

UNDERSTANDING THE EFFECT OF COMPUTER-SUPPORTED, CASE-BASED
INSTRUCTION ON THIRD-YEAR MEDICAL STUDENTS' ETHICAL
REASONING

A Dissertation
presented to
the Faculty of the Graduate School
at the University of Missouri-Columbia

In Partial Fulfillment
of the Requirements for the Degree

Doctor of Philosophy

by
WEI-HSIN LU

Dr. Julie Caplow, Dissertation Supervisor

DECEMBER 2007

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

UNDERSTANDING THE EFFECT OF COMPUTER-SUPPORTED,
CASE-BASED INSTRUCTION ON THIRD-YEAR MEDICAL
STUDENTS' ETHICAL REASONING

presented by Wei-Hsin Lu,

a candidate for the degree of Doctor of Philosophy

and hereby certify that, in their opinion, it is worthy of acceptance.

Dr. Julie Caplow

Dr. John Wedman

Dr. James Laffey

Dr. Joi Moore

Dr. Joe Donaldson

DEDICATION

For 568

ACKNOWLEDGEMENTS

The completion of this dissertation as well as my doctoral program would not have been possible without the support and guidance of several people:

First and foremost I am indebted to my dissertation advisor, Dr. Julie A. Caplow, who was always available to help me professionally as well as personally. Without her continuous consultations and positive attitude, this work would never have been completed. I could not ask for a better advisor.

I also want to thank Dr. John Wedman, my program advisor. Meeting Dr. Wedman was a significant turning point in my life. It was because of him that I was even able to pursue a PhD degree in learning technologies.

Sincere gratitude also goes to members of my program and dissertation committee; Dr. Joe F. Donaldson, Dr. James Laffey, Dr. Joi Moore, Dr. David Jonassen, Dr. Rose Marra, and Dr. Daryl Hobbs, for their generous and invaluable input on my research and coursework studies.

I am also grateful for the mentorship of two inspirational people who were the major influence for the professional career path that I choose; Dr. Kimberly G. Hoffman, Associate Dean for Education Evaluation and Improvement, and Dr. Michael C. Hosokawa, Associate Dean for Curriculum at the MU School of Medicine. Dr. Hoffman always believed in me more than I believed in myself. She is an excellent role model both professionally and academically. It was her encouragement, words of wisdom, and compassion especially during the difficult times that gave me enough strength and courage to push forward and work hard. What she had done for me helped me more than she will ever know. Dr. Hosowaka was always the one who showed me the forest when I got lost among the trees. I could always count on him to give me sound advice and reality checks. His support means more to me than I could ever describe in words.

I wish to also express my appreciation to Dr. David A. Fleming for his enthusiasm in this research, intellectual contributions, and expertise in the area of medical ethics; Dr. Caroline Kerber for graciously allowing me to implement this research; and Helen Cook for all her administrative support and coordination. I am

also extremely appreciative for the opportunity that Dr. Steve Zweig gave me to work on the Donald W. Reynolds Foundation grant, which not only helped me financially but also enabled me to gain experience in conducting programmatic evaluation.

Heartfelt thanks go to Hochun Tseng. This dissertation and degree is as much his as it is mine. He patiently kept me focused whenever I lost perspective and was often more excited about my accomplishments than I was myself. He is my rock, my source of comfort, my best friend, my family.

Special thanks go to a special and dear friend, Brenda Betz. Brenda was always there for me when I needed someone that I could trust and talk to. She kept me sane and helped me overcome moments of frustration as she unwearingly listened to me whine and worry. When needed, she would gently nudge me to finish when I was not sure if I would ever make it to the end. I feel so lucky to have such a genuine friend with a heart of gold.

Further, I would like to recognize a great group of people at the Office of Medical Education (both past and present) including Dr. Rachel Brown, Chris A. Fox, Gina Graves, Peggy Gray, Melissa Griggs, Stacy Hall, Gina Johnson, Christina Martin, Latisha Mayes, Janet Moreland, Suzanne Neff, Jen Rachow, Amy Shumate, and Dee Dee Vincent. It was an extreme pleasure to have worked in such a warm and friendly environment and be surrounded by such wonderful people everyday. I only hope that they continue to enjoy Chipotle lunches and think of me when they are.

My acknowledgement is also extended to my fellow colleagues in SISLT, who I feel fortunate to have gone through this journey of pursuing doctoral degree with: Moon-Heum Cho, Bosung Kim, Pei-Ju Liu, Hsinyi Peng, I-Chun Tsai, and Chia-Chi Yang. I am also thankful for my fabulous friends in Taiwan: Cathy Kuo, Mei-Huei Lau, and Jamic Ruan.

Above all, deep appreciation goes to my mom, Mei-Na Ja, and two younger brothers Wei-Chung (John) Lu and Wei-Jian (Jimmy) Lu for their unconditional love and endless encouragement through the years. I will especially be forever grateful for the sacrifices that my father, Wei-Lin Lu, made for us. I know he is watching over our family from heaven.

UNDERSTANDING THE EFFECT OF COMPUTER-SUPPORTED, CASE-BASED INSTRUCTION ON THIRD-YEAR MEDICAL STUDENTS' ETHICAL REASONING

Wei-Hsin Lu
Dr. Julie Caplow, Dissertation Supervisor

ABSTRACT

The major focus of this study was to determine whether or not providing third-year medical students with example videos that exhibit experts' ethical reasoning and with opportunities to engage in online asynchronous ethical case discussions would stimulate change and improvement in students' ethical reasoning. It was speculated that the medical students would be able to reflect on both their own reasoning and others' reasoning and thus develop complexity in how they reason. In this study ethical reasoning consisted of four components: (1) identification of ethical issues (ethical sensitivity); (2) adoption of multiple viewpoints (ethical viewpoint); (3) resolution of ethical dilemmas (ethical options); and, (4) justification of decisions and actions (ethical justification).

In addition to examining the effectiveness of the instructional activities, the impact of the ethics curriculum on students' perception of the relevance and effectiveness of medical ethics teaching on their ability to handle ethical issues in daily clinical practice was also examined. Finally, another aim of this study was to understand how medical students interacted with their peers during online asynchronous ethical case discussions.

ANOVA results did not show any significant difference between the computer-supported, case-based (CSCB) instruction and non computer-supported, case-based (non-CSCB) instruction groups on the four sub-scores (ethical sensitivity,

ethical viewpoint, ethical options, and ethical justification) from the pre-test to post-test. Results revealed, however, a significant increase on participants' perception of their ability to deal with ethical issues in clinical settings after the ethics curriculum in the Internal Medicine clerkship rotation. Two levels of content analyses using pre-determined coding schemes were applied in order to identify interaction patterns in the online asynchronous ethical case discussions.

LIST OF ILLUSTRATIONS

Figure	Page
1 Snapshot of Case Overview Video Clip	79
2 Snapshot of Case Expert Panel Discussion Video Clip	79
3 Comparison of Ethical Sensitivity Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)	112
4 Comparison of Ethical Viewpoint Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)	114
5 Comparison of Ethical Options Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)	117
6 Comparison of Ethical Justification Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)	119
7 Frequency Distribution of Triggers Across Online Asynchronous Ethical Case Discussions	126
8 Frequency Distribution of Triggers Across Discussion Groups	126
9 Frequency Distribution of Interaction Phases Across Online Asynchronous Ethical Case Discussions	130
10 Frequency Distribution of Interaction Phases Across Discussion Groups	130
11 Sample Discourse Map of Case B (Medication Error by a Student Physician) Online Asynchronous Ethical Case Discussion	132

LIST OF TABLES

Table	Page
1 Kohlberg's Six Stages of Moral Development	23
2 Kohlberg's Three Levels of Moral Development, Concepts of Justice and Moral Orientation, and Foundations for Moral Reasoning	25
3 Summary of Related Research on Educational Interventions in the Health Professions to Enhance Moral and Ethical Reasoning	50
4 Research Questions, Research Design, Data Sources, and Data Analyses	60
5 Nonequivalent Pretest-Posttest Control Group Design	63
6 Vignette Case Scenarios	70
7 Overview of Possible Score on the Vignettes	72
8 Overview of the Ethics Curriculum in an Internal Medicine Clerkship Rotation Block for both Treatment Groups	84
9 Intercorrelations among Ethical Sensitivity, Ethical Viewpoint, Ethical Options, and Ethical Justification Sub-scales	87
10 Interaction Analysis Model (IAM) by Gunawardena et al. (1997, p. 414)	91
11 Association between the IAM and Operational Transactive Statements .	92
12 Selected Examples of Coded Discussion Board Content from the Pilot Study using the Coding Scheme	94
13 Overview of Discussion Board Data Analyses Procedures, Purposes, and Results	99
14 Descriptive Characteristics of the Research Participants	105
15 Means and Standard Deviations for Ethical Reasoning Total Score and Sub-scale Scores on the Pre-test and Post-test Measures	109
16 Means and Standard Deviations for Ethical Viewpoint Sub-scale Scores on the Pre-test and Post-test Measures, and Summary of ANOVA Results for Group-by-Time Interaction per Vignette Case	115

17	Frequency of Discussion Board Messages Posted to the Online Asynchronous Ethical Case Discussion Forums by Discussion Group . .	123
18	Frequency and Percentage of Expert and Peer Triggers in Online Asynchronous Ethical Case Discussions by Discussion Group	125
19	Frequency and Percentage of Interaction Phases in Online Asynchronous Ethical Case Discussions by Discussion Group	128
20	Thematic Content from Ethical Case Discussions	133
21	Major Types of Interaction Patterns in Online Asynchronous Ethical Case Discussions	134
22	Frequency of Interaction Patterns in Online Asynchronous Ethical Case Discussions	139
E1	Example Scoring Results for Case A	188
E2	Summary of Inter-rater Reliability Results	189
J1	Summary of Responses to Survey Question: “The expert-reasoning example videos are presented in a way, which could assist the learner in considering the following . . .” ($N = 3$)	203
K1	Means, Standard Deviations of Pre- and Post-Survey Items, and Summary of Paired-samples <i>t</i> -test by Treatment Group	205

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
ABSTRACT	iv
LIST OF ILLUSTRATIONS	vi
LIST OF TABLES	viii
CHAPTER 1. INTRODUCTION	1
Rationale for the Study	2
Background	7
Moral and Ethical Decision Making and Cognitive Moral Development	7
Moral and Ethics Education in the Medical Profession	9
Approaches to the Teaching and Learning of Moral and Ethical Reasoning	12
Purpose of the Study	16
Research Questions and Hypotheses	17
Assumptions	19
Significance of the Study	20
Chapter Summary	21
CHAPTER 2. REVIEW OF THE LITERATURE	22
Moral Development and Moral Reasoning	22
Kohlberg's Cognitive Moral Development Theory	22
Gilligan's Care-Oriented Moral Reasoning	27
Rest's Four Component Model of Moral Behavior	29
Measuring Moral Development and Limitations of Existing Instruments	30
Theories of Ethics	32
Deontological Ethics and Teleological/Utilitarian Ethics	32
Descriptive Ethics, Normative Ethics, and Metaethics	33
Professional Ethics and Medical Ethics	34
Approaches to Medical Ethics Teaching and Medical Ethics Education ...	35
Theoretical and Pedagogical Frameworks for Promoting Moral Development and Ethical Reasoning	40
Cognitive and Social Disequilibrium	40
Cognitive Flexibility Theory	41
Cases and Case-based Instruction	42

Related Research on Educational Interventions to Enhance Moral and Ethical Reasoning	46
Computer-supported Instructional Approaches in Medical Education	52
Online Asynchronous Learning and Interaction	52
Instructional Use of Videos	53
CHAPTER 3. RESEARCH METHODS	57
Participants	62
Research Design and Rationale	62
Context of the Study	65
Role of the Researcher	66
Pilot Study	67
Instruments	68
Vignettes	68
Self-Report Surveys	75
Semi-structured Group Interview Protocol	77
Treatments	78
Expert-Reasoning Example Videos	78
Online Asynchronous Discussion Board Forums	80
Data Collection	83
Experimental (CSCB instruction) Group	83
Control (non-CSCB instruction) Group	85
Data Analyses	86
Quantitative Data Analysis	86
Analysis of the Discussion Board Content	88
Analysis of the Group Interview	100
Limitations of the Study.	101
Protection of Human Subjects	102
Chapter Summary	103
CHAPTER 4. RESULTS AND FINDINGS	104
Preparing the Data and Preliminary Analyses	105
Comparison of Experimental (CSCB instruction) Group and Control (non-CSCB instruction) Group Participants' Ethical Reasoning Scores at Pre-Test	106
Data Analyses and Results	107
Research Question 1	107

Research Question 2	120
Research Question 3	122
Interaction Patterns in Online Asynchronous Ethical Case Discussions	131
Chapter Summary	139
CHAPTER 5. DISCUSSION	141
Summary of the Study	141
Purposes	141
Procedures	142
Overview of the Findings	143
Discussion of the Findings and Implications	145
Computer-supported, Case-based Instruction and Medical Students’ Ethical Reasoning	145
An Online Asynchronous Ethical Case Discussion: Blowing the whistle, is it worth it?	154
Study Limitations	156
Recommendations for Future Research	159
Conclusion	162
REFERENCES	164
APPENDIX	177
A. Ethics Workup	177
B. Instructions for the Ethics Curriculum in the Internal Medicine Clerkship	179
C. Sample Vignette	182
D. Sample Vignette Scoring Scheme	184
E. Inter-rater Reliability Results	187
F. Pre-Survey	190
G. Post-Survey	193
H. Medical Ethics Curriculum in the Internal Medicine Clerkship Group Interview Protocol	196
I. Release of Information Form	199
J. Video Content Evaluation Form and Results	201
K. Pre-Survey and Post-Survey Results	204
VITA	206

UNDERSTANDING THE EFFECT OF COMPUTER-SUPPORTED, CASE-BASED INSTRUCTION ON THIRD-YEAR MEDICAL STUDENTS' ETHICAL REASONING

Wei-Hsin Lu
Dr. Julie Caplow, Dissertation Supervisor

CHAPTER 1

INTRODUCTION

Making medical decisions includes not only technical considerations but also moral considerations (Savulescu, Crisp, Fulford, & Hope, 1999). Singer, Pellegrino, and Siegler (2001) maintained that in order to improve the quality of patient care, physicians must have the ability to identify, analyze, and resolve ethical problems that are inherent in the day-to-day operations of clinical practice. One of the important goals of medical education is to develop physicians who are able to provide ethically sensitive, morally justifiable care (Forrow, Arnold, & Frader, 1991; Grundstein-Amado, 1991). Extant literature, however, has suggested that ethical sensitivity and moral reasoning decreases as medical students matriculate through medical school and training (Crandall, Volk, & Loemker, 1993; Feudtner, Christakis, & Christakis, 1994; Goldie, 2004; Hebert, Meslin, & Dunn, 1992; Patenaude, Niyonsenga, & Fafard, 2003; Self & Baldwin, 1998; Self, Baldwin, & Wolinsky, 1996; Self, Schrader, Baldwin, & Wolinsky, 1991; Shorr, Hayes, & Finnerty, 1994; Sulmasy, Geller, Levine, & Faden, 1990). Meanwhile, rapid technological advances, especially in biotechnology, and rapid social change have created an increasing number of exceedingly difficult ethical dilemmas, within both the society and the medical profession, that have caused great uncertainty regarding moral or ethical courses of

action (Angelos, DaRosa, Derossis, & Kim, 1999; Hattab, 2004; The Hastings Center, 1980).

Rationale for the Study

Ethical competence is more than just accumulating and applying knowledge of ethical theories and principles in clinical settings (Myser, Kerridge, & Mitchell, 1995a); it is also the ability to solve ethical dilemmas through independent reasoning grounded in considered deliberation (Christie, Bowen, & Paarmann, 2003). According to Benjamin and Curtis (1992) ethical deliberation addresses the question “What, all things considered, ought to be done in a given situation?” (p. 9). Rest (1994) claimed that some people have difficulty in handling moral or ethical situations because they lack the adequate conceptual tools “for making sense out of the world and deriving guides for decision making” (p. 16). For example, saying that ‘abortion is wrong’ is a moral statement, whereas considering the ethics of abortion will lead to questions and issues such as whether the termination of a fetus is morally equivalent to killing a human being?; at what point does a fetus become a human being?; and how do we define ‘a human being’? Such issues require reasoning and reflection on ethical theories and principles that underpin our moral dispositions (Brigley, 2006). Therefore, in order for medical students to make sense of and resolve difficult moral and ethical dilemmas, they must possess the adequate ethical reasoning skills (i.e., conceptual tools) that will guide them in the decision making process. Moreover, students need to be able to identify and integrate information that is relevant to the ethical situation including highly abstract moral principles as well as pertinent factual details. Hence, the challenge in teaching medical ethics is how to support medical students in developing such skills and sensitivities. Given this need, the main purpose of this investigation was to study the effects of instructional activities in a technology-based

learning environment where the promoting of ethical reasoning was a skill necessary for clinical decision-making processes.

Formal education in medical ethics has become a standard component of medical education in the United States for decades (Fox, Arnold, & Brody, 1995). During the preclinical years of medical school, students are generally taught the theories, principles, and concepts of medical ethics (Fox et al., 1995). A common criticism about teaching medical ethics in the preclinical years, however, is that this field of study often deals with issues that medical students neither have experienced nor therefore fully appreciate (Redmon, 1989).

Research has revealed that, as students enter the clinical years and begin their clerkship rotations, they experience considerable difficulty in using what they know about medical ethics to help them make competent ethical decisions in their daily clinical practice (Myser, Kerridge, & Mitchell, 1995b; Pellegrino, Hart, Henderson, Loeb, & Edwards, 1985). There are several possible reasons that contribute to this phenomenon. First, while on the wards, medical students have direct contact with real patients during which they must not only deal with new and difficult experiences, but also respond in ways that are not intuitive for them (Roberts & Fincher, 1997). Further, they need to balance the differing values among patients, other healthcare professionals, and themselves. All these responsibilities affect clinical ethical analyses and decision-making (Mitchell, Myser, & Kerridge, 1993). To compound this situation, medical students are usually away from their peers and faculty instructors, and often experience moral and ethical dilemmas in isolation. Owing to the limited opportunities for discussion, it is likely that timely feedback, comments, and suggestions regarding medical students' ethics-based questions and concerns will remain unanswered or overlooked (Gross, 2001).

Finally, when medical students are on their clerkship rotations, they are often overwhelmed with the clinical work involved and have little time or energy to reflect on medical ethics or to enhance their ethical reasoning skills (Siegler, 1978). As students seldom have opportunities for questions, interactions, or reflection (Bickel, 1991; Coulehan & Williams, 2003; Feudtner & Christakis, 1994), the challenge of adapting to the clinical world becomes even more difficult (Christakis & Feudtner, 1993). More important, since researchers have found that learning by practice without a reflective component does not promote psychological growth (Sprinthall, 1994), the lack of opportunities for reflection in most medical students' training is a cause for concern (Branch, 2000).

This scenario has become a growing concern for medical educators, particularly as standards for medical schools—set forth by the Liaison Committee on Medical Education (LCME), a nationally recognized accrediting authority for medical education—mandated that “medical schools must teach medical ethics and human values, and require its students to exhibit scrupulous ethical principles in caring for patients, and in relating to patients’ families and to others involved in patient care” (ED-23 standard; LCME, 2006).

A common approach in teaching medical ethics in clinical settings is to have medical students observe role models such as faculty physicians who are on the wards (Hafferty & Franks, 1994; Roberts & Fincher, 1997) or engage in informal “hallway” discussions after a difficult case about what could have been done differently (Smith, Fryer-Edwards, Diekema, & Braddock, 2004). This approach supports educational theorists’ decades of emphasis on the importance of situating instruction in meaningful contexts insofar as this type of instruction provides medical students with opportunities for apprenticeship learning (Williams, 1992). Nevertheless, this primary

means of teaching medical ethics has exhibited insufficient effects due to minimal individualized or predictable interaction between practicing physicians and students, and due to practicing physicians' lack of emphasis on the discussion of ethics with students (Bulger & Reiser, 1993; Burack, Irby, Carline, Root, & Larsen, 1999; Strong, Connelly, & Forrow, 1992). In addition, it is reported that students sometimes do not agree with the ways in which residents or attending physicians handle patient cases, but they often hesitate to say anything or ask critical questions for fear of either creating a negative image of themselves among senior team members or adversely affecting their grades (Branch, 2000; Huijter, van Leeuwen, Boenik, & Kimsma, 2000; Lewin, Olson, Goodman, & Kokotailo, 2004; Redmon, 1989; Roberts & Fincher, 1997; Satterwhite, Satterwhite, & Enarson, 2000). Consequently, there is a need to develop effective models for teaching medical ethics—models in which students can observe, reflect, and comment on the reasoning processes of practicing physicians in response to moral and ethical dilemmas without fear of possible negative consequences (Singer, Pellegrino, & Siegler, 2001).

Small group moral dilemma case discussions have been another widely used method in medical ethics teaching and have been shown to enhance the moral development (Latif, 1999, 2000), the moral reasoning (Self, Olivarez, & Baldwin, 1998a), and the ethical reasoning skills (Self, Baldwin, & Olivarez, 1993) of medical and other health profession students. Blatt (1969) first introduced the use of peer discussions of controversial moral dilemmas. The purpose of peer discussions was to provide concentrated practice in moral problem solving that is stimulated by challenges to one another's thinking, reexaminations of assumptions, exposure to different viewpoints, construction of arguments, and responses to counterarguments. Theoretically, this method stems from the perspectives of Piaget (1965) and Vygotsky

(1978) that offers evidence that social interaction among peers promotes learning and development. Although there has been published research on the successful outcomes of peer discussions (e.g., Self et al., 1998b; Smith et al., 2004), it appears that we know little about the information accessed, quality, processes, and patterns of peer group interaction during moral dilemma case discussions. Examination of these aspects may help researchers and educators understand more about the potential of this approach in promoting the moral judgment and ethical reasoning of learners in medicine and other health professions. Furthermore, research studies to date have focused on face-to-face learning environments. There have been no studies that indicate whether or not ethical case discussions in online learning environments would be an effective strategy in enhancing moral judgment and ethical reasoning. Computers with Internet access are now common in the clinical environment. As a result, medical students are able to participate in online learning activities with minimal conflict with their clinical responsibilities or distraction from their work as members of a health-care team (Kerfoot et al., 2006). Thus, a better understanding of the effectiveness of online learning activities such as asynchronous, text-based conversations in computer-mediated communication (CMC) and how it contributes to the enhancement of students' ethical reasoning is needed.

Background

Moral and Ethical Decision Making and Cognitive Moral Development

How do people decide what is right or wrong? Although the terms ethics and morals are often used interchangeably in describing how one makes judgments and decisions, they are not identical in meaning (Dufrene & Glosoff, 2004). *Morals* typically refer to societal perspectives of what is right or wrong as a human being, in which morality is viewed not as the internalization of professional values, but the

employing of universal ethical principles such as justice, autonomy, respect for persons, and beneficence (Musick, 1999). *Ethics*, however, are moral principles that individuals or groups adopt and that provide behavioral guidelines for the standard conduct in professional contexts (Corey, Corey, & Callanan, 1998). *Medical ethics* is one of the several areas of professional ethics. It is an applied discipline that assists physicians in identifying, analyzing, and resolving ethical issues in clinical medicine (Jonsen, Siegler, & Winslade, 1998; Rhodes & Cohen, 2003). Further, medical ethics encompasses more than just moral problems; it encompasses value issues that are embedded in the daily interaction between the physician and his or her patient (Barnard, 1985).

The work of cognitive developmental psychologists (e.g., Piaget and Kohlberg) has contributed much to understanding how people make judgments and has rigorously accounted for many differences in people's judgments. Kohlberg's (1976) cognitive moral development model is grounded in Piaget's (1965) stage theories of how children develop both logical reasoning skills and moral reasoning skills. According to Kohlberg (1976), cognitive moral development occurs through invariant hierarchical sequences, where the movement is from lower to higher stages. Identifying six stages, Kohlberg stated that, at each stage, the framing of moral issues corresponds to a different cognitive structure and that, again at each stage; moral judgments correspond to different justifications. As an individual reaches a new stage, he or she is able to think through a moral problem by incorporating higher-order principles and by using more sophisticated reasoning.

Kohlberg (1976) postulated that moral decisions are based on principles of justice, in which "the welfare and order of the total social system or society is the reference point for judging 'fair' or 'right'" (p.32). An individual at the most

sophisticated level of moral development—the principled or post-conventional level—is able to reason on the basis of his or her own internal sense of responsibility (i.e., conscience) and his or her interpretation of what is best for the society. Nevertheless, individuals at the principled level do not necessarily have a higher moral status; rather, they are assumed to have better conceptual tools for making sense of the world and making decisions (Rest, 1994). For example, the decision that “physicians should not perform abortions” may be the same for a 24-year-old medical student and a twelve-year-old child, but the reasoning processes that enable a person to arrive at that decision may significantly differ from one another (Latif, 2000).

One of the most persistent and debatable questions is whether or not the teaching of ethics has an effect on the behaviors of physicians (Pellegrino, 1989a). Over the past two decades, educators in the professions have recognized the importance of ethics instruction in professional education (Bebeau, 2002). While most health educators would concur that an ethics course alone cannot create ethical graduates, ethics courses provide foundational principles and key concepts needed to analyze ethical issues and to think critically in ethical dilemma situations (Christie et al., 2003).

