (1978) internalized Krathwohl's five categories and identified them as concepts of nursing: interests, attitudes, values and empathy. Concept terms used in the affective domain of health care include: caring, beliefs, values, attitudes, ethics and morality (Reilly & Oerman, 1992). These terms can be found in such documents as the Patient Bill of Rights, Code for Nurses, Code of Ethics for Radiologic Technologists, social policy statements and professional Standards of Practice. While all concepts of are equal importance, the subject of ethical behavior and attitude are generally discussed and reviewed frequently in an attempt to understand the affective processes of students in health care education.

Ethical Theories

There are as many ways of defining ethics as there are ethicists. Most believe that morality and ethical reasoning are the same thing. Jesus said to love your neighbor as yourself (Mt. 22:39, The New King James Version). Socrates argued that if we knew what the good life was we would seek to find it (Mundy, 1999). Webster's Dictionary definition of ethics is a study of acceptable conduct and moral judgment (Webster's, 1982). Veatch believes that ethics "...is the enterprise of disciplined reflection on moral intuitions and moral choices" (1989, p. 2). Obergfell (1995) describes ethics as "study of the standards of conduct and moral judgment, as well as the system or code of morals of a particular group or profession" (p. 10). Biomedical ethics, a term coined in the early 1980's, is used as a guideline for proper attitudes and activities towards patients and coworkers in the health professions (Beauchamp & Childress, 1994). All the various

definitions point to one construct: "do no harm". The practice of ethics in health care or medicine has been the subject of studies since the time of Hippocrates. It was he who said, "let your best means of treating people be your love for them, your interest in their affairs, your knowledge of their condition, and your recognized attentiveness to them" (Bulger, 1987, p. 17). Throughout the Middle Ages, the Industrial Revolution, and into the Twenty-first century, the Hippocratic oath is summed up in the ideal of "do no harm".

The importance of medical ethics education came to the forefront in the 1800's in preparing students to practice medicine (Baker, et al, 1999). The first code of ethics for physicians was written by the American Medical Association in 1847 (Pellegrino, 1987). In more recent developments in the educational realm of various health disciplines, ethics and bioethics are being emphasized as key concepts in professional practice. Pellegrino (1987) would argue that while the Hippocratic oath is a most admirable code, its "ethical sensibilities and high moral tone are insufficient for the complexities of today's programs" (p. 47). He argues that the idea of a physician, who is paternalistic and benevolent, making all the decisions for the patient is inconsistent with the educated patient of today.

Infusing Ethics into the Curriculum

The question arising from the definitions of ethics is in regard to the importance of teaching ethics in health care educational programs. Defining and discussing ethics with students who are new to the professions becomes a vital part of health care education. Many times the student is bombarded with conflicting answers or courses of action to take when faced with an ethical dilemma (Purtilo, 2000). There is a mutual

responsibility of students, didactic instructors and clinical supervisors to ensure that the students have an understanding of moral decision making and to allow them to trust in their ability to make a correct decision when a situation calls for moral reflection and action (Purtilo, 1989). Krawczyk (1997) would include a separate ethics course in the educational program based upon her research of groups of nursing students who had formal ethical education. She suggested that not only was the separate course beneficial but the format of the class should allow students as a group to discuss various ethical dilemmas and make ethical decisions. Allowing the student to practice defending an issue is as important as allowing the student to practice a medical procedure. This can potentially lead to more self-confidence in ethical decision making when in actual professional practice.

Obergfell (1995) discusses health care as a complex system of tests and treatments that cure, relieve pain or prolong life. Ethical issues arise when decisions have to be made regarding delivery of health care and who is responsible for those decisions. Obergfell further states that judgments must be made on social and religious morals as well as public policy. Ethical principles and codes of ethics enable health professional students to understand individual responsibility for the decisions that are made. Codes of ethics are developed by individual professional organizations in which the duties and course of action taken by the professional are defined for daily practice (Wilson, 1997). Indoctrination into the code of ethics usually starts with an introductory course in the radiologic technology program and then is infused throughout the program curriculum. Students are evaluated in some manner on their ethical behavior but this varies from school to school.

Ethical Reasoning

A working knowledge of the code is important for the student in order to understand what the standards of the profession are (Keefer & Ashley, 2001); however, the codes can be too abstract at times to fit into the every day work ethic. Students must be able to recognize situations where they may be faced with difficult decisions. Discussing ethical dilemmas and solutions with teachers and peers will allow the students to identify ethical problems that may present.

The practice of ethics goes beyond the individual right to self-interest and must extend to the good of the others. Every decision made in dealing with another person's welfare is made with or without conscious knowledge of being ethical (Curtin, 2000). Students begin to practice professional ethical behavior when working at a clinical site. Almost immediately, the student can be faced with decisions that will conflict with what they have read or know (Keefer & Ashley, 2001). Patients' rights are at the forefront of the newly learned behavior. While the patient has the right to refuse testing or treatment, for the most part she or he is at the mercy of the health care worker. The choice of interacting with the patient in an ethical manner is left up to the student. Curtin (2000) postulates that the current books and articles are helpful to define integrity and ethics, however, the literature implies the health professional will know what is the right thing to do and then will do it. This can be accomplished by allowing the student to learn by experience.

Care and Virtue Ethics in Health Education

Within the last ten years, application of ethics in health professions has taken on the form of caring as well as making moral decisions. The nursing profession, in particular, has embraced the concept of caring as part of its code of ethics and standards of practice. Going beyond the utilitarian or deontological theories, care ethics are a learned experience (Noureddine, 2001). The professional knowledge and skills required are one part of health care expertise. When the professional is committed to the patient's welfare (utilitarianism) as well as protecting individual choice (deontology) when utilizing knowledge and skills, caring becomes an ethical behavior (de Casterle & Janssen, 1996; Noureddine, 2001). Acting according to professional codes of ethics does not speak to the professional goodness or caring attitude of the health care worker (Gastmans, 2002). Practicing concern for the well being of the patient, as well as being honest and loyal, will lead to moral development of the student and consequently, the practitioner will do more than what is expected in the rules. Character building and ethical quality in a person goes beyond teaching the rules of ethics to students in health care programs (Gastmans, 2002). A well-rounded ethical curriculum will include a definition of care giving with practical applications and an emphasis on virtuous living as well as the rules of the profession.

Role Model for Ethical Behavior

One key issue remains with regard to teaching ethics to health education students. The general outlook of students that are entering college today is different than previous generations, including the generation of the health educators. The values, morals and

ethics that the younger population has learned may clash with what the older generations consider to be ethical, moral and virtuous (Hersh, 1998).

Today's teens have grown up in the midst of enormous social changes that have shaped, reshaped, distorted and sometimes decimated the basic parameters for healthy development. They have grown up with parents who are still seeking answers about what it means to be an adult man or woman. They have lived in families that seldom fit the old ideal of a family and in a culture where the traditional wisdom of how to raise children has been replaced by a kind of daily improvisation as parents try to fit child rearing into their busy lives. At a time when adolescents need to emulate role models, the adults around them are moving targets (Hersch, 1998, p. 18).

In order to teach students how to reason and judge what is right or wrong, the instructor must be the role model for ethical practice (McDowell, 1991). It is impractical to believe that students with little understanding of the principles of ethics will respond in an appropriate manner when faced with ethical dilemmas in the health care setting.

“...the teaching of ethics has been in a decline because of a widening gap between moral philosophy and the concrete realities of life” (Brockett & Geddes, 1997, p. 301). Health care educators need to give students opportunities to discuss ethical situations, to work them out and to own the responsibility for the decisions made regarding the dilemma.

One serious issue in health education is the lack of expertise on the part of the faculty in teaching moral theory, and the lack of curricular design regarding ethics and critical thinking (Vallentyne & Accordino, 1998). Other problems arise when the students receive conflicting ideas about ethics and ethical situations. There are many different and divergent approaches taken by faculty in teaching or discussing ethics with students (Tucker & Stout, 1999). Without adequate instructor training, the focus is put on discipline-specific ethical issues; core concepts and principles are overlooked when

teaching ethics in the classroom (Vallentyne & Accordino, 1998). Faculty development programs would be a way to ensure the success of teaching ethics across the curriculum.

Application to Health Practitioners

The Relationship of Educational Theory to Professional Practice

Duckett and Ryden (1994) list three situations in health care practice that have ethical implications:

1. Those in which moral principles and care for the patient can only have one direction in the course of action to take. There are no alternative actions.
2. Those which have two possible solutions but one principle would supercede the other. For example, care of the patient comes before loyalty to a fellow worker who is constantly late for work.
3. Those in which two or more ethical principles are relevant but there is disagreement as to which principle should be followed. In this situation, the practitioner is faced with making a decision that could affect someone negatively. It is at this point that principled moral reasoning would be a factor in the decision-making process.

The practitioner cannot be prepared to deal with these professional ethical situations without a proper ethics education prior to practice (Duckett & Ryden, 1994). Moral reasoning and critical thinking go hand-in-hand in the every day work world. In research of nurses and nursing students, Duckett, et al (1992), concluded that moral reasoning in nurses tends to increase with more formal education. However, education does not stop when the student becomes the practitioner. Continuing education in moral development is critical for the health professional especially in the fast pace of changing technologies in medicine (Arras & Steinbock, 1995).

Technology and Ethical Consideration

The Belmont Report came on the heels of technological advances during World War II (Veatch, 1989). The face of medicine and health care continues to change as new technologies are used in diagnosis and treatment of diseases. Issues such as cloning and stem cell research result in ethical debates because it is difficult to determine by mere ethical principles, which argument is better. Arras and Steinbock state,

Obviously, much of the ferment in contemporary biomedical ethics is due to the unrelenting pace of technological advance. Before we know it, these new techniques and services begin to take on lives of their own, expanding well beyond the problems and patients for whom they were originally intended (1995, p. 3).

The ethical principles of beneficence, nonmaleficence, autonomy, justice and fidelity written into the Belmont report are even more important today as health care workers are frequently faced with new types of ethical dilemmas arising from research and development of new technologies. Students must have a firm understanding of the challenges presented and must be taught, in a safe environment, how to deal with moral aspects of the profession they are entering.

Another major shift in the medical world is the patients' and society's view of the health care workers in relationship to managed care, health maintenance organizations and insurance companies. Curtin (2000) determined that while most of the daily situations in health practice do not become headline news, these situations actually make up the fabric of the lives of health workers and patients alike. Moral decisions made by health professionals regarding their patients are not only a reflection of character but a creation of it.

Professional ethics are drawn into the forefront of many professions and disciplines if for no other reason than the publicity of unethical practice in the various professions (Bayles, 1989; Freeman, 1998; Purtilo, 1981; Windsor & Cappel, 1999). Organizations have developed individual sets of ethical principles that determine what the role of the profession is and what the conduct of the professional should be (Bayles, 1989). Koehn (1994) believes that professional ethics lead to a relationship of trust between the practitioner and the patient. If the practitioner is not trustworthy, in whom can the patient place his confidence when sick or injured?

A radiologic technologist has an ethical responsibility to produce the quality radiograph necessary for the radiologist to make a diagnosis (ARRT, 2002). This responsibility is fulfilled in part by the cognitive and psychomotor skills necessary to produce the quality film (Mundy, 1999). Those skills are developed through a two or four year educational program designed to instill those technical skills. The practitioner also has the ethical responsibility to maintain up-to-date knowledge of technology that will be used and procedures that will be required to perform. Ethical situations in the workplace can include breach of confidentiality, falsifying records, or continually providing substandard radiographs for diagnosis. Unethical behavior can also be demonstrated in a lack of care for the patient in the technologist's charge.

Registered technologists are required to obtain continuing education credits on a regular basis. Much of the ethical violations reported by the ARRT (2001) deal with technologists obtaining these continuing education credits by falsifying documentation or cheating on tests.

Codes of Ethics

Being familiar with the profession's code of ethics and having a firm grounding in ethical theories and principles will guide the technologist in addressing ethical situations and dilemmas that will arise on a regular basis (Mundy, 1999; Towsley-Cook & Young, 1999). Codes of ethics have been established to guide the practitioner with regard to care of the patient or client. There is an independence of judgment on the part of the individual practitioner that is earned. The practitioner must be ethically as well as technically competent (Purtilo, 1989). There is a sense of duty to colleagues and patients with regard to honesty, as well as a sense of duty to uphold the standards of the profession. Purtilo further believes that a primary duty is patient advocacy, guarding the patient's welfare. A listing of these duties is often found in the code of ethics that is specific to a particular profession.

Problems arise with a code of ethics due to the general nature of the code (Purtilo, 1989). It is assumed within professions that everyone understands what ethics really are and knows how to follow the rules explicitly (Pattison, 2001). Moving away from theoretical resolution of ethical dilemmas, practitioners have to make decisions based on what comes from within (Freeman, 1998). When an ethical dilemma occurs that cannot be resolved by a written code the solution is often found in a personal choice made by the individual.

Beyond the Code – Ethical Reasoning

Practicing ethics is not just an external obligation to follow rules. Professional ethics also needs to focus on the character of the practitioner and what traits are exhibited. Compliance to the rules does not necessarily demonstrate if a person is ethical

(Brockett, et al, 1996; McDowell, 1991). Laws or rules according to Rest, et al (1999) are a natural discovery when people are attempting to organize cooperation in a society. The Moral Judgment component as defined by Rest (1994) takes into account all the actions that can be considered and, subsequently, a decision is made regarding which action is best for the patient, best for self, or both. Depending on the level of ethical reasoning (personal interest, maintaining norms or post-conventional reasoning) the practitioner will respond using the “bedrock concepts” (Westbrook, 1994, McDowell, 1991) or core values that are within one’s self. Thus, he or she will not make a decision based upon educational inducement alone (Bebeau & Thoma, 1998). The maintaining norms schema proposed by Rest is the second level of ethical reasoning and flows with Kohlberg’s Stage 4 of obeying rules or following codes of ethics. Philosophically speaking, it is better to have this level of beliefs than to have a society without rules; however, only following rules does not bespeak of a higher level of ethical reasoning (Rest, et al, 1999). Postconventional reasoning goes beyond following the facts or laws. Personal ideals are also a part of the cognitive process in making decisions. Moral obligations in society come from individual ideals that can be shared, that are fully reciprocal, and that are subject to scrutiny with one another (Rest, Narvaez, Thoma & Bebeau, 2000).

It is generally assumed that everyone understands what ethics are and why a code of ethics is necessary (Pattison, 2001). At times the rules or standards of practice can be confused for what is believed to be codes of ethical conduct. It is very important, especially in a profession where peoples’ lives are at stake, that high standards be maintained (Oberghell, 1995). The individual practitioner will be faced quite often with

situations that are outside those addressed by standards. How will he or she determine what the best course of action is for those dilemmas? The practitioner has some cognitive reasoning from the basic ethical principle of “do no harm” and the Belmont principles, but codes do not give guidance to help one understand how conscience is involved in moral decision-making (Pattison, 2001). If professionals cannot understand how to apply the codes to ethical issues, they may neglect codes and follow individual moral judgment. The likelihood of this lessens if the practitioner has been given a solid foundation of ethical principles and moral reasoning in the educational program from which he or she graduated.

Other Studies of Ethical Reasoning in Health Care

Ethics is an integral part of the radiography educational curriculum, however, little has been written concerning ethical reasoning in radiologic technology students or practitioners. Van Valkenburg (1989) compared groups of radiologic technology students in which one group received intensive, methodical instruction in the affective domain while one group received the regular curriculum. In analysis utilizing the Locus of Control and Dogmatism Scale measurement tests, there was a significant difference in the scores of the treatment group versus the control group. Additionally, a socialization process was utilized over an 18-month period of time to reinforce the affective principles of caring, attitude, virtue, and morality. The results demonstrated that there were higher levels of affective awareness and empathetic caring in those students who were part of the treatment group. Van Valkenberg recommended follow-up research with

practitioners who had graduated from the program to determine if the increased affective instruction had long lasting behavioral effects.

In a study of moral reasoning in occupational therapy students, Greene (1997) performed pretest-posttest research of students who had a service-learning experience included in the curriculum. The Sociomoral Reflection Measure- Short Form was used to determine moral reasoning in students before and after the deliberate intervention. There were no significant differences in pretest and posttest scores in either group and average scores reflected reasoning similar to the first and second schema proposed by Rest. In fact, there was a regression in the level of moral reasoning moving from a “conscious-driven thinking to ...thinking involving an external locus of control” (Greene, 1997, pg. 848). This again would represent a shift from postconventional moral reasoning to conventional or maintaining norms reasoning. Greene concludes that teaching methods in ethics education should be enhanced beyond teaching the codes of ethics.

Moral Development

The Defining Issues Test (DIT) has been used in over 1500 studies and has been reported in over 500 articles (King & Mayhew, 2002) since Rest first started exploring moral development. Various types of validity criterion were established which included: 1) longitudinal change studies evaluating moral reasoning and levels of education of students from middle school to graduate school; 2) moral education intervention examining the effect of enrichment programs on levels of moral reasoning; 3) cross-sectional studies of groups differing in expertise across many demographics; 4) moral comprehension versus moral reasoning in which the participants themselves agreed that the higher stages of moral reasoning were better than the lower stages such as Personal

Interest; and 5) linking moral reasoning to pro-social behavior, professional decision making, and job performance (Rest, et al, 1999). The P or postconventional score on the DIT determine higher stages of moral reasoning. The higher the value of the P score, the more the participant uses postconventional or principled reasoning to solve ethical dilemmas. From many studies, Rest determined that junior high school students often had average P scores in the 20's, high school students had scores in the 30's, college students in the 40's and graduate students in the 50's. The score is based upon answers given to prescribed moral dilemmas on the DIT. Answers chosen by the participant also determine if the participant is prone to the personal interest or maintaining norms schemas as well.

There have been over 100 documented studies in professions such as accounting, dentistry, medicine, nursing, occupational therapy, and teaching (Bebeau, 1994; Dieurf, 1998; Duckett & Ryden, 1994; Ponemon, 1992; Reiman & Thies-Sprinthall, 1993; Self & Baldwin, 1994). These studies include participants from health education programs and the professional work force. Rest and Thoma (1986) demonstrated that ethics education intervention of 3 to 12 weeks in length could make a difference in levels of moral development. In a related study, Clarkeburn, Downie and Matthew (2002) examined students in life sciences programs such as biomedical science, immunology and pharmacology. One group in each area was given a problem-based learning intervention utilizing discussion groups on ethical issues over a four-week time period. At the end of the intervention, all participants were tested using the DIT as well as other ethical sensitivity and development instruments. Analysis demonstrated that there was no significant difference in the levels of ethical reasoning between the control and test

groups. The researchers concluded that results on the DIT indicated that the life sciences students were “very much unsettled and immature in their use and choice of moral decision making tools” and “frequently utilize relatively unrefined methods” (pg. 77) when making ethical decisions. The average DIT score for both groups in this research was 31.66, which the authors believed was low for undergraduates when compared to other results reported by Rest (1986).

While no studies were found examining ethical reasoning or utilizing the DIT in radiologic technology, over 60 studies of moral reasoning using the DIT have been reported in the health professions. In a study of ethical sensitivity (defined as the ability to interpret factors that relate to the profession’s code of ethics) and moral reasoning, dental students demonstrated a significant increase in DIT scores with a medium to large effect size (.36) when tested after undergoing deliberate ethical education intervention throughout the four-year undergraduate curriculum (Bebeau, 1994). Ethical sensitivity scores increased as well. The students in the study decided instruction in moral reasoning was a thing to be valued.

Krawczyk (1997) examined groups of nursing students at three different institutions of higher education. One program had a dedicated 3-credit hour ethics course, another program had integrated non-specific ethics material into the nursing curriculum, and the third program did not cover ethical issues unless brought up by students in class discussion. There was a significant difference in levels of postconventional ethical reasoning between the three groups, $F = 7.95, p < .001$. Students in Program A had average P scores of 51.78, Program B scores averaged 44.92 and Program C scores averaged 38.14. Krawczyk determined that not only was it

important to have specific ethics courses but the structure of the course should be centered around group discussion of ethical dilemmas with problem solving included. Her belief is that if the student is allowed to practice in the safety of the classroom, the nurse will be more equipped to handle ethical situations with higher levels of ethical reasoning.

Dieurf (1998), in a study of physical and occupational therapy students, discovered that the differences in P (postconventional) scores were not significantly different between students beginning a program of study and those completing four years. Her conclusion was that the lack of change could be a result of an inhibiting feature either in the educational program, the clinical setting, or the environment of the student that would not allow for moral development. She also concluded that age was a major predictor of principled moral reasoning when other studies (Rest, 1999) have shown that age does not stand alone as a determinant unless it is coupled with increased formal education. Rest also found that age alone is actually negatively correlated to principled reasoning and that DIT scores plateau when a person leaves formal education (1999). Principled scores for participants in Dieruf's study averaged 47.34, which was equal to other scores for college students and averages for occupational therapy and physical therapy students in other studies (Kanny, 1996; Sisola, 1996). Dieurf advocates promoting ethics early in a professional program of study to help students understand their own value system as well understand the relationship of the individual to society, professions and health care in general.

One study in occupational therapy compared ethical reasoning in both students and practitioners (Kanny, 1996). The three groups examined were a cross section of

students beginning an occupational therapy program, students in their final year of education, and practitioners with two years experience from four regions in the United States. Findings indicated that, while P scores were in the 40's for all three groups, there were no significant differences in the level of postconventional reasoning regardless of amount of formal education or years of practice. Kanny did not anticipate a difference in average scores by the practitioners since amount of formal education is the highest predictor of P scores, and the senior students and practitioners virtually had the same amount of education. She was concerned by the lack of difference in levels of postconventional reasoning in beginning and ending students and concluded that perhaps the program of study in occupational therapy does not challenge students to think at higher levels of ethical reasoning. Kanny recommended that more critical thinking and problem-solving techniques regarding ethical issues be incorporated into the curriculum.

Summary

Ethics have been an integral part of health education for many years. Both classical and modern day ethical theories lay the foundation for principled moral reasoning in radiologic technology students and practitioners. The Belmont report has guided health occupations and societies in developing professional codes of ethics. In addition to the ethical theories presented, moral development theories have been examined over the past 50 years. Educational programs in radiologic technology have integrated ethical theories into the curriculum by introducing students to profession-specific codes of ethics. Practitioners are expected to follow guidelines set by the codes but often these codes do not address solutions to ethical dilemmas of every-day work or

present a path to higher moral reasoning. While there are an extensive number of articles that have researched moral development in many professions, no studies found in the radiologic sciences that have evaluated students or practitioners with regard to ethical or moral reasoning. Studies in other health professions have suggested that postconventional levels of ethical reasoning are mixed in students when ethics education interventions are integrated into the didactic and clinical portions of the program. Suggestions were also made to continue moral reasoning development in practitioners in health professions.

CHAPTER THREE

METHODOLOGY

Introduction

This study investigated the level of ethical reasoning in students and graduates of radiologic technology programs. The Defining Issues Test-2 (DIT2) developed by Rest & Narvaez (1998) was used as the instrument to analyze levels of ethical reasoning in three groups: 1) students at the beginning of their radiologic technology education; 2) students at the conclusion of a two-year or four-year radiologic technology program; and, 3) technologists practicing in radiologic technology three to five years post graduation. In addition to the DIT2 test, a questionnaire regarding ethics education and evaluation was distributed to all students, practitioners, and program directors (Appendix B).

Design of Study

This study utilized a comparative and an associational research approach. According to Gliner and Morgan (2000), a comparative approach is used when studying an attribute of the participants, and when there are less than five levels of the independent variable. The dependent variables are the scores on the DIT2 and the independent variables are participant type, program type, and gender. An associational research approach is utilized when there are more than five ordered levels of the independent variable (Gliner and Morgan, 2000). In this approach the dependent variables are scores

on the DIT2 and the independent variables are age and years of formal education. In supplemental analysis, the dependent variables are perceived amounts of ethics education and perceived amounts of ethics evaluation received. The independent variables are the same as those used in comparison and relationship with DIT2 scores with the exception of adding program directors as a participant type.

Protection of Human Subjects

The Internal Review Board (IRB) of Colorado State University approved this study for use of the test instrument and overall methodology. I sent a letter to the program directors describing the study (Appendix C) and requested letters of cooperation (Appendix D) from all college and university program directors in order to dispense the test to the students in, and to graduates of both programs. Permission was also obtained from those universities that had Internal Review Boards. Participants were informed that they were under no obligation to do or complete the test or questionnaire. Return of the completed test indicated consent to participate from both students and practitioners. DIT2 results and questionnaires were confidential and anonymous. All participants were issued a non-identifying number for data entry after the test was returned. The DIT2 tests were then sent to the Center for the Study of Ethical Development at the University of Minnesota for scoring.

Description of Participants

Directors of Radiologic Technology programs in thirteen colleges and universities From the Western United States agreed to assist in the distribution of surveys for this

study. Three groups sampled were: 1) students from associate degree programs in the central and northern Rocky Mountain states, and Pacific Coast states; 2) students from baccalaureate degree programs in the same region; and 3) graduates from all programs. The number of students graduating was lower than number of students entering programs due to attrition. More packets were sent to participants from associate-degreed programs than from baccalaureate programs but this is representative of the higher number of associate-degreed programs in the profession.

The number of practitioners was greater than the number of students beginning or graduating due to a three-year compilation, however, the rate of return for practitioners was lower because the students' responses were returned as groups from the program directors, while the practitioners' responses were returned individually. While this is a convenience sample, the participants represent the general population of students and technologists from college-based programs in the country. There are hospital-based certificate programs in radiologic technology but only college programs were included to test for differences in years of formal (college) education.

The survey was administered to students beginning radiologic science programs who had some general education courses but no radiologic technology program courses. It is rare that a student enters a college radiologic technology program directly out of high school. There is also a possibility that some of the students entering a radiologic technology program will have completed two to four years of college or even graduate studies prior to admission to the program. Graduating students and technologists completed all college course requirements as well as all program courses.

Demographics of Participants

Participants included in the final analysis were students, practitioners, and program directors from associate and baccalaureate degree programs. Participant type was divided into beginning students (189) at 40.7%; graduating students (219) at 47.2%; practitioners (44) at 9.5%; and program directors (12) at 2.6%. There were 266 (57%) participants in associate degree programs and 197 (43%) from baccalaureate degree programs. There are many more associate programs than baccalaureate programs in the country so these numbers resemble those of the national statistics. Although more packets were sent to associate degree programs than baccalaureate programs (63% to 37%), the rate of return was higher from baccalaureate participants (71% to 61%). Program directors were not included in total numbers for analyzing DIT2 scores because they did not take the test.

Table 1 lists the frequencies of gender and age. The mean age of participants was 27.65 and median age was 24 with the highest number of participants between the ages of 21 and 25. The youngest participant was 18 years of age and the oldest was 56 years old. Of the participants who listed their gender, 314 (74.4%) were female and 108 (25.6%) were male. This percentage difference is slightly higher than the national trends of female to male ratios (70% to 30%) in radiologic technology programs and in places of employment.

Table 1

Demographic Characteristics of Participants (N = 452)

Characteristic	<i>n</i>	%
Gender		
Female	314	74.4
Male	107	25.6
Total	422	
Missing	30	
Age Groups		
18 – 20	46	9.9
21 – 25	188	40.5
26 – 30	54	11.6
31 – 35	43	9.3
36 – 40	27	5.8
Over 40	49	10.6
Total	407	
Missing	45	

Note. Program Directors are not included in this table.

Number of Participants and Packet Return Rates

Table 2 demonstrates the distribution rate and rate of return for all participants. Students and graduates from nine associate degreed, radiologic technology programs and from four baccalaureate degreed, radiologic science programs participated in this study. 682 packets containing the DIT2 test and a questionnaire were mailed to program directors for distribution to, and collection from students. 215 packets out of 358 or 56% percent were returned for beginning students. Nineteen DIT2 tests were incomplete upon return. 218 packets out of 311 (70%) were returned for graduating students. Six DIT2

tests were incomplete upon return. Total return rate from students was 63%. Program directors also mailed a total of 619 packets to practitioners who had graduated from the programs and have been working for three to five years in the profession. An estimated 43 packets were returned to program directors due to address changes or unknown addresses, and were not mailed again. Practitioners returned a total of 44 packets for analysis representing a 7.5% return rate. The thirteen program directors were also asked to complete a questionnaire regarding the amount of ethics education and evaluation delivered. Twelve questionnaires were returned. A total of 1258 packets were distributed with 489 packets returned from all participants. This represents a 39% overall return rate.

Table 2

Number of Surveys Distributed and Percent of Return

	Number of Packets Sent	Number Returned	Percent
Beginning Students			
Associate	227	125	55%
Baccalaureate	131	90	69%
Graduating Students			
Associate	183	125	68%
Baccalaureate	128	93	73%
Practitioners			
Associate	330	23	7%
Baccalaureate	246	21	8%
Program Directors			
Associate	9	8	89%
Baccalaureate	4	4	100%
Total	1258*	489	39%

*Packets that were undeliverable by the post office were omitted from the count.

Hypotheses Testing

This study tested the following hypotheses:

1. There will a difference in the level of ethical reasoning when comparing three levels of participant type and two levels of program type.
2. There will be a relationship between the levels of ethical reasoning and the amount of formal education.
3. There will be no relationship between levels of ethical reasoning and age.
4. There will be no difference in levels of ethical reasoning with regard to gender.

Procedure

Surveys were distributed to 1258 students, practitioners and program directors. The numbers distributed to each school varied due to program size. The number of students in each program was small (10 to 65) due to the nature of the program. Each program director received packets of DIT2 tests and questionnaires to distribute at various times. The packets were mailed out to program directors in April, May and July for graduating students. The packets were mailed to practitioners via the program directors beginning in June. The final mailing took place in July for students beginning programs in August and September.

All participants received a packet containing a cover letter explaining the study (Appendix E), directions on how to complete the test, the DIT2 with answer sheet, and a questionnaire regarding ethics education and evaluation. When test and questionnaire

were completed the participants returned the sealed packet to the program director. The packets, as a group, were then returned to me.

Due to privacy issues, the program directors mailed the packets to practitioners who had graduated from their respective programs. The practitioners sent their individual responses back to me in postage-paid envelopes. No follow-up mailing was sent to encourage practitioners to complete the survey.