Moral and Ethics Education in the Medical Profession

A major goal of moral education is to enhance students’ capacity for moral reasoning regardless of what their particular set of moral beliefs happens to be (Self, Baldwin, & Wolinsky, 1992). Moral reasoning is based on the principle of justice and refers to the cognitive processes in which an individual engages when making decisions as he or she faces a particular ethical situation (Kohlberg, 1976; Self, Ellison, Saatkamp, & Wild, 2006). In this view, rather than explicitly create sound moral character (Pellegrino, 1989a), the purpose of enhancing moral reasoning is to

develop students' insights and perspectives that are useful in moral reflection (Bulger & Reiser, 1993) and in the rendering of moral judgments (Self & Baldwin, 1994).

The aim of teaching ethics to students is to enable them to resolve personal and professional dilemmas by teaching them theory and analysis (Loewy, 1986). One of the challenges that developing professionals generally face is the need to distinguish among values, morals, and ethics in professional practice (Biggerstaff, 2005). For example, while a professional code of ethics is explicit about saving lives, a physician's personal value of reducing a patient's suffering may influence his or her efforts, thus, causing an ethical dilemma (Rezler, Schwartz, Obenshain, Lamber, Gibson, & Bennahum, 1992). Clinical situations are complex, involving a wide range of medical facts, a multitude of circumstances, and a variety of values. Siegler (1978) and others (e.g., Pellegrino, 1988) have underscored the importance of fostering ethical reasoning, particularly during clerkship rotations, at the patients' bedside, where students are able to observe and appreciate "the nuances and complexities of medical ethical choices" (Pellegrino, 1989a, p. 702) and how ethical deliberation ends in "decision and action" (Pellegrino, 1988, p. 837). Hence, ethical reasoning enables physicians to translate "moral principles and rules into concrete decisions," regardless of the uncertainties and uniqueness of each patient's situation and illness (Pellegrino, 1989b, p. 165).

As students matriculate through medical school, they move through several stages of intellectual and emotional development. Just as medical judgment on technical issues evolves over time, so does ethical judgment (Christakis & Feudtner, 1993). Cognitively, physicians should be "free of emotional prejudices, conscious of the impact of their actions, self-critical of ideas and beliefs, and articulate about values" (Thomasma, 1982, p. 18). It has been reported that third-year medical

students starting clerkship rotations often struggle with technical facts, personal opinions, and personal or professional values and confuse them with reasoned argument and justifiable clinical ethical decision-making (Myser et al., 1995a, 1995b). Hence, one of the reasons for fostering medical students' ethical reasoning skills is so that the students will be able to examine, clarify, and reflect on their own value systems and develop systematic approaches to moral dilemmas rather than approach problems in an ad hoc way (Siegler, 1978). According to Barclay and Elkins (1991), to develop such skills, students should have opportunities for personal discovery and the exploration of one's own values in comparison with other people's values.

There are both critics and supporters regarding formal educational experiences whose purpose is to teach ethics to medical students. One of the concerns that critics (e.g., Culver et al., 1985) have had was whether or not it is too late to teach ethics to young adult medical students, especially because their basic moral characters have already been "formed by the time they enter medical school" (p. 254). Critics continued to argue that because individuals either have solid morality or lack it, not much could be done in the classroom to change this state. Moral development, they debated, has comparatively little to do with formal education, reasoning, and analysis; and more to do with the personal character and strength of conviction acquired in the home or in early childhood—traits that are necessary for a successful translation of personal values into practice (The Hastings Center, 1980). However, Rest (1988, 1994) and other researchers (Leming, 1981; McNeel, 1994; Self, Wolinsky, & Baldwin, 1989) have demonstrated this to be not true, revealing that educational interventions can promote growth in moral judgment and concluded that the cognitive aspects of ethics can be taught.

It has also been questioned (e.g., Hafferty & Franks, 1994) whether or not what

is learned in moral education can translate into clinical ethical behavior. According to Bebeau, Rest, and Narvaez (1999), a person who behaves morally performs psychological processes that consist of four elements: moral sensitivity, moral reasoning, moral motivation, and moral character, which constitute the Four Component Model. Focusing on moral reasoning, Sheehan and colleagues (1980) found a significant correlation between physicians' high moral reasoning and physicians' high levels of clinical performance. Although moral reasoning is only one factor contributing to moral behavior, results from Sheehan and his colleagues' study indicated that moral reasoning itself is an important component of clinical behavior (Sheehan, Husted, Candee, Cook, & Bargen, 1980). Results from several more recent studies in other health professions such as nursing and pharmacy (e.g., Krichbaum, Rowan, Duckett, Ryden, & Savik, 1994; Latif, Berger, Harris, Barker, Felkey, & Pearson, 1998) were similar in that it was found that moral reasoning was a significant predictor of ethical clinical performance. In short, even though engaging in moral reasoning does not guarantee appropriate moral action, there is some connection between the two (Holm, 1997). Therefore, educational interventions should aim to enhance the moral reasoning and the moral judgment of medical students in order to promote ethical clinical practice (Self & Baldwin, 1994).

Approaches to the Teaching and Learning of Moral and Ethical Reasoning

In light of a growing concern about ethics in medical practice, it is important to have a better understanding of the effectiveness of educational efforts to promote medical students' moral and ethical reasoning skills (ABIM Foundation, ACP-ASIM Foundation, & the European Federation of Internal Medicine, 2002). In a meta-analysis of 56 empirical studies of educational interventions designed to stimulate development of moral judgment, Rest and Thoma (1986) found that

participation in peer discussion of controversial moral dilemmas has been one of the most effective approaches in promoting cognitive moral development.

Kohlberg (1976) maintained that by engaging in dilemma discussions, participants are likely to experience cognitive conflict causing cognitive disequilibrium (Piaget, 1965), which stimulates developmental changes in moral reasoning. The development of an individuals' moral judgment, in other words, is a dynamic process involving interaction with others in his or her social environment. Such experiences may enable one to become aware of his or her viewpoints and recognize a conflict between existing viewpoints and alternative viewpoints. As current ways of thinking are challenged and inadequacies are revealed, development toward a more equilibrated stage is stimulated (Walker & Taylor, 1991).

Other researchers have looked at the effect of transactive discussions, which are defined as "reasoning that operates on the reasoning of another" (Berkowitz & Gibbs, 1983, p.402), which is to say, on moral reasoning (Berkowitz, Gibbs, & Broughton, 1980; Berkowitz & Gibbs, 1983). Berkowitz and Gibbs (1983) found that undergraduates who engaged in discussions with higher rates of transactive statements exhibited significant development in their moral reasoning. According to Berkowitz and Gibbs (1983) a transaction is regarded when one discussant extends, paraphrases, refines, completes, criticizes, or requests for justification of another discussants' reasoning. In other words, rather than merely provide consecutive assertions, discussants operated on each other's reasoning where one's own reasoning is confronted with the other's reasoning in an ongoing dialogue (Berkowitz & Gibbs, 1983).

As mentioned earlier, there are seldom opportunities during clerkship rotations for medical students to engage in dilemma discussions and even fewer occasions for

transactive discussions. Nonetheless, researchers have suggested that the nature of the learning activity; such as structuring tasks in ways so that alternative perspectives are possible and can be challenged or developed, should be an important aspect to consider in promoting cognitive development and enhancing reasoning skills (Buchs, Butera, Mugny, & Darnon, 2004).

One avenue for facilitating such activities is the use of videos that capture the analyses and the reasoning processes of experts in response to ethical or moral dilemmas. Based on the principles of cognitive flexibility theory and case-based pedagogy, example videos that exhibit practicing physicians reasoning and the reasoning of other members representing different fields of expertise (i.e., nursing, philosophy) are able to convey additional complexity about the processes of reasoning by presenting different expert viewpoints regarding ethical cases and by stressing the interconnections between related facts and principles (Jacobson & Spiro, 1995). That is, the example videos can capture the cognitive processes such as reasoning and decision making of experts thereby facilitating learning because it makes visible to learners these otherwise invisible mental processes. It has also been suggested that example videos can provide a common reference for discussion and an opportunity for reflection focused on complex issues of the problem (Hewitt, Pedretti, Bencze, Vaillancourt, & Yoon, 2003) such as ethical dilemma cases. By watching example videos, individuals can “operate” not only on their own reasoning on the basis of experts’ ethical reasoning but also on the reasoning attributable to other people who have watched the same example videos. Thus, individuals can construct, or co-construct, new responses to replace initial ones that may have been more intuitive. Yet, there is very little empirical support for the use of video-based pedagogy, and therefore, there is a need to further study its effects (Richardson, 1999), especially in

terms of how it affects thinking and reasoning and how changes in such thinking and reasoning occur.

Additionally, the characteristics of online asynchronous learning environments appear to be ideal for case discussions. Online asynchronous learning environments are based on text-based communication and require additional cognitive efforts in terms of reading and writing. They support students' higher-order learning by allowing exchanges to be in written format, which can be edited and revised for clearer communication as well as preserved and available for review at a later time (Garrison, 2003). According to Garrison (2003), students have the opportunity not only to present, explore, and discuss ethical issues but also to share, challenge, and reflect on their ideas and thoughts. However, more empirical research is needed, especially in terms of how learners interact with each other during ethical case discussions that take place in online asynchronous learning environments and how these interactions affect their ethical reasoning performance as a learning outcome. These two issues were examined in this study.

The major focus of this study was to determine whether or not providing third-year medical students with example videos that exhibit experts' ethical reasoning and with opportunities to engage in online asynchronous ethical case discussions would stimulate change and improvement in the students' ethical reasoning. In this study ethical reasoning consisted of four components: (1) identification of ethical issues (referred to as ethical sensitivity); (2) adoption of multiple viewpoints (referred to as ethical viewpoint); (3) resolution of ethical dilemmas (referred to as ethical options); and, (4) justification of decisions and actions (referred to as ethical justification).

Purpose of the Study

The primary purpose of this was to examine the effectiveness of computer-supported, case-based (CSCB) instruction designed to: (1) increase medical students' sensitivities to ethical issues in making clinical decisions, (2) generate medical students' alternative viewpoints and to offer students opportunities to examine their own thinking compared to others' thinking; and, (3) enhance medical students' ethical analytical skills that include resolving ethical dilemmas and justifying one's own decisions and actions (Pellegrino, 1989a). The CSCB instruction included: (1) observation of videos of experts' reasoning regarding clinical cases with ethical considerations (referred to as expert-reasoning example videos); and (2) participation in online asynchronous ethical dilemma case discussions (referred to as online asynchronous ethical case discussions).

In addition to examining the effectiveness of the instructional activities, the researcher of this study was also interested in examining the influence of the ethics curriculum on students' perception of the relevance and effectiveness of medical ethics teaching on their ability to handle ethical issues in daily clinical practice. In other words, based on the medical ethics training they received, how prepared did they feel in being able to deal with ethical issues in clinical settings? In previous studies, it was indicated that medical students who were dissatisfied with their own ethical environment and competence would 'erode' in their ethical self-identities, which would thus hinder their ethical development (Feudtner et al., 1994). Conversely, other research has indicated that positive attitudes toward ethics training improve beneficial outcomes of educational innovations (Roberts, Hammond, Geppert, & Warner, 2004). For instance, positive views of the quality of their ethics training were significantly correlated with house officers' (i.e., resident physicians and surgeons of a

hospital) confidence in dealing with ethical conflicts (Sulmasy et al., 1990). In an attempt to prevent ‘ethical erosion’ and promote positive attitudes, it was important to understand what the medical students thought and whether or not the ethics curriculum improved their perceptions of how much their medical ethics training has prepared them to handle ethical issues encountered in their daily medical practices.

Finally, another aim of this study was to understand how medical students interacted with their peers during online asynchronous ethical case discussions, how the quality of their interactions was, and what the patterns of their interactions were.

Research Questions and Hypotheses

It was speculated that observing expert-reasoning example videos followed by online asynchronous ethical case discussions would significantly enhance third-year medical students’ ethical reasoning of hypothetical clinical ethical cases. Three main research questions guided this study:

1. How does the ethical reasoning of third-year medical students who received computer-supported, case-based instruction compare to those of their peers who did not? Specifically,
 - (1a) Do participants who observed expert-reasoning example videos and who participated in online asynchronous ethical case discussions identify more ethical issues in hypothetical clinical ethical cases than participants who did not?

Hypothesis 1a: The CSCB instruction will have a significant effect on participants’ ability to identify ethical issues in hypothetical clinical ethical cases (i.e., ethical sensitivity). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical sensitivity as measured by the pre- and post-test vignettes than will the

non-CSCB instruction group.

- (1b) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions adopt more perspectives in hypothetical clinical ethical cases than participants who did not?

Hypothesis 1b: The CSCB instruction will have a significant effect on participants' ability to adopt perspectives in hypothetical clinical ethical cases (i.e., ethical viewpoint). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical viewpoint as measured by the pre- and post-test vignettes than will the non-CSCB instruction group.

- (1c) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions recognize more options in hypothetical clinical ethical cases than participants who did not?

Hypothesis 1c: The CSCB instruction will have a significant effect on participants' ability to recognize options in hypothetical clinical ethical cases (i.e., ethical options). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical options as measured by the pre- and post-test vignettes than will the non-CSCB instruction group.

- (1d) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions provide more justification for their ethical decisions in hypothetical clinical ethical cases than participants who did not?

Hypothesis 1d: The CSCB instruction will have a significant effect on participants' ability to provide justification for their ethical decisions in hypothetical clinical ethical cases (i.e., ethical justification). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical justification as measured by the pre- and post-test vignettes than will the non-CSCB instruction group.

2. Is there a difference in third-year medical students' perception of preparedness to deal with ethical issues in clinical settings before and after the medical ethics curriculum in the Internal Medicine clerkship rotation?

Hypothesis 2: The medical ethics curriculum in the Internal Medicine clerkship rotation will improve students' ratings of their own ability to deal with ethical issues in clinical settings as measured by the pre- and post-surveys.

3. How were third-year medical students' who participated in online asynchronous ethical case discussions able to 'operate on' the reasoning of others and to what extent does that affect their ethical reasoning of hypothetical clinical ethical cases? Specifically, what were the amount and patterns of interaction in the online asynchronous ethical case discussions regarding hypothetical clinical cases with ethical considerations?

Assumptions

In this study it was assumed that the participants were at the post-conventional level of Kohlberg's theory of cognitive moral development. In other words, the participants were activating similar moral schemas when considering moral or ethical issues. Thus, differences in solutions and/or decisions were based on varying ethical reasoning skills and not because of significant differences in the level of moral

development. This assumption was supported by studies that looked at the relationship of formal education to moral development. It was concluded that formal education, especially college education, fosters post-conventional moral reasoning and growth in thinking (King & Mayhew, 2002; Rest & Thoma, 1986; Rogers, 2002). Additionally, Kohlberg postulated that higher stages of moral development, such as stages 4 or 5 do not become prevalent until individuals are in their 20s (Colby, Kohlberg, Gibbs, & Lieberman, 1983). Therefore, since the participants in this study were all young adult postgraduates, it was assumed that their moral reasoning were at the post-conventional level. It was also assumed that responses to the surveys can be used to explain the participants' perceptions of preparedness to deal with ethical issues in clinical settings. Finally, it was assumed that the participants would be honest when asked to complete the self-report pre- and post-surveys.

Significance of the Study

While on the wards, medical students often experience or observe ethical dilemmas but have little or no opportunity for related discussion with others. Through the use of technology, ways can be created in which students, during their clerkship rotations, are able to receive and to contribute comments and feedback on common clinical ethical dilemmas and are able to do so in an accessible and timely fashion. This study was significant in that findings generated from this research illuminated possible technology-based instruction and tools that medical educators can use to promote the clinical ethical reasoning skills of medical students. In addition, findings from this study provided a descriptive model that depicted how medical students engaged in and reasoned on the reasoning of others during ethical case discussions that will add to the existing knowledge about the importance of peer discussion in the development of ethical reasoning skills.

Chapter Summary

In acknowledging the limitations of both teaching in real clinical settings and the various technological resources that are currently available for educational purposes, Singer, Pellegrino, and Siegler (2001) suggested that technology-based teaching modules for medical ethics that facilitate self-directed learning should be incorporated into the curricula. This chapter stated the current problem in teaching medical ethics and described the purposes and research questions of this study that addressed the need to investigate the efficacy of teaching clinical ethics using technology-based instructional interventions.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter begins with a review of the literature on the theories of moral development and moral reasoning. These theories provide a framework for understanding the principles on which ethical decisions are based. As ethics is a field of philosophy, the philosophical theories of ethics is presented, followed by a brief description of ethics in the professions, particularly in medicine. Also, frameworks for promoting moral development and moral reasoning, and related research regarding instructional interventions in promoting moral and ethical reasoning is reviewed as well as an examination of the attributes of alternative, computer-supported instructional approaches.

Moral Development and Moral Reasoning

A considerable amount of literature on the moral development of young adults has been based on the work of Kohlberg (1969, 1975), Gilligan (1982), and Rest (1979, 1994). The perspectives and relevant research of each of these researches is discussed below as well as a brief review of moral development theory and synopsis of the research.

Kohlberg's Cognitive Moral Development Theory

Building on Piaget's (1965) earlier work in cognitive development, Kohlberg (1969) proposed his cognitive moral-development theory based on data collected from longitudinal studies of adolescent males. In the studies, hypothetical moral dilemmas were posed to the subjects and they were asked for justifications concerning the behavior of others. The purpose for the studies was not to investigate the content of moral choice (e.g., whether or not to lie in a particular situation) but to understand the

underlying structure or reasons that an individual uses to justify a moral choice (Sheehan et al., 1980). Kohlberg (1969) theorized that there was a developmental progression in the ways people at various ages differentiates between personal needs and those of the conventional society. His findings indicated that cognitive development was a prerequisite for the formulation and understanding of moral concepts. Further, in line with Piaget's notion of stages, Kohlberg (1969) revealed that an individuals' moral development follows a hierarchical continuum of six stages that consists of three levels of morality, each containing two stages (see Table 1 for details).

Table 1

Kohlberg's Six Stages of Moral Development

Stage	Definition and Example
Pre-conventional Level	
Stage 1: Obedience and punishment orientation	What is considered to be right is based on what authority figures say to do, and the reason is for doing it is to avoid punishment. Egocentric point of view. Example: It is less bad to kill an animal than a human because you don't get in as much trouble for doing it.
Stage 2: Instrumental-relativist orientation	What is considered right is what meets one's own need but with a sense of fairness in terms of equal exchange between parties in agreement. Concrete individualistic point of view. Example: The doctor should let the women die because if he were in her place, he'd want to die too.
Conventional Level	
Stage 3: Interpersonal-concordance orientation	What is considered right or good is related to the expectations of the people with whom one is close and of importance to. Mutual expectations, peer relationships, and interpersonal conformity. Example: The doctor should give the woman the drug because he was acting out of good intentions.
Stage 4: Law and order orientation	What is considered right consists of fulfilling one's agreed upon duty, showing respect for authority, and maintaining the given social order for its own sake. Example: The doctor should give the woman the drug if mercy killing is considered legitimate by the legal institutions of society in which the doctor practices.

(table continues)

Table 1 (*continued*)

Stage	Definition and Example
Post-conventional/Principled Level	
Stage 5: Social, contract, legalistic orientation	Right actions tend to be defined in terms of general individual rights and in terms of standards, which have been critically examined and agreed upon by the whole society. It is based upon rational consideration of the best welfare of all humankind. Example: The doctor should give the woman the drug because autonomy in making life decisions ought to be respected as a fundamental right.
Stage 6: Universal ethical principles orientation	What is considered right is based on commitment to universal ethical principles of justice, equality, autonomy, and respect for the dignity of all human beings as individual persons. Although laws and social agreements are usually valid because they are based on these principles, when laws violate these principles, one acts in accordance with the principles.

Note: Adapted from Self, Saatkamp, Ellison, & Wild (2006).

Kohlberg's theory has been influential to understanding how people at different stages of maturity think about social and moral problems. According to Kohlberg (1969), progression between the stages--advancement in moral reasoning--is seen as involving the acquisition, understanding, and use of an increasingly abstract conception of justice as well as greater concern for the welfare of others. In this regard, individuals proceed through the stages in an invariant sequence in which ways of thinking are restructured, encompassing broader perspectives, and integrating the insights achieved at prior stages (Colby & Kohlberg, 1987). What an individual considers to be fair or morally right is based on reasoning that moves from a position that serves one's own self interest (pre-conventional level) to ultimately a conception that serves the society and for the good of the public (post-conventional/principled level). Kohlberg's theory, like Piaget's, focused on moral thought, not behavior and

was believed to be cross-cultural and universal. Table 2 depicts Kohlberg's three levels of moral development and the associated considerations an individual takes into account during moral reasoning.

Table 2

Kohlberg's Three Levels of Moral Development, Concepts of Justice and Moral Orientation, and Foundations for Moral Reasoning

Levels of Moral Development	Concepts of Justice and Moral Orientation	Foundations for Moral Reasoning
Pre-conventional	Self-interest/egocentric: reward and punishment	External authority
Conventional	Societal perspectives: law and order	Social group/Group norm
Post-conventional/Principled	Universal fairness: principles	Inner conscience

Note: Adapted from Thorne (2001).

A considerable body of empirical evidence supported Kohlberg's theory that people proceed through the stages in an invariant sequence as they mature. Although Kohlberg and Turiel (1973) claimed that stages five and six are reached during adulthood, the ages at which individuals reach the different stages still varies depending on the person's culture and personal experiences (Zeidler & Keefer, 2003). Kohlberg's original longitudinal study of New England schoolboys (Colby & Kohlberg, 1987); Walker's (1989) longitudinal study of Canadian children and their parents; Nisan's and Kohlberg's (1982) longitudinal study of city and country dwelling Turkish children; and Snarey and colleague's (1985) longitudinal study of Israeli Kibbutz adolescents (Snarey, Reimer, & Kohlberg, 1985) all supported the invariant stage-to-stage sequence proposition, not finding stage-skipping nor statistically significant stage reversals in their results. Additionally, in regards to the

universality of Kohlberg's theory, Edwards (1981) concluded after conducting a review of cross-cultural research on moral judgment that stages one to four were found in all cultures. In regards to stage five, however, it was less commonly found in simple than complex societies (Edwards, 1981). Finally, although stage six exists theoretically, it has rarely been empirically validated (Rest, 1994).

The concept of invariant sequence, however, is not without criticism. It was argued that in reality, people's level of moral judgment fluctuates from situation to situation, in which a person may have a high stage of moral judgment in one situation, but low in another (Rest, 1979). Also, Kohlberg's (1969) postulation that all six stages form 'structured wholes', each of which reflects a specific 'thought organization' has raised questions as well. Especially when it was frequently found that the moral reasoning of some individuals would extend over two or more stages at the same time rather than employ a single organizational structure (Dawson, 2002). Also, Siegler (1997) argued that sometimes an individual's moral judgment levels regresses from higher to the lower levels.

In addition to age, education was also found to be a strong predictor of moral judgment development (Colby et al., 1983). According to Kohlberg (1975) educational settings that especially challenge learners to question their reasoning would thereby guide learners to higher levels of development. Findings from studies showed that development in moral judgment seems to advance dramatically, especially in early adulthood, as long as an individual is in school, and that when an individual discontinues formal education, his or her moral judgment development tends to plateau (Rest, 1994). In a recent review of 172 studies King and Mayhew (2002) investigated the moral development of undergraduate students and found that compared to non-college students, college students were more likely to use

post-conventional moral reasoning. The researchers concluded that there was a positive correlation between formal education and moral development (King & Mayhew, 2002).

Gilligan's Care-Oriented Moral Reasoning

In response to Kohlberg's theory that holds the principle of justice to be the highest form of morality, Gilligan (1982) emphasized the importance of "connection, care, and response" (p.8) in morality. Criticizing the absence of women samples in the work from which Kohlberg had developed his theory upon, Gilligan (1982) argued that women's ways of conceptualizing morality are different than men; therefore, they approach ethical dilemmas with a different logic. Gilligan's (1982) investigations of women experiencing the dilemma of abortion and resulted in her conclusion that 'a different voice' had guided their moral action and judgments. Importantly, Gilligan did not deny that women understood the meaning of moral rules and principles nor question the development of the concept of justice in their thinking; instead she suggested that women and men differed in "their approach to conflict resolution—that is, their *use* [italics added] rather than their understanding of the logic of rules and justice" (1987, p.22). Thus, Gilligan (1982) claimed that when using Kohlberg's theory, women would have difficulty progressing past stage three of cognitive moral development due to their greater commitment to the care of others compared to adhering to the principles justice and equality.

Supporters of Gilligan's view further expressed concern that morality depending on only justice will promote impartiality, which can develop into aloofness and indifference (Carse, 1991). Even so, empirical studies have revealed that there was no significant difference between men and women in their moral reasoning (Rest, 1994). Bussey and Maughan (1982) explored whether or not socialization into different sex

roles for men and women may contribute the sex difference in moral development. Using Bern's Sex-Role Inventory (BSRI), 40 adult students were classified as masculine, feminine or androgynous and were then administered with Kohlberg's Moral Judgment Interview (MJ) (1977). Also, the sex of the central characters in Kohlberg's dilemma stories featured in the MJ was varied as compared to the all males presented in the original stories. It was found that the subjects' moral reasoning did not differ according to their sex role classification.