Instrument Used

The Defining Issues Test- 2 (DIT2), developed by Rest et al. (1998), was used as the survey instrument. The DIT2 is the updated version of the DIT1 created by Rest in 1979. The stories are new, the instructions to the participants are clearer, and a greater number of subjects are retained in the study due to new reliability checks. According to Rest and Narvaez (1998), the validity of the DIT2 test has improved over the DIT1. Permission to use this test was granted because the scoring service is purchased (Appendix F). The DIT2 is comprised of five hypothetical dilemmas representing general situations that can occur in everyday life. Scoring for the DIT2 comes from the ranking and rating of accompanying questions and statements on the answer sheet.

While based upon Kohlberg's (1984) moral development theory, the DIT2 analyzes three schemas instead of the six stages described by Kohlberg. The three schemas are: 1) Personal Interest, 2) Maintaining Norms, and 3) Postconventional Reasoning. "In short, the DIT is a measure of the development of concepts of social justice" (Rest & Narvaez, 1998 p. 27).

For each DIT dilemma, participants rated each of the twelve issue statements that followed on a five-point scale of importance (Great, Much, Some, Little, No). The

participants then ranked which four of the twelve statements were most important to them (Most, Second Most, Third Most, Fourth Most). Finally, participants determined if they favored the action taken in the story (did not favor, don't know, favor). According to studies performed by the Center for Study of Ethical Development (1999), the reliability and validity of the DIT2 is rigorously tested, with a test-retest reliability and internal consistency (Cronbach's alpha) in the upper .70s to low .80s across groups from high school to graduate school. Rest and Narvaez (1998) rate this internal consistency as adequate. The internal consistency can be lower if studies are performed on groups that are similar in age or formal education. Cronbach's alpha for this study was .69. The DIT1 has been used in over 1500 studies and has been discussed in over 400 publications (Rest and Narvaez, 1998). It has been frequently used in health profession studies such as medical, dental, nursing, and occupational therapy (Bebeau & Thoma, 1994; Dieruf, 1998; Duckett & Ryden, 1994; Kanny, 1996).

In addition to taking the DIT2 test, participants answered a question regarding attendance in a two-year or four-year program and two questions regarding their perceptions of the amount of ethics education and evaluation. Demographic questions on the DIT2 included age, gender and highest level of education. Incidental questions on the DIT2 also included political views, current citizenship, and if English is the primary language. Program directors were asked to fill out a brief survey with the same questions regarding ethics education and evaluation (Appendix G). A letter of instructions for program directors to read to the students was also included (Appendix H).

Scoring the DIT2

The Center for the Study of Ethical Development scored the five dilemmas on the DIT2. There were over 50 variables addressed in the returned data disk. Various scores from the data that either were interpreted or could have been interpreted are as follows:

1. The N2 Score: this score represents the new index that is used with the DIT2. While the P and N2 scores assess similar issues, the validity checks incorporated in scoring makes the N2 superior to using the P score with the old validity checks (Rest & Narvaez, 1998). Theoretically, the N2 score was used to look at the individual responses on the test for estimation of ethical development. Empirically, the N2 proved to be a modified P score with participant discrimination of higher and lower stage items included (Thoma, 2002). While the P score is based on the ranking data, the N2 also measures the rating (high-low) data of the test. N2 scoring is in two parts: "the degree to which P items are prioritized and the degree to which the lower stages are rated lower than the ratings of the higher stages" (Rest, Thoma, Narvaez, & Bebeau, 1997, p. 500-01). The P score of the DIT1 has been re-scored in several studies to the N2 score with high correlation, $r > .80$ (Rest, et al., 1997). Rescoring of P with the N2 criteria also proved to increase the overall average score of postconventional reasoning in participants.

2. Scoring is also included for the Personal Interest Schema (Stage 2/3) and Maintaining Norms Schema (Stage 4). Stage 2 focuses on the direct advantage to the participant and on exchanges of favor for favor. Stage 3 considers the maintenance of friendships and approval as well as focusing on the good or evil intentions of people. Stage 3 also examines the relationship between self and others and how situations can affect that relationship (Thoma, 2002). Stage 4 focuses on maintaining the legal systems,

roles, or formal organizational structures that are already in place (Rest, et al, 1999; Walker, 2002). Regulatory or social norms such as Codes of Ethics are a part of Stage 4.

3. The P score: scores obtained in the survey are based on weighted Stage 5 and Stage 6 items throughout the five DIT2 stories. Stage 5A represents a focus on organizing a society that utilizes majority vote and due process thus safeguarding basic rights. Stage 5B/6 considers social arrangements and relationships in terms of ideals that are intuitively appealing (Rest & Narvaez, 1998). P scores are the sum of ranked scores from Stages 5A, 5B and 6 that are converted to a percent by dividing the P raw score by the number of stories.

The P (principled or post-conventional) score is the percentage of principled level moral reasoning (stages 5 and 6 combined). "This score is interpreted as the relative importance a subject gives to principled moral considerations in making a decision about moral dilemmas" (Rest, 1990, p. 4.2). For example, if a student's P score is 45, this indicates that 45% of the responses on the test were rated at the principled level of moral reasoning. The P score is an interpretation of moral reasoning and judgment based on the answers given on the DIT. Rest and Narvaez (1998) determined that P scores for junior high school students averaged in the 20's, high school students in the 30's, college students in the 40's, professional school programs in the 50's and doctoral students majoring in moral philosophy in the 60's. The P score was used as the determinant for principled reasoning until 1997 when the DIT was revised and the N2 score became the measurement of postconventional reasoning.

4. The D Score: is an index of moral judgment development that encompasses all stages rather than just from Stage 5 and 6. The DIT follows Kohlberg's six stages of

moral development and the most prominent score, the P score, is determined by scoring the answers relating to Stage 5 and 6. The D Score is an average score for all six stages of moral development and was an attempt to find a better index than the P score. Rest, et al. (1999) have suggested not using it for analysis.

5. The U Score is a rating of differences in people as to how they utilize moral concepts in decision-making and behavior. This is a new index measured on the DIT-2 (Rest et al, 1999). The U score serves as a moderator between the DIT scores and other behavioral or attitudinal scores. Since no other tests are being used, the U score will not be analyzed in this study.

6. There are five built-in checks in the test itself to determine if a participant's response is valid. There is a rate-and-rank consistency in which the participant will place a higher rank on the questions that were rated higher. There are also meaningless questions in a majority of the dilemmas that, if the participant consistently rates meaningless items higher, will invalidate the test. If too many rates are left out of the entire test, it becomes invalid as well. If more than four ranks are omitted from the test, it is also invalidated. Finally, if there is no differentiation in the rating or ranking on more than one story, the test is invalidated. The scoring for the DIT2 takes a conservative approach with regard to subject reliability and if there is doubt about the reliability of a subject, the data is eliminated from the study (Rest & Narvaez, 1997). It is ultimately left up to the researcher to relax criteria in order to retain more subjects and put eliminated subjects back into the data pool based on knowledge of the participants or the circumstances. After comparing results from including the purged scores and excluding scores, I chose to exclude the purged scores for my analysis for reliability purposes.

Data Analysis

An analysis of the data was performed using the Statistical Package for Social Sciences (SPSS version 11). A descriptive analysis included frequencies, means, and standard deviations for gender, age, level of education, two levels of program type, and the three levels of participant type studied. Factorial analysis of variance (ANOVA) was used to determine differences among the three groups studied using the DIT2. An independent samples *t* test was utilized to compare differences in ethical reasoning based on gender. A paired samples *t* test compared participants' scores for the three schemas: Postconventional, Maintaining Norms and Personal Interest. Correlation analysis was used to compare the amount of formal education and ethical reasoning because there are eight levels of formal education. Correlation analysis was also used to explore the relationship between age and scores on the DIT2.

In supplementary analysis, a factorial ANOVA was used to determine differences in perceived amounts of ethics education and evaluation received by program and participant types. Correlation analysis was used to determine the relationship of participant's DIT2 scores, age, and years of formal education with perceptions of ethics education and evaluation. An independent samples *t* test was again used to compare perceived amounts of ethics education and evaluation based on gender.

CHAPTER 4

RESULTS

Introduction

Four hypotheses or questions were presented for research. Are there differences in levels of ethical reasoning based upon participant and program type? Is there a relationship between levels of ethical reasoning and years of formal education? Is there a relationship between levels of ethical reasoning and age? Are there differences in levels of ethical reasoning when comparing genders?

In addition to the analysis of the hypotheses, supplemental analyses were performed to determine if there are differences in perceptions regarding amounts of ethics education and evaluation received, and if there is a correlation between ethical reasoning scores and perceived amounts of education and evaluation received.

As previously mentioned, twenty-five DIT2 tests were not submitted for scoring due to incomplete or inaccurate answers. Program directors did not complete the DIT2. A total of 424 DIT2 tests were sent to The Center for the Study of Ethical Development. 354 DIT2 tests were used in the analysis after purging 70 tests for inconsistencies in rating or ranking scores, or for giving too much validity to meaningless items (Rest, et al, 1999). This represented a 16.5% reject rate and is slightly higher than the 15% average mentioned by Bebeau (personal communication, October, 2002) for purged subjects. Any N2 score of 99.9 represents missing data and is not a real value, so 28 surveys were

excluded automatically from the analysis of ethical reasoning. With regard to the remaining 42 purged subjects, Bebeau (2002) suggested analyzing the data in three ways: by purging all subjects rejected by reliability checks; by leaving the purged subjects in the data; or by leaving only some of the purged subjects in the data if I determined that some had been omitted incorrectly. After analyzing the data these three ways, the difference in the results was minimal (Table 3) so I decided to leave out the purged subjects to increase the reliability of the study.

Table 3

Means and Standard Deviations for Data Before and After Excluding Subjects

N2 Scores	<i>n</i>	<i>Mean</i>	<i>SD</i>
All purged subjects included	396	29.6	15.01
Some purged subjects included	381	30.3	14.77
All purged subjects excluded	356	30.8	14.98

Both N2 and P scores were analyzed when comparing participant and program type. Table 4 demonstrates the means, standard deviations and *n* for P and N2 scores for each participant type and program type. The P or principled score had been the standard score for reporting DIT results until 1997 (Rest, et al, 1999) when an updated, shorter test (DIT2) was used and a new score (N2) was utilized because of better checks for reliability. In this study, there was a high correlation, $r = .82$, between the N2 and P scores, and the means with standard deviations shown in Table 4 do not demonstrate an appreciable difference in the average scores among participants between P and N2.

Therefore, I chose to use the newer N2 score in statistical analysis of differences and correlations because of the reliability checks.

Table 4

Means and Standard Deviations for Participant Type and Program Type on N2 and P Scores

Variable	<u>Associate</u>			<u>Baccalaureate</u>			<u>Total</u>	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
N2 Scores								
Beginning	92	33.05	15.19	76	29.84	15.10	31.60	15.18
Graduating	82	29.19	14.49	65	30.52	14.87	29.77	14.63
Practitioner	21	27.32	16.21	20	36.66	13.56	31.88	15.53
Total	195	30.81	15.09	161	30.96	14.89		
P Scores								
Beginning	92	34.49	13.68	76	33.01	13.43	33.82	13.55
Graduating	82	31.96	14.39	65	32.92	14.41	32.38	14.36
Practitioner	21	28.08	15.99	20	35.06	15.45	31.48	15.79
Total	195	32.74	14.31	161	33.23	13.97		

Hypotheses Testing

Postconventional, Maintaining Norms, and Personal Interest Scores

In addition to determining postconventional ethical reasoning, the DIT2 is also scored for the personal interest schema (Stage 2/3) and the maintaining norms schema (Stage 4). A correlation analysis between N2 and Stage 4 scores was done to determine if there would be a relationship between the levels of postconventional reasoning and maintaining norms reasoning. Pearson's correlation was negatively significant,

$r(356) = -.35, p < .001$. The effect size is medium and the variance predicted from these variables is 12%. This was also a negative correlation so participants with higher maintaining norms scores tend to have lower postconventional scores.

There was also a significant negative correlation between Stage 2/3 scores and N2 scores, $r(356) = -.527, p < .001$. The effect size is large and 28% of the variance can be predicted from the association of N2 and Stage 2/3 scores. There was also a significant negative correlation between Stage 4 and Stage 2/3 scores, $r(356) = -.310, p < .001$. The effect size is medium to large and 10% of the variance can be predicted from the associated of Stage 4 and Stage 2/3 scores.

Figure 1 demonstrates a comparison of the three types of scores on the three participant types. Paired samples t tests demonstrated significant differences ($p < .001$) when comparing N2 scores with Stage 4, N2 with Stage 2/3 and Stage 4 with Stage 2/3. These differences are noted in Table 5. Effect sizes range from medium to very large. Stage 4 scores were significantly higher than N2 scores suggesting participants operate from the Maintaining Norms schema more than a Postconventional schema when making ethical decisions. Furthermore, both average N2 and Stage 4 scores were higher than the average Stage 2/3 scores.

Many studies have found that as N2 scores increase, Stage 2/3 scores decrease (Rest, et al, 1999). Since results of comparing Stage 2/3 scores to N2 scores are similar to other findings reported, no further analysis was performed regarding Stage 2/3 scores.

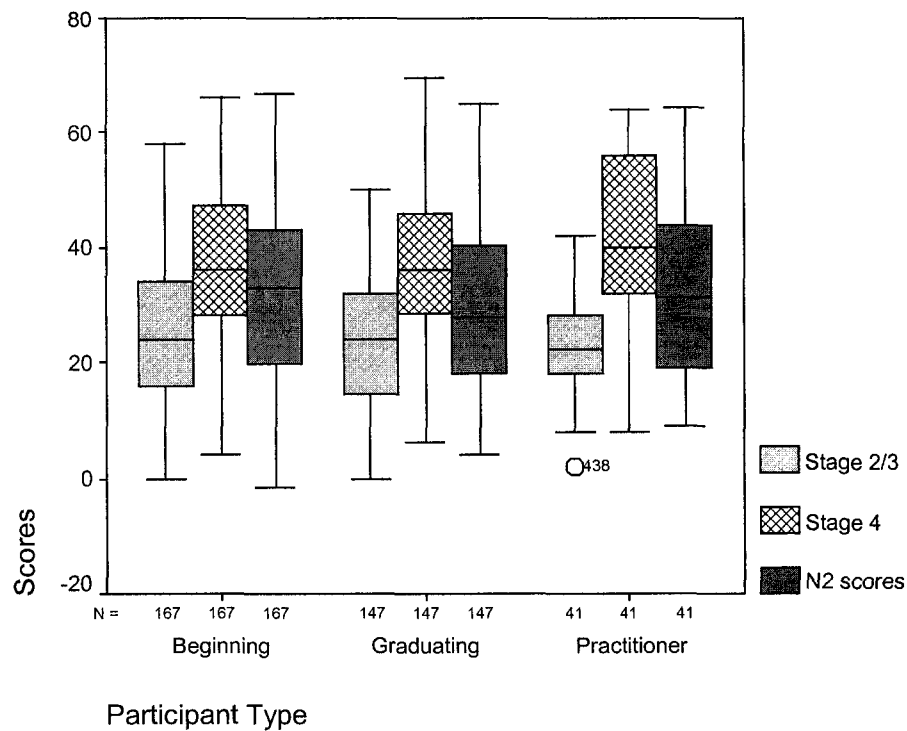


Figure 1. Comparisons of stage 2/3, stage 4, and N2 scores on the DIT2 with participant type.

Table 5

Paired Samples t Tests of Scores in Ethical Reasoning

Variable	M	SD	<i>t</i>	<i>p</i>	<i>d</i>
N2	30.87	14.99	5.43	<.001	.47
Stage 4	37.41	12.56			
N2	30.87	14.99	-5.31	<.001	.49
Stage 2/3	24.32	11.54			
Stage 4	37.41	12.56	-12.65	<.001	1.08
Stage 2/3	24.32	11.54			

Comparison of N2 Scores for Participant Type and Program Type

Hypothesis one stated that there would be a difference in levels of ethical reasoning when comparing participant types and program types. A factorial ANOVA (Table 6) demonstrates that there was no significant difference in the main effect of participant type or in the main effect of program type. There was a significant interaction between program type and participant type on N2 scores, $F(2,350) = 3.10, p = .046$. Eta on the interaction was .13, which, according to Cohen (1988), is a small effect size and 2% of the variance of postconventional ethical reasoning scores could be predicted from the interaction of participant type and program type. The interaction null hypothesis is rejected.

Table 6

Two-Way Analysis of Variance for Program Type and Participant Type on Levels of Ethical Reasoning (N2 Scores)

Variable and Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2
N2 Scores					
Participant Type	2	128.01	.574	.564	.003
Program Type	1	373.26	1.67	.197	.005
Participant*Program	2	690.87	3.10	.046	.017
Error	350	222.99			

Note. $\eta = .13$ = effect size for participant*program type

Post hoc testing did not demonstrate significant differences when comparing beginning students, graduating students and practitioners in either of the two programs. Further analysis showed no significant contrast between beginning and graduating students from the two programs. There was, however, a statistically significant contrast between practitioners from associate degree programs and practitioners from

baccalaureate degree programs, $t(350) = -2.00, p = .046$. The effect size of the contrast test is medium to large ($d = .65$). The profile plot in Figure 2 demonstrates the difference in scores between the three participant groups and the two program groups. As indicated by the above t , practitioners with baccalaureate degrees had higher average N2 scores than did associate-degreed practitioners. Levels of postconventional ethical reasoning seem to rise from beginning students to practitioners in baccalaureate programs whereas scores seem to drop across the three levels of associate degree participants. However, as indicated above, the contrast of participant type in separate analysis of associate degree and baccalaureate degree programs showed no significant difference from beginning to graduating student to practitioner.

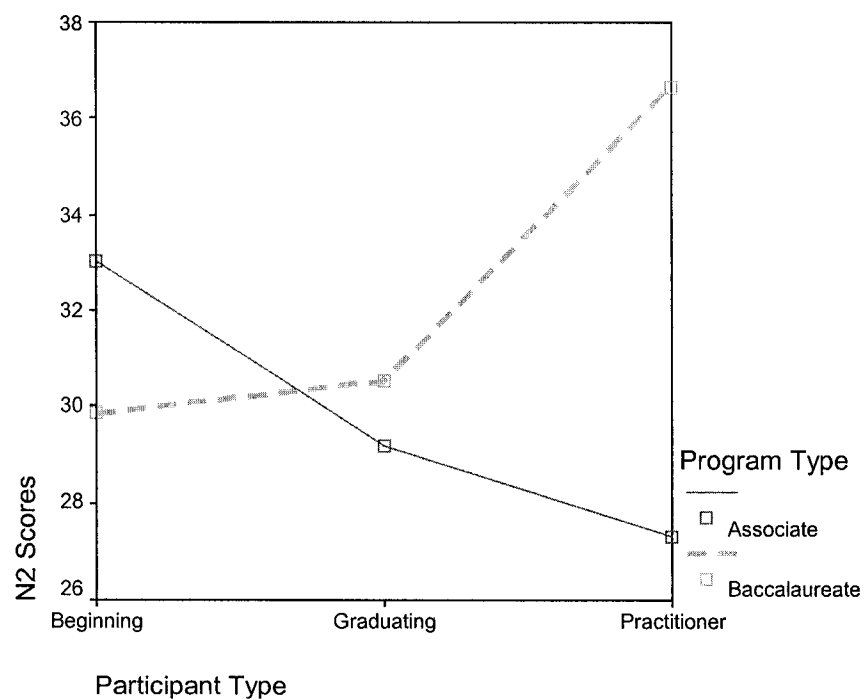


Figure 2. Interaction of program and participant type on postconventional ethical Reasoning (N2 scores).

Supplemental univariate analysis of variance for Stage 4 scores (Maintaining Norms schema) was performed on participant type and program type. There was no significant difference in the main effects of participant type and program type. There also was no significant interaction between program and participant type. Table 7 demonstrates the means, standard deviations and *n* for Stage 4 scores. Average mean scores seemed to be higher for practitioners than for beginning and ending students in both programs but the main effect of participant type was not significant.

Table 7

Means and Standard Deviations for Participant Type and Program Type on Stage 4-Maintaining Norms Scores

Variable	<u>Associate</u>			<u>Baccalaureate</u>			<u>Total</u>	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Stage 4 Scores								
Beginning	92	37.79	12.73	76	35.99	11.61	36.97	12.23
Graduating	82	36.86	12.35	65	36.71	11.41	36.79	11.91
Practitioner	21	44.32	13.53	20	38.39	17.09	41.43	15.47
Total	195	38.10	12.78	161	36.58	12.27		

Demographics of Participant Formal Education

With regard to formal education, participants were asked to list the level of education completed at the time of taking the survey. The majority of participants had completed an associate degree (Table 8). While most associate degree programs are two years in length, it is likely that students graduating from radiologic technology programs completed at least three years of formal education due to the program curriculum

requirements. It is rare for a student to begin a radiologic technology program without taking any previous college courses.

Table 8

Years of Formal Education

High School Graduate	1	0.2
Freshman in College	10	2.2
Sophomore	19	4.1
Vocational Education Graduate	18	3.9
Associate Degree Graduate	157	33.8
Junior in College	89	19.2
Senior in College	108	23.3
More Than 4 Years College	13	2.8
Master's Degree	2	0.4
Total	417	
Missing	47	

Ethical Reasoning and Years of Formal Education

Hypothesis #2 stated that there would be a significant relationship between levels of ethical reasoning and years of formal education. 84% of participants reported that they had between three and four years of formal education. This included beginning students as well as practitioners. Due to the lack of variance in years of formal education, statistical analysis was not performed for Hypothesis #2. Supplemental analysis was also not performed for the maintaining norms schema.

Correlation of Age With Levels of Ethical Reasoning

Hypothesis #3 stated that there would not be a significant relationship between levels of postconventional ethical reasoning and age of the participant. There was not a statistically significant correlation between age and postconventional ethical reasoning, $r(342) = -.006, p = .91$. The null hypothesis is not rejected.

Performing the same analysis with Stage 4 scores demonstrated that there was a significant positive correlation between age and maintain norms ethical reasoning, $r(342) = .14, p = .009$. The effect size, according to Cohen (1988), is small and 2% of the variance in Stage 4 reasoning can be predicted from the combination of variables. The direction of this correlation is positive indicating that older participants may be more inclined to follow the rules or codes of the profession and may not utilize higher levels of postconventional reasoning.

Comparison of Gender on Ethical Reasoning

Hypothesis #4 stated that there would not be a difference in the level of ethical reasoning and gender. An independent samples t test was performed to compare levels of gender on postconventional ethical reasoning. Although there was a large difference in the numbers of the two groups, Levene's Test for Equality of Variances was not significant ($p = .70$). There was a significant difference in the levels of postconventional ethical reasoning between females and males, $t(352) = 2.01, p = .045$, with females averaging higher N2 scores of 31.83 and males averaging N2 scores of 28.14 as seen in Table 9. The null hypothesis is rejected.

An independent samples *t* test was also run on Stage 4 scores and gender. In this case, there was no significant statistical difference between male and female participants on Stage 4 scores. Average scores for both groups are essentially the same (Table 9).

Table 9

Means and Standard Deviations for Levels of Ethical Reasoning and Gender in N2 and Stage 4 Scores

Variable	N2 Scores			Stage 4 Scores	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Male	88	28.14	14.71	37.28	12.59
Female	266	31.83	14.99	37.49	12.50
Total	354	30.91	14.85	37.39	12.54

Supplementary Analysis

Participant Type and Program Type on Perceived Amounts of Ethical Education

In a supplemental analysis, students and practitioners were questioned with regard to their perceptions of the amount of ethical education they believed would be taught or that were taught (1 = little, 5 = high). Program directors were also asked about the amount of ethics education that is delivered in their respective programs.

Table 10 shows the responses to the question, “What are your perceptions regarding the amount of ethics education received/delivered?” Answers given range from the participants perceiving that there was a lot of ethics education offered (31.6%) in the program or, to the best of their recollection, there was very little ethics education received (0.4%). The overall mean was 3.8 indicating that participants believed they received a moderate amount of ethics education.

Table 10

Response to the Survey Question, "What is Your Perception of the Amount of Ethics Education Received/Delivered?"

Response	<i>n</i>	%
Very Little	2	0.4
Some	99	22.3
Don't Know/Can't Remember	14	3.2
Quite a Bit	188	42.4
A Lot	140	31.6

Note. *N* = 443

Table 11 presents the means and standard deviations for the levels of participant type and program type. Table 12 demonstrates a statistically significant difference in the main effect of participant type, $F(3,435) = 8.89, p < .001$. In addition, there is a significant difference in the main effect of program type, $F(1, 435) = 5.55, p = .019$. There was also a significant interaction between participant type and program type with regard to amounts of ethical education perceived, received, or delivered ($F(3,435) = 5.59, p = .001$). Eta is approximately .19 for the interaction, which, according to Cohen (1988), is a small to medium effect size.

The variances for all groups were significantly different (Levene's $F = 7.36, p = .000$) so the Games-Howell was used for post hoc testing. Examination of participant type indicates that practitioners ($M = 3.1$) perceive they received less ethical education than students beginning the program ($M = 4.0$) believe they would receive ($p < .001$). Practitioners also perceived there was less ethics education received ($p = .005$) than did graduating students ($M = 3.8$). While average scores for program directors in associate degree programs indicate a moderate amount of ethics education delivered ($M = 3.9$),

average scores for directors in baccalaureate programs indicate that only some ethical education is delivered ($M = 3.3$). The overall average score for associate degree programs was 3.9 while the average score for baccalaureate degree programs was 3.4, a significant difference as indicated by the main effect of program type mentioned above.

Table 11

Means, Standard Deviations and n for Participant and Program Types in Perceptions of Ethics Education in Radiologic Technology Programs

Participants	Associate Degree			Baccalaureate Degree			Total		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Beginning	102	3.9	1.11	80	4.1	.87	182	4.0	1.01
Graduating	125	4.1	.98	87	3.4	1.27	212	3.8	1.16
Practitioners	21	3.4	1.02	16	2.8	1.06	37	3.1	1.07
Directors	8	3.9	1.25	4	3.3	1.50	12	3.6	1.30
Total	256	3.9	1.05	187	3.4	1.17	443	3.6	1.12

Table 12

Factorial Analysis of Variance for Perceived Amount of Ethics Education Received or Delivered in Radiologic Technology Programs

Variable and Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2
Ethics Education					
Participant Type	3	10.12	8.89	<.001	.058
Program Type	1	6.37	5.56	.019	.013
Participant*Program	3	6.37	5.59	.001	.037
Error	435	1.14			

Note. $\eta = .24$ = effect size for participant type, $\eta = .11$ for program type and $\eta = .19$ for program type* participant type.

Levene's Test of Equality is significant ($p = <.001$).

A one-way ANOVA with follow-up contrasts was performed to determine if any contrast of participant and program type was significant. Levene's test for homogeneity

of variance was significant ($p < .001$) indicating unequal variance. The one-way ANOVA demonstrated that there was a significant difference, $F(7, 435) = 7.32$, $p < .001$. Contrast analysis of the four groups indicated a significant difference in graduating students from associate programs versus graduating students from baccalaureate programs, $t(153.43) = 4.46$, $p < .001$. The profile plot for perceived amounts of ethics education on participant type and program type is demonstrated in

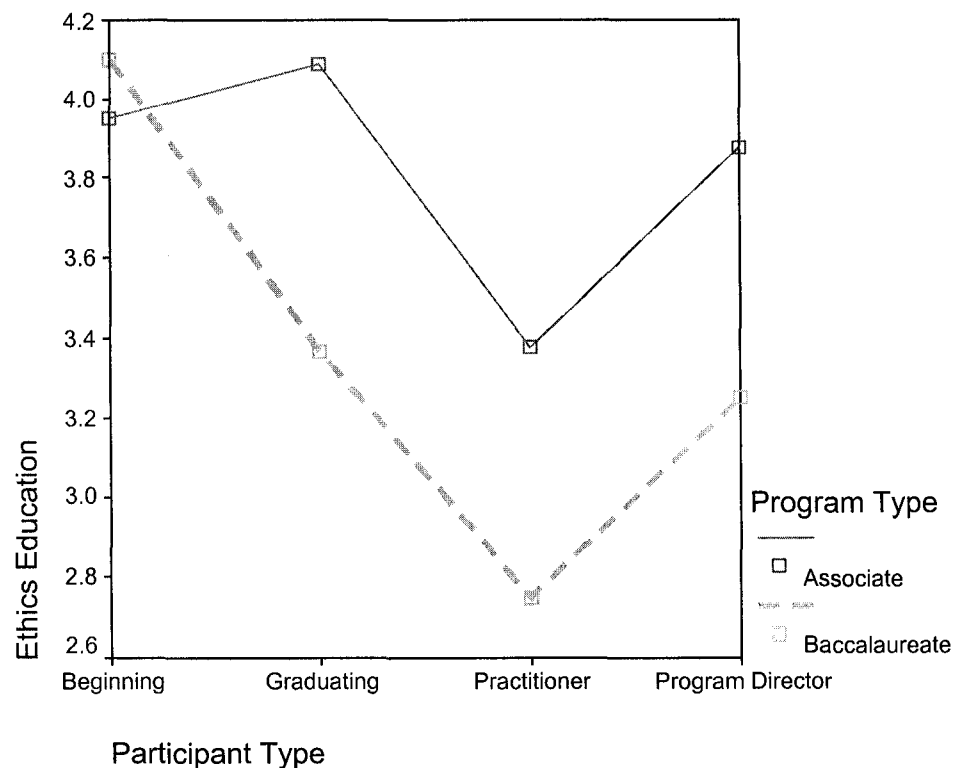


Figure 3. Program and participant type on perceived amount of ethics education.

Contrast Analysis of Perceived Amounts of Ethics Education

A contrast analysis was also performed between student and practitioner participant types in each program. The test for homogeneity was significant so equal variances were not assumed. A one-way ANOVA demonstrated a significant difference

between the six groups of participant types excluding program directors (Table 13). In six contrasts, comparing beginning students to graduating students to practitioners within each program, there were significant contrasts with the exception of beginning students to graduating students in associate degree programs (Table 14). Effect sizes, were small to very large in the contrast analysis.