Ford and Lowery (1986) examined the adequacy of Kohlberg's cognitive moral development theory as a representation of female moral reasoning. A sample of 202 undergraduates filled out a self-report questionnaire on moral dilemmas they had experienced. They then rated their use of both justice and care orientations in resolving those dilemmas. The use of the two orientations was examined in relationship to subject gender, sex role, and perceptions of the two orientations. Few significant differences were obtained except that female subjects were more consistent in their use of a care orientation, and that male subjects were more consistent in their use of a justice orientation, and more feminine males were more likely to report the use of a care orientation than less feminine males. Although this study did provide some support for Gilligan's assertions that females are more attuned to issues of care in moral conflicts and males more attuned to issues of justice. However, it also supported the conclusion that the realm of care is neither an exclusively female realm nor justice an exclusively male realm.

In fact, a number of studies (e.g., Latif & Berger, 1997; Self & Olivarez, 1993; Self, Olivarez, & Baldwin, 1998a) conducted with health care professionals have indicated that women scored significantly higher than men on moral reasoning. Despite these inconsistent results, Gilligan's work has raised thoughtful questions in

regards to the ways in which differences—gender, as well as race and culture—shape and influence processes of moral development (Tappan, 1997). Consequently many scholars today perceive both moral orientations—justice and care—to be complimentary (Gilligan, 1988; Parker, 1990; Rest, 1994).

Rest's Four Component Model of Moral Behavior

Extending on Kohlberg's initial work, Rest and Narvaez (1994) proposed the Four Component Model of morality, which describes the four distinct psychological processes that are required for an individual to behave morally. Each component is summarized as follows (Lewin et al., 2004):

- (a) Moral sensitivity: interpreting the situation in terms of how people's welfare is affected by our actions. In other words, the lack of empathy or skill in interpreting social situations may cause failure to act morally.
- (b) Moral judgment: judging which of the available course of actions is most justified. In order to decide on a justifiable decision or response to a moral or ethical issue, one must consider how other people would be affected by each existing decision or action.
- (c) Moral motivation: prioritizing the moral value over other significant concerns. An individual may fail to give appropriate priority to moral values in comparison with other considerations such as convenience, self-preservation, or allegiance to others in the healthcare team.
- (d) Moral character: being able to construct and implement actions that service the moral choice. Individuals must also possess the perseverance and character to carry out their moral decisions.

Rest (1994) stated that “[M]oral failure can occur because of deficiency in any component. All four components are determinants of moral action” (p.24). Further, an

individual does not perform the four components sequentially or independently, rather “there are complex interactions among the four components”, in which they “comprise a logical analysis of what it takes to behave morally” (p.24). This model allows for circumstances to exist in which an individual may have sufficient judgment to the right course of action but lack moral character or moral motivation to carry through with the decision or action.

Lapsley (1996) concluded that multi-process models, such as Rest’s Four Component Model, is necessary for understanding the reasons for moral failing and therefore provided useful guidelines for the design of moral education programs, curricula, and educational experiences. As a result, the four components can be converted into criteria for evaluating moral education interventions using measurements designed to evaluate student competence in each of the four components (Bebeau, Rest, & Narvaez, 1999).

Measuring Moral Development and Limitations of Existing Instruments

Most researchers interested in medical ethics have relied on instruments that indirectly measure clinical ethical reasoning abilities such as the Moral Judgment Interview (MJI) developed by Kohlberg (1976) and the Defining Issues Test (DIT) developed by Rest (1979). The MJI is a semi-structured interview that consists of hypothetical situations in which respondents are asked to resolve three moral dilemmas. Each dilemma is followed by a systematic set of open-ended probe questions designed to determine the respondent’s underlying reasoning for specific decisions. This process is designed to require the respondent to explain his or her moral reasoning logically and coherently. To calculate the score, the judgments and justifications given by the respondent are matched with criterion judgments provided in the scoring manual. Scoring yields an overall score, that is a continuous measure of

moral maturity; and a score that reflects the subject's stage of moral reasoning. In terms of reliability, however, the MJJ is sensitive to the skill of the person responsible for scoring the respondent's reply, and therefore has proven to be labor intensive, as it requires the scorers to have training that will enable them to perform it adequately.

Using Kohlberg's (1976) method of presenting individuals with hypothetical moral dilemmas but in written format instead, Rest (1979) developed the Defining Issues Test (DIT). The DIT consists of six hypothetical dilemmas followed by 12 statements for each dilemma. The respondent first rates each statement on a five-point scale and then ranks them from "unimportant" to "important" to resolving the issue at hand. The ranking of items determines a principle score (i.e., P index) that corresponds to the respondent's stage of moral development. The DIT is concerned with how individuals at different cognitive moral development stages select in rank order different statements to represent its importance in resolving a moral dilemma (Trevino, 1986). A high P index score indicates that the individual gives more importance to principled considerations (Stages 5 and 6). Used in research for more than twenty years and in over 1000 studies, the validity of the DIT is well documented (Rest, Narvaez, Bebeau, & Thoma, 1999). Reported test-retest reliabilities have been in the upper .70s or .80s and Cronbach's alpha index of internal consistency has been reported to be in the upper .70s (Rest, 1979). It has also been used to assess moral education programs for a variety of professional groups such as medicine, dentistry, nursing, teaching, and accountancy.

A concern about the widely used DIT is that because respondents are asked to rank order existing lists of predefined answers to ethical issues, they are prompted to think about ethical issues which they may not otherwise have done; thus providing little information regarding what their own thinking of what the ethical issues are

(McAlpine, Kristjanson, & Porocho, 1997). Another limitation of the DIT is that it uses generic moral judgment scenarios, not professional scenarios; therefore, it does not call for professional decisions nor does it measure ethical values explicitly. In fact, Rest (1986) encouraged researchers to develop real-life moral dilemmas in each professional field and to develop profession-specific ethical measures. An updated DIT instrument (e.g., DIT-2) has been developed and published recently (Bebeau & Thoma, 2003). The DIT-2 consists of fewer, updated scenarios but has limited field-testing and validity studies.

Theories of Ethics

Deontological Ethics and Teleological/Utilitarian Ethics

There are two main theories of ethics that are concerned with the determination of right and wrong actions. Deontology, formulated by Kant (1742-1804), in its purest form, “holds that an individual should perform duties without exception, whatever the consequences” (Seedhouse, 1998, p.114). Deontological ethics focuses on the intrinsic values that determine our actions (Benn & Boyd, 1996). These values, formulated as rules for human behavior, should hold under all circumstances. Specifically, an individual would not choose to adhere by the rules under some circumstances and disregard them under others (Mattison, 2000). Thus, the golden rule ‘Do to others as you would have them do to you’ serves as a general guideline. A limitation of the deontological position is that its application is sometimes impractical. There will be inevitable occasions when it would be better not to follow the rules. Furthermore, disregarding the consequences of our actions is contradictory to what it means to do ethics (Gibson, 1993).

Utilitarianism, developed by Mill (1863), on the contrary, does not assume that there are naturally right things to do (Seedhouse, 1998). Utilitarian ethics determines

what actions are right or wrong by weighing what the consequences of the actions will be. Therefore, the moral quality of an action does not depend inherently on the action itself but on its ‘utility’ for the benefit of persons; actions that result in greater degrees of good are valued or desired.

Based on the aforementioned descriptions, it is clear that the continuous philosophical debate between the deontologists and utilitarians lies in their disagreement over how particular moral dilemmas should be resolved. In hope to settle the debate, Kohlberg made efforts to incorporate the philosophical view of ethics into the field of psychology. In his elaboration of his moral development theory, Kohlberg (1969) postulated that in stage 5 the conception of justice is associated with utilitarian philosophies in which duty does not arise in its own right but in virtue of serving to promote happiness and human good, whereas stage 6 is a deontological view of ethics in which duties are based on universal ethical principles (Crittenden, 1990). Hence, Kohlberg’s elucidations contributed to an understanding of the applicability and usefulness of philosophical theories to ‘real world’ practice.

Descriptive Ethics, Normative Ethics, and Metaethics

Contemporary philosophy distinguished ethics into three factors that are included in the ethical decision-making process: descriptive ethics, normative ethics, and metaethics (Frankena & Granrose, 1974). Descriptive ethics seeks an accurate, objective account of the actual moral behavior or beliefs of particular individuals or groups and avoids any moral judgment concerning the behavior or belief system being studied. Additionally, descriptive ethics allow students to understand the ethical theories and moral rules of different people, professions and cultures (The Hastings Center, 1980).

Normative ethics addresses questions regarding what is right, wrong, good, and

morally obligatory. Normative judgments support decisions or actions that are morally right and to “harm someone or cause unhappiness” (Colby & Kohlberg, 1987, p.12) is considered to be wrong. Metaethics, on the other hand, addresses questions such as “What is the meaning of the expressions morally right or good?”, “How can ethical judgments be established or justified?”, and “What is morality?” (Colby & Kohlberg, 1987, p.12). From a Piagetian viewpoint, normative ethical thinking is regarded as operational reasoning while metaethical thinking represents reflective reasoning (Colby & Kohlberg, 1987). So, although normative ethics and metaethics are closely interrelated, Kohlberg’s theory of moral development only deals with normative judgments and not with metaethical thinking.

Professional Ethics and Medical Ethics

Bebeau (2002) stated “professional practice is predominantly a moral enterprise” (p.1), implying that the knowledge and skills professionals acquire should be used in practice in appropriate and ethical ways. Professionals must not only possess the willingness to ‘do the right thing’ but they also need to have the ethical tools to be able to ‘do things right’. Professional associations develop codes of conduct, or codes of professional ethics, that help define specific behaviors that are expected of their members in the practice of their discipline.

All codes of conduct addresses issues such as respect, rights, confidentiality, informed consent, competency, professional boundaries, conflict of interest, and honesty (Pettifor, Estay, & Paquet, 2002). In regards to the medical profession, codes of conduct include the American Medical Association's Code of Ethics, the American College of Physicians' Ethics Manual, and the British Medical Association's Handbook of Ethics and Law. Also, all physicians must also pledge to fulfill the Hippocratic Oath, vowing to lead life and practice the profession in uprightness and

with honor.

Medical ethics, an interdisciplinary field that is the intersection of medicine, law, public policy, and individual morals; addresses clinical dilemmas or challenging questions that are increasingly influenced by the rapid advancements of biotechnology and knowledge (Rhodes & Cohen, 2003). According to Pellegrino (1988), in our morally heterogeneous society, medical ethics has become “a public affair” (p. 837), in which physicians are expected to use a more formal and systematic knowledge of ethical analysis and where decisions must be justifiable to the patients, the patients’ families, colleagues, and the legal courts. The main concern of medical ethics education, therefore, is the inculcating of medical professionalism, which involves helping students understand the content as well as the justification of their responsibilities as physicians (Rhodes & Cohen, 2003).

Approaches to Medical Ethics Teaching and Medical Ethics Education

Self (1993) described three approaches to teaching medical ethics: cultural transmission, affective developmental, and cognitive developmental. These approaches are important to understanding how medical ethics teaching is presently being undertaken at various medical schools in the U.S. (Musick, 1999). The cultural transmission approach to medical ethics teaching primarily involves teaching the classical humanities as a part of medical education (e.g., philosophy, history, literature, law, religion and art; Musick, 1999). This approach is very “profession-oriented”, and involves the transmittal of professional oaths, codes of behavior, and professional norms to medical students. According to Self (1993), the cultural transmission approach “stresses the internalization of basic values and knowledge of the culture of medicine and includes various rites of passage” (p.223).

The affective developmental approach, on the other hand, is more concerned

with the teaching of interpersonal communication, stress management, physician burnout and impairment prevention, personal growth and development, and concern with community medicine (Musick, 1999). This approach emphasizes the development of attitudes and behaviors of compassion, sensitivity, and empathy toward patients, colleagues, and oneself (Musick, 1999). It is very “student-centered” in that it focuses primarily on the personal development of the physician, with the belief that if one's self esteem and insight are well developed “then competency of knowledge will be taken care of also” (Self, 1993, p.223).

The cognitive developmental approach differs from the other two approaches primarily on the basis of the educational methods used in medical ethics teaching. This approach is concerned with “the development of logical and critical thinking based on principles as being central and essential to medical education” (Self, 1993, p.223). Also known as “principlism”, this approach focuses on a progression of higher and higher levels of maturity in thinking and reasoning (Musick, 1999).

Since the 1970s, although most medical schools in the United States have incorporated medical ethics into their curricula; there is, however a growing dissatisfaction by the public today with the behavior of practicing physicians in which some claim is due to the lack of influence that medical ethics curricula has on developing medical students’ professional values (Coulehan & Williams, 2003).

Swenson and Rothstein (1994) proposed that in order to produce ethically competent physicians, medical educators must not only teach students to understand and learn from the dilemmas that shape their moral world but also prepare them to respond to those dilemmas appropriately. Specifically, the ethical skills and professional attitudes of physicians are developed in part by the curricula in the preclinical years of medical school as well as through the lived lessons of medical

training during the clinical years (Roberts et al., 2004). Thus, as most medical educators would agree, an ethics course that focuses on the teaching of bioethical theories, concepts and/or important ethical issues alone cannot create ethical physicians (Fox et al., 1995; Hafferty & Franks, 1994). Teaching medical ethics has the same general goals as all teaching in medical schools, for it aims to impart a core of knowledge that can be applied to the problem at hand (Loewy, 1986). Therefore the development of ethical reasoning and decision-making skills are just as relevant to clinical practice as the application of biomedical knowledge to the diagnosis of a patient's problem (Myser et al., 1995a, 1995b).

Miles, Lane, Bickle, Walker, & Cassel (1989) claimed that the consensus regarding the goals of medical ethics education includes the following:

- (a) To teach physicians to recognize the humanistic and ethical aspects of medical careers,
- (b) To enable physicians to examine and affirm their own personal and professional moral commitments,
- (c) To equip physicians with a foundation of philosophical, social, and legal knowledge,
- (d) To enable physicians to employ this knowledge in ethical reasoning, and
- (e) To equip physicians with the interactional skills needed to apply this insight, knowledge, and reasoning to human clinical care.

The conceptual framework most widely used in medical ethics education is that of the Principles of Biomedical Ethics introduced by Beauchamp and Childress (1994) as *prima facie* rules that provides an effective means for addressing ethical dilemmas (Pellegrino, Veatch, & Langan, 1991). *Prima facie* means that each principle is morally binding unless it conflicts with one of the other principles (Benn & Boyd,

1996). The principles consist of the following (Kaldjian, Weir, & Duffy, 2005):

- (a) Respect for the autonomy of persons: the right to choose and follow one's own plans of life. Physicians are obligated to respect a patient's preferences and decisions according to their values and beliefs. Patients with decision-making capacity are presumed to be autonomous, whereas patients who do not have this capacity will require surrogate decision-makers.
- (b) Beneficence: duty to assist persons in need. It is the obligation of the physician to act for (and maximize) what is beneficial to the patient.
- (c) Non-Maleficence: duty to cause no harm. Harm may occur intentionally or from negligence, and may be physical, psychological, social, financial, or spiritual.
- (d) Justice: ethics of fair and equitable distribution of burdens and benefits within a community. Injustice would be when physicians discriminate against persons or groups on the basis of criteria that is generally considered inappropriate (e.g., gender, ethnicity, age, social status, or religious belief).

Gillon (1994) noted that the four principles provide: a common set of moral commitments, a common moral language, and a common set of moral issues to be considered in particular ethical cases.

Coulehan and Williams (2003) pointed out, however, that there is a general and increasing dissatisfaction with the physicians of today and their behavior by the public. They attributed this to the lack of influence that medical ethics curricula have had on medical students and identified several factors as to why (Coulehan & Williams, 2003, p. 14-15):

- (a) Too little: Ethics courses constitute a drop in the curricular bucket and, therefore, they have limited objectives, such as giving a “taste” of end-of-life decision-making.
- (b) Too soon: Ethics courses often take place in the preclinical years, before students are exposed to the powerful, and often opposing, tacit learning in the hospital.
- (c) Too late: In some cases, when reflection on values is postponed until the clinical years, the socialization that has already taken place in medical training makes the students, at best, reluctant learners.
- (d) Too distant: Ethics courses often take place in the classroom rather than the clinic, utilize paper cases rather than real patients, and focus on hard decisions or leading-edge questions rather than the texture of most lived professional lives.
- (e) Too countercultural: The culture of clinical training is often hostile to professional virtue. The tacit value system of the hospital culture is contrary to the explicit value system that the student learned in ethics and humanities courses. The tacit value system is so potent in forming the trainee’s view of doctoring that ethics curricula are irrelevant unless they can produce a substantive and continuing impact on hospital culture.

Therefore the challenges that medical educators face today are how to increase students’ sensitivities to the moral issues in making clinical decisions, teach the skills of clinical ethical analysis, and help students clarify their own ethical beliefs (Pellegrino et al., 1985).

Theoretical and Pedagogical Frameworks for Promoting Moral Development and Ethical Reasoning

Cognitive and Social Disequilibrium

Proponents of the cognitive developmental approach (e.g., Kohlberg, 1969) inspired by the work of Piaget believed that moral development results from personal experience that includes confronting difficult moral decision-making situations, endorsing a position and thinking about reasons for selecting that position, and hearing the reasoning used by others on the same moral problem (Galbraith & Jones, 1976). Kohlberg (1976) maintained that environments ideal for stimulating growth in moral reasoning provide opportunities for individuals to learn to see things from perspectives different than their own. In these environments, individuals experience cognitive disequilibrium, the key factor that leads to the development of moral reasoning. In the same vein, Rest (1986) stated, “changes in one’s cognition come from experiences that do not fit one’s earlier (and simpler) conceptions” (p.32). Thus, cognitive disequilibrium is responsible for internal adjustments and developmental changes.

One of the most well-known intervention strategies in experimental studies of moral development is the “plus one” method where an individual is exposed to reasoning that is one stage higher than his or her own stage (Turiel, 1966; Walker, 1983). The underlying assumption of this method is that, as an individual recognizes the inadequacies of his or her current stage of reasoning, it will generate internal structural disequilibrium, in which he or she will then move on to the next stage of development. However, this technique has been deemed questionable (Berkowitz & Gibbs, 1983), as empirical studies have found that individuals at the same cognitive level have shown progress after being involved in confrontations with one another

(Doise & Mugny, 1979) and that essentially the more intense the social conflicts are, the greater it is their progress in cognitive development.

Developmental social psychologists, on the other hand, have emphasized the social nature in which cognitive disequilibrium is facilitated and proposed that in addition to a presentation of alternative viewpoints, confrontational sociocognitive conflict (i.e., a dynamic, social opposition between opinions or levels of reasoning of different individuals) must exist in order for cognitive development to occur (Doise, Mugny, & Perez, 1998; Levine, Resnick, & Higgins, 1993; Roy & Howe, 1990; Webb & Palincsar, 1996). This perspective is based on Vygotsky's (1986) assertion that true direction of the development of one's thinking "is not from the individual to the social, but from the social to the individual" (Tappan, 1997, p.81). The key to Vygotsky's theory is based on his postulation of the zone of proximal development, which refers to an individual's potential range for learning and development. Vygotsky theorized that peer interaction not only initiates change, but shapes the nature of change as well, as peers internalize cognitive processes that are implicit in interactions and communication with others (Tappen, 1997). Nevertheless, both perspectives (i.e., those of Piaget and Vygotsky) have been fundamental in providing the theoretical framework for educators in their design of instructional interventions aimed at the facilitation of moral growth and reasoning.

Cognitive Flexibility Theory

The cognitive flexibility theory, developed by Spiro, Coulson, Feltovich, and Anderson (1988), focused on the interconnection of the different modes of knowing and addressed the deficiencies of advanced knowledge acquisition. Spiro and colleagues (1988) hypothesized that the transfer of complex knowledge is enhanced by the presence of multiple representations of content, and that much of learning

failures come about because complex knowledge is often oversimplified, and thus, as a consequence, learners develop misconceptions. In response to this, it was theorized that to learn successfully, instruction must emphasize “the real-world complexity and ill-structuredness of many knowledge domains (Spiro et al., 1991, p.24). Therefore, cognitive flexibility, according to Spiro et al. (1991), means to know a concept in its entire complexity so as to be able to effectively apply it in novel situations.

Based on this theory Spiro et al. (1991) provided a set of recommendations for developing technology-based learning environments. These recommendations consisted of incorporating multiple representations, including case examples, avoiding oversimplification, utilizing the web-like nature of knowledge, and providing opportunities for knowledge assembly. Spiro et al. (1991) postulated that a premise of the cognitive flexibility theory is that revisiting the same material, at different times, in rearranged contexts, for different purposes, and from different conceptual perspectives is particularly important for attaining the goals of advanced knowledge acquisition because “knowledge that will have to be used in many ways is taught in many ways” (p. 170). Moreover, complex, or ill-structured, domains are best understood in this way—that is, by examination from multiple perspectives for multiple reasons so that the knowledge and skill internalized is flexible and can be applied appropriately within the varying contexts within which they are needed—such as clinical ethics.

Cases and Case-based Instruction

Cases, according to Merseth (2000), are usually presented in narrative form that is based on real-life situations with multiple representations of the context. Merseth (2000) contended that the three primary purposes for using cases are: (a) to serve as exemplars, (b) to allow the opportunity for learners to practice analysis as well as

contemplate action, and (c) to act as stimulants to personal reflection. Yet, the case itself is not an instructional technique, but rather helps to set the stage for peer discussion and case analysis. Lynn (1999) suggested that cases be presented to learners with a definite instructional purpose in mind, offering learners insight into alternative solutions from various perspectives rather than just giving them the correct answers (Harrington, 1995). From a theoretical perspective, cases appeal to educators who hold a constructivist view of learning since they allow learners to struggle with ideas and build an understanding of the issues at hand (Harrington, 1995) and also to those who view learning as situated, since a case is necessarily situated in the practice of the discipline (Shulman, 1996).

Case-based instruction compels students to become active learners as they are provided with the opportunity to develop their own methods of examining and solving problems (Shulman, 1992). In professional education and training, case-based instruction is typically used to encourage the practice of reasoning and problem solving rather than the application of rules and principles in prescriptive ways (Gartland, 2003). Further, some researchers have asserted that discussions stemming from cases are not only an essential but also the key component in the application of case-based instruction (Levin, 1995; Merseth, 2000).

From the social constructivist perspective, interactions during case discussions, especially the rise of challenges from peers and the discussion facilitator who have conflicting views and values, can promote development in cognitive and social domains and change ways of thinking (Dana & Floyd, 1994; Levin, 1995; Lundeborg & Scheurman, 1997). Lampert and Ball (1999) argued that case discussions provide opportunities for learners to develop “multiple voices” in their heads, which allows them to subsequently hear and interpret practice in multiple ways. Case discussions

can also aid in the development of skills of argumentation and justification as the discussants push each other to carefully articulate their thinking and rationalize their proposed interpretations or decisions (Manouchehri, 2002). Hence, case discussions have been found to improve people's ability to analyze cases (Levin, 1995) and allow them to transcend the limitations of their own experience and values (Harrington & Garrison, 1992).

Research in psychology and education has consistently shown the success of facilitating cognitive stage development through peer discussions of relevant topics (Berkowitz & Gibbs, 1983). In many professional areas (business, law, medicine, and education), case discussion has been a method used to help novices develop ways of thinking like professionals do about problems, issues, and dilemmas that are experienced in the field (Levin, 1999). Group discussions of controversial moral dilemmas, first introduced by Blatt (1969) and then labeled as 'dilemma discussions' by Rest and Thoma (1986), provide concentrated practice in moral problem solving that is stimulated by peers challenging one another's thinking, reexamining of assumptions, being exposed to different viewpoints, building argumentation, and responding to counterarguments. Individuals discover, understand, and appreciate higher-level moral arguments from their peers, leading to growth in moral judgment (McNeel, 1994). Specifically, it has been suggested that the process of openly challenging the moral decisions articulated in resolving a dilemma during group case discussions by individuals at higher stages of thought than one's own facilitates cognitive disequilibrium (or cognitive conflict), which stimulates upward movement within moral stages (Hersh, Miller, & Fielding, 1980; Self, Olivarez, & Baldwin, 1998a). This is especially important in medical ethics education because it involves reasoning and decision making based on the physicians moral values and beliefs and

also on what is professionally ethically right. Hence, it is widely agreed among medical educators that ethics instruction should be case-centered dealing with ethical dilemmas, especially during the clinical years of medical training (Miles et al., 1989).

As for ethical dilemma cases, Bickel (1993) describes them as: (a) presenting a situation in which two or more issues come into conflict over substantive moral issues; (b) stimulating discussion of reasoning and provoke disagreement about action; (c) including no necessary details; (d) ending with a question about what action one should take, and (e) being followed by insightful probe questions, preferably revealing subtle or additional possibilities about the case. As students work through the case, they are required to (a) state the facts that are given, (b) identify all the values at stake, (c) articulate the values conflicts, (d) choose an alternative; and (e) defend their choice and respond to objections. Therefore, ethical dilemma cases permit medical students the opportunity to explore real clinical ethical issues, while at the same time giving instructors control over what situations they should analyze and what issues they should consider (Putnam & Borko, 1997).