Table 13

One-Way Analysis of Variance of Participant Type on Perceived Amounts of Ethics Education

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	5	57.13	11.43	10.16	<.001
Within Group	425	478.17	1.13		
Total	430	535.29			

Table 14

Contrast Tests for Participant Types in the Same Program on Perceived Amounts of Ethics Education

Variable	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
Associate				
Beginning vs. Graduating	-.97	202.68	.334	.19
Beginning vs. Practitioner	4.21	20.48	<.001	.70
Graduating vs. Practitioner	4.75	18.37	<.001	.47
Baccalaureate				
Beginning vs. Graduating	11.09	28.68	<.001	.65
Beginning vs. Practitioner	4.77	19.17	<.001	1.34
Graduating vs. Practitioner	2.07	23.57	.050	.60

Note. Test for Homogeneity, $p = < .001$, equal variances were not assumed.

Participant and Program Type on Perceived Amounts of Ethical Evaluation

Another supplemental analysis examined participants' responses to a question regarding perceived amounts of evaluation of ethical behavior (1 = little, 5 = high).

Table 15 shows the responses to the question, “What are your perceptions regarding the amount of ethics evaluation received/delivered?” Answers given range from the participants perceiving that there was a lot of evaluation (36.3%) of ethical performance offered in the program or, to the best of their recollection, there was very little ethics evaluation received (3.6%). The program directors in each program indicated that evaluation of ethical behavior was slightly higher than moderate ($M = 4.1, 4.3$). The overall mean was 3.8 indicating, again, that participants believed that they had received a moderate amount of ethical evaluation.

Table 15

Response to the Survey Question, “What is Your Perception of the Amount of Ethics Evaluation Received/Delivered?”

Response	<i>n</i>	%
Little	16	3.6
Some	91	20.5
Don't Know/Can't Remember	19	4.3
Moderate	156	35.2
High	161	36.3

Note. $N = 443$

Table 16 presents the means, standard deviations, and n for participants and programs. Table 17 demonstrates that there is not a significant interaction of participant type and program type. There is, however, a statistically significant difference for the main effect of participant type with regard to perceived amounts of ethical evaluation, $F(3, 433) = 25.12, p = <.001$.

In both types of programs, average scores for perceived amount of ethical evaluation dropped from a higher percentage among graduates, students, and program

directors to a lower rating among practitioners. 15% of the variance in the answers for ethics evaluation can be predicted from participant type, program type and the interaction. Eta for the variable of participant type is .39, which is a large effect size according to Cohen (1988). The variances for the main effect of participant type were significantly different (Levene's $F = 7.89, p < .001$) so Games-Howell was used for post hoc tests.

Table 16

Means, Standard Deviations and n for Participant and Program Types in Perceptions of Ethics Evaluation in Radiologic Technology Programs

	<u>Associate Degree</u>			<u>Baccalaureate Degree</u>			<u>Total</u>		
Participants	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Beginning	102	4.3	.97	80	4.2	.90	182	4.3	.94
Graduating	125	3.7	1.23	87	3.3	1.29	212	3.5	1.26
Practitioners	21	3.0	1.44	16	2.4	1.20	37	2.8	1.36
Directors	8	4.1	.99	4	4.3	0.50	12	4.2	.83
Total	256	3.9	1.20	187	3.6	1.24	443	3.8	1.23

Table 17

Two-Way Analysis of Variance for Perceived Amount of Ethics Evaluation Received or Delivered in Radiologic Technology Programs

Variable and Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2
Ethics Evaluation					
Participant Type	3	33.05	25.52	<.001	.150
Program Type	1	1.70	1.31	.252	.003
Participant*Program	3	1.05	.81	.487	.006
Error	435	1.29			

Note. $\eta = .39$ = effect size for participant type.
Levene's Test of Equality is significant ($p < .001$).

Post hoc examination of participant type again indicates that graduating students believed there was less evaluation of ethical behavior than did beginning students in both programs ($p < .001$). Practitioners perceived there was less evaluation of ethical behavior than students beginning the program believed they would receive ($p < .001$). Practitioners also perceived that there was less ethical evaluation performed ($p = .005$) than graduating students believed, and program directors said they performed ($p = .008$).

In examining Figure 4, average scores for all participants in associate degree programs appear to be higher than scores from participants in baccalaureate degree programs with the exception of program directors. The overall score for associate degree programs was 3.9 while the average score for baccalaureate degree programs was 3.7 but this was not a significant difference, as noted above.

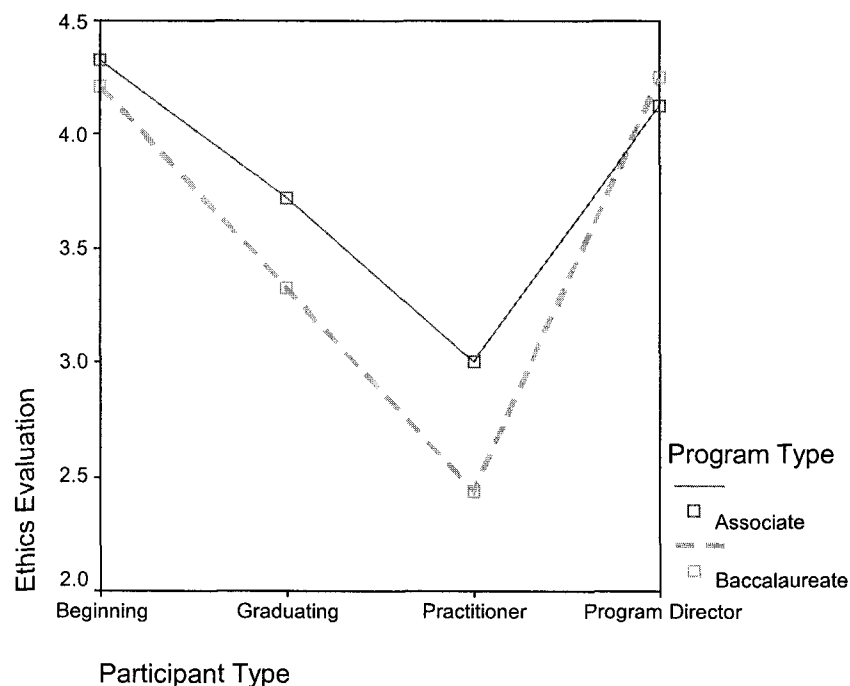


Figure 4. Participant and program type on perceived amount of ethics evaluation.

Contrast Analysis of Perceived Amounts of Ethics Evaluation

A contrast analysis was also performed between student groups in each program on perceptions of evaluation of ethical behavior. The test for homogeneity was significant so equal variances were not assumed. A one-way ANOVA demonstrated a significant difference between the groups of participant types excluding program directors (Table 18). In six contrasts, comparing beginning students to graduating students to practitioners in each program, there were significant contrasts between each group (Table 19).

Table 18

One-Way Analysis of Variance of Participant Type on Perceived Amounts of Ethics Evaluation

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	5	105.37	21.07	16.11	<.001
Within Group	425	555.84	1.30		
Total	430	661.21			

Table 19

Contrast Tests for Participant Types in the Same Program on Perceived Amounts of Ethics Evaluation

Variable	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
Associate				
Beginning-Graduating	4.12	224.63	<.001	.55
Beginning-Practitioner	4.06	23.79	.001	1.22
Graduating-Practitioner	2.14	25.12	.041	.54
Baccalaureate				
Beginning-Graduating	5.19	153.34	<.001	.82
Beginning-Practitioner	5.57	18.43	<.001	1.69
Graduating-Practitioner	2.65	21.86	.014	.71

Note. Test for Homogeneity, $p = < .001$, equal variances were not assumed.

Relationship of Ethical Reasoning to Amounts of Ethics Education and Evaluation

Analysis was then performed to determine if there was a relationship between levels of postconventional ethical reasoning and participants' perceptions of ethics education and evaluation. There was a negative significant correlation between N2 scores and ethics education, $r(340) = -.13, p = .015$. There was also a statistically significant negative correlation between N2 scores and ethics evaluation, $r(340) = -.12, p = .026$. Thus, as perceptions of ethical education and evaluation decreased, postconventional reasoning increased. The effect size for both correlations was small and 2% of the variance was predicted from the relationship between N2 scores and amount of perceived ethical education. The same is true for ethical evaluation. There was no significant correlation between Stage 4 scores and perceived amounts of ethical education and evaluation.

Formal Education and Perceived Amounts of Ethical Education and Evaluation

A correlation analysis demonstrated there was a significant negative correlation between years of formal education with perceived amounts of ethics education received, $r(397) = -.28, p = <.001$; and perceived amounts of ethics evaluation received, $r(397) = -.21, p = <.001$. It appears that students with a greater amount of formal education believed that they received less ethical education and evaluation of ethical performance than students with less years of education did. Practitioners appeared to have the lowest scores in perceptions of education and evaluation. This may be due to a poor memory or changes in the curricula in recent years. Effect size is small to medium for both relationships. Approximately 8% of the variance can be predicted from the

relationship between formal education and ethics education while 4% of the variance can be predicted from the relationship between formal education and ethics evaluation.

Age and Perceived Amounts of Ethical Education and Evaluation

There was a statistically significant negative correlation between age and ethics education, $r(387) = -.15, p = .004$, and ethics evaluation, $r(387) = -.10, p = .043$. Again, the effect size is small, with 1% of the variance in perceived ethics evaluation and 2% in education being predicted by age. It appears that older participants perceived they received lesser amounts of ethics education and evaluation.

Gender and Perceived Amounts of Ethical Education and Evaluation

Independent samples t tests were performed to determine if there was a difference between females and males with regard to the amount of ethics education or evaluation. There was no significant difference in perceptions of ethics education, $p = .111$, or in perceptions of ethics evaluation, $p = .071$, between males and female participants.

Summary

A summary table (Table 20) demonstrates the significant differences, interactions, and correlations in analyses performed in this study. There is a large number of significant results and some may be due to chance rather than variance. Based on the analysis of the hypotheses, there is a significant interaction in levels of postconventional reasoning between program type and participant type. This resulted from baccalaureate

practitioners having higher average N2 scores than associate degree practitioners did. In addition, females had higher average N2 scores than males did.

Further analysis of the levels of ethical reasoning revealed significant negative correlations between scores representing postconventional reasoning and scores representing both the maintaining norms schema and the personal interest schema. While average N2 scores were higher than Stage 2/3 scores, the average N2 score for all three groups of participants was lower than the average Stage 4 score. There was also a significant positive correlation between age and scores representing the maintaining norms schema suggesting that as participant age increased so did the tendency to follow rules rather than utilizing postconventional moral development.

In supplementary analysis of perceived amounts of ethics education there were significant differences in participant type and program type, as well as a significant interaction in the variables. Post hoc and contrast tests revealed a significant difference between the two groups of graduating students with associate degree students having higher average perceptions than did baccalaureate students. Scores of program directors would indicate that either program directors are unaware of the amount of ethics education delivered in the classroom or that there is truly a low amount of ethics education in the curriculum. Correlation analysis revealed that there was a negative association between postconventional reasoning and perceptions of ethics education received. A negative association was also found between years of formal education and perceived ethics education as well as age and perceived education. All correlations had small effect sizes.

Analysis of perceived amounts of ethics evaluation also demonstrates significant differences in participant type. Post hoc examination revealed differences in several groups of participant type. Scores in both programs decreased from beginning students to graduating students to practitioners. Scores were high among directors in both programs indicating a moderate amount of evaluation of ethical behavior. There were also negative correlations between evaluation of ethical behavior and N2 scores. Negative correlation was found, as well, between years of formal education and age with perceived ethical evaluation. Again, all correlation analyses had small effect sizes.

Contrast testing (Table 21) of perceived ethical education between participants (excluding directors) in each program revealed significant differences in all groups but one. In associate degree programs, beginning students expected higher amounts of ethical education, and graduating students believed they received more education than the amount practitioners believed they received. There was not a significant difference between beginning and graduating students in baccalaureate degree programs. In associate programs, graduating students actually had higher perceptions of education received than did beginning students and practitioners.

Contrast testing of perceived ethical evaluation between participants (excluding directors) from each program demonstrated significant differences in all groups. Average scores decreased from beginning students to graduating students to practitioners in both programs.

Table 20

Summary Table of Analysis of Significant Differences and Correlations

Variables	<i>p</i>	<i>effect size</i>
Scores in Ethical Reasoning		
N2 > Stage 2/3	<.001	medium to large
Stage 4 > N2	<.001	medium to large
Stage 4 > Stage 2/3	<.001	very large
N2 Scores		
Practitioners		
Baccalaureate > Associate	.046	medium to large
Female > Male	.045	small
Negative Correlation of N2 with		
Stage 4 Scores	<.001	medium
Stage 2/3 Scores	<.001	large
Negative Correlation of Stage 4 with		
Stage 2/3 scores	<.001	medium
Positive correlation of Stage 4 with		
Age	.009	small
Scores in Perceived Amounts of Ethical Education		
Graduating Students		
Associate > Baccalaureate	<.001	medium to large
Negative Correlation of Ethics Education with		
N2 Scores	.015	small
Formal Education	<.001	small to medium
Age	.045	small
Scores in Perceived Amounts of Ethical Evaluation		
Participants		
Beginning > Graduating	<.001	large
Beginning > Practitioner	<.001	very large
Graduating > Practitioner	.009	medium to large
Negative Correlation of Ethics Evaluation with		
N2 Scores	.026	small
Formal Education	<.001	small to medium
Age	.004	small

Table 21

Significant Contrast Analyses of Beginning and Graduating Students, and Practitioners in the Same Program on Perceived Amounts of Ethical Education and Evaluation

Variable	<i>p</i>	<i>effect size</i>
Ethical Education		
Associate		
Beginning > Practitioner	.029	medium
Graduating > Practitioner	.007	medium to large
Baccalaureate		
Beginning < Graduating	<.001	medium to large
Beginning > Practitioner	<.001	very large
Graduating > Practitioner	.050	medium to large
Ethical Evaluation		
Associate		
Beginning > Graduating	<.001	medium
Beginning > Practitioner	.001	very large
Graduating > Practitioner	.041	medium
Baccalaureate		
Beginning > Graduating	<.001	large
Beginning > Practitioner	<.001	very large
Graduating > Practitioner	.014	medium to large

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

Introduction

Decision-making using ethical reasoning is a major part of a health professional's work because of the interactions required with patients, physicians and peers. Ethical theories such as deontology, utilitarianism, or virtue, coupled with ethical principles found in the Belmont Report lay the foundation of practiced ethical development. Codes of ethics are developed by professional organizations to define the responsibilities of practitioners toward those entrusted to their care. Programs of study promote ethical principles in both didactic and clinical educational settings.

Rest (1986) proposed four components to moral development: moral sensitivity, moral judgment, moral motivation and moral character. Of the four components, moral judgment is most often studied and reported. Rest and Narvaez (1997) developed the Defining Issues Test-2 (DIT2) to determine moral judgment or reasoning in various groups of students from junior high school to graduate school. Many studies have examined ethical reasoning in professional practice as well.

The purpose of this study was to determine if there were differences in levels of ethical reasoning in students and practitioners in the radiologic technology profession. Many studies regarding ethical reasoning have been conducted in various health professions. However, there were few studies found regarding radiologic technologists

and ethical reasoning. Four hypotheses were presented for research and analyzed. Additional analysis was performed on perceptions of ethical education and evaluation.