While case-based instruction holds promise for teaching medial ethics and promoting reasoning skills, much of the research on the case-based instruction have emphasized on “how best to” teach using cases or studying the impact of case-based instruction on students’ thinking and reasoning in face-to-face learning environments; effective models that can be adapted to the virtual classroom remains an area that needs to be explored.

Related Research on Educational Interventions to Enhance Moral and Ethical Reasoning

Educators influenced by cognitive developmental theories have attempted to facilitate the development of moral reasoning by providing learners with various enriched and stimulating educational experiences (Rest & Thoma, 1986). A review of 55 studies of educational interventions designed to stimulate development in moral reasoning reported that treatments of 3-12 weeks, and those that involved dilemma discussion, all show larger treatment effect size (Schlaefli, Rest, & Thoma, 1985). All 55 studies used the Defining Issues Test (DIT), an established instrument developed by Rest (1979) that measures an individuals' level of reasoning based on Kohlberg's six stages of cognitive moral development. Of the studies that were conducted in higher education, several reported significant pre-post gains in the experimental groups on the DIT but they did not sufficiently report on comparisons with gains in control groups (Rest, 1986). Hence, the gains on the DIT cannot necessarily be attributed to the educational interventions in all cases (Rest, 1986).

Bebeau (2002) reviewed 33 studies, primarily post-baccalaureate professional programs (e.g., medicine, dentistry, nursing, law, and veterinary medicine), that examined the effects of professional education on students' moral judgment. Four specific questions guided the meta-analysis: (1) Does professional education promote moral judgment development?; (2) Does the addition of ethics instruction promote ethical reasoning development?; (3) Are there differences in moral development subgroups within a profession?; and, (4) Is moral judgment linked to professional performance? The studies in aggregate included approximately 6,600 participants and a majority of the studies used the DIT as the measurement tool. Studies that used other measures cited findings that were generally consistent with the DIT studies and therefore provided additional support to the conclusions. In summary, Bebeau (2002)

found that unlike college education, professional school curricula did not promote moral reasoning unless there was an ethics component that involved students in the discussion of ethical issues. Although there were a variety of ethics interventions that seemed effective and generated positive outcomes, instructional approaches that utilized student-centered moral discourse produced the largest effects (Bebeau, 2002).

More recently and specifically in medical education, Lewin and colleagues (2004) reviewed summary reports submitted by 18 U.S. medical schools that were part of the Undergraduate Medical Education for the 21st century (UME-21) initiative. The purpose of the UME-21 project was to support selected medical schools develop, implement and evaluate innovative curricula for medical students, primarily in their clinical years, in nine content areas, one of which was medical ethics. Lewin and colleagues (2004) analyzed the reports from each school, focusing on the learning objectives, content, teaching methods, and evaluation strategies in their ethics curricula. Small group discussion was found to be the most common and often used instructional approach by the schools, especially in the third and fourth year curriculum (Lewin et al., 2004). However, in these studies evaluation of student performance and assessment of program effectiveness relied mostly on students' self-report surveys, thus providing little valid and reliable empirical evidence to support the effectiveness of the widely used group discussion approach in medical ethics education. To date only a handful of empirical studies regarding the impact of group discussion on medical students' moral development and reasoning have been reported. These studies are reviewed below.

In a study conducted by Self, Wolinsky, and Baldwin (1989), two different methods of teaching moral reasoning—small group case-study discussion and traditional didactic lecture—to first-year medical students ($n = 119$) were compared. It

was found that both methods significantly increased moral reasoning with the case-study discussion method being more effective than the lecture format. In examining how much exposure to small group case study discussion was necessary to significantly increase moral reasoning skills, Self, Olivarez, and Baldwin (1998b) pre- and post-tested first-year medical students from the Classes of 1991 through 1998 ($n = 729$). It was discovered that students who had participated in small groups case-based discussions for 20 or more hours demonstrated a significant increase in their scores on the DIT.

In another study, Self, Olivarez, and Baldwin (1998a) had 114 first-year medical students self-select to join one of three groups: one group that did not participate in film discussions on ethical dilemma cases and the two others that did participate in film discussions for one or two quarters. Students who participated in the film discussions showed significant increases on their DIT scores. While it was noted by the researchers that self-selection may have been a biasing variable, both participating groups showed an increase in their DIT scores as well, demonstrating the effectiveness of teaching medical ethics.

Indicating a need for more concrete data on the impact of discussion when teaching ethics in the clinical setting, Smith and colleagues (2004) compared the effects of written case analyses (i.e., case analysis) and written case analyses with group discussion (i.e., discussion) on third-year medical students' ($n = 146$) recognition and assessment of common ethical dilemmas. As a requirement of the pediatrics clerkship, all students were required to analyze four ethics cases that focused on common ethical issues that students were likely to face. The first 3 cases were completed during the clerkship and were provided with feedback from the instructor within two weeks of submission. During the final week of the clerkship, the

fourth, and final case was given to the students as a take home assignment. A total of sixty-six students were in the case analysis group and eighty students were in the discussion group. Between submitting the first three cases and the final take home case analysis, students in the discussion group participated in a one-hour, one-time facilitated group discussion of the first three cases. It was found that students' ability to identify and assess ethical issues on the first three cases improved following exposure to the pediatrics ethics topics, regardless of which group they were in. However, students in the discussion group performed significantly better on the final case analysis than the students in the case analysis group. Although, this study demonstrated the additional value of discussion in improving third-year medical students' ethical reasoning skills, the challenge of having students gather together for group discussions, especially during their clinical years when they are spread out in various clinical locations, is a practical concern, which may have also been the reason why the students in this study only met one time for one hour. A summary of research related to educational interventions intended to enhance moral and ethical reasoning is presented in Table 3.

Table 3

Summary of Related Research on Educational Interventions in the Health Professions to Enhance Moral and Ethical Reasoning

Author(s) (Year)	Sample	Educational Intervention (Length of Treatment)	Measure(s)	Research Design	Results
Greene (1997)	52 occupational therapy students	Two service-learning experiences: visits to older adults in nursing homes and interactions with persons with disabilities in community settings (six visits, one per week for six weeks, each lasting for one hour with the same person). All participants were required to reflect on their experiences through weekly journals.	Social-moral Reflection Measure (SRM) – short form; Students Development Task and Lifestyle Inventory (SDTLI)	Alternative treatment groups, pre- and post-test design (visits to older adults group, interaction with persons with disabilities group)	Participants in both groups exhibited a significant time-related increase in psycho-social development but no increase in moral reasoning. Participants interacting with persons with disabilities exhibited a decrease over time in moral reasoning compared with the participants interacting with older adults.
Latif (2000)	96 second-year pharmacy students	Ethical dilemma case discussion and role taking (one semester)	DIT-1	Pre- and post-test design	Paired samples t-test revealed that students scored significantly higher on the post-test than on the pre-test. Also, students at higher levels of moral reasoning perceived as significantly less problematic common ethical dilemmas faced by practicing pharmacists. This study concluded that ethical dilemma case discussions may enhance moral development.

(table continues)

Table 3 (*continued*)

Self, Olivarez, & Baldwin (1993)	114 first-year medical students	Used film discussions for teaching medical humanities (for one or two quarters)	DIT-1	Post-test, control group design (control group, two experimental groups)	Significant increases in the moral reasoning scores (e.g., DIT-1 scores) of those students who participated in the film discussions.
Self, Olivarez, & Baldwin (1998a)	95 medical students	First semester course in medical ethics that involved small group discussion of moral dilemmas	DIT-1	Longitudinal, repeated measures design (beginning of first semester, end of first semester, and end of fourth year)	Significant correlations between moral reasoning scores and gender, with women consistently higher than men.
Self, Olivarez, & Baldwin (1998b)	729 medical students	Participation in 20 hours or more of small group, case-study discussions of medical ethics	DIT-1	Longitudinal, comparative design (20 hours or more group, less than 20 hours group)	Significant increase in moral reasoning scores in the 20 hours or more group, and not in the less than 20 hours group.
Self, Wolinsky, & Baldwin (1989)	119 medical and veterinary medicine students	Two methods of implementation ethics curriculum: lecture and case-study discussions (two-quarter semesters)	Social-moral Reflection Measure (SRM)	Comparative, pre- and post-test design (lecture group, case-study group, and control group)	Both methods significantly increased moral reasoning with the case-study discussion method ($p<.004$) being more effective than the lecture format ($p<.0001$).
Smith, Frye-Edwards, Diekema, & Braddock (2004)	146 third-year medical students on the pediatrics clinical rotation	All students received three scenarios with written instructions for ethical analysis, submitted written answers, and received written feedback. Eighty students also participated in an hour-long, one-time discussion group about the cases. All students submitted a final case analysis.	Researcher developed case analysis form	Comparative design (written case analyses group, written case analyses with group discussion group)	The discussion group had a higher absolute increase in total score ($p=.017$) and in ability to formulate a plan ($p=.013$) on the final case analysis. Students' recognition and assessment of ethical issues I pediatrics improves following a case-based exercise with structured feedback. Group discussion may optimize the learning experience and increase students' satisfaction.

Computer-supported Instructional Approaches in Medical Education

Online Asynchronous Learning and Interaction

Rapid advancements in telecommunications and Internet technologies have allowed learning to no longer be time and place bound, but available on demand, anytime, anywhere (Brown & Duguid, 2000). The inherent features of asynchronous computer mediated communication (CMC), mainly the time lag between reading a message, formulating a reply, revising it, and finally posting it; allows more time for reflection and thus affecting how people learn (Garrison, Anderson, & Archer, 2001). As Riel (1990, p. 448) pointed out, “the educational power of telecommunications . . . lies in its potential to enable new forms of group interactions.” Harasim et al. (1995) asserted that online interactions are increasingly meaningful because “learners actively construct knowledge by formulating ideas into words through the reaction and responses of others”. Online asynchronous learning environments are especially appealing for learners in the professions such as medicine because they offer adult learners opportunities to interact with expert faculty and can foster communities of inquiry so that learners are able to reflect and develop new understanding through discussion with other members of the learning community (Curran, Lockyer, Kirby, Sargeant, Fleet, & Wright, 2005). Instructors use online discussion as a primary strategy for interacting in distance education contexts and although it offers the potential to promote meaningful interaction, the actual benefits still remains unclear (Choi, Land, & Turgeon, 2005).

In a systematic review of research on online asynchronous learning across the medical education continuum, Curran and colleagues (2005) were only able to find two studies that examined outcome changes from learning online. One study looked at four online courses in continuing medical education (CME) and findings suggested

that there was minimal amount of learner-to-learner interaction (Curran et al., 2005). More specifically, participation primarily consisted of independent messages and the discussions lacked elements of critical reflection, interaction, and debate among participants. In the other study that also involved an online course in CME, less than half of the course participants actively participated in the discussion boards and most of the interactions were between the course facilitators and participants, not among participants themselves (Curran et al., 2005). Both of the studies not only did not provide positive outcomes, they also did not provide insight into what learning and interaction actually occurred among participants.

Instructional Use of Videos

Studies have shown the effectiveness of using video interventions to convey educational information, especially complex and ill-structured problems, to different groups. The use of videos in professional education is mostly seen in teacher development programs (e.g., Abell, Cennamo, Anderson, Bryan, & Hug, 1996; Goldman & Barron, 1990; Marx, Blumenfeld, Krajcik, & Soloway, 1998). In teacher education, videos offer a glimpse of classroom practice and present opportunities for “rich, contextualized views of teaching and learning; practice in observing and identifying use of best practice strategies, and in depth explorations of the underlying principles” (Skiera & Stirling, 2004, p.3194).

Yet one of the limitations of videos, Hewitt et al. (2003) argued, unfortunately, is that they are an intrinsically passive medium. According to Hewitt and colleagues (2003) “simply observing a teaching episode is not likely, in itself, to effect a great deal of change in preservice teacher beliefs or practices” (p. 486). For this reason, it is suggested that videos be used in combination with activities that engage learners in analysis, personal reflection, and group discourse (Hewitt, Pedretti, Bencze,

Vaillancourt, & Yoon, 2003).

Videos are also able to capture multiple perspectives, which according to Merseth (1994) is one of the three essential components of a case. Recently, Skiera and Stirling (2004) argued that there are two main reasons to include multiple perspectives in the form of expert commentary in a video intervention: (a) in a novel situation, case users may lack the basic knowledge and ability needed to meaningfully observe complex and rapid interactions that occur in a case, and (b) although case users may have the knowledge and ability, they could enhance their understanding by looking at the case from experts' perspectives. Skiera and Stirling (2004) continued to stress that although video intervention seems to be a promising and effective instructional tool for teacher professional development, rigorous research in examining its impact on students' performance and learning is still lacking. Similarly, although the use of videos has long been an instructional resource in medical education, particularly in technical skills training (Heath, Luff, & Svensson, 2007), there have been no investigations on the use of video to promote the development of cognitive skills such as ethical reasoning.

Recently, in an effort to address the challenges that instructors face when teaching Korean dental students due to their busy schedules and the large amounts of decontextualized (textbook) information that needed to be learned, Choi, Kim, Kang, Jung, and Clinton (2004) designed a case-based e-learning environment incorporating six representative video cases of anesthesiologists in various dental surgery operation settings. These representative videos cases provided rich information about what usually goes on during oral surgery and how anesthesiologists deal with problems in actual operating rooms. In addition, problem situations requiring critical decision-making and reasoning were embedded within the representative video cases

in order to prompt cognitive dissonance and motivate learners to understand the situations and solve the problems (Choi et al., 2004).

Supplementary to the representative video cases were experts' storytelling video clips in which experts narrated what their internal thought processes would be if they were faced with similar situations such as the problems demonstrated in the representative video cases and how they would make critical decisions. The expert's storytelling videos usually included six decision-making steps: identifying problem cues, assessing situations, setting goals, generating solutions, executing the solutions, and evaluating the solutions (Choi et al., 2004). Choi et al. (2004) proposed that by listening to experts' narratives about their interpretations of certain phenomena, it would help learners to understand the phenomena they are observing as well as help them model experts' reasoning processes. Different from the representative video cases, the expert's storytelling video clips of real-life stories do not present the actual operation process. Although the problems might be more meaningful if they were delivered through video of actual performance in the operating room, the expert's storytelling video method can facilitate effective transfer of learning (Choi et al., 2004). Choi and his colleagues (2004) contended that learners who watch and study the representative video cases and that have a certain level of prior knowledge will be able to visualize problem situations and build mental models of the problem from simply listening to an expert's narrative story about the problems presented. More importantly, since most experts in the real world continue to build their knowledge by exchanging their experiences and problems through a narrative form, that is, storytelling (Orr, 1996, as cited in Choi et al., 2004), learners have the benefit of being exposed to this method of realistic practice early in their professional careers by listening to these narrative stories. Nevertheless, while the assertions of Choi and his

colleagues on the effectiveness of their case-based e-learning environment on students' learning are considered pedagogically sound, they have yet to present empirical findings to support these assertions.

CHAPTER 3

RESEARCH METHODS

The primary purpose of this study was to examine the effectiveness of computer-supported, case-based (CSCB) instruction designed to: (1) increase medical students' sensitivities to ethical issues in making clinical decisions, (2) generate medical students' alternative viewpoints and to offer students opportunities to examine their own thinking compared to others' thinking; and, (3) enhance medical students' ethical analytical skills that include resolving ethical dilemmas and justifying one's own decisions and actions. The CSCB instruction included: (1) observation of videos of experts' reasoning regarding clinical cases with ethical considerations (referred to as expert-reasoning example videos); and (2) participation in online asynchronous ethical dilemma case discussions (referred to as online asynchronous ethical case discussions).

In addition to examining the effectiveness of the instructional activities, the influence of the ethics curriculum on students' perception of the relevance and effectiveness of medical ethics teaching on their ability to handle ethical issues in daily clinical practice was also examined. Finally, another aim of this study was to also understand how medical students interacted with their peers during online asynchronous ethical case discussions.

The three main research questions were as follows:

1. How does the ethical reasoning of third-year medical students who received computer-supported, case-based instruction compare to those of their peers who did not? Specifically,
 - (1a) Do participants who observed expert-reasoning example videos and who

- participated in online asynchronous ethical case discussions identify more ethical issues in hypothetical clinical ethical cases than participants who did not?
- (1b) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions adopt more perspectives in hypothetical clinical ethical cases than participants who did not?
 - (1c) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions recognize more options in hypothetical clinical ethical cases than participants who did not?
 - (1d) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions provide better justifications of their ethical decisions in hypothetical clinical ethical cases than participants who did not?
2. Is there a difference in third-year medical students' perception of preparedness to deal with ethical issues in clinical settings before and after the medical ethics curriculum in Internal Medicine clerkship rotation?
 3. How were third-year medical students' who participated in online asynchronous ethical dilemma case discussions able to 'operate on' the reasoning of others and to what extent does that affect their ethical reasoning of hypothetical clinical ethical cases? Specifically, what were the amount and patterns of interaction in the online asynchronous ethical case discussions regarding hypothetical clinical cases with ethical considerations?

The following sections include a description of the participants, the research design and rationale, the context of the study, the materials and instruments used, and its supporting reliability and validity data. In addition, details regarding the pilot study conducted, data collection procedures, methods used for data analyses, the limitations of this dissertation study, and measures taken to protect human subjects are also presented. Table 4 gives an overview of the data sources and analysis strategies.

Table 4

Research Questions, Research Design, Data Sources, and Data Analyses

Research Question	Research Design	Data Source	Data Analysis
1. How does the ethical reasoning of third-year medical students who received computer-supported, case-based instruction compare to those of their peers who did not? Specifically,			
1a. Do participants who observed expert-reasoning example videos and who participated in online asynchronous ethical case discussions identify more ethical issues in hypothetical clinical ethical cases than participants who did not?	nonequivalent pretest-posttest control group design	- pre-test and post-test vignettes	- independent samples <i>t</i> -test - 2x2 mixed design analysis of variance (ANOVA) with one repeated measure
1b. Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions adopt more perspectives in hypothetical clinical ethical cases than participants who did not?	nonequivalent pretest-posttest control group design	- pre-test and post-test vignettes	- independent samples <i>t</i> -test - 2x2 mixed design analysis of variance (ANOVA) with one repeated measure
1c. Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions recognize more options in hypothetical clinical ethical cases than participants who did not?	nonequivalent pretest-posttest control group design	- pre-test and post-test vignettes	- independent samples <i>t</i> -test - 2x2 mixed design analysis of variance (ANOVA) with one repeated measure
1d. Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions provide better justifications of their ethical decisions in hypothetical clinical ethical cases than participants who did not?	nonequivalent pretest-posttest control group design	- pre-test and post-test vignettes	- independent samples <i>t</i> -test - 2x2 mixed design analysis of variance (ANOVA) with one repeated measure

(table continues)

Table 4 (*continued*)

Research Question	Research Design	Data Source	Data Analysis
2. Is there a difference in third-year medical students' perception of preparedness to deal with ethical issues in clinical settings before and after the medical ethics curriculum in the Internal Medicine clerkship rotation?	nonequivalent pretest-posttest control group design	- pre- and post-surveys	- descriptive statistics - paired samples <i>t</i> -test
3. How were third-year medical students' who participated in online asynchronous ethical case discussions able to 'operate on' the reasoning of others and to what extent does that affect their ethical reasoning of hypothetical clinical ethical cases? Specifically, what were the amount and patterns of interaction in the online asynchronous ethical case discussions regarding hypothetical clinical cases with ethical considerations?	case study design	- discussion board postings - group interview transcript	- content analysis using a coding scheme - descriptive statistics in the format of contingency tables and chi-square tests - discourse maps

Participants

The participants in this study were third-year medical students at a research extensive public university in the mid-Western United States. Twenty-two students from two blocks (blocks 13 and 14) on an Internal Medicine clerkship rotation were assigned as intact groups to either the experimental or the control group. Two blocks were selected due to the limited number of students enrolled during one block. The experimental group included eleven students from block 13 who received the computer-supported, case-based instructional intervention (i.e., CSCB instruction group). The control group was comprised of eleven students from block 14 and received the traditional instruction that consisted of the two face-to-face sessions with the medical ethics faculty instructor, not the computer-supported, case-based instructional intervention (i.e., non-CSCB instruction group). In order to control for potential threats resulting from use of different instructions, participants in the two blocks were taught by the same medical ethics faculty instructor. Participation in the activities pertaining to this study was a required activity for which students received credit. In rating how comfortable they were in using technology in the self-report pre-survey, the mean score for the participants in the CSCB instruction group was 5.64 ($SD = 2.69$) on a 10-point scale, where 1 = not at all comfortable and 10 = very comfortable.

Research Design and Rationale

This mix-method study used a quasi-experimental, nonequivalent pretest-posttest control group design and a case study approach. According to Christensen (1991), a quasi-experimental approach is selected when the design of the study “does not meet all the requirements necessary for controlling the influence of extraneous variables. In most instances the requirement that is not met is that of random assignment of

subjects to groups” (p. 305). Due to the nature of the registration process and student enrollment in the third-year clerkship rotations, random assignment was not feasible for this study; therefore a quasi-experimental design was selected. Since the participants were pre-selected and not randomly assigned (Campbell & Stanley, 1969), nonequivalent groups were used. The pretest-posttest design was used to control for factors other than the treatment that could likely account for the results and threaten internal validity (Campbell & Stanley, 1969). That is, to evaluate the effect of the instruction on participants’ performance, it was necessary to measure the participants’ ethical reasoning competence at the beginning and end of the clerkship rotation during which the instruction was delivered. Therefore, if it was found that one group performed better than another group on the post-test, we can rule out initial differences (if the groups were in fact similar on the pre-test) as an explanation for the differences. The quasi-experimental design is illustrated in Table 5.

Table 5

Nonequivalent Pretest-Posttest Control Group Design

	Pre-test	Treatment	Post-test
Experimental Group (CSCB instruction group)	O ₁	X	O ₂
Control Group (non-CSCB instruction group)	O ₁		O ₂

Note: O = vignettes and self-report surveys; X = expert-reasoning example videos and online asynchronous ethical case discussions; Time between pre-test and post-test was 5 weeks.

There were two independent variables in this study, with one variable being the treatment group (the CSCB instruction group and the non-CSCB instruction group) and the other variable was time (before the treatment and after the treatment). The interval dependent measures were medical students’ ethical reasoning, operationally defined as the participants’ scores on the vignettes (pre-test and post-test), which was

compiled of points received in terms of four specific components: ethical sensitivity, ethical viewpoint, ethical options, and ethical justification.

To triangulate and supplement findings from the quasi-experiment, a case study method was also used. The case study method was employed because it is an appropriate method when “how” questions are posed and there is a need for the investigation of a phenomena within a natural context (Yin, 2003). According to Yin (2003), since phenomenon and context are difficult to distinguish in real life situations, case study inquiry must rely on “multiple sources of evidence with data needing to converge in a triangulating fashion” (Yin, 2003, p.14). Additionally, Merriam (1998) claimed that the case study method is useful for studying educational innovations and in educational settings because it allows researchers to examine, understand, and improve practice in applied fields of study. Therefore, in this study the case study data collected captured the learning experience from the viewpoint of the participants, which not only offered further support to the quantitative results but also helped to discover new information and implications to refine the instructional intervention in such a way that it could be more successfully incorporated into other educational settings (Creswell, 2003).

In terms of case study design, a single-case with embedded cases design was employed. Stake (1995) described a case study as “the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances” (p. xi). Yin (2003) asserted that embedded cases could provide significant opportunities for extensive analysis, enhancing the insights into the single case. The rationale for using a single-case design with embedded case studies was because there was more than one unit of analysis involved and there were outcomes from individual parts included (Yin, 2003). In this study, block 13 of the Internal

Medicine clerkship (CSCB instruction group) was framed as the single case, with the online ethical dilemma case discussions as embedded cases and thus were the units of analysis. Yin (1994) identified at least six sources of evidence in case studies including: documents, archival records, interviews, direct observation, participant-observation, and physical artifacts. The online asynchronous ethical case discussion board postings and the follow-up semi-structured group interview were the main sources of case study data for the purposes of this study.

Context of the Study

All medical students in year three of their medical school education at the study site rotate through seven discipline specific clerkships; Child Health, Family and Community Medicine, Internal Medicine, Obstetrics/Gynecology, Neurology, Psychiatry, and Surgery. During their clerkship rotations, the students play an active role in patient care as they directly participate and take on clinical responsibilities in patient encounters.

In the Internal Medicine (IM) clerkship, students spend eight weeks (i.e., one block) on the internal medicine inpatient service at hospital or clinical settings, where they learn to care for adult patients with acute and chronic illnesses. Teaching emphasizes the principles of differential diagnosis and problem solving as well as the integration of basic science information into patient care. Students also gain clinical experience in medical interviewing and physical examination.

The main curriculum during the preclinical first and second years of medical school at the study site is a problem-based learning (PBL) curriculum; however, in regards to medical ethics training, the students attend primarily didactic medical ethics lectures and seminars. In their third-year, as students begin their clerkship rotations, they generally have no formal training in clinical ethics. In the 2005 winter

semester, an ethics curriculum was integrated into the IM clerkship at the study site. During the first week of the clerkship, the medical ethics faculty instructor, who is also a clinical ethicist, gives a one-hour didactic session with case discussion providing an overview of medical ethics, definitions, and instruction. A critical systematic framework—an ethics workup sheet—for thinking about and discussing morally troubling cases is used (see Appendix A) to guide students in arriving at sound, justifiable decisions. Following the face-to-face session, students go into the clinical environment for their rotation (i.e., in-patient service) and are required to identify, assess, and write-up an actual clinical case in which they are directly involved that has ethical dimensions or concerns. The clinical case write-up is the only required assignment for the curriculum and during the seventh week of the clerkship, the students and the medical ethics faculty instructor meet again as a group to discuss the write-up that each student had identified during their rotation. During the time between the face-to-face didactic session and the wrap-up meeting, students are located at various clinical settings within the community and across the state.

Role of the Researcher

Since August of 2005, I have worked as the graduate research assistant for the Office of Medical Education (OME) at our university's School of Medicine. In a collaborative effort among the OME, the university's Center for Health Ethics, and the Department of Internal Medicine to enhance the teaching of ethics at the school, a computer-supported, case-based (CSCB) component was integrated into the existing Internal Medicine clerkship ethics curriculum, as described above, during the academic year of 2006-2007. As the graduate research assistant working on this project, my responsibilities included helping to create the instructional materials (e.g., videos), setting up the online discussion boards via Blackboard, developing and

validating the instruments, collecting, analyzing, and reporting the data. During this project, I met with the medical ethics faculty instructor on a regular basis to discuss issues and share updates. I was also responsible for giving participants who received the CSCB instruction a half hour face-to-face training session on how to navigate through Blackboard, a secure course management system, and answer any questions or concerns they may have had regarding this curriculum.

Pilot Study

Prior to the main dissertation study, a pilot study with 17 third-year medical students was conducted in block 11 of the Internal Medicine clerkship for the following purposes: (a) to test the implementation procedures for the instructional interventions (i.e., online asynchronous discussion boards via Blackboard and use of expert-reasoning example videos); (b) to check the data collection procedures (ease of administration); and (c) to increase the validity and reliability of the instruments, including increasing inter-rater reliability and validating the scoring and coding schemes.

Data collected from the pilot study included: (a) follow-up open-ended essay questions requesting comments regarding the instructional intervention (e.g., what was its greatest strength?; what was its greatest limitation?; how could it be enhanced?; any difficulties encountered?); (b) content (i.e., postings) of the online asynchronous ethical case discussions; and, (c) responses to the vignette cases.

Implications from the open-ended essay questions led to changes and revisions made to the implementation of the main study. The changes and revisions were as follows:

- Participants from the pilot indicated the need for more prompting in terms of what they were required to do. Therefore a timeline that included specific

deadlines for posting and responding to messages on the discussion boards was prepared (see Appendix B: Instructions for the Ethics Curriculum in the Internal Medicine Clerkship). In addition, the Department of Internal Medicine student coordinator agreed to send out emails to the participants at the beginning of every week of the rotation to remind students what they were required to do for that week on Blackboard. Originally, only an email requesting participants to check Blackboard on a regular basis during the rotation was sent at the start of the clerkship. As the participants had very busy schedules, it proved very hard for them to remember to do so; thus the comment for more prompting emerged.

- During the pilot, some students had trouble accessing Blackboard or finding where things were located. Therefore, it was decided to give a face-to-face training session to the participants before the treatment was implemented.

Data from the discussion board forums and responses to the vignettes were used to determine the reliability and validity of the instruments. The results and findings of these data are reported separately in later sections.

Instruments

Vignettes

Rationale. A vignette is a short, case scenario that describes a series of representative and typical events that is limited to a brief time span, bounded space, and to one or a few key actors (Miles & Huberman, 1994). Vignettes contain precise references to what are thought to be the most important factors in the respondents' processes of decision-making and judgment-making (Alexander & Becker, 1978). The vignette technique was originally developed to study social status. Rossi (1977) used vignettes to study family life and concluded that vignettes have a significant amount

of validity. Vignettes have also been used to study social attitudes (Burstin, Doughtie, & Raphaeli, 1980) and in simulations of jury decision-making (Landy & Aronson, 1969). In addition, Hunt and Vitell (1986) found vignettes to be useful in studying marketing ethics research. In a comparison of different techniques used in ethics research, Cavanaugh and Fritzsche (1985) stated that ethical vignettes allow the researcher to place ethical problems in a realistic context and be able to obtain some measure of the difference between ethical principles and ethical behavior. Moreover, in recent years in medical education, the incorporation of vignettes into evaluation instruments to assess students' proposed behavior on encountering ethical dilemmas has been a favored approach (e.g., Goldie, Schwartz, McConnachie, & Morrison, 2002; Hebert, Meslin, Dunn, Byrne, & Reid, 1990; Mitchell, Myser, & Kerridge, 1993; Rezler et al., 1992; Sulmasy, Geller, Levine, & Faden, 1993).

Development. Five vignettes were developed by a clinical ethicist (David Fleming, M.D.) that reflected common ethical issues that arise in clinical practice. These included conflicts between the patient's interest and the physician's self-interest, the autonomy of the patient and the physician, beneficence, nonmaleficence, professionalism, and social justice (refer to Table 6 for brief descriptions of vignette case scenarios and see Appendix C for a detailed description of a vignette case as an example).

Table 6

Vignette Case Scenarios

Vignette	Brief Description of Case Scenario	Ethical Issue/Conflict
Case A	A 37-year old woman with breast cancer who decided on a do not resuscitate/intubate (DNR/DNI) order without her husband knowing her wishes	Nonmaleficence for the dying patient
Case B	Medication error by a student physician	Beneficence and nonmaleficence, patient safety
Case C	A 65-year old man with advanced amyotrophic lateral sclerosis requesting large doses of narcotics to relieve his pain and to “get it over with”	Patient autonomy vs. physician autonomy
Case D	Substance abuse leading to unprofessional conduct by a fellow colleague during clinical rounds	Professionalism
Case E	An attending physician who demonstrated discriminatory behavior against a fellow colleague	Social Justice

Measurement tool for assessing ethical reasoning. The vignettes were used as an assessment tool to: (1) measure participants’ ability to identify ethical issues; and, (2) provide participants with an ethical situation to analyze and reason about these issues in order to come to a justifiable resolution. Participants were instructed to respond to three questions pertinent to all five vignettes, which were:

- (a) What are the ethical concerns in this case? Why are they ethical concerns?
- (b) What options exist? What course of action should be taken? and,
- (c) What ethical principles, values, or arguments support your decision?

Three ethicists (David Fleming, MD, William Bondeson, Ph.D., and Sarah Breier-Mackie, Ph.D.) were presented with the five vignettes and asked to provide their responses to the three questions. A final answer key was created based on the consensus of the answers from the three ethicists. A scoring scheme for each of the

five vignettes was then created based on the answer key. The format of the scoring schemes was an adaptation of the evaluation tool that Smith and colleagues (2004) had developed to assess student responses to ethical dilemma cases (see Appendix D for the Vignette Scoring Scheme for Vignette Case A). These scoring schemes served as indicators for the processes of ethical reasoning, which enabled a numerical value assessment of the quality of the participants' responses.

Four components were assessed, specifically, participants' abilities to: (a) identify ethical issues (i.e., ethical sensitivity); (b) adopt multiple viewpoints (i.e., ethical viewpoint); (c) resolve ethical dilemmas (i.e., ethical options); and, (d) justify their decisions and actions (i.e., ethical justification). In terms of the ability to identify ethical issues, unless a problem or potential for a problem is acknowledged, there was no reason to make a decision on a course of action; therefore this must be determined first. Once it has been determined that a problem exists, it is then necessary to view all aspects of the situation and determine possible options and resolutions. Last, all decisions or course of actions should be based on reasoned analysis using logical and critical thinking as well as ethical principles to justify their arguments. For example, an attending physician turning off the respirator of a patient in vegetative state is not to save the hospital money but to comply with the patient's stated or presumed wish to die.

Since the participants' responses were qualitative in nature, they were quantified through the use of scoring schemes (e.g., rubrics) so that statistical analyses could be performed. In regards to the scoring schemes, a full point was given for each correctly and explicitly identified ethical issue (i.e., ethical sensitivity) and principle (i.e., ethical justification) (which were considered as explicit responses) pertaining to each case vignette. Participants who recognized the ethical issues or referred to the ethical

principles without using the proper term for it (which were considered as implicit responses) were partially awarded with a half point for each implicit response (Malek, Geller, & Sugarman, 2000). In regards to the ability to adopt multiple viewpoints (i.e., ethical viewpoint), the total possible points for this component were five points. For each correctly identified existing option and/or resolution, participants were given one point (i.e., ethical options). The total score for each vignette ranged from sixteen to twenty-two points depending on the number of ethical issues, options/resolutions, and principles it encompassed (see Table 7). The overall total score for all five vignettes was 91 points.

Table 7

Overview of Possible Score on the Vignettes

Vignette	Sub-scale: Ethical Sensitivity	Sub-scale: Ethical Viewpoint	Sub-scale: Ethical Options	Sub-scale: Ethical Justification	Overall Total Possible Score
Case A	7	5	4	6	22
Case B	3	5	2	6	16
Case C	4	5	3	5	17
Case D	4	5	4	7	20
Case E	4	5	2	5	16
Overall Total Possible Score	22	25	15	29	91

Validity. The investigator and author of this study evaluated the face validity of the vignettes. The clarity and content validity were established through a review by two expert ethicists. The two ethicists ensured that the vignettes addressed common ethical issues in clinical settings and were presented clearly (see Appendix C for a Sample Vignette).

Establishing Reliability using Pilot Study Data. One of the purposes for conducting a pilot study prior to the main dissertation study was to determine the

inter-rater reliability, which is the extent where two or more raters yield consistent and similar results in the implementation of a scoring system (i.e., the scoring schemes for the vignettes) (MacLennan, 1993). Three faculty physicians in the Department of Internal Medicine were recruited to help with the scoring of the responses to the vignettes completed by the participants in the pilot study ($n = 17$). However, the overall inter-rater reliability was moderate ($Kappa = .54$). Since variability among the raters was high (e.g., number of years practicing medicine, it was therefore determined that in order to increase inter-rater reliability, raters with no clinical experience should be recruited instead of practicing physicians.

Subsequently, two raters, both of whom were graduate students taking a course in health care ethics, were recruited. The raters attended a four-hour training session where they were given an overview of the scoring scheme, had reached a conceptual consensus regarding how to use the scoring scheme, and were clear about the expectations of the assessment. The raters then independently scored sample written responses from the pilot study and recorded their scores independently.

The agreement between the raters was calculated using both Cohen's Kappa and Pearson product-moment correlation. Cohen's Kappa is a method used to calculate inter-rater reliability in which the data is considered as a nominal variable. Since the raters in this study were asked to score written responses by giving points based on pre-determined answers outlined in the scoring schemes, the data for calculating inter-rater reliability was considered as nominal data; that is, agreement between the raters with either giving points or not giving points. Cohen's Kappa also takes into account the probability that the raters will agree by chance. In other words, Kappa statistics is the extent to which agreement between two raters exceeds chance agreement. Therefore, if Kappa equals 0, the agreement between the raters is simply

what would be expected by chance. In this study, Kappa was computed for three of the four components of ethical reasoning (i.e., ethical sensitivity, ethical options, and ethical justification). Results revealed a Kappa of .76, which is by convention considered to be good (Altman, 1991). As for the ethical viewpoint sub-scale of ethical reasoning, scores were given based on a 5-point rating scale rubric and considered a continuous variable. Hence, Pearson product-moment correlation (r) was performed to calculate the inter-rater reliability for this one component of ethical reasoning. The correlation coefficient was .89, which indicated a moderate inter-rater reliability (for details on the inter-reliability results see Appendix E).

Administration and Scoring. Participants were instructed to read the five vignettes and respond to the three follow-up questions first at the beginning of the clerkship (i.e., pre-test; prior to the instructional intervention for the CSCB instruction group) and again at the end of the clerkship (i.e., post-test). The same two raters from the pilot study but blind to the purpose of this main study and its hypotheses scored all the participant's responses. The raters were blind to which group (i.e., CSCB instruction or non-CSCB instruction) the participants were in and whether or not the responses were from the pre-test or the post-test.

After the raters separately scored all the responses, the scores were collected and an overall comparison of the scores by items between the two raters was done. If there was a discrepancy of two or more points, a note of this would be made, and then the two raters would discuss to resolve discrepant items until scores they gave were the same or had a one point or less point difference (Shaughnessy, Zechmeister, & Zechmeister, 2003). The average scores for each of the four sub-scale of ethical reasoning (i.e., ethical sensitivity, ethical viewpoint, ethical options, and ethical justification) from all five vignettes were used in the analyses. The average overall

score reflected participants' performance on the four sub-scales combined.

Self-Report Surveys

Development. An extensive literature review in Medline, PsychINFO, and TIMELIT was conducted to identify published studies on programs and curricula related to medical ethics and the various tools and instruments that were used to assess and measure learners' competencies, abilities, and perceptions. Three items on the self-report surveys were drawn from a survey used by Roberts, Hammond, Geppert, and Warner (2004) to investigate the views of professionalism and ethics preparation of medical students and residents. These items were pertinent to soliciting information regarding medical students' perceptions of their medical ethics training experience. The remaining items on the self-report surveys were designed and developed by the researcher based on the four components that comprises ethical reasoning as defined in this study. These items addressed the abilities (i.e., ethical sensitivity, ethical justification, etc.) required when dealing with ethical issues in clinical settings.

Validity. Following the development of the pre- and post-surveys, three expert judges were recruited to review the surveys for clarity and content validity. The first expert judge was a clinical ethicist with over five years of experience teaching medical ethics and had published work on the subjects of medical ethics and bioethics. The second expert judge was a practicing physician with over 18 years of clinical practice and over five years of experience in medical education. The third expert judge held a doctoral degree in higher and continuing education and has worked in health care and medical education for over 20 years. The expert judges were asked to consider the extent to which the surveys could be easily understood and applied. All of the experts commented that changes to the surveys were not needed.

Description. The pre- and post-surveys consisted of two sections each (see Appendix F for the Pre-Survey and Appendix G for the Post-Survey). The purpose of the first section (Part I with seven items) in both the pre- and post-surveys was for participants to rate on a 9-point scale:

- (1) their understanding of ethical principles (9 = very good, 1 = limited);
- (2) their ability to identify and address clinical ethical issues (9 = excellent, 1 = unsatisfactory);
- (3) their ability to resolve clinical ethical issues (9 = excellent, 1 = unsatisfactory);
- (4) the amount of clinical ethical dilemmas they have encountered to date (9 = constantly, 1 = never);
- (5) how adequate medical ethics training they have received to date (9 = sufficient, 1 = insufficient);
- (6) how much medical ethics training they have received to date (9 = very much, 1 = not at all); and
- (7) their overall clinical ethical competence (9 = acceptable, 1 = unacceptable).

In the study by Roberts et al. (2004), it was found that a scale of this size to be effective for eliciting the perspectives of medical students regarding ethics education. Using data collected from the pilot study, the internal consistency reliability (Cronbach alpha) of the seven survey items was estimated by calculating the alpha coefficient ($r = .90$).

The pre-survey also included additional specific questions (Part II) related to the participants' personal background such as: area of medicine interested in specializing, and comfort level (ranging from 1 to 10; 1 = not at all comfortable, 10 = very comfortable) regarding learning with technology. The use of a 10-point scale for

comfort level was employed due to other researchers' successful use of this approach in identifying and discriminating the learning needs of residents and practicing physicians (Lurie, Margolis, McGovern, & Mink, 1998; Waz & Henkind, 1995).

The post-survey also included additional questions (12 items in Part II) related to participants': (1) overall impressions of and satisfaction levels with the ethics curriculum as was incorporated in the current clerkship; (2) views about how much the ethics curriculum in the current clerkship contributed to their awareness of the processes and importance of ethical reasoning. Responses were indicated on a five-point Likert scale (5 = strongly agree, 1 = strongly disagree).

Semi-structured Group Interview Protocol

Description. The purpose of the semi-structured group interview was to gain an in-depth understanding of the attitudes, beliefs, and perceptions of the participants in this study. Open-ended questions were developed that in general focused on the participants': (a) overall impressions of the ethics curriculum and instructional interventions, (b) perceived relevance (strengths) of the ethics curriculum and instructional interventions, and (c) perceived obstacles or hindrances (weaknesses) to the implementation and effectiveness of the ethics curriculum and intervention (see Appendix J for Group Interview Protocol). The questions were reviewed by the medical ethics faculty instructor and the clerkship director of the Department of Internal Medicine to ensure that the questions were adequate and appropriate.

The group interview lasted approximately sixty minutes. The group interview protocol was used to structure the interview process and the order of the questioning was dependent upon responses elicited from the participants (Bogdan & Biklen, 2003). Therefore, the format of the group interview was open-ended, in which a free flow of comments and ideas were encouraged in order to generate information-rich data. The

group interview was conducted at a location that was familiar to the participants and in which they should have felt comfortable. The interview data were used to triangulate results from the quantitative data in this study. The interview was tape-recorded with the participants' permission and transcribed verbatim for analysis.

Treatments

Expert-Reasoning Example Videos

Development. Three ethicists (David Fleming, MD, William Bondeson, Ph.D., and Sarah Breier-Mackie, Ph.D.) were invited via email to participate in a video-taped panel discussion. The three experts agreed to participate in the panel discussion and signed a release of information form giving permission to videotape their discussion and to disseminate the videos for educational purposes (Appendix H Release of Information Form).

The topics for the panel discussion were the five vignettes that the clinical ethicist had developed. The experts were instructed that their discussion should address the three follow-up questions to the vignettes and that the ethics workup should guide the progression of the discussion. In addition, the experts were provided with a list of the most commonly overlooked ethical considerations, principles, and values by the participants in the pilot study. This list had served as a reference for issues the experts could focus on and emphasize with in their reasoning and deliberation during the panel discussion. The panel discussion demonstrated how ethicists would collectively analyze and reason through ethical cases, similar to that of an ethics consultation in a real clinical setting.

Discussion of each vignette began with a 2-3 minute overview of the ethical case (Figure 1), which was then followed by a 10-15 minute discussion among the experts (Figure 2). Five separate videos, one for each vignette, were edited and produced. The

creation of the videos was followed by an evaluation to establish validity of the content, which will be discussed more in detail in the following section.



Figure 1. Snapshot of Case Overview Video Clip



Figure 2. Snapshot of Case Expert Panel Discussion Video Clip

Evaluation of the video content. Three graduate students who were taking a course in health care ethics were recruited to evaluate how well the expert-reasoning example videos reflected the process of conducting an ethics work-up and took into account relevant issues pertaining to ethical reasoning. The researcher explained to

the evaluators what their responsibilities were, gave each evaluator a CD with the expert-reasoning example videos, and a questionnaire that solicited information regarding their perceptions of the expert-reasoning videos (see Appendix J for the Video Content Evaluation Form and Results). Overall, the three graduate student evaluators thought that the videos had achieved the desired purposes; therefore, no changes were made.

Online Asynchronous Discussion Board Forums

After the first week of the block, participants completed the pre-surveys and pre-test vignettes, attended a face-to-face training session, and participated in the face-to-face didactic session with the medical ethics faculty instructor. The subsequent five weeks had a total of five weekly required participation online asynchronous discussion board sessions via Blackboard. The discussion topics for four of the five weeks (weeks 2, 3, 5, and 6 of the block) were based on the ethical cases (i.e., vignettes) that the participants were asked to read and respond to in the pre-test. In week 4 of the block, however, participants were requested to share with his/her online discussion group a preliminary summary of the ethical case they were requested to identify and write-up during their rotation, which was also the required assignment for the existing ethics curriculum.

Since the participants were already familiar with the ethical cases from the pre-test, they had addressed at least some of the ethical considerations embedded in the cases and had a plan of action prior to the online asynchronous ethical case discussions. The rationale for using the same ethical cases from the pre-test vignettes as discussion topics was based on McAninch's (1993) assertion that students benefit more from opportunities to re-analyze the same narratives through different lens. Lundeberg and Scheurman (1997) further postulated that since complex cases

represent ill-structured situations, to learn complex ideas require multiple representations that allow for multiple explanations and dimensions of analysis. In addition, presenting a case before instruction is likely to increase students' receptivity and enhance the possibility that new information will be contextualized as students confront new material and perspectives (Lundeberg & Scheurman, 1997).

In order to eliminate the instructor as a confounding factor, the medical ethics faculty instructor only provided feedback at the end of each weekly online asynchronous discussion session. Participants were encouraged to recognize their peers as important resources and to pose questions and/or comments to each other during the online asynchronous ethical case discussions.

The following were the specific activities the participants were instructed to carry out:

1. At the beginning of each week, one ethical case from the five vignettes in the pre-test was selected and posted onto the discussion board in Blackboard. Also, a corresponding expert-reasoning example video was uploaded onto Blackboard under Course Materials.
2. All the participants were instructed to read the ethical case and observe the video that consisted of three ethicists (a practicing physician, a philosophy ethicist, and a practicing nurse) who were discussing and reasoning through the ethical considerations of the case.
3. All participants were then instructed to post one original message that addressed but were not limited to the following prompting questions:
 - (a) What concepts (or comments) did you find interesting from viewing the video?
 - (b) Previously, you were asked to read this same case and answer follow-up

questions regarding the case. Reflecting back on your answers, what similarities or differences do you see between your answers and what the experts had discussed? What were the course of action that you recommend be taken? What were the ethical principles, values, or arguments that you provided to justify your decision?

- (c) What other issues or concerns do you think should be considered but were not mentioned or addressed in the video or in your previous answers?

4. Each participant was then required to read and respond to the original messages posted by the other two (or three) members of their group. In their reply message, participants used the following probing questions to guide their discussion:

- (a) Do you agree or disagree with the comments/messages posted by your peers?
What similarities or differences do you see in the comments/messages?
Support for your answer is required.
- (b) Are there any questions you have and/or is there a need for clarification, elaboration, or additional justification in the messages posted by your peers?
- (c) Using the Practical Ethical Reasoning Guideline (i.e., the ethics workup) provided by Dr. Fleming, what other issues or concerns do you think should be considered but was not mentioned or addressed in the message(s) thus far?
- (d) Is there anything that was brought up that you would like to further discuss more about or exchange perspectives on with your peers?
- (e) Any question raised by a group member that is specifically addressed to another group member must be responded to.

Data Collection

Experimental (CSCB instruction) Group

On the first day of the IM clerkship rotation, participants received an orientation email that described the requirements for the medical ethics curriculum with the pre-survey and vignettes attached. The orientation email was then followed by a face-to-face training session in which the participants were provided with a demonstration of Blackboard, shown the various tools and functionalities of Blackboard, and given written instructions that explained how to use it (see Appendix B). The pre-survey and vignettes were disseminated and collected before the face-to-face session with the medical ethics faculty instructor during the first week of the clerkship.

Considering ecological validity of this investigation, all research activities followed the original ethics curriculum. The treatment phase of the quasi-experiment took place during weeks 2 through 6 of the clerkship rotation. During this time, participants were required to regularly access Blackboard to complete relevant assignments and activities. The participants were not asked to work extra hours besides the aforementioned requirements. Technical assistance was available, but never requested. Table 8 depicts the general timeline of the research procedures according to the clerkship rotation schedule.

Table 8

Overview of the Ethics Curriculum in an Internal Medicine Clerkship Rotation Block for both Treatment Groups

Week During the Block	CSCB Instruction Group	Non-CSCB Instruction Group
1	(a) Orientation email and face-to-face training session (b) Administered the pre-survey and pre-test vignettes (c) Face-to-face didactic session with medical ethics faculty instructor	(a) Orientation email (b) Administered the pre-survey and pre-test vignettes (c) Face-to-face didactic session with medical ethics faculty instructor
2	Each week participants were asked to view an expert-reasoning example video and participate in a follow-up online asynchronous ethical case discussion with their peers. At the end of each week's discussion, the medical ethics faculty instructor posted wrap-up comments and feedback.	
3		
4		
5		
6		
7	(a) Administered the post-test vignettes (b) Face-to-face wrap up session with medical ethics faculty instructor (c) Administered the post-survey (d) Conducted a follow-up semi-structured group interview	(a) Administered the post-test vignettes (b) Face-to-face wrap up session with medical ethics faculty instructor (c) Administered the post-survey
8	End of rotation	End of rotation

To encourage one-on-one communication, online discussion groups were comprised of 3-4 members (Harasim, 1993). Since there were 11 participants in the CSCB instruction group, two groups with 3 members (Group 1 and Group 2) and one group with 4 members (Group 3) were formed. During the 7th week of the clerkship, the post-test vignettes were disseminated and collected via email before participants met with the medical ethics faculty instructor for their face-to-face wrap up meeting. After the face-to-face meeting, participants were asked to fill out the post survey as

well as were recruited to participate in a follow-up group interview. The group interview with the CSCB instruction group took place within two weeks after the clerkship rotation had ended and lunch was offered as an incentive. Nine students volunteered to participate.