Discussion of Hypotheses

Hypothesis 1

Hypothesis 1 stated that there would be a difference in the levels of ethical reasoning between beginning and graduating students in radiologic technology programs and practitioners in the profession. The DIT2 is a test in moral judgment that determines a level of ethical reasoning by activating three schemas. Rest, et al (2000) defines these three schemas as: Personal Interest, Maintaining Norms, and Postconventional Reasoning. These schemas represent a blending of the six stages proposed by Kohlberg (1984). The highest level in moral development is postconventional reasoning. The essence of postconventional thinking, according to Rest, et al (2002), is that “moral obligations are to be based on shared ideals, are fully reciprocal, and are open to scrutiny” (p. 388). There was a significant difference in the levels of postconventional reasoning between associate degreed practitioners (27.32) and baccalaureate degreed practitioners (36.66). This finding could indicate that baccalaureate practitioners are in employment positions where postconventional levels of ethical reasoning are needed for the work performed. As was true in this study for radiologic technology, Kanny (1996) did not find significant difference in scores between students who were in four-year occupational therapy programs and practitioner who were working in the field.

Postconventional reasoning changes were not evident in beginning students compared to graduating students who had been in either two-year or four-year programs.

The present finding supports the research in other recent studies of students in professional programs (Clarkburn, et al, 2002, Cummings, et al, 2001). Dieurf (1998) and Kanny (1996) reported similar findings in studies of occupational therapy students and practitioners. In the current study, the mean score for postconventional reasoning in baccalaureate participants increased slightly but not significantly in graduating students (30.52) from beginning students (29.84) and continued to increase in practitioners (36.66). Mean scores for the students and practitioners decreased somewhat but not significantly over the three participant groups in associate degree programs (33.05, 29.19, 27.32). A longitudinal study performed at Alverno College (Rogers, 2002) showed that although moral growth increased throughout the college years there was no significant increase in growth after graduation. Additionally, there was not a great deal of difference in the amount of education between the associate degree students and baccalaureate students which could explain the similarity in average scores.

Purposeful ethics education intervention has also proven to increase postconventional reasoning scores when comparing senior nursing students to students beginning the program (Krawczyk, 1997). In a study of three nursing programs, Krawczyk demonstrated that students who had received a specific ethics course, which included student role playing and interaction in solving ethical dilemmas, had significantly higher P scores on the DIT when compared to students who had received little or no specific educational intervention. Van Valkenburg (1989), in exploring the affective domain, determined that increased affective education and socialization reinforcing affective principles increased affective awareness between beginning and graduating students. Greene (1997), however, found that deliberate service-learning

intervention did not increase moral reasoning in occupational therapy students and that levels of ethical reasoning actually declined from a measure of reasoning similar to postconventional reasoning to a measure similar to a maintaining norms type of reasoning. The present study did not determine if there was specific ethics education intervention given by the participating programs.

Analysis was also performed on the other two schemas of ethical reasoning. Average scores in this study indicated that participants on average utilized less of the personal interest schema, that is, decision-making based on self-interest in the outcome of the dilemma. This finding concurs with studies reported by Rest, et al. (1999). Findings did indicate that all participant groups scored higher in the Maintaining Norms schema than scored in the Postconventional schema and there were no significant differences in the three groups across the schema. The Maintaining Norms schema demonstrates a conventional propensity towards following the rules or codes set by the profession itself (Rest, et al., 1999). High average Maintaining Norms scores (41.43) of the practitioners in both programs could indicate a bent towards doing what the rules state at their places of employment instead of using postconventional reasoning in solving moral problems. The DIT2 is also based on Kohlberg's cognitive theory. Affective components of care, value, and personal feelings may be very important factors when resolving ethical dilemmas (Bay, 2002).

Studies by Bebeau and Thoma (1999) suggest that there may be an "intermediate" level of ethical concepts in professional education. These intermediate-level concepts include the Belmont principles of ethics in health professions: autonomy, beneficence, and confidentiality. These concepts are not as concrete as professional codes of ethics.

Textbooks in radiologic technology center discussions of ethics on these concepts. Students are evaluated in their ethical behaviors with a strong emphasis on following the rules and all technologists must agree to abide by the profession's Code of Ethics. Stage 4 scores in associate degree participants were significantly lower in students than in practitioners. Again, the Maintaining Norms schema evolves from a propensity to follow rules. Brockett (1996) believes that a typical ethics curriculum in health education focuses on professional rules and not on moral theory or reasoning. Walker (2002) suggests extending research to include studying intermediate concepts in everyday life and developing taxonomies around these concepts. Lower N2 and higher Stage 4 scores on the DIT2 in this study might also be explained further by testing in the intermediate concept level.

The DIT2 is based on Kohlberg's cognitive theory. Perhaps affective components of care, value, and personal feelings should be explored as important factors when resolving ethical dilemmas (Bay, 2002) in addition to cognitive theory.

Hypothesis 2

Many studies using the DIT have reported that formal education is the major predictor of higher levels of postconventional reasoning (Rest, et al., 1999). de Casterle, et al. (1996) concluded that levels of education had a positive influence on ethical reasoning in nursing students. Because 84% of participants stated three to four years of education, analysis was not performed on formal education. Kanny (1996) reported that there was not a significant relationship for formal education between occupational therapy students and therapists. This could be due to the fact that there was not much

difference in the amount of education between the two groups. This is also true in radiologic technology programs. By the time a student enters the radiologic technology portion of the program many students already have at least one to three years of general education and other course work completed. Some beginning students have completed baccalaureate or masters-level courses prior to entering the radiologic technology program. Longitudinal studies performed by Rest (1986) demonstrated that formal education was a powerful predictor of moral development in individuals over time. The mean for formal education in this study was between three and four years of college with not much variation in participant responses. Formal education could not be used as a predictor in this study.

While Rest, et al (1999) demonstrated that N2 scores for college students were most often in the 40's, average scores for the participants in this study were in the upper 20's to mid 30's regardless of the type of educational program or amount of formal education. This is not to imply that participants in this study are any less ethical than participants of other studies. N2 scores indicate levels of postconventional ethical reasoning. Rogers (2002) found that postconventional reasoning did not increase but rather was maintained following completion of a formal program of study. The lower scores for participants in this study could indicate a tendency to use other levels of ethical reasoning, especially maintaining norms or other types of ethical theory in solving ethical dilemmas.

Hypothesis 3

No significant relationship was found between postconventional ethical reasoning and the participants' age. This was to be expected since many studies conducted using the DIT found that age was not a significant predictor of postconventional reasoning unless it was coupled with formal education (Rest, et al, 1999). In a study of informational system professionals and students, Windsor & Cappel (1999) reported differences in levels of postconventional reasoning in terms of educational level, years of experience and age. The current study demonstrated that N2 scores were not significantly different between practitioners and students with regard to levels of education or work experience. Combining N2 scores with age showed insignificant differences as well.

There was a small, significant positive relationship between Maintaining Norms scores and participant age. As age increased, utilization of the Maintaining Norms schema increased as well. The median age for students was 23 years and for practitioners was 32 years. This could indicate that as people get older an adherence to rules or laws becomes more prevalent.

Hypothesis 4

The results of this study are consistent with a meta-analysis of gender differences reported by Thoma (1986). Comparing 56 studies in which over 6000 students participated in DIT testing, females consistently scored the same or higher than males across the educational groups from junior high to graduate school. Other studies showed that there were few significant differences in females and males with regard to

postconventional reasoning scores. If there are significant differences, females have higher average scores than males (Rest, et al, 1999). There was a small significant difference in this study with females having higher average N2 scores (31.83) than did males (28.14). Rest, et al. (1999) concluded that gender, as a variable, is trivial when determining variance in postconventional reasoning.

An analysis was also conducted using Stage 4 (Maintaining Norms) scores when comparing the genders. In this case, there were no significant differences between males and females in the Maintaining Norms schema; however, average Stage 4 scores, 37.49 for males and 37.28 for females, were higher than the average N2 scores in both groups. This would seem to indicate that other factors are involved in determining levels of ethical reasoning besides gender.

Supplemental Analyses

Ethics Education

In supplemental analyses, participants were questioned regarding perceived amounts of ethics education received. Overall, perceptions of the amount of ethics education delivered declined from beginning students (4.1) to graduating students (3.4) to practitioners (2.8) in baccalaureate degree programs. While averages increased slightly from beginning students (3.9) to graduating students (4.1) in associate degree programs, scores declined in practitioners (3.4). These findings concur with a study by de Casterle, et al (1996) in which nursing students at the conclusion of study in technical and professional programs gave less than positive responses when questioned about didactic and clinical ethics education. Practitioners in the current study perceived they received

only some ethics education or could not remember the education received during the program of study. Memory loss over time could have played a role in the participants' answers or, perhaps, ethics education in school was not similar to ethical practice in the work place. Possibly, there was less ethics education delivered three to five years ago than there is currently.

There was also a small negative correlation between postconventional scores and perceived amounts of ethics education. This would indicate that as perceptions declined, higher levels of ethical reasoning were being utilized in ethical dilemmas. Perhaps there was more ethics education delivered than practitioners can remember or perhaps the practitioners developed postconventional reasoning regardless of the amount delivered. Age also had a small effect on negative perceptions. Again, this could be due to memory loss or experiential differences in the workplace regarding ethics.

Ethics Evaluation

Participants were also questioned regarding perceived amounts of evaluation of ethical behavior. Again, results were similar to perceived ethics education. Contrasts of participants from the same programs revealed significant differences in perceived evaluation of ethical behavior. Beginning students had high expectations of ethical evaluation (4.3) during the program, however, perceptions declined for graduating students (3.5) and practitioners (2.8) over time. Again these findings concur with de Casterle, et al (1996) in which student's perceptions of clinical ethical education became less positive at the end of the program. Practitioners' perceptions of evaluation of ethical behavior could be a result of lack of similar ethical evaluation in the workplace

or memory loss over time. Possibly, there was less evaluation of ethical behavior three to five years ago compared to ethical evaluation today. Postconventional reasoning scores were negatively correlated to evaluation perceptions suggesting that possibly persons have higher levels of ethical reasoning in place regardless of less perceived ethical evaluation. Again, perhaps there was more ethics evaluation than practitioners can remember or perhaps the practitioners developed postconventional reasoning regardless of the amount of ethical evaluation.

Limitations

1. A stronger method for evaluating levels of ethical reasoning would be a longitudinal study. Time constraints would not allow research to continue for the minimum of five years required to follow participants from the beginning of a program of study to at least three years working as a practitioner. The closest comparative study was to survey students who were beginning and ending in the same program, and survey practitioners who had graduated from those same programs. An assumption was made that while ethical theories are continually evolving, the teaching of ethical theory in the classroom has been fairly consistent if programs follow the professional curriculum that is in place for accredited programs.

2. There are also some issues with the external validity of the study due to the design of the study. Research was limited to four baccalaureate and nine associate degree programs in the Western United States. A cross sectional study of programs from all regions of the country would provide a broader perspective of radiologic technology

students and practitioners. Including hospital-based certificate programs might also strengthen the validity of the study.

3. The number of tests returned could have had an effect on the generalizability of the study. The return rate was acceptable from the beginning and graduating students but was low among practitioners from both programs. Because of privacy issues in academia, I could not control the mailing of the packets to practitioners and had to rely on the program directors to find addresses and send the packets. A follow-up postcard was not mailed out to remind practitioners to complete the test and return the packet. The only way to have control of mailing to practitioners would have been to send out packets to technologists in general because a directory for radiologic technologists is published on the ARRT web site. A general directory, however, lacks information regarding graduation dates and schools from which the practitioner graduated. This would not have been in line with the purpose of the study. One other possibility of a low return rate could be due to the nature of the subject matter itself. Testing on ethical or moral issues can be intimidating if there is any doubt of anonymity on the part of the participant.

Additionally, the DIT2 test is extensive and takes between 35 to 45 minutes to complete. There is a possibility that participants did not wish to take the time to complete the test.

4. Another limitation was the percentage of DIT2 tests that were returned but not completed, and the numbers that were purged by scoring because of reliability checks. While Bebeau reported reject percentages up to 15% (personal communication, October, 2002), there was a 16.5% reject rate for this study. One way to have resolved this was to administer the test personally to all beginning and graduating students to assure that they understood the purpose of the test and how to fill in their answers. This

was not possible due to travel constraints. The timing of giving the test could also have been an issue. The majority of graduating students received the test two weeks or less prior to graduation. Beginning students were given the test within two weeks of starting the program. It is possible that due to stress factors, the students did not take the test seriously or put the necessary time into taking the test to complete it properly.

Practitioners who had ample time to complete the test had a very low purge rate; only 1 out of 44 DIT tests were purged. A better time to administer the DIT2 may have been in the middle of the first or last semester of the course when students were under less pressure. In a study of occupational and physical therapy students, Brockett, et al. (1997) had similar conclusions regarding the number of purged subjects. They added that, perhaps while students felt obligated to take the test, there was no sense of personal commitment to the research.

Recommendations

Research in Moral Development

1. Further research exploring the other three components (moral sensitivity, motivation, and character) of Rest's Four Component Model would be beneficial to determine if other psychological processes besides moral judgment are used to solve ethical dilemmas. Other instruments that are more sensitive to determining ethical behavior or motivation should be considered for use in study.

2. This research could be repeated as a longitudinal study, tracking students from the beginning of radiologic technology education to five years post graduation. Test-retest research design could significantly strengthen a study in ethical reasoning.

3. Research exploring ethics education intervention in the radiologic sciences would be beneficial in determining if higher levels of ethical reasoning could be attained after such intervention.

Education and Evaluation in Ethics

This study demonstrated that there was not a significant relationship between higher ethical reasoning among participants and formal education. There was a significant decrease over time in perceptions of ethics education received and in evaluation of ethical behavior from the beginning student to the practitioner. Perhaps further explanation of the outcome of this study would result from an examination of the teaching methodology used to deliver ethics education and evaluation in radiologic technology programs. A study to compare curricula and teaching methods leading to postconventional ethical reasoning versus maintaining norms reasoning in radiologic technology would be useful. Research exploring continuing education for technologist practitioners would also be valuable in comparing levels of postconventional reasoning versus maintaining norms reasoning in professional practice.

Conclusion

The results of this study revealed that postconventional levels of ethical reasoning did not change significantly from beginning a program of study to professional experience in radiologic technology. Additional analysis of perceptions of ethics education and evaluation became less positive over time. These results indicate that

methods of teaching ethics in educational programs may not have an impact on higher levels of ethical reasoning. Instead, ethics education may be directed towards the maintaining norms schema in which following rules and laws is an acceptable level for radiologic technologists. Further studies are needed to examine methods of teaching ethics to determine if there is a need to develop a model of teaching that allows students and practitioners to reach and maintain the postconventional level of ethical reasoning. Continuing education courses for technologists may also have a similar focus towards the maintaining norms schema. Studies of continued ethical education for technologists may also be useful to determine levels of moral development in the profession.