To ensure confidentiality between the participants and the researcher, all information to and from the participants went through the student coordinator in the Internal Medicine department who was not involved in the study. All identifying information was removed and the administrative assistant assigned participants anonymous identifying information, so that his or her responses from the pre-test vignettes and pre-survey could be matched with their responses on the post-test vignettes and post-survey. In sum, the data collected from the CSCB instruction group included the following:

1. Responses to the vignettes (from pre-test and post-test)
2. Responses to the self-report surveys (from pre-survey and post-survey)
3. Online asynchronous ethical case discussion board postings
4. Group interview transcript

Control (non-CSCB instruction) Group

Participants in the control group only participated in the existing ethics curriculum (traditional delivery methods) and did not receive the computer-supported, case-based instructional intervention. They were required, however, to complete the pre- and post-test vignettes and surveys. A follow-up group interview was not conducted for this group primarily because this was the last block of the school year and it was determined that it would be extremely difficult to recruit students to participate. The non-CSCB participants were also not asked to work extra hours besides the regular curriculum requirements.

Data Analyses

The present study considered information from the responses to the pre- and post-test vignettes and surveys, discussion board postings, and the group interview; so that findings were not drawn from a single source, thus increasing both accuracy and credibility. Multiple methods of data analysis were conducted. Quantitative data (i.e., pre-test and post-test scores; pre-survey and post-survey scores) were analyzed first, followed by qualitative data (i.e., group interview transcript; discussion board postings), and findings from these methods were merged together in the interpretation of the results (Creswell, 2003). All quantitative data collected for this study was analyzed using SPSS version 12.0 and qualitative data was analyzed using QSR NVivo version 7.0 qualitative analysis software package. Unless otherwise stated, a critical value of .05 was used to determine the statistical significance. The following describes the data analysis methods for both quantitative and qualitative data.

Quantitative Analysis

Descriptive statistics, including means, standard deviations, frequencies, percentages, and ranges were used to describe the characteristics of the participants. An independent samples *t*-test was conducted to examine whether or not systematic pre-test differences existed between the two groups of participants.

For research question 1, data were analyzed using a series of four 2 (groups) by 2 (pre/post) mixed design analysis of variances (ANOVAs) with one repeated measure. ANOVA was determined for analysis rather than MANOVA because the dependent variables (i.e., sub-scales) were in most part moderately to strongly correlated (Tabachnick & Fidell, 2007). According to Tabachnick and Fidell (2007), MANOVA is recommended when the dependent variables are highly negatively correlated or moderately correlated, but not highly positively correlated. Cohen (1988) suggested

that correlations between +/- .30 to +/- .49 are considered moderately correlated and correlations between +/- .50 to +/- 1.0 are considered strongly correlated. Table 9 displays the intercorrelations among the sub-scales of the four components of ethical reasoning.

Table 9

Intercorrelations among Ethical Sensitivity, Ethical Viewpoint, Ethical Options, and Ethical Justification Sub-scales

Sub-scale	1	2	3	4
1. Ethical Sensitivity	--	.81 **	.50 **	.68 **
2. Ethical Viewpoint		--	.51 **	.74 **
3. Ethical Options			--	.35 *
4. Ethical Justification				--

Note: ** correlation is significant at the .01 level (2-tailed)

* correlation is significant at the .05 level (2-tailed)

The categorical independent variables included one between groups variable, *group*, with two levels (CSCB, non-CSCB) and one within subject variable, *time*, with two levels (pre-test, post-test). That is, differences between those who received CSCB instruction and those who did not receive CSCB instruction were explored. Also comparisons were made between the pre-test ethical reasoning scores and the post-test ethical reasoning scores. The dependent measure was ethical reasoning of hypothetical clinical ethical cases as measured by the vignettes. In this study ethical reasoning consisted of four components: (a) ability to identify ethical issues (i.e., ethical sensitivity sub-score on the vignettes), (b) ability to adopt multiple viewpoints (i.e., ethical viewpoint sub-score on the vignettes), (c) ability to resolve ethical dilemmas (i.e., ethical options and resolutions sub-score on the vignettes), (d) ability to justify their decisions and actions (i.e., ethical justification sub-score on the vignettes). There were three sources of variance: Group Main Effect, Time Main

Effect, and Group x Time Interaction. If an interaction was found to be significant, a simple effect analysis using paired samples *t*-test with Holm's sequential Bonferroni's procedure was performed to control for familywise Type 1 error as a result of multiple comparisons (Green & Salkind, 2005). Effect sizes, reported as partial *eta* squared, were calculated to determine the magnitude of the difference between the two groups. According to Cohen (1988), effect sizes are categorized as small (.01), medium (.09), and large (.25).

For research question 2, a paired-samples *t*-test was performed to compare the mean scores on the seven survey items in the pre- and post-surveys, in which participants' were asked to rate their perceptions of the medical ethics training they've received thus far and their ability to deal with ethical issues in clinical settings.

Trustworthiness. To validate the credibility of the findings, triangulation was done by using multiple sources of data including the online asynchronous discussion board postings and a follow-up semi-structured group interview with the CSCB instruction group, so that the findings were not drawn from a single source, thereby increasing its trustworthiness. The procedures for analyzing the group interview data and discussion board content is described in the following sections.

Analysis of the Discussion Board Content

One of the most commonly used qualitative research methods in examining computer-mediated communication (CMC) includes survey research, evaluative case study, and content analysis, also called transcript analysis (Hara, Bonk, & Angeli, 2000). Content analysis, specifically, may proceed through an emergent coding process, in which categories emerge over time by repeatedly returning to the text, or an a priori process, where relevant conceptual frameworks have been generated prior to the examination of the text. In this study, content analysis was employed to analyze

the data for research question 3 in order to provide an adequate overview of the patterns of interaction in the online asynchronous ethical case discussions.

Used to analyze the participants' discussion board postings was the interaction analysis model (IAM) developed by Gunawardena, Lowe, and Anderson (1997). Gunawardena et al. (1997) contended that previous models and protocols were not able to explain the learning process that takes place within a group particularly during the process of interaction among participants in a CMC context. As a result, they proposed the interaction analysis model (IAM), which could be applied in CMC learning environments, where multiple perspectives are provided, reflection is encouraged, and topics of discussion are based on real world examples. In this study, the IAM was chosen as the coding scheme to analyze the discussion board content because the discussions were carried out in a CMC learning environment.

Moreover, Gunawardena and his colleagues (1997) maintained that the IAM consist of interaction phases that distinguishes between "lower mental functions" (Phase I) and "higher mental functions" described as Phases III, IV, and V (p. 415), which is stimulated through cognitive dissonance. Thus, another rationale for selecting the IAM was because as participants in this study engage in ethical case discussions and exchange perspectives, cognitive dissonance may be created, thereby creating different types and levels of interaction, which can then be identified using the IAM.

Further, the phases in the IAM are in alignment with Berkowitz and Gibbs' (1983) framework of operational transactive reasoning (i.e., reasoning that operates on the reasoning of others), in which an individual engaged in discussion responds by extending, paraphrasing, refining, completing or criticizing another's or his/her own reasoning. Moreover, not only can the IAM content analysis protocol be used to

qualitatively describe meaningful interactions that promote critical learning, but it can also be used to determine the presence of meaningful thinking in online discussions (Marra, Moore, & Klimczak, 2004). Table 10 presents the five phases and, in detail, the specific operations that may occur at each phase of the IAM. Table 11 shows the correlation between the types of operational transactive statements proposed by Berkowitz and Gibbs (1983) and the phases in the IAM developed by Gunawardena et al. (1997).

Table 10

Interaction Analysis Model (IAM) by Gunawardena et al. (1997, p. 414)

Phase I: Sharing/comparing of information

- Statement of observation or opinion
- Statement of agreement from one or more other participants
- Corroborating examples provided by one or more participants
- Asking and answering questions to clarify details of statements
- Definition, description, or identification of a problem

Phase II: Discovery and exploration of dissonance or inconsistency among ideas, concepts or statements

- Identifying and stating areas of disagreement
- Asking and answering questions to clarify the source and extent of disagreement
- Restating the participant's position, and possibly advancing arguments or considerations in its support by references to the participant's experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view

Phase III: Negotiation of meaning/co-construction of knowledge

- Negotiation or clarification of the meaning of terms
- Negotiation of the relative weight to be assigned to types of argument
- Identification of areas of agreement or overlap among conflicting concepts
- Proposal and negotiation of new statements embodying compromise, co-construction
- Proposal of integrating or accommodating metaphors or analogies

Phase IV: Testing and modification of proposed synthesis or co-construction

- Testing the proposed synthesis against "received fact" as shared by the participants
- Testing against existing cognitive schema
- Testing against personal experience
- Testing against formal data collected
- Testing against contradictory testimony in the literature

Phase V: Agreement statement(s)/applications of newly constructed meaning

- Summarization of agreement(s)
 - Applications of new knowledge
 - Metacognitive statements by the participants illustrating their understanding that their knowledge or ways of thinking (cognitive schema) have changed as a result of the conference interaction
-

Table 11

Association between the IAM and Operational Transactive Statements

Interaction Analysis Model (Gunawardena et al., 1997)	Operational Transactive Statements (Berkowitz & Gibbs, 1983)
Phase I: Sharing/comparing of information	Clarification
Phase II: Discovery and exploration of dissonance or inconsistency among ideas, concepts or statements	Competitive clarification, Contradiction, Reasoning critique
Phase III: Negotiation of meaning/ co-construction of knowledge	Refinement, extension, competitive extension
Phase IV: Testing and modification of proposed synthesis or co-construction	Common ground/Integration
Phase V: Agreement statement(s)/ applications of newly constructed meaning	n/a

The basic unit of coding was determined as a single and complete concept or idea by an individual (can consist of a word, phrase, sentence, or sentences).

Therefore an entire discussion board posting could be coded as one unit, or one discussion board posting could include two or more coded units, depending on the number of concepts the participant attempted to convey in his/her posting.

Coding Scheme. The IAM was applied to the analysis of a one-week discussion board forum from the pilot study. However, implementation of the IAM proved to be insufficient. That is, the IAM was not able to provide insight into one important aspect of the interactions, which was whether or not discussions exhibited statements that “operated” on the reasoning of another, and if so, from whom?

According to Garrison, Anderson, and Archer (2001), critical thinking is both a process and an outcome of online communities engaged in reflective critical discourse (p. 7-8). During online critical discourse, participants apply reflection and reasoning

to facts and ideas often “triggered” by an event, usually a problem or dilemma that is defined or identified by the instructor (Garrison et al., 2001). In this study, it was observed that as triggered events occurred, participants continued to engage in and operate on the reflection and reasoning exhibited in the triggered event. Thus, a distinction was made between determining the triggered event and the source of the “trigger”, which in this study would either be an expert ethicist from the expert-reasoning example videos (coded as “ET” indicating expert trigger) or peers from the online asynchronous ethical case discussion group (coded as “PT” indicating peer trigger).

As a result, a two-level parallel analysis was conducted for this study, in which the first level of analysis focused on identifying the triggers and the second level of analysis concentrated on identifying the interaction phases demonstrated in the online asynchronous ethical case discussions in order to understand the progress of the online discourse. For instance, if an individual agreed with a previous statement made by his/her peer or if the individual reiterated an idea/concept originally initiated by a peer, the statement by the individual would be coded as PI (Phase I; second level of analysis), whereas the trigger was the previous statement made by the peer and thus the acknowledgment by the individual of his/her peers’ statement/idea/concept would be coded as a PT (first level of analysis). On the other hand, if the statement was based on or had “operated” on something mentioned by one of the experts in the panel discussion, then the codes ET (first level of analysis) and PI (Phase I; second level of analysis) would have been coded. Selected examples from the case discussion on medication error by a student physician (i.e., Case B) from the pilot study with corresponding codes for the second level of analysis are depicted in Table 12.

Table 12

Selected Examples of Coded Discussion Board Content from the Pilot Study using the Coding Scheme

Code		Example
First Level	Second Level	
Peer Trigger (PT)	Phase I (PI)	I agree with John (<i>pseudonym</i>) in that most patients are probably more concerned about their own well-being and healthcare than helping a poorly run/mistake prone hospital learn from its mistakes. I know that if I were the patient, I would not take solace in the fact that my misfortune helped someone else. Instead I would be upset that mistakes were being made and wonder how careless my healthcare team is.
Expert Trigger (ET)	Phase II (PII)	I'd like to comment on what Dr. Bondeson stated. He said that if you present the situation to the pt. as a learning situation for the staff and hospital, the pt. will know that the incident will be less likely to happen again and feel better from that. I don't think that the average pt. is highly concerned about all the quality improvements going on in the hospital unless it affects them. Their main concern is that they are healthy and that nothing bad happens to them during the stay. There are also certain pt. that openly threat hospital staff with lawsuits when they don't get what they want (I've seen that several times just the last 2 weeks at the VA) and you can bet that those individuals will not smile and go on with their business after you tell them that a potentially lethal mistake was made. It all depends on the type of person you are dealing with, and what their threshold is for being upset and trying to express their anger on you.
Expert Trigger (ET)	Phase III (PIII)	It would not be surprising to me if several physicians, even in today's world of medicine, decided not to inform a patient about a "near miss" for fear of lawsuits. Unfortunately, this fear of full disclosure, like Dr. Fleming said, damages the patient-doctor relationship and makes it difficult for the patient to trust us in future medical management. The patient is more likely to be compliant and cooperative if he or she trusts the physician and thus it could be argued that full disclosure provides the best medicine to our patients.

(table continues)

Table 12 (*continued*)

Code		Example
First Level	Second Level	
n/a	Phase IV (PIV)	The concept I found most interesting is that informing your patient about the mistake will help build rapport with the patient. While I understand that it is right and ethical thing to do, I can not grasp that pointing out the holes in the system to the patient will help them trust the system more. For an example, each time there is a recall for anything (car parts, toys, food, etc), I trust that I will be informed, but it does not increase my trust with the company. How much of a hit did bagged spinach take after the E. Coli outbreak? (Spinach Sales Are Slow To Rebound After Outbreak, by Christopher Faherty, <i>Special to the Sun</i> October 10, 2006). For another example, think back to the Challenger disaster...how much trust did the NASA program lose?
n/a	Phase V (PV)	To respond to the comments that it could have been prevented with all the hands that the orders and chart passes through, I think not only could it have been prevented...but it should have been prevented. There must be checks in order to prevent these sorts of easily correctable mistakes from occurring. Medicine has been too slow in establishing checks to prevent pt errors. Secondly, it should not only be the responsibility of the physician to apologize to the patient, but the pharmacist filling the order, the nurse giving the antibiotic, the unit secretary...etc. I think the reason so many errors go unreported is the fear of being blamed...and instead of it being the responsibility of one person, it should be the responsibility of the entire team.

Note: Minor grammatical corrections were made in order to improve readability.

Establishing Inter-coder Reliability. Establishing inter-coder reliability comprised of several steps. First, the researcher trained a second coder on the use of the coding scheme. During the training session, the researcher explained about the coding scheme to the second coder in order to reach a conceptual consensus. Afterwards, the second coder and the researcher independently coded randomly selected discussion board postings from the pilot study ($n = 17$). The researcher's results were then compared with the second coder's results; comparing each coded unit (unitizing) and its associated code (categorizing). All inconsistent codes were discussed until

consensus was reached on the understanding of the coding scheme and the units of codes.

Second, the other coder and the researcher individually coded all the discussion board postings from the main study. All the postings were in chronological sequence and the subject line was kept but participants' names were removed so that they could not be identified. During this coding process, the second coder could call or email the researcher if she had any questions or issues regarding the scoring scheme or the participants' discussion board postings. After the entire data set was coded, all the coded units were compared to ensure that coding was consistent between the second coder and the researcher. The initial agreement ranged from 75% to 90% for each of the ethical case discussion. Subsequently, the researcher met with the second coder to identify, discuss, and resolve inconsistencies until 100 percent agreement on the coding was achieved.

Establishing Interaction Patterns. Several progressive steps were taken in order to ascertain and illustrate interaction patterns demonstrated during the online asynchronous ethical case discussions. First, descriptive statistics including frequencies and percentages of the discussion board postings were provided to indicate the level of participation of the discussion groups in each of the online asynchronous ethical case discussions. The minimum requirement for participation was that participants would post at least two postings per weekly discussion. Additionally, frequencies and percentages of the coded data (triggers and interaction phases) from the discussion board postings were provided to indicate the types and levels of interaction among the discussion group participants. This was informative in that it provided a general idea of how participants engaged and interacted as they reasoned and discussed ethical issues in the cases presented to them. For example, a

higher frequency of expert triggers indicates that the comments made by the experts highly prompted the participants to think and discuss about the ethical issues in the cases. Additionally, a higher number of Phases I and II would suggest that the discussion prompted by the triggers mainly focused on agreeing or disagreeing of what was said.

Second, nonparametric chi-square tests were performed to examine whether or not there were significant differences in the frequencies of coded triggers and interaction phases from the statistically expected values among the discussion groups and in the ethical case discussions. Afterwards, within case ('case' here refers to the individual online asynchronous ethical case discussions) and cross case analyses were performed (Creswell, 2003). Within case analysis was conducted by identifying thematic content that was generated in each of the ethical case discussions. This was followed by a cross case analysis that consisted of reviewing the types and amount of triggers and interaction phases coded for each of case discussions and detecting interaction patterns associated with the various ways of reasoning that emerged from the ethical case discussions across the three discussion groups. Interaction pattern, therefore, in this study is defined as a complete event sequence of a trigger and subsequent interaction phase(s) within a discussion board posting, in which the conversation had evolved around an idea, concept, or issue pertaining to the ethical case discussion.

Prior to the within case and cross case analyses, discourse maps were created to depict the thematic content and interaction patterns that emerged from the ethical case discussions. In a study conducted by Hogan, Nastasi, and Pressley (2000) that examined the discourse patterns and collaborative scientific reasoning in peer and teacher-guided discussions; discourse maps were created to describe the types of

statements that discussion participants made to one another during their knowledge construction discussions. Specifically, the discourse maps illustrated the chronological process and content of collaborative cognition within instances of knowledge construction discussions (Hogan et al., 2000). In this study, it was anticipated that discourse maps would help the researcher understand the development of critical discourse and reasoning by portraying the process in which participants engaged in the ethical case discussions. Table 13 presents an overview of the steps taken in determining the interaction patterns.

Table 13

Overview of Discussion Board Data Analyses Procedures, Purposes, and Results

Analysis Procedure	Purpose	Results
Step 1: Review and tabulate the discussion board data	Determine level of participation	Frequencies and percentages of discussion board postings per discussion group, per ethical case discussion
Step 2: Conduct two levels of content analyses on the discussion board postings using the coding scheme	Identify the types and amount of triggers (first level of analysis) and interaction phases (second level of analysis) demonstrated in the discussion board postings	Frequencies and percentages of the coded triggers and interaction phases
Step 3: Perform chi-square tests	Compare the frequencies of coded triggers and phases among discussion groups and the ethical case discussions	Significant chi-square values would indicate differences in the number of coded triggers and interaction phases among discussion groups and/or ethical case discussions
Step 4: Create discourse maps	Portray the interaction and reasoning processes inherent in the online asynchronous ethical case discussions. Describe the discussion content derived from the ethical case discussions	Four discourse maps
Step 5: Conduct within case analyses	Identify themes that emerged from each of the four ethical case discussions	Thematic content for each of the four online asynchronous ethical case discussion
Step 6: Conduct cross case analyses	Establish and define interaction patterns by looking for consistent trends of reasoning associated with triggers and interaction phases across all three discussion groups and all four ethical case discussions	Interaction patterns

Analysis of the Group Interview

The group interview questions were designed to enrich and substantiate the quantitative data analysis results as well as the emergent themes from the content analysis of the discussion board postings. The semi-structured group interview was audiotaped and transcribed verbatim. Miles and Huberman's (1994) data analysis model, which involves three sub-processes consisting of: data reduction, data display, and conclusion drawing and verification, was used to guide the analysis of this qualitative data. Coding the transcript was an early form of analysis, which led to the identification of categories. That is, while reading the transcript, quick and short notes of three kinds: free notes (simple reactions or reflections to what was said without any implications of becoming a hypothesis but might be useful upon further exploration), theoretical notes (interpretations that might be the beginnings of a hypothesis), or methodological notes (reminders or critical comments on the data-gathering process itself) was made (Bogdan & Biklen, 2003).

Subsequently, Miles and Huberman's (1994) thirteen tactics for generating meaning from qualitative data was used. These tactics ranged from descriptive to explanatory and from concrete to conceptual and abstract. They were:

1. Noting patterns, themes
2. Seeing plausibility
3. Clustering
4. Making metaphors
5. Counting
6. Making contrasts/comparisons
7. Partitioning variables
8. Subsuming particulars into the general

9. Factoring
10. Noting relations between variables
11. Finding intervening variables
12. Building a logical chain of evidence, and
13. Making conceptual/theoretical coherence

According to Miles and Huberman (1994), the first three tactics tell us “what goes with what” (p. 245). The next two tactics let us know “what's there” (p. 245). The following two tactics help “sharpen our understanding” (p. 245). The next four help us “see things and their relationships more abstractly” (p. 245). Last, the final two help us to “assemble a coherent understanding of the data” (p. 246). Although not all of the tactics may be used, it provided a systematic way for looking at the transcription data.

Limitations of the Study

Several limitations to this investigation are recognized:

1. The sample size was limited based on predetermined Internal Medicine Clerkship clinical rotation enrollment numbers. Also, the small sample size limited the probability of correctly determining a statistically significant difference between the two groups on their performance scores from the pre-test and post-test vignettes.
2. While attempts to reduce threats to external validity were made, results cannot be generalized to other schools or other participants until the study is conducted at more than one site and with different participant cohorts.
3. Participants in the CSCB instruction group may have accidentally been exposed to external factors resulting in them being more engaged than participants in the non-CSCB instruction group, or vice versa. Additional problems may have

resulted from discovering that the two groups do differ on the pre-test measure. If groups differ at the onset of the study, any differences that occur in test scores at the conclusion are difficult to interpret.

4. Due to the quasi-experimental design of the study, no cause-effect relationships can be tested. Only preliminary evidence of relationships can be determined which can then be used as a basis for further research.
5. The ethical reasoning skill was measured by written responses to questions pertaining to hypothetical clinical ethical cases (i.e., vignettes). Participants who have written, expressive difficulties may have been able to make better-informed decisions than their writing indicated.
6. The ecological validity of the study was limited by the degree to which the vignettes in this study represented real-life situations. Though the cases were based on actual situations recorded from the ethicist's personal experiences, it was still only a representation of life.
7. The reliability of the raters may have biased the pre-test and post-test results. Also, rater fatigue may have also affected the quality of their scoring.

Protection of Human Subjects

Permission to initiate this study was obtained from the Associate Dean of Education Evaluation and Improvement at the OME, the Director of the Internal Medicine Clerkship, and the medical ethics faculty instructor. Approval for the study was obtained from the university's Health Science Center Institutional Review Board (IRB). Participants were informed that involvement in the study did not affect their grades or their relationship with the medical ethics faculty instructor. Therefore, there should be no substantial risks or discomforts that may occur as a result of the subjects' participation. All data collected in this study were kept confidential and saved in

secure settings.

Chapter Summary

Both quantitative and qualitative methods were used to examine the effects of computer-supported, case-based (CSCB) instruction, specifically example videos of experts' ethical reasoning and online asynchronous ethical case discussions, on third-year medical students' ethical reasoning. More specifically, quantitative methods examined medical students': (1) identification of ethical issues; (2) adoption of multiple viewpoints; (3) resolution of ethical; and, (4) justification of decisions and actions. The quantitative data results and findings, however, were not able to provide rich and comprehensive portrayal in regards to how CSCB instruction influenced medical students' reasoning when contemplating about medical ethical issues. Therefore a qualitative approach was used to help triangulate quantitative results as well as provide an in-depth perspective into how individuals operate on the reasoning others during ethical case discussion.

CHAPTER 4

RESULTS AND FINDINGS

The major focus of this study was to determine whether or not providing third-year medical students with example videos that exhibit experts' ethical reasoning and with opportunities to engage in online asynchronous ethical case discussions would stimulate change and improvement in students' ethical reasoning. The experimental group is referred to as the CSCB instruction group and the control group as the non-CSCB instruction group. The results provided in this chapter were based on twenty-two participants; 11 CSCB instruction group participants from Block 13 and 11 non-CSCB instruction group participants from Block 14. Descriptive characteristics of the participants are displayed in Table 14. An independent-samples *t*-test was conducted to explore whether or not the technology comfort level differed between CSCB instruction and non-CSCB instruction group participants. No significant differences between the two groups were found [$t(20) = -1.20, p = .25$].

Table 14

Descriptive Characteristics of the Research Participants

Characteristic	CSCB Instruction Group (<i>n</i> =11)		non-CSCB Instruction Group (<i>n</i> =11)		Combined (<i>N</i> =22)	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>N</i>	(%)
Sex						
Female	4	(36.36)	6	(54.55)	10	(45.45)
Male	7	(63.64)	5	(45.45)	12	(54.55)
Technology Comfort Level						
Range (min. – max.)	1-10		3-10		1-10	
Mean	5.64		7.00		6.32	
<i>SD</i>	2.69		2.65		2.70	
Area Interested in Specializing						
Emergency Medicine	1	(9.09)	0	(0.00)	1	(4.55)
Family Medicine	2	(18.18)	4	(36.36)	6	(27.27)
Internal Medicine	1	(9.09)	0	(0.00)	1	(4.55)
Ob/GYN	0	(0.00)	3	(27.27)	3	(13.64)
Pathology	0	(0.00)	1	(9.09)	1	(4.55)
Pediatrics	4	(36.36)	0	(0.00)	4	(18.18)
Psychiatry	0	(0.00)	1	(9.09)	1	(4.55)
Radiology	1	(9.09)	0	(0.00)	1	(4.55)
Surgery	1	(9.09)	2	(18.18)	3	(13.64)
Not Sure	1	(9.09)	0	(0.00)	1	(4.55)

In the following section, process for preparing the data is described.

Preparing the Data and Preliminary Analyses

Prior to the analyses, data were examined for missing values. No missing data were observed. Normality of the data sets were assessed by obtaining skewness and kurtosis values. In regards to the self-report survey items (items 1-7; refer to Appendix I for the Pre-Survey and Appendix J for the Post-Survey), all the skewness values were within the +2 to –2 range, which indicated that the data sets were normally distributed and relatively symmetrical (Pallant, 2001). As for the kurtosis values all but two of the self-report survey items were slightly leptokurtic (2.07 and

2.11) but were not considered major departures from normality. For the pre- and post-test scores on the vignettes, the skewness and kurtosis of the measured variables were all less than 1, thus considered normally distributed.

Univariate outliers were also identified by examining box plots. Three cases were identified as univariate outliers for item 1 on the self-report post-survey; one case was an univariate outlier for item 2 on the self-report post-survey; two cases were identified as univariate outliers for item 5 on the self-report post-survey; two cases were identified as univariate outliers for item 6 on the self-report post-survey; and three cases were identified as univariate outliers for item 7 on the self-report post-survey. The Ethical Justification sub-scale on the pre-test had one case identified as an outlier and Ethical Viewpoint sub-scale on the post-test had two cases identified as univariate outliers. As variable transformation was not possible, these values were adjusted to be 1 unit higher or lower than the next most extreme values depending on their position in the distribution (Tabachnick & Fidell, 2007). After the adjustments were made, the data were tested again and no outliers were found.

Comparison of Experimental (CSCB instruction) Group and Control (non-CSCB instruction) Group Participants' Ethical Reasoning Scores at Pre-Test

Independent-samples *t*-tests were conducted to explore whether or not the ethical reasoning scores differed between experimental and control group participants on the dependent measures at the pre-test. No significant differences between the two groups were found; thus, prior to the treatment, the groups were considered to be equivalent in terms of ethical reasoning. Specifically, the Ethical Sensitivity sub-scale mean score for the experimental group was 7.16 ($n = 11$; $SD = 2.17$), whereas the sub-scale mean score for the control group was 6.86 ($n = 11$; $SD = 1.42$), $t(20) = .38$, $p = .71$.

The Ethical Viewpoint sub-scale mean score for the experimental group ($n = 11$;

$M = 10.55$, $SD = 2.50$) and the control group ($n = 11$; $M = 11.09$, $SD = 1.34$) were also not significantly different at pre-test, $t(20) = -.64$, $p = .53$. The Ethical Options sub-scale mean score for the experimental group was 5.70, ($n = 11$; $SD = 1.93$) and the sub-scale mean score for the control group was 5.41 ($n = 11$; $SD = 1.04$). The t -test result was not significant $t(20) = .45$, $p = .66$.

Last, the comparison of the two groups on the Ethical Justification sub-scale mean scores revealed no significant differences at pre-test. The Ethical Justification sub-scale mean score for the experimental group was 4.30 ($n = 11$; $SD = 1.67$) and for the control group was 4.95 ($n = 11$; $SD = 0.86$) with a $t(20) = -1.17$, $p = .26$.

Data Analyses and Results

The following describes the data analysis procedures and methods for both quantitative and qualitative data. Results are organized and reported based on the research questions and corresponding hypotheses (if applicable) that guided the inquiry.

Research Question 1

The first research question addressed in this study was “How does the ethical reasoning of third-year medical students who received computer-supported, case-based instruction compare to those of their peers who did not?” Specifically,

- (1a) Do participants who observed expert-reasoning example videos and who participated in online asynchronous ethical case discussions identify more ethical issues in hypothetical clinical ethical cases than participants who did not?
- (1b) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions adopt more

perspectives in hypothetical clinical ethical cases than participants who did not?

- (1c) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions recognize more options in hypothetical clinical ethical cases than participants who did not?
- (1d) Do participants who observed expert-reasoning examples and who participated in online asynchronous ethical case discussions provide better justifications of their ethical decisions in hypothetical clinical ethical cases than participants who did not?

Of interest was whether or not participants, when presented with the CSCB instruction would perform significantly better in responding to hypothetical clinical ethical cases over participants in the control group. Student responses were scored for ethical sensitivity, ethical viewpoint, ethical options, and ethical justification.

Descriptive statistics including means and standard deviations for the four sub-scale scores and the total score for ethical reasoning on the pre-test and post-test vignettes are summarized in Table 15. In sum, the overall total mean score increased from the pre-test (27.70) to the post-test (28.93) for the CSCB instruction group, while it decreased for the non-CSCB instruction group (pre-test = 28.32, post-test = 26.41).

Table 15

Means and Standard Deviations for Ethical Reasoning Total Score and Sub-scale Scores on the Pre-test and Post-test Measures

Variable	<u>CSCB Group</u> <u>(n=11)</u>		<u>non-CSCB Group</u> <u>(n=11)</u>		<u>Overall (N=22)</u>		Range
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
Total Score	27.70 (7.16)	28.93 (6.38)	28.32 (3.67)	26.41 (6.42)	28.01 (5.56)	27.67 (6.38)	0-91
Ethical Sensitivity	7.16 (2.17)	7.00 (1.83)	6.86 (1.42)	6.05 (2.07)	7.01 (1.80)	6.52 (1.97)	0-22
Ethical Viewpoint	10.55 (2.50)	11.32 (1.68)	11.09 (1.34)	9.91 (1.67)	10.82 (1.98)	10.61 (1.79)	0-25
Ethical Options	5.70 (1.93)	5.75 (1.87)	5.41 (1.04)	5.09 (1.28)	5.56 (1.52)	5.42 (1.60)	0-15
Ethical Justification	4.30 (1.67)	4.77 (2.02)	4.95 (0.86)	5.36 (1.91)	4.63 (1.34)	5.07 (1.95)	0-29

The four hypotheses were tested using a series of four 2 x 2 (group x time) mixed repeated measures analysis of variances (ANOVAs) to evaluate whether or not there was a main effect for group (CSCB, non-CSCB), a main effect for time (pre-test, post-test), or a group-by-time interaction for ethical reasoning (ethical sensitivity, ethical viewpoint, ethical options, ethical justification). If the interaction was found to be significant, a simple effect analysis using paired samples *t*-test with Holm's sequential Bonferroni's procedure was performed to control for Type 1 error. The interaction effect shows if the changes in measured variables over time were different for the two groups.

Before conducting ANOVA, the data were examined to determine whether or not the assumptions of sphericity and homogeneity of variance (Pallant, 2001) were met. The assumption of sphericity was checked using Mauchly's W test. The Box's Test of

Equality of Covariance Matrices (Box's M) was examined to see if the data violated the assumption of homogeneity of variance-covariance matrices, which is whether or not there were differences between the variances obtained from the repeated measures in the sample (Pallant, 2001). Also, an acknowledged limitation of this study was that the assumption of independence of observation between subjects would not be met because the participants were grouped as an intact block of students. Results related to the analyses addressing each hypothesis are presented in the following sections.

Hypothesis 1a. The CSCB instruction will have a significant effect on participants' ability to identify ethical issues in hypothetical clinical ethical cases (i.e., ethical sensitivity). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical sensitivity as measured by the pre- and post-test vignettes than will the non-CSCB instruction group.

To test this hypothesis, a 2 (CSCB instruction group versus non-CSCB instruction group) by 2 (time of measurement: pre-test versus post-test) mixed design ANOVA with one repeated measure for the Ethical Sensitivity sub-scale mean scores was performed. Before the ANOVA procedure, assumptions were checked. In terms of the assumption of sphericity, it was upheld using the Greenhouse-Geisser statistic (1 *df*). Box's M was 4.71 ($F = 1.40, p = .24$), indicating there were no major violations of homogeneity of variance.

ANOVA results showed that there were no statistically significant effects for the main effect for group [$F(1, 20) = 0.79, p = .39$, partial $\eta^2 = .04$, observed power = .14]; the main effect for time [Wilk's Lambda = 0.93, $F(1, 20) = 1.52, p = .23$, partial $\eta^2 = .07$, observed power = .22]; and the group-by-time interaction [Wilk's Lambda = 0.97, $F(1, 20) = 0.69, p = .42$, partial $\eta^2 = .03$, observed power = .12] (partial *eta squared* reported in this study are indicated by partial η^2). This indicates there was no statistically significant difference between the two groups on the Ethical Sensitivity sub-scale mean scores from pre-test to post-test. Therefore the results did not confirm hypothesis 1a.

As seen in Figure 3, the CSCB instruction group mean score for the Ethical Sensitivity sub-scale decreased slightly from the pre-test ($M = 7.16, SD = 2.17$) to post-test ($M = 7.00, SD = 1.83$). For the non-CSCB instruction group, the decrease

from pre-test ($M = 6.86$, $SD = 1.42$) to post-test ($M = 6.05$, $SD = 2.07$) was greater.

However, as previously mentioned, none of these differences were determined to be statistically significant.

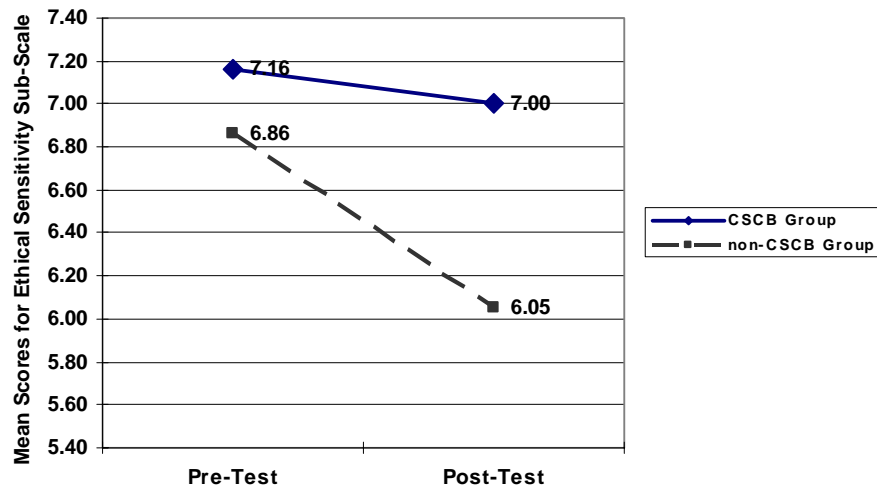


Figure 3. Comparison of Ethical Sensitivity Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)

Hypothesis 1b. The CSCB instruction will have a significant effect on participants' ability to adopt perspectives in hypothetical clinical ethical cases (i.e., ethical viewpoint). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical viewpoint as measured by the pre- and post-test vignettes than will the non-CSCB instruction group.

Sphericity was upheld using the Greenhouse-Geisser statistic (1 *df*). Box's M was 6.66 ($F = 1.98, p = .11$), indicating there were no major violations of homogeneity of variance. ANOVA results for the Ethical Viewpoint sub-scale mean scores revealed that there were no statistically significant effects for the main effect for group [$F(1, 20) = 0.42, p = .53$, partial $\eta^2 = .02$, observed power = .09] and the main effect for time [Wilk's Lambda = 0.99, $F(1, 20) = 0.24, p = .63$, partial $\eta^2 = .12$, observed power = .08]. However, there was significant effect for the group-by-time interaction [Wilk's Lambda = 0.97, $F(1, 20) = 5.54, p < .05$, observed power = .61] with a large effect size (partial $\eta^2 = .22$), indicating that the non-CSCB instruction group had greater change in the Ethical Viewpoint sub-scale mean score from pre-test to post-test (from 11.09 to 9.91) than did the CSCB instruction group (from 10.55 to 11.32). Yet, follow-up paired-samples *t*-tests demonstrated that the decrease in Ethical Viewpoint sub-scale mean scores for the non-CSCB instruction group [$t(10) = 1.83, p = .10$] was not significant. Further, for the CSCB instruction group, the improvement in Ethical Viewpoint sub-scale mean scores from the pre-test to the post-test was not significant [$t(10) = -1.49, p = .17$] as well. Thus, the results did not support hypothesis 1b (see Figure 4).

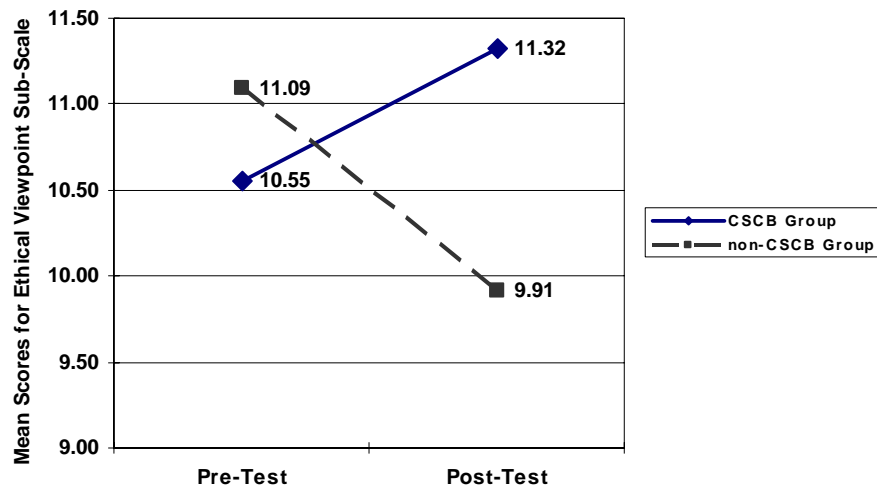


Figure 4. Comparison of Ethical Viewpoint Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)

Since the study involved five vignette cases that had a wide range of ethical considerations under various circumstances, further investigation was done to see if the changes in the Ethical Viewpoint sub-scale scores from the pre-test to the post-test differed among the individual vignettes cases for the CSCB instruction group and non-CSCB instruction group. Therefore additional ANOVA analyses were performed by examining the data from each vignette case separately in regards to the Ethical Viewpoint sub-scale scores. Based on an overall critical value of .05, a Bonferroni type adjustment was considered to control for inflated Type 1 errors. Therefore, the alpha was set at .01 (.05/5). Findings are presented in Table 16. In general, the Ethical Viewpoint sub-scale score increased from pre-test to post-test in four of the five ethical cases (i.e., Cases B, C, D, & E) for the CSCB instruction group, whereas the score decreased for all five ethical cases for the non-CSCB instruction group.

Table 16

Means and Standard Deviations for Ethical Viewpoint Sub-scale Scores on the Pre-test and Post-test Measures, and Summary of ANOVA Results for Group-by-Time Interaction per Vignette Case

Source	Group	Pre-Test	Post-Test	ANOVA		
		Mean (SD)	Mean (SD)	MS	$F(1, 20)$	partial η^2
Case A	CSCB	2.68 (0.98)	2.45 (0.79)	0.09	0.28	.01
	non-CSCB	2.18 (0.60)	2.14 (0.71)			
Case B	CSCB	2.05 (0.47)	2.36 (0.50)	3.01	19.03 **	.49
	non-CSCB	2.64 (0.50)	1.90 (0.54)			
Case C	CSCB	1.77 (0.61)	2.18 (0.68)	0.82	2.43	.11
	non-CSCB	2.23 (0.88)	2.09 (0.70)			
Case D	CSCB	2.27 (0.79)	2.41 (0.74)	0.21	0.81	.04
	non-CSCB	2.18 (0.40)	2.05 (0.65)			
Case E	CSCB	1.77 (0.68)	2.00 (0.45)	0.57	3.88	.16
	non-CSCB	1.86 (0.45)	1.64 (0.64)			

Note: CSCB ($n = 11$), non-CSCB ($n = 11$), MS = Mean Square, partial η^2 = effect size, ** $p < .001$

Results revealed that there was a significant effect for the group-by-time interaction in regards to vignette Case B (i.e., Medication Error by Student Physician) [Wilk's Lambda = 0.51, $F(1, 20) = 19.03$, $p = .00$, partial $\eta^2 = .49$, observed power = .99].

Follow-up t -tests demonstrated that the increase in the Ethical Viewpoint sub-scale score for Case B from pre-test to post-test was not significant for the CSCB instruction group [$t(10) = -2.28$, $p = .05$, partial $\eta^2 = .34$]. As for the non-CSCB instruction group, however, the decrease in their Ethical Viewpoint sub-scale score for Case B from pre-test to post-test was significant [$t(10) = 3.73$, $p < .005$, partial $\eta^2 = .58$].

These results indicate that there were some significant changes from the pre-test to post-test Ethical Viewpoint sub-scores for Case B. Consequently, fine-grained analyses were conducted with emphasize on qualitative data pertaining to Case B in

effort to identify factors that may have contributed to this finding.

Hypothesis 1c. The CSCB instruction will have a significant effect on participants' ability to recognize options in hypothetical clinical ethical cases (i.e., ethical options). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical options as measured by the pre- and post-test vignettes than will the non-CSCB instruction group.

Sphericity was upheld using the Greenhouse-Geisser statistic (1 *df*). Also, there were no major violations to the homogeneity of variance (Box's $M = 6.02$, $F = 1.79$, $p = .15$). ANOVA results for the Ethical Options sub-scale mean scores showed that there were no statistically significant effects for the main effect for group [$F(1, 20) = 0.77$, $p = .39$, partial $\eta^2 = .04$, observed power = .13]; the main effect for time [Wilk's Lambda = 0.99, $F(1, 20) = 0.12$, $p = .73$, partial $\eta^2 = .01$, observed power = .06]; and the group-by-time interaction [Wilk's Lambda = 0.99, $F(1, 20) = 0.21$, $p = .65$, partial $\eta^2 = .01$, observed power = .07]. Although Figure 5 shows that the Ethical Options sub-scale mean scores from pre-test to post-test slightly increased for the CSCB instruction group, while it decreased for the non-CSCB instruction group, the statistical results indicated that there was no significant difference between the two groups in regards to the changes in mean scores. Thus, findings did not support hypothesis 1c.

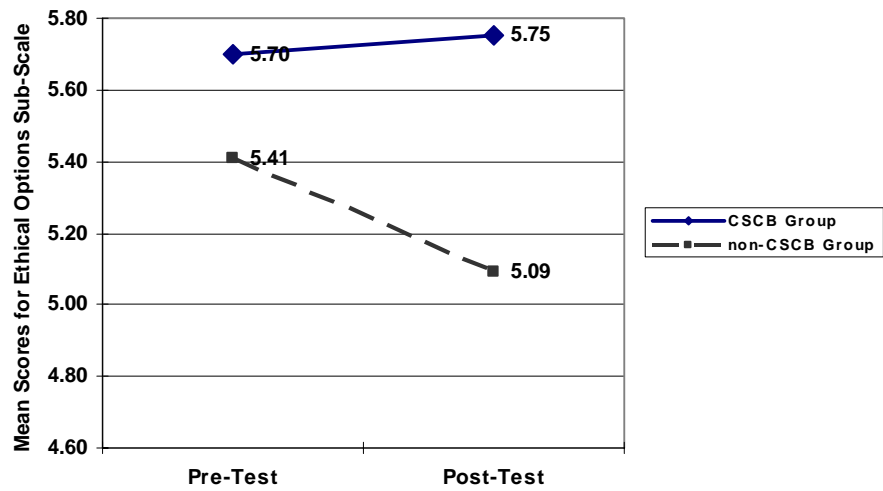


Figure 5. Comparison of Ethical Options Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)

Hypothesis 1d. The CSCB instruction will have a significant effect on participants' ability to provide justification for their ethical decisions in hypothetical clinical ethical cases (i.e., ethical justification). After the instruction, the CSCB instruction group will have significantly better mean scores in terms of ethical justification as measured by the pre- and post-test vignettes than will the non-CSCB instruction group.

Sphericity was upheld using the Greenhouse-Geisser statistic (1 *df*). Also, there were no major violations to the homogeneity of variance (Box's $M = 7.77$, $F = 2.31$, $p = .07$). ANOVA results for the Ethical Justification sub-scale mean scores showed that there were no statistically significant effects for the main effect for group [$F(1, 20) = 0.97$, $p = .34$, partial $\eta^2 = .05$, observed power = .16]; the main effect for time [Wilk's Lambda = 2.16, $F(1, 20) = 1.77$, $p = .20$, partial $\eta^2 = .08$, observed power = .25]; and the group-by-time interaction [Wilk's Lambda = 0.01, $F(1, 20) = 0.01$, $p = .92$, partial $\eta^2 = .00$, observed power = .05]. While the Ethical Justification sub-scale mean scores had improved from pre-test to post-test for both groups (see Figure 6), ANOVA results indicated there was no statistically significant difference in the variance between the two groups. Therefore hypothesis 1d was not confirmed.

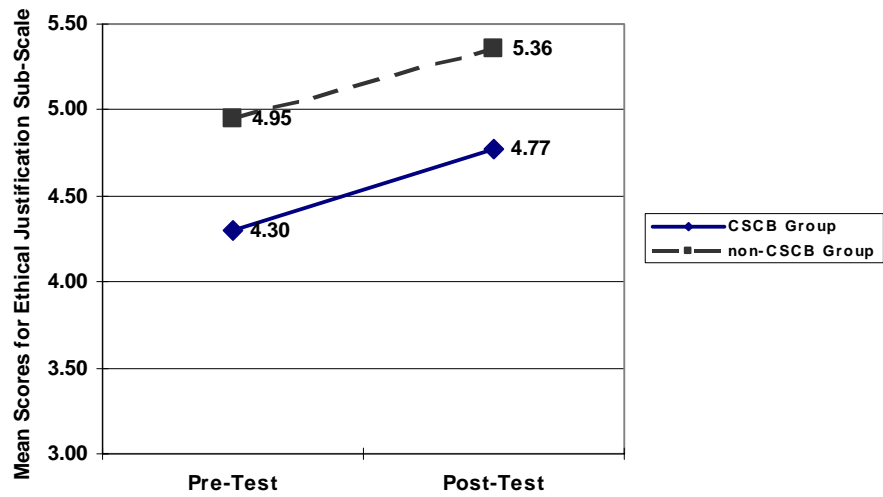


Figure 6. Comparison of Ethical Justification Sub-scale Mean Score Change from Pre-test to Post-test by Treatment Group (CSCB instruction versus non-CSCB instruction)

Research Question 2

The second research question was: “Is there a difference in third-year medical students’ perception of preparedness to deal with ethical issues in clinical settings before and after the medical ethics curriculum in the Internal Medicine clerkship rotation?” The hypothesis was the following: the medical ethics curriculum in the Internal Medicine clerkship rotation will improve students’ ratings of their own ability to deal with ethical issues in clinical settings as measured by the pre- and post-surveys.

A paired-samples *t*-test was conducted to evaluate the impact of the ethics curriculum on medical students’ perception of their medical ethics training and ability to deal with ethical issues in clinical settings as measured by the seven items on the pre- and post-surveys. Perception data was derived from responses on a 9-point scale where higher numbers represented more favorable perceptions. There was a statistically significant increase in the survey total score from pre-survey ($M = 36.36$, $SD = 7.87$) to post-survey ($M = 48.68$, $SD = 6.52$), $t(22) = -8.83$, $p < .00$ for all of the participants as a whole. The *eta squared* statistic (.79) indicated a large effect size. Thus, hypothesis 2 was confirmed.

Further paired-samples *t*-tests by treatment group (CSCB, non-CSCB) were performed on each of the seven survey items. Results revealed that the scores for each of the seven survey items had significantly increased for participants in both groups (see Table K1 in Appendix K). Overall, the total scores increased from pre-survey ($M = 34.36$, $SD = 8.93$) to post-survey ($M = 46.82$, $SD = 8.05$) for the CSCB instruction group [$t(10) = -7.08$, $p = .00$], with an effect size of .83; as well as for the non-CSCB instruction group [pre-survey $M = 38.36$, $SD = 6.44$; post-survey $M = 50.55$, $SD = 4.11$, $t(10) = -5.41$, $p = .00$], with an effect size of .75.

To triangulate with the quantitative findings and to gain a more comprehensive understanding of how the participants perceived the instructional intervention had affected them, a semi-structured group interview with the CSCB instruction group was conducted. Three themes emerged from the group interview: (1) participants preferred face-to-face interaction over online asynchronous learning, (2) participants would rather have used their time to study material related to the board examinations, that is improving hard skills (e.g., medical knowledge, patient care) rather than developing soft skills (such as medical ethical reasoning), and (3) although the curriculum pushed the participants to look a little deeper into what their own values, beliefs, and approaches to ethical issues were, they felt that were already competent enough to deal with ethical issues presented in the curricular activities.

Nevertheless, the curriculum did make them aware that some issues were not always “clear cut” as one participant stated that there were “uniform processes available to help assess ethical situations”, and there were “reasonable strategies” for approaching most ethical dilemmas. Also, although the participants commented that the videos were very helpful and informative because they demonstrated how an ethics committee would conduct an ethics consultation, the participants still preferred to observe an actual ethics consult so that they would have the opportunity to listen to real patient cases and be allowed to ask questions afterwards. Overall, the participants thought that what they learned during the M1 and M2 years were reinforced by the ethics curriculum and so they in general expressed confidence in their ethical reasoning skills. More detailed information from the group interview will be drawn upon to support and supplement the interpretations given in the next chapter.