REFERENCES

- Almeder, R. F. (2000). *Human happiness and morality: A brief introduction to ethics*. Amherst: Prometheus Books.
- American Registry of Radiologic Technologists. (2002). *Examinees' handbook*. Minneapolis: Author.
- American Registry of Radiologic Technologists. (2001, Fall). *Educators' update*. Minneapolis: Author.
- Aquinas, T. (trans. 1964). *Summa theologiae. Latin text and English translation*. New York: McGraw-Hill.
- Aristotle. (trans. 1981). *The Nicomachean ethics*. London: Penguin Classics.
- Armon, C. (1998). Adult moral development, experience and education. *Journal of Moral Education*, 27 (3), 245-371.
- Arras, J. D., & Steinbock, B. (1995). *Ethical issues in modern medicine*. (4th ed.), London: Mayfield Press.
- Baier, A. (1994). *Moral prejudices: Essays on ethics*. Cambridge: Harvard University Press.
- Baker, R. B., Caplan, A. L., Emanuel, L. L., & Latham, S. R. (1999). *The American medical ethics revolution*. Baltimore: The Johns Hopkins University Press.
- Bay, D. (2002). A critical evaluation of the use of the DIT in accounting ethics research. *Critical Perspectives on Accounting*, 13, 159-177.
- Bayles, M. D. (1989). *Professional ethics*. Belmont, CA: Wadsworth.
- Beauchamp, T. L., & Childress, J. F. (1994). *Principles of Biomedical Ethics*. New York: University Press.
- Bebeau, M. J. (1994). Influencing the Moral Dimensions of Dental Practice. In J. Rest & D. Narvaez (Eds.). *Moral development in the professions: Psychology and applies ethics* (pp. 121-145). Hillsdale, NJ: Erlbaum.

- Bebeau, M. J., & Thoma, S. J. (1998). *Designing and testing a measure of intermediate level ethical concepts*. Paper presented at the Annual Meeting of the American Educational Research Association. San Diego.
- Bebeau, M. J., & Thoma, S. J. (1999). "Intermediate" concepts and the connection to moral education. *Educational Psychology Review*, 11(4), 340-360.
- Birkelund, R. (2000). Ethics and education. *Nursing Ethics*, 7, 473-481.
- Bloom, B. (1956). *Taxonomy of educational objectives: The affective domain*. Los Angeles: University of California Clearing House.
- Brockett, M. M. (1996). Ethics, moral reasoning and professional virtue in occupational therapy education. *Canadian Journal of Occupational Therapy*, 63(3), 197-205.
- Brockett, M. M., & Geddes, E. L., Westmorland, M., & Salvatori, P. (1997). Moral development or moral decline? A discussion of ethics education for the health care professions. *Medical teacher* 19 (4), 301-310.
- Bulger, R. (1987). The search for a new ideal. In R. Bulger (Ed.) *In search of modern Hippocrates* (pp. 9-21). Iowa City: University of Iowa Press.
- Callahan, J. C. (1988). *Ethical issues in professional life*. Oxford: Oxford Press.
- Carlton, L. (1999). Decision making skills to solve ethical dilemmas in the clinical setting. *Seminars in Radiologic Technology*, 4, 167-173.
- Carpendale, J. I. (2000). Kohlberg and Piaget on stages of moral reasoning. *Developmental Review*, 20, 181-205.
- Clarkeburn, H., Downie, J. R., & Matthew, B. (2002). Impact of an ethics programme in a life sciences curriculum. *Teaching in Higher Education*, 7 (1), 65-79.
- Covey, S. (1990). *Principle-centered leadership*. New York: Summit Books.
- Cram, S. B. (1998). The impact of service-learning on moral development and self esteem of community college ethics students (Doctoral dissertation, University of Iowa, 1998). *Dissertation Abstracts International*, 59, 1407.
- Cummings, R., Dyas, L. Maddux, C. D., & Kochman, A. (2001). Principled moral reasoning and behavior of preservice teacher education students. *American Educational Research Journal*, 38 (1), 143-158.
- Curtin, L. (2000). On being a person of integrity - or ethics and other liabilities. *The Journal of Continuing Education in Nursing*, 31, 55-58.

- deBlois, J., Norris, P., & O'Rourke, K. (1994). *A primer for health care ethics: Essays for a pluralistic society*. Washington D.C.: Georgetown University Press.
- deCasterle, B. D., & Janssen, P. J., & Grypdonck, M. (1996). The relationship between education and ethical behavior of nursing students. *Western Journal of Nursing Research*, 18, 330-351.
- Desjardins, C., & Brown, C. (1991). A new look at leadership. *National Forum*, 71, 18-22.
- Dieruf, K. A. (1998). Ethical decision-making by students in physical and occupational therapy (Doctoral dissertation, The University of New Mexico, 1998). *Dissertation Abstracts International*, 59, 2341.
- Duckett, L., Boyer, M., Ryden, M., Crisham, P., Savik, K., & Rest, J. (1992). Challenging misperceptions about nurses' moral reasoning. *Nursing Research*, 41(6), 324-331.
- Duckett, L. J., & Ryden, M. B. (1994). Education for ethical nursing practice. In J. Rest & D. Narvaez (Eds.). *Moral development in the professions: Psychology and applies ethics* (pp. 51-69). Hillsdale, NJ: Erlbaum.
- Duska, R., & Whelan, M. (1975). *Moral development: A guide to Piaget and Kohlberg*. New York: Paulist Press.
- Fey, C. J., & Kelly, K. (1996). *Integrating ethics into the curriculum and co-curriculum: Model comprehensive approaches*. Paper presented at the annual conference of the National Association of Student Personnel Administrators, Atlanta, GA.
- Ford, C. W. (1983). Allied Health. In C. McQuire, et al. (Eds.) *Handbook of health professions education*. (pp. 113-126). San Francisco: Jossey-Bass.
- Freeman, N. K. (1998). Morals and character: The foundations of ethics and professionalism. *The Educational Forum*, 63, 30-36.
- Gastmans, C. (2002). A fundamental ethical approach to nursing: Some proposals for ethics education. *Nursing Ethics*, 9 (5), 494-507.
- Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge: Harvard University Press.
- Gilligan, C., & Attanucci, J. (1988). Two moral orientations: Gender differences and similarities. *Merrill-Palmer Quarterly*, 34, 223-237.
- Gliner, J. A., & Morgan, G. A. (2000). *Research methods in applied settings: An integrated approach to design and analysis*. Mahwah, NJ: Erlbaum.

- Gonzalez, L. S. & Colman, R. O. (1994). Ethics Education. *ASHA*, 36 (8), 47-48.
- Greene, D. P. (1997). The use of service learning in client environments to enhance ethical reasoning in students. *The American Journal of Occupational Therapy*, 51 (10), 844-852.
- Henry, S. E. (2001). What happens when we use Kohlberg? His troubling functionalism and the potential of pragmatism... *Educational Theory*, 51, 259-276.
- Hersch, P. (1998). *A tribe apart: A journey into the heart of American adolescence*. New York: Fawcett Columbine.
- The Holy Bible: New King James Version*. (1982). Nashville: Thomas Nelson.
- Jaeger, S. M. (2001). Teaching health care ethics: The importance of moral sensitivity for moral reasoning. *Nursing Philosophy*, 2, 131-142.
- Joint Review Committee on Education in Radiologic Technology. (2002). *Standards of accreditation for educational programs in radiologic technology*. Chicago: Author.
- Jonsen, A. R. (1990). *The new medicine & the old ethics*. Cambridge: Harvard University Press.
- Kanny, E. M. (1996). Occupational therapists' ethical reasoning: Assessing student and practitioner responses to ethical dilemmas (Doctoral dissertation, University of Washington, 1996). *Dissertation Abstracts International*, 57, 4336.
- Kant, I. (trans. 1959). *The foundations of the metaphysics of moral philosophy*. New York: Liberal Arts Press.
- Keefer, M., & Ashely, K. D. (2001). Case-based approaches to professional ethics: A systematic comparison of students' and ethicists' moral reasoning. *Journal of Moral Education*, 30 (4), 377-398.
- Killen, A. R. (1998). Morality in perioperative staff nurses: Relationships among moral motivation, moral character, moral action, and nurse and patient outcomes (Doctoral dissertation, Boston College, 1998) *Dissertation Abstracts International*, 60, 0130.
- King, P. M., & Mayhew, M. J. (2002). Moral judgment development in higher education: insights from the defining issues test. *Journal of Moral Education*, 31(3), 247-270.
- Koehn, D. (1994). *The ground of professional ethics*. London: Routledge.

- Kohlberg, L. (1984). *Essays on moral development, Vol. 2: The psychology of moral development: The nature and validity of moral stages*. Cambridge: Harper and Row.
- Krathwohl, D., Bloom, B., & Masia, B. (1964). *Taxonomy of educational objectives: the classification of educational goals, Handbook II. Affective Domain*. New York: Longman.
- Krawczyk, R. M. (1997). Teaching ethics: Effect on moral development. *Nursing Ethics*, 4(1), 57-65.
- Kuhse, H., & Singer, P. (1997). Partial and impartial ethical reasoning in health care professionals. *Journal of Medical Ethics*, 23, 226-232.
- McDowell, B. (1991). *Ethical conduct and the professional's dilemma*. New York: Quorum Books.
- Mundy, W. (1999). Ethical decision making in a managed care environment. *Seminars in radiologic technology*, 4, 157-166.
- Murray, N. M. (1995). Moral reasoning in male and female nurses: A care perspective vs. justice perspective (ethics) (Doctoral dissertation, Rutgers University, 1995). *Dissertation Abstracts international*, 57, 0619.
- Noddings, N. (1984). *Caring: A feminine approach to ethics and moral education*. Berkeley: University of California Press.
- Nouredine, S. (2001). Development of the ethical dimension in nursing theory. *International Journal of Nursing Practice*, 7, 2-7.
- Oakley, J., & Cocking, D. (2001). *Virtue ethics and professional roles*. Cambridge: Cambridge University Press.
- Obergfell, A. M. (1995). *Law and ethics in diagnostic imaging and therapeutic radiology*. Philadelphia: W. B. Saunders.
- Palmer, C. K. (1999). Professional ethics in the radiologic sciences. *Seminars in Radiologic Technology*, 7(3), 149-156.
- Parsons, R. (2001). *The ethics of professional practice*. Needham Heights: Allyn & Bacon.
- Pattison, S. (2001). Are nursing codes of practice ethical? *Nursing Ethics*, 8(1), 5-18.

- Pellegrino, E. (1987). Toward and expanded medical ethics: The Hippocratic ethic revisited. In R. Bulger (Ed.) *In search of the modern Hippocrates* (pp. 45-64). Iowa City: University of Iowa Press.
- Piaget, J. (1932/1965). *The moral judgment of the child*. (M. Gabain, Trans.). New York: Free Press.
- Ponemon, L. (1992). Ethical reasoning and selection-socialization in accounting. *Accounting Organizations and Society*, 17, 239-258.
- Purtilo, R. B. (1993). *Ethical dimensions in the health professions*. (2nd ed.). Philadelphia: W.B. Saunders.
- Rachels, J. (1999). *The elements of moral philosophy*. Boston: McGraw-Hill College.
- Rawls, J. (1971). *A theory of justice*. Cambridge: Harvard University Press.
- Reilly, D. E., & Oermann, M. H. (1992). Affective learning in the clinical setting. In: *Clinical Teaching in Nursing Education 2nd ed*. New York: NLN.
- Reiman, A., & Thies-Sprinthall, L. (1993). Promoting the development of mentor teachers: Theory and research programs using guided reflection. *Journal of Research and Development in Education*, 26, 179-185.
- Rest, J. R. (1979). *Development in judging moral issues*. Minneapolis: University of Minnesota Press.
- Rest, J. R. (1986). *Moral development: Advances in research and theory*. New York: Praeger.
- Rest, J. R. (1990). *DIT manual: Manual for the defining issues test*. Minneapolis: University of Minnesota Press.
- Rest, J. R. (1994). Background: Theory and Research. In J. Rest & D. Narvaez (Eds.) *Moral development in the professions: psychology and applied ethics* (pp. 1-27). Hillsdale, NJ: Erlbaum.
- Rest, J. R., Thoma, S. J., Narvaez, D. F., & Bebeau, M. J. (1997). Alchemy and beyond: Indexing the Defining Issues Test. *Journal of Educational Psychology* 89, 498-507.
- Rest, J. R., & Narvaez, D. F. (1997). *Ideas for research with the DIT*. Minneapolis: University of Minnesota.
- Rest, J. R., & Narvaez, D. F. (1998). *Guide for DIT-2*. Minneapolis: University of Minnesota.

- Rest, J. R., Narvaez, D. F., Bebeau, M. J., & Thoma, S. J. (1999). *Postconventional moral thinking: A Neo-Kohlbergian approach*. Mahwah, NJ: Erlbaum.
- Rest, J. R., Narvaez, D. F., Mitchell, C., & Thoma, S. J. (1999). *Exploring moral judgment: A technical manual for the defining issues test*. Minneapolis: University of Minnesota.
- Rest, J. R., Narvaez, D. F., Thoma, S. J., & Bebeau, M. J. (2000). A neo-Kohlbergian approach to morality research. *Journal of Moral Education*, 20 (4), 381-395.
- Rogers, G. (2002). Rethinking moral growth in college and beyond. *Journal of Moral Education*, 31(3), 325- 338.
- Sadlick, M. (1978). The affective domain in the teaching of rehabilitation nursing. *ARN Journal*, 3(2), 4-7.
- Self, D. J., & Baldwin, D. C. (1994). Moral reasoning in medicine. In J. R. Rest & D. F. Narvaez (Eds.), *Moral development in the professions: psychology and applied ethics* (pp. 147-162). Hillsdale, NJ: Erlbaum.
- Shannon, T. A. (Ed.). (1976). *Bioethics: Basic writings on the key ethical questions that surround the major, modern biological possibilities and problems*. New York: Paulist Press.
- Sisola, S. W. (1996). Principled moral reasoning as a predictor of clinical performance in physical therapy. (Doctoral dissertation, University of Minnesota, 1995). *Dissertation Abstracts International*, 56-10B. 5440.
- Socrates. In Kohlberg, L. (1984). *Essays on moral development, Vol. 2: The psychology of moral development: The nature and validity of moral stages*. Cambridge: Harper and Row.
- Steutel, J., & Carr, D. (1999). *Virtue ethics and moral education*. London: Routledge.
- Thoma, S. J. (1986). Estimating gender differences in the comprehension and preference of moral issues. *Developmental Review*, 6, 165-180.
- Thoma, S. J. (2002). An overview of the Minnesota approach to research in moral development. *Journal of Moral Education*, 31, 225-245.
- Tong, R. (1998). The ethics of care: A feminist virtue ethics of care for healthcare practitioners. *Journal of Medicine and Philosophy*, 23 (2), 131-152.
- Towsley-Cook, D. M., & Young, T. A. (1999). *Ethical and legal issues for imaging professionals*. St. Louis: Mosby.

- Tucker, E. M., & Stout, D. A. (1999). Teaching ethics: The moral development of educators. *Journal of Mass Media Ethics*, 14 (2), 107-118.
- Valentyne, P., & Accordino, J. (1998). Teaching critical thinking about ethical issues across the curriculum. *Liberal Education*, 84, (2), 46-52.
- Van Valkenburg, J. A. (1989). The relationship between instructional methods and the development of affective awareness in radiologic technology students (Doctoral dissertation, The University of Utah, 1989). *Dissertation Abstracts International*, 50, 2845.
- Veatch, R. M. (1989). *Medical ethics*. Massachusetts: Jones and Bartlett.
- Walker, L. J. (2002). The model and the measure: An appraisal of the Minnesota approach to moral development. *Journal of Moral Education*, 31, 353-361.
- Watson, J. (1985). *Nursing: The philosophy and science of caring*. Niwot: University Press of Colorado.
- Webster's New World Dictionary of the American Language* (2nd ed.). (1982). New York: Simon and Schuster.
- Westbrook, T. (1994). Tracking the moral development of journalists: A look at them and their work. In J. R. Rest, & D. F. Narvaez (Eds.). *Moral development in the professions: Psychology and applied ethics* (pp. 189-198). Hillsdale, NJ: Erlbaum.
- Wilson, B. G. (1997). *Ethics and basic law for medical imaging professionals*. Philadelphia: F. A. Davis.
- Windsor, J. C. & Cappel, J. J. (1999). A comparative study of moral reasoning. *Student College Journal*, 33(2), 281-287.
- Wright, R. A. (1987). *Human values in health care*. New York: McGraw-Hill.

APPENDICES

Appendix A
American Society of Radiologic Technologists
Code of Ethics

ARRT CODE OF ETHICS

1. The radiologic technologist conducts herself or himself in a professional manner, responds to patient needs and supports colleagues and associates in providing quality patient care.
2. The radiologic technologist acts to advance the principle objective of the profession to provide services to humanity with full respect for the dignity of mankind.
3. The radiologic technologist delivers patient care and service unrestricted by the concerns of personal attributes or the nature of the disease or illness, and without discrimination on the basis of sex, race, creed, religion or socioeconomic status.
4. The radiologic technologist practices technology founded upon theoretical knowledge and concepts, uses equipment and accessories consistent with the purposes for which they were designed, and employs procedures and techniques appropriately.
5. The radiologic technologist assesses situations; exercises care, discretion and judgment; assumes responsibility for professional decisions; and acts in the best interest of the patient.
6. The radiologic technologist acts as an agent through observation and communication to obtain pertinent information for the physician to aid in the diagnosis and treatment of the patient and recognizes that interpretation and diagnosis are outside the scope of practice for the profession.
7. The radiologic technologist uses equipment and accessories, employs techniques and procedures, performs services in accordance with an accepted standard of practice, and demonstrates expertise in minimizing radiation exposure to the patient, self and other members of the health care team.
8. The radiologic technologist practices ethical conduct appropriate to the profession and protects the patient's right to quality radiologic technology care.
9. The radiologic technologist respects confidences entrusted in the course of professional practice, respects the patient's right to privacy and reveals confidential information only as required by law or to protect the welfare of the individual or the community.
10. The radiologic technologist continually strives to improve knowledge and skills by participating in continuing education and professional activities, sharing knowledge with colleagues and investigating new aspects of professional practice

Appendix B

Student and Practitioner Questionnaires

First Year Student Questionnaire

Please mark a response for the following categories:

Are you:

1. ☐ in an associate degree program
 ☐ in a baccalaureate degree program

2. My expectation of the amount of ethics taught in the program

 ☐ very little ethics will be taught throughout the program
 ☐ some ethics will be taught throughout the program
 ☐ don't know
 ☐ quite a bit of ethics will be taught throughout the program
 ☐ a lot of ethics will be taught throughout the program

3. My expectation of the amount of evaluation of my ethical behavior in the program

 ☐ there will be little evaluation of my ethical behavior during the program
 ☐ there will be some evaluation of my ethical behavior during the program
 ☐ don't know
 ☐ there will be a moderate amount of evaluation of my ethical behavior during the
 program
 ☐ there will be a high amount of evaluation of my ethical behavior during the
 program

Graduating Student Questionnaire

Please mark a response for the following categories:

Are you:

1. ☐ in an associate degree program
 ☐ in a baccalaureate degree program

2. My perception of the amount of ethics taught in the program

 ☐ very little ethics was taught throughout the program
 ☐ some ethics was taught throughout the program
 ☐ don't know/ don't remember
 ☐ quite a bit of ethics was taught throughout the program
 ☐ a lot of ethics was taught throughout the program

3. My perception of the evaluation of my ethical behavior in the program

 ☐ there was little evaluation of my ethical behavior during the program
 ☐ there was some evaluation of my ethical behavior during the program
 ☐ don't know/don't remember
 ☐ there was a moderate amount of evaluation of my ethical behavior during the
 program
 ☐ there was a high amount of evaluation of my ethical behavior during the
 program

Practitioner Questionnaire

Please mark a response for the following categories:

1. Did you graduate from
 - ☐ an associate degree program
 - ☐ a baccalaureate degree program

2. My perception of the amount of ethics taught in the program
 - ☐ very little ethics taught throughout the program
 - ☐ some ethics taught throughout the program
 - ☐ don't know/ don't remember
 - ☐ quite a bit of ethics taught throughout the program
 - ☐ a lot of ethics taught throughout the program

3. My perception of the evaluation of my ethical behavior in the program
 - ☐ there was little evaluation of my ethical behavior during the program
 - ☐ there was some evaluation of my ethical behavior during the program
 - ☐ don't know/don't remember
 - ☐ there was a moderate amount of evaluation of my ethical behavior during the program
 - ☐ there was a high amount of evaluation of my ethical behavior during the program

Appendix C

Letter to Program Directors

April 1, 2002

School of Education
Fort Collins, Colorado 80523-1588

Dear Program Director,

As you know, per our telephone conversation, we are conducting research for the study titled, "From educational theory to professional practice: A comparative study of ethical reasoning in students and graduates of radiologic technology programs". As educators we have been aware of the increased interest in and attention paid to ethics in the field of radiologic technology. While there are studies in other health professions with regard to professional ethics and ethics education, there is a paucity of research in the radiologic sciences. Educators in this field need more information about a student's ethical reasoning skills and whether the education received in the two and four year programs impacts the practitioner's ethical reasoning.

Your program was selected for this regional study in which three groups of radiography participants will be compared. To protect the privacy of the participants we are asking if you, as Program Director, will assist us in obtaining the participant groups. The groups are as follows:

- We will first be surveying the students who will be graduating this year (May – July). We will be sending the first packet of tests beginning in April. The test will take the students approximately 40 minutes to complete. We would ask you to distribute in class and request that the student return it the following day in the sealed envelope provided to your office. Once all surveys are returned, please mail them back in the envelope provided.
- The next group of participants is technologists who have graduated from your program from 1997 - 1999. The surveys will come to you in postage-paid packets. We ask that you would help distribute the packet by placing a mailing label on the envelope. These packets will be sent to you in June. Your address will be used for any returned packets. We will contact you with regard to numbers of returned surveys.
- We will then send another packet of tests in August or September for those students starting your program. Again, we would ask that you distribute the test in class and request that the student return it the following day in the sealed envelope provided to your office. Again, once all surveys are returned, please mail them to Bette in the envelope provided.

The test being used is the Defining Issues Test-2 (Rest et al, 1999) that has been used in over 1500 studies of students and professionals. This instrument is a measure of a person's characteristic pattern of ethical reasoning. Scoring for the test is performed on groups, not individuals in the study.

This study will be conducted in total confidentiality of the participants and the schools. There will be no names submitted to me. The results of this research will be reported in aggregate form and the research will discuss the region in which the research was completed, not individual states or schools.

The results of this research should provide radiologic science educators with important information regarding the differences or similarities in ethical reasoning of radiography students and graduates, and if exposure to ethics studies in a professional program makes a difference. We would be happy to share the results of this study with you when it is completed.

We will contact you by mid April to discuss distribution and collection of the test. We have attempted to provide you with sufficient detail about this study by both our phone conversation and this letter. If you have any further questions or need more details, please contact us at (970) 523-0381 (home- Co-PI), at (970) 248-1651 (work- Co-PI) or at (970)491-0608 (Principle Investigator). Bette's email address is bschans@mesastate.edu. Thank you again for your help with this study.

Sincerely,

Bette Schans, MS, RT(R)
Co-Principle Investigator
Doctoral Candidate, Education
Colorado State University

George Morgan, PhD
Principle Investigator
School of Education
Colorado State University

Appendix D

Letter of Cooperation



3201 Campus Drive, Klamath Falls, OR 97601-8801 phone 541.885.1000 www.oit.edu

Letter of Cooperation

To Whom It May Concern,

I, Stephen M. Schultz am the program director in the Radiologic Science Program at the Oregon Institute of Technology.

Bette Schans has contacted me and I am familiar with the study. I agree to the following:

- I, or a faculty member, will read the script that Bette Schans has provided to my students, inviting them to participate in this study.
- I, or a faculty member, will leave the survey instruments in the classroom for the students to take and complete on their own time. I will instruct the students to return the completed form in the sealed envelope to my office.
- I will return the instruments in the sealed envelopes, without examining them, to Bette.
- With regard to graduates, I will place a mailing label on the envelope provided and send the survey to the graduates. I will give a report of any unopened, returned instruments to Bette.

Student and graduate participation is voluntary. I am under no obligation to complete the program director questionnaire. I acknowledge that the information the students and graduates provide will be anonymous and confidential. The students and graduates may at any time stop filling out the survey and there are no known risks to filling out the survey.

Stephen M. Schultz
name

4/8/02
date

Appendix E

Student Cover Letter

Practitioner Cover Letter



School of Education
Fort Collins, Colorado 80523-1588

Dear Student Technologist:

Health care delivery in America today is constantly changing and always challenging. Quality patient care remains a priority for health professionals. We are conducting research for a doctoral dissertation titled, "From Educational Theory to Professional Practice: a Comparative Study of Ethical Reasoning in Students and Graduates of Radiologic Technology Programs."

We are asking you to participate in a research study of ethical reasoning in students and graduates of radiologic technology/science programs in the Western United States. The director of the program where you are enrolled in radiologic technology has distributed this packet to you. The survey contains instructions for completion of the survey itself. You will read each dilemma and then be asked to identify the importance of each question asked. You will then identify which four questions are of the most importance to you. We are also asking you to complete a brief questionnaire regarding teaching and evaluation of ethics in your program. It will take approximately 35 minutes to complete the survey.

Your participation is strictly voluntary. No names are requested so the survey is completely anonymous. If, for any reason, you do not desire to complete the survey, please place it in the envelope and return it to the program director. However, if you choose to complete the survey, it is important that you answer as thoroughly and honestly as possible so that the results of the study will be representative of students of associate and baccalaureate programs.

You may be assured that your response is strictly anonymous. You will place your completed survey in the envelope and seal it prior to returning it to your instructor or program director. The program director will return the packets to me. A third party will be opening the packets so the investigators will be unable to identify the schools. Completion of the survey will serve as your informed consent to participate in this study. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks. There are no direct benefits to the participants of the study.

The Human Research Committee at Colorado State University has approved this research study and your school has agreed to participate. Results of the study will be available from the CSU library when completed.

If you have any questions, please feel free to contact Bette collect at (970) 523-0381. For information regarding human subject's rights, please contact Celia Walker at (970) 491-1563. Thank you for your time and valuable assistance for this research project.

Sincerely,

Bette Schans, PhD(c), RT(R)
Doctoral Candidate Education
Colorado State University

George Morgan, PhD
School of Education
Colorado State University

Dear Radiologic Technologist:

Health care delivery in America today is constantly changing and always challenging. Quality patient care remains a priority for health professionals. We are conducting research for a doctoral dissertation titled, "From Educational Theory to Professional Practice: A Comparative Study of Ethical Reasoning in Students and Graduates of Radiologic Technology Programs."

We are asking you to participate in a research study of ethical reasoning in students and graduates of radiologic technology/science programs in the Western United States. The director of the program where you completed your studies in radiologic technology has sent this packet to you. The survey contains instructions for completion of the survey itself. You will read each dilemma and then be asked to identify the importance of each question asked. You will then identify which four questions are most important to you. We are also asking you to complete a brief questionnaire regarding teaching and evaluation of ethics in your program. It will take approximately 35 minutes to complete the survey and questionnaire.

Your participation is strictly voluntary. No names are requested so the survey is completely anonymous. It is your choice whether or not to complete the survey, however if you choose to complete the survey, it is important that you answer as thoroughly and honestly as possible in order that the results of the study to be representative of graduates of associate and baccalaureate programs.

You may be assured that your response is strictly anonymous. The program director has affixed the mailing label to the packet. Please send the completed survey back to me in the postage-paid return envelope. A third party will open the envelopes so the investigators will be unable to identify the participants. Your name will never be associated with your response. Completion of the survey will serve as your informed consent to participate in this study. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks. There are no direct benefits to the participants of the study.

The Human Research Committee at Colorado State University has approved this research study and your school has agreed to participate. Results of the study will be available from the CSU library when completed.

If you have any questions, please feel free to contact me collect at (970) 523-0381. For information regarding human subject's rights, please contact Celia Walker at (970) 49101563. Thank you for your time and valuable assistance for this research project.

Sincerely,

Bette Schans, PhD(c), RT(R)
Doctoral Candidate, Education
Colorado State University

George Morgan, PhD
School of Education
Colorado State University

Appendix F

Permission to Use DIT2

From: Muriel Bebeau <bebea001@maroon.tc.umn.edu>
To: Bette Schans <bschans@mesastate.edu>
Date: 3/25/02 9:45AM
Subject: Re: letter of permission

Bette: As I indicated in my prior message, you purchase the tests and scoring service from the Center, you are granted specific permission. You are aware that the key for the test will not be provided, but that you will be provided with a disk that includes scores so you can conduct secondary analysis.

Thanks for your interest in the DIT.

Mickey Bebeau

Appendix G

Program Director Questionnaire

Dear Program Director,

Thank you very much for facilitating the distribution of the DIT packets to your students. I am asking you to fill out the brief survey at the bottom of the page, place it in the envelope attached to this letter and mail it back to me. The responses will be opened by a third party so I will have no knowledge of which letter belongs to a particular program or program director.

The survey questions at the bottom of the page are the same questions being asked of graduating students and graduate technologists in an attempt to correlate teaching and evaluating with learning.

Bette Schans

This program is

- ☐ Associate degree program
- ☐ Baccalaureate degree program

Amount of ethics taught in the program

- ☐ very little ethics taught throughout the program
- ☐ some ethics taught throughout the program
- ☐ don't know/ no opinion
- ☐ a moderate amount of ethics taught throughout the program
- ☐ a high amount of ethics taught throughout the program

Evaluation of ethical behavior in the program

- ☐ there was little evaluation of ethical behavior during the program
- ☐ there was some evaluation of ethical behavior during the program
- ☐ don't know/ no opinion
- ☐ there was a moderate amount of evaluation of ethical behavior during the program
- ☐ there was a high amount of evaluation of ethical behavior during the program

Appendix H
Letter of Instruction

INSTRUCTIONS FOR STUDENTS COMPLETING THE SURVEY

Dear Program Director,

Thank you for your help with distribution of this survey. Would you or your designated instructor please read the following instructions to the students:

"We have been asked to be a part of a research study by Bette Schans which is titled, "From educational theory to professional practice: A comparative study of ethical reasoning in students and graduates of radiologic technology programs". The survey you have received is the Defining Issues Test - 2 by James Rest. There are 5 dilemmas on the DIT-2. This survey measures ethical reasoning for groups of students and examines ethical reasoning versus ethical practice. Individual scores are not measured.

This survey takes approximately 35 minutes to complete. Instructions for taking the survey are on the DIT-2. Please read these instructions carefully and answer the survey as completely and honestly as you can. Please complete the brief questionnaire also.

You are under no obligation to take this survey or to complete the survey once you have started. By placing the survey in the envelope provided, sealing it, and returning it to the program director, there is complete anonymity. If you choose not to complete the survey, please return it in the envelope to the program director.

Please do not fold the test or the answer sheet. Please use a pencil to fill in your answers. Thank you."