Research Question 3

The third research question was: “How were third-year medical students’ who participated in online asynchronous ethical case discussions able to ‘operate on’ the reasoning of others and to what extent does that affect their ethical reasoning of hypothetical clinical ethical cases?” Specifically what were the amount and patterns of interaction in the online asynchronous ethical case discussions regarding hypothetical clinical cases with ethical considerations?

The discussion board content was used to determine if the participants demonstrated acts of reasoning and reasoning that operated on the reasoning of others as they engaged in online asynchronous ethical case discussions. All students’ discussion board postings were collected and analyzed to identify two types of triggers (expert and peer), which was the first level of analysis. Afterwards, using the adapted IAM coding scheme, the discussion board postings were coded again for a second level of analysis.

A summary of the frequency of discussion board postings by discussion group per online asynchronous ethical case discussion is presented in Table 17. Each ethical case discussion had approximately the same total amount of discussion board messages posted (from 20 to 22 messages). The total number of posted discussion board messages does not include the end-of-week wrap-up message posted from the medical ethics faculty instructor. In sum, Group 1 and 2 had the same number of discussion board postings per ethical case discussion and in total (30), whereas Group 3, although had more participants, posted the lowest number of discussion board postings per ethical case discussion and in total (23) but had written more content than the two other groups.

Table 17

Frequency of Discussion Board Messages Posted to the Online Asynchronous Ethical Case Discussion Forums by Discussion Group

Online Asynchronous Ethical Case Discussion	<u>Group 1</u> <u>(n=3)</u> # posts (words)	<u>Group 2</u> <u>(n=3)</u> # posts (words)	<u>Group 3</u> <u>(n=4)</u> # posts (words)	Total
Case B: Medication Error by a Student Physician	8 (964)	8 (882)	5 (1,130)	21 (2,976)
Case C: Patient Requesting to “Get it over with”	8 (1,170)	8 (1,287)	6 (1,441)	22 (3,898)
Case D: Substance Abuse by a Fellow Colleague	7 (838)	7 (574)	6 (946)	20 (2,358)
Case E: Discriminatory Behavior towards a Fellow Colleague	7 (727)	7 (939)	6 (1,046)	20 (2,712)
Total	30 (3,699)	30 (3,682)	23 (4,563)	83 (11,944)

Descriptive statistics for the triggers and interaction phases for each discussion group in each online asynchronous ethical case discussion are displayed in Tables 18 and 19.

As displayed in Table 18, except for Case E, regarding discriminatory behavior made towards a fellow colleague by an attending physician; the other three cases exhibited a higher percentage of expert triggers (discourse that “operated” on something stated by the experts in the panel discussion) (65%, 55%, and 58% respectively) compared to peer triggers. In addition, Case B (regarding medication error by a student physician) had the most number of triggers (34), whereas Case E had the least number of triggers in total (18). Figure 7 shows the frequency distribution of coded triggers in each online asynchronous ethical case discussion.

Reviewing the discussion groups separately, Group 1 had higher percentages of

expert triggers in the Cases B, C, and D discussions (67%, 62%, and 67% respectively) than peer triggers. For Group 2, they had a higher percentage of peer triggers in the Cases C, D, and E discussions (63%, 57%, and 83% respectively) than expert triggers. Last, Group 3 had a higher percentage of expert triggers (67%, 63%, and 60% respectively) compared to peer triggers in the Cases B, C, and D discussions. Figure 9 exhibits the frequency distribution of coded triggers across the discussion groups.

In two separate chi-square tests for comparison, results revealed that the frequencies of coded triggers among the three discussion groups were not significant [$\chi^2 (2, N = 107) = 1.76, p = .42$]. This indicates that the actual amount of triggers had an equal likelihood to occur in any one of the discussion groups. However, chi-square results revealed that differences in frequencies of coded triggers among the four ethical case discussions were significant [$\chi^2 (3, N = 107) = 7.67, p = .05$]. In reviewing the ethical case discussions, it was found that Case B had a higher percentage of expert triggers (68%), whereas Case E had a higher percentage of peer triggers (72%), than the statistically expected values.

Table 18

Frequency and Percentage of Expert and Peer Triggers in Online Asynchronous Ethical Case Discussions by Discussion Group

Discussion Group	Expert Trigger (ET)			Peer Trigger (PT)			Sub-total
	Freq	% (Group)	% (Trigger)	Freq	% (Group)	% (Trigger)	
Case B: Medication Error by a Student Physician							
Group 1	8	67%	35%	4	33%	36%	12
Group 2	7	70%	30%	3	30%	27%	10
Group 3	8	67%	35%	4	33%	36%	12
Sub-total	23		65%	11		35%	34
Case C: Patient Requesting to “Get it over with”							
Group 1	8	62%	50%	5	39%	39%	13
Group 2	3	38%	19%	5	63%	39%	8
Group 3	5	63%	31%	3	38%	23%	8
Sub-total	16		55%	13		45%	29
Case D: Substance Abuse by a Fellow Colleague							
Group 1	6	67%	40%	3	33%	27%	9
Group 2	3	43%	20%	4	57%	36%	7
Group 3	6	60%	40%	4	40%	36%	10
Sub-total	15		58%	11		42%	26
Case E: Discriminatory Behavior towards a Fellow Colleague							
Group 1	0	0%	0%	3	100%	23%	3
Group 2	1	17%	20%	5	83%	39%	6
Group 3	4	44%	80%	5	56%	39%	9
Sub-total	5		28%	13		72%	18
Total	58		54%	49		46%	107

Note: Group 1 ($n = 3$), Group 2 ($n = 3$), Group 3 ($n = 4$), percentages may not add up to exactly 100% due to rounding.

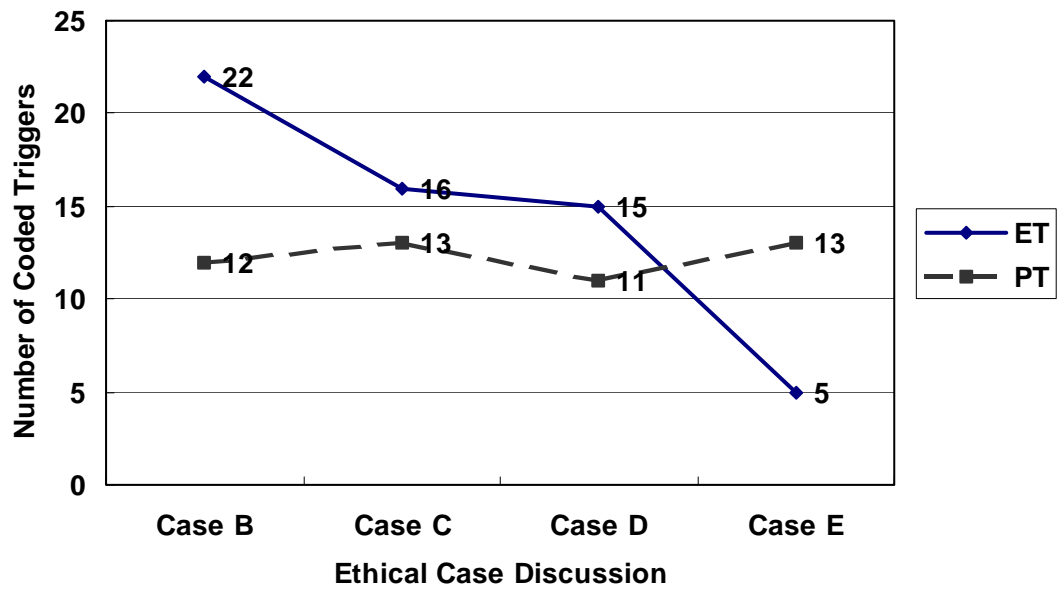


Figure 7. Frequency Distribution of Triggers Across Online Asynchronous Ethical Case Discussions

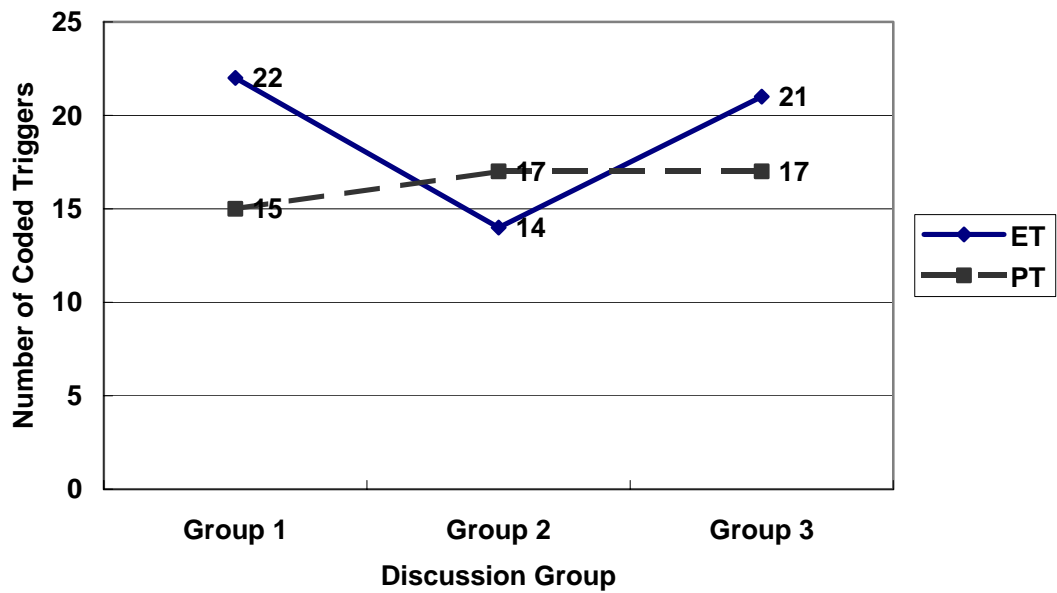


Figure 8. Frequency Distribution of Triggers Across Discussion Groups

As reported in Table 19, Case C ethical case discussion had the most number of coded interaction phases (73) in total, whereas Case D had the least total number of coded interaction phases (39). Results from a chi-square test concluded that the frequencies of coded interaction phases were not significantly different from the statistically expected values for the ethical case discussions [χ^2 (12, $N = 225$) = 11.04, $p = .53$]. Chi-square results also did not show significant differences in frequencies of the coded interaction phases among the discussion groups [χ^2 (8, $N = 225$) = 8.06, $p = .43$]. Figures 9 and 10 illustrate the frequency distribution of interaction phases across the online asynchronous ethical case discussions and across the discussion groups respectively.

In terms of interaction phases, a total of 225 units were coded from all of the 83 discussion board postings. Phase III had the most coded units (80), which was 36% of all the coded units. Phase I had the second highest number of coded units (70), making up 31% of all the coded units. The interaction phase with the least amount of coded units was Phase V with a total of 8 coded units (about 4% of all the coded units).

Table 19

Frequency and Percentage of Interaction Phases in Online Asynchronous Ethical Case Discussions by Discussion Group

Discussion Group	Interaction Phase					Sub-total
	PI	PII	PIII	PIV	PV	
<u>Case B: Medication Error by a Student Physician</u>						
Group 1 (n=3)	8	4	7	3	1	23
% within Phase	36%	36%	33%	43%	25%	
% within Group	35%	17%	30%	13%	4%	
Group 2 (n=3)	7	3	6	0	2	18
% within Phase	32%	27%	29%	0%	50%	
% within Group	39%	17%	33%	0%	11%	
Group 3 (n=4)	7	4	8	4	1	24
% within Phase	32%	36%	38%	57%	25%	
% within Group	29%	17%	33%	17%	4%	
Sub- total	22	11	21	7	4	65
% within Phase	34%	17%	32%	11%	6%	
<u>Case C: Patient Requesting to “Get it over with”</u>						
Group 1 (n=3)	8	5	12	4	0	29
% within Phase	42%	50%	41%	29%	0%	
% within Group	28%	17%	41%	14%	0%	
Group 2 (n=3)	4	4	6	7	0	21
% within Phase	21%	40%	21%	50%	0%	
% within Group	19%	19%	29%	33%	0%	
Group 3 (n=4)	7	1	11	3	1	23
% within Phase	37%	10%	38%	21%	100%	
% within Group	30%	4%	48%	13%	4%	
Sub-total	19	10	29	14	1	73
% within Phase	26%	14%	40%	19%	1%	

(table continues)

Table 19 (*continued*)

<u>Case D: Substance Abuse by a Fellow Colleague</u>						
Group 1 (<i>n</i> =3)	4	4	5	1	0	14
% within Phase	27%	44%	50%	33%	0%	
% within Group	29%	29%	36%	7%	0%	
Group 2 (<i>n</i> =3)	6	1	2	0	2	11
% within Phase	40%	11%	20%	0%	100%	
% within Group	55%	9%	18%	0%	18%	
Group 3 (<i>n</i> =4)	5	4	3	2	0	14
% within Phase	33%	44%	30%	67%	0%	
% within Group	36%	29%	21%	14%	0%	
Sub-total	15	9	10	3	2	39
% within Phase	38%	23%	26%	8%	5%	
<u>Case E: Discriminatory Behavior towards a Fellow Colleague</u>						
Group 1 (<i>n</i> =3)	3	2	7	0	0	12
% within Phase	21%	29%	35%	0%	0%	
% within Group	25%	17%	58%	0%	0%	
Group 2 (<i>n</i> =3)	3	4	5	3	1	16
% within Phase	21%	57%	25%	50%	100%	
% within Group	19%	25%	31%	19%	6%	
Group 3 (<i>n</i> =4)	8	1	8	3	0	20
% within Phase	57%	14%	40%	15%	0%	
% within Group	40%	5%	40%	50%	0%	
Sub-total	14	7	20	6	1	48
% within Phase	29%	15%	42%	13%	2%	
Total	70	37	80	30	8	225
	31%	16%	36%	13%	4%	

Note: Percentages may not add up to exactly 100% due to rounding.

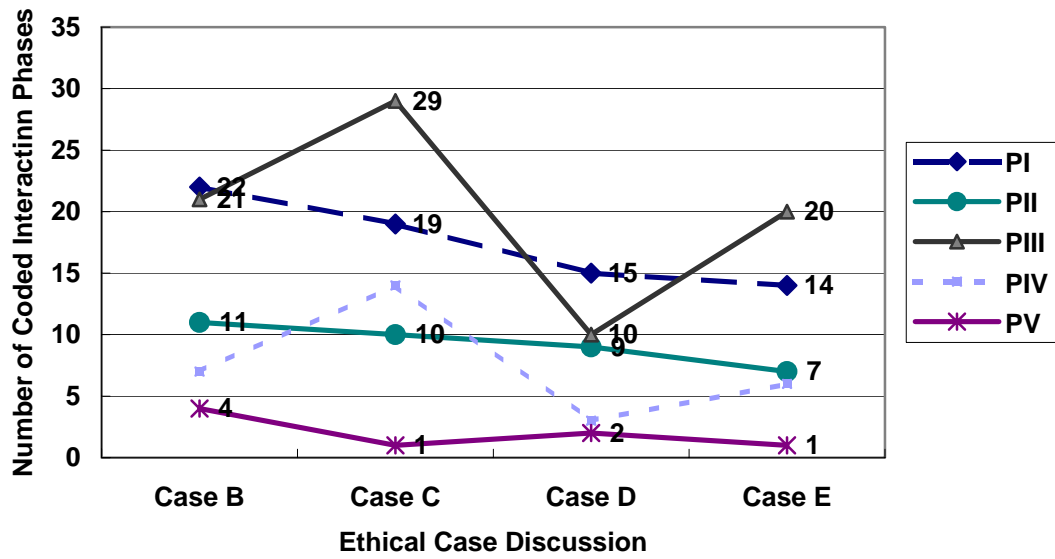


Figure 9. Frequency Distribution of Interaction Phases Across Online Asynchronous Ethical Case Discussions

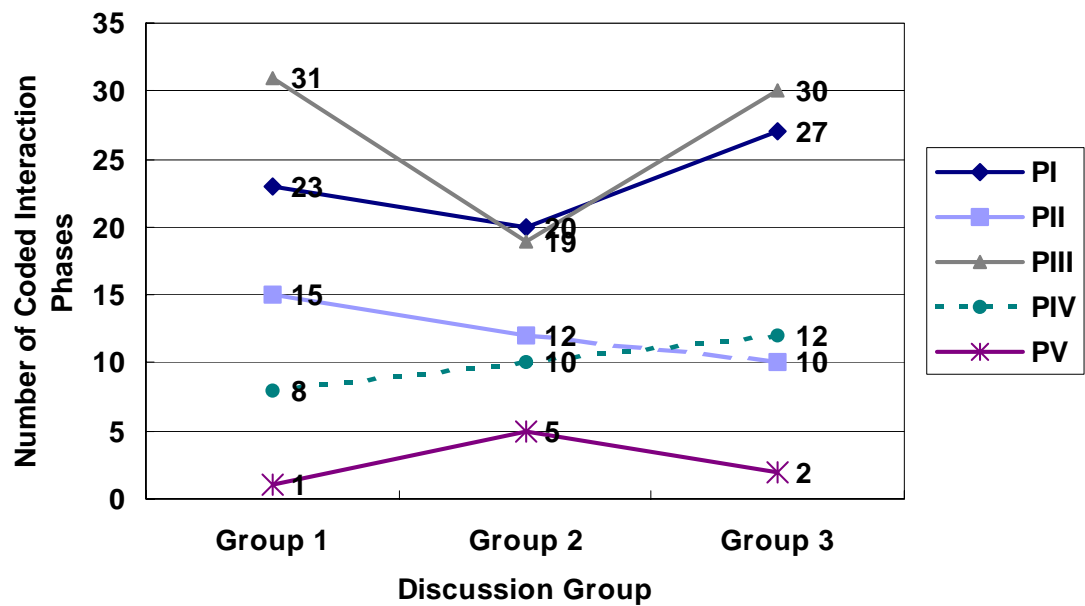


Figure 10. Frequency Distribution of Interaction Phases Across Discussion Groups

Interaction Patterns in Online Asynchronous Ethical Case Discussions

In order to better understand what emergent themes (within case analyses) and interaction patterns (cross case analyses) were prevalent during the online asynchronous ethical case discussions, four separate discourse maps were created, one for each ethical case discussion. Figure 11 displays a sample discourse map of the online asynchronous ethical case discussion about medication error by a student physician (Case B).

The first column shows the three discussion groups. The second column lists the types that initiated the interactions developed among discussion group participants. The sequence of the interaction is represented horizontally. One-direction arrows connect the flow of the ethical case discussion content. The portion in the discourse map called interaction space displays the substance of the ethical case discussion. All the statements in the interaction space were examples of Interaction Phase IIIs. In sum, Figure 11 displays the ethical case discussion on the discourse level without any interpretation or revealing patterns of interaction and reasoning.

Following, within and cross case analyses were conducted in which thematic content and interaction patterns were identified and presented in Tables 20 and 21 respectively. Examples of the coded data for each of the identified interaction pattern follow afterwards.

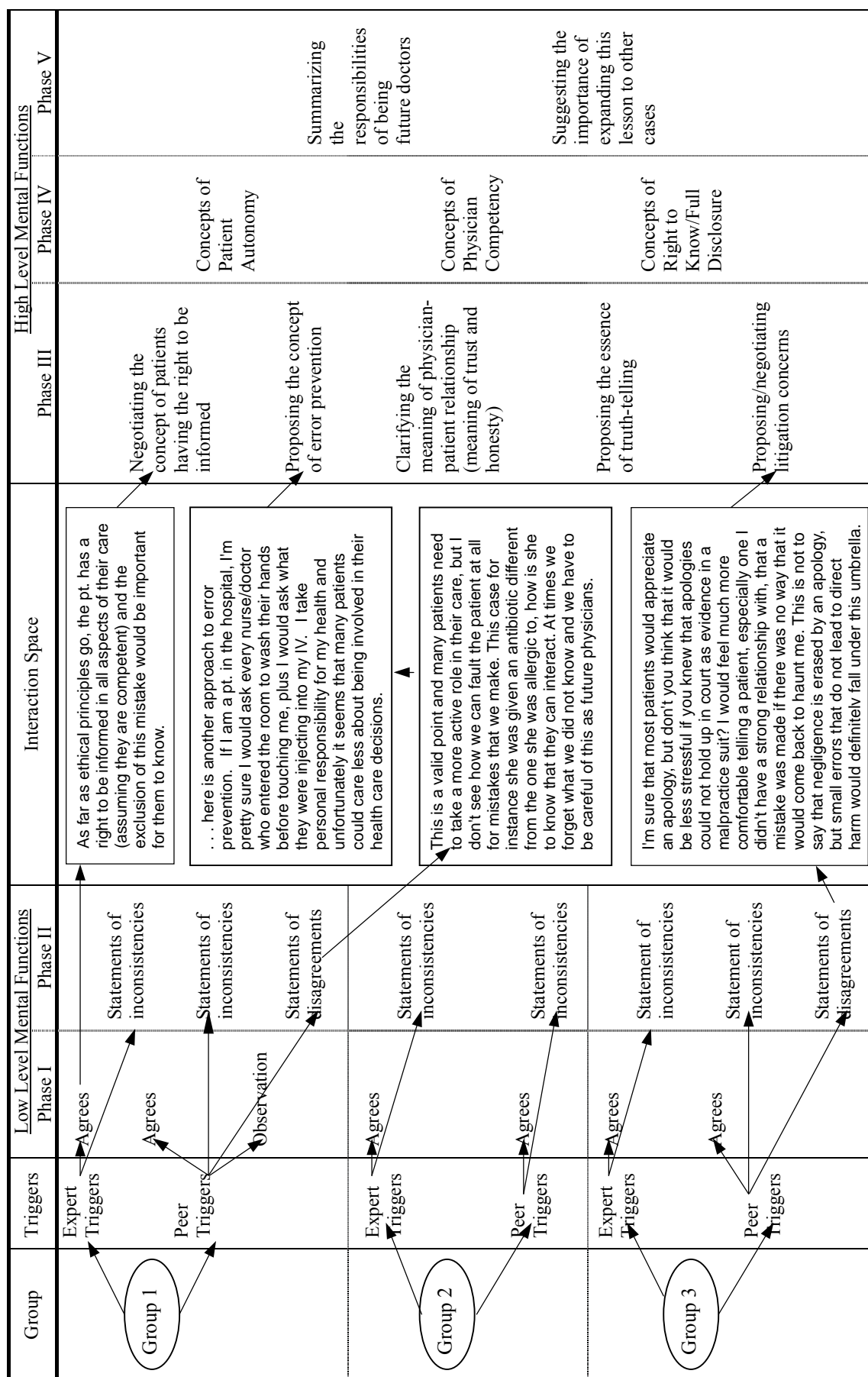


Figure 11. Sample Discourse Map of Case B (Medication Error by a Student Physician) Online Asynchronous Ethical Case Discussion

In terms of thematic content, Table 20 summarizes the main themes that emerged and were formulated from the online asynchronous ethical case discussions.

Table 20

Thematic Content from Ethical Case Discussions

Online Asynchronous Ethical Case Discussion	Main Discussion Themes
Case B: Medication Error by a Student Physician	Litigation Concerns and Issues
	Informed Consent
	Physician-Patient Relationship (Honesty/Respect/Trust)
	Truth-telling (Ethical and Professional)
	Patient Autonomy
	Patients' Right to Know/Full Disclosure
	Error Prevention
	Physician Competency
Case C: Patient Requesting to "Get it over with"	Concept of "Double Effect"
	Comfort Measures
	Reasoning behind Patients' Request
	Mental Capacity of Patient
	Current Quality of Life and Pain Management Plan
	Physician Assisted Suicide
	Patient Autonomy
	Personal Beliefs and Experiences
Case D: Substance Abuse by a Fellow Colleague	Representing all medical students
	Patient Safety
	Harm to Self
	Long-term Effects and Consequences
	Directly Confronting Fellow Colleague vs. Friendship
	Professional Assistance
	Doctors are humans too
Case E: Discriminatory Behavior towards a Fellow Colleague	Directly Confronting the Attending Physician
	Follow Chain of Command
	Respect/Discrimination/Racism
	Unprofessional Behavior/Abuse of Power
	Negative Impact on Learning
	Support Fellow Colleague

Table 21

Major Types of Interaction Patterns in Online Asynchronous Ethical Case Discussions

Interaction Pattern/ Sub-category (Sequence of Interaction)	Description
<p>Agreement</p> <ul style="list-style-type: none"> - with Expert (ET→PI) - with Peer (PT→PI) 	<p>Participant expressed agreement with or reiterated what the panel expert(s) had stated in the video clip</p> <p>Participant expressed agreement with or reiterated what his/her peer(s) had previously written</p>
<p>Dissonance</p> <ul style="list-style-type: none"> - with Expert (ET→PII) - with Peer (PT→PII) 	<p>Participant expressed disagreement with or acknowledged inconsistencies with his/her prior knowledge/understanding with that of what the panel expert(s) had stated in the video clip</p> <p>Participant expressed disagreement with or acknowledged inconsistencies with his/her prior knowledge/understanding with that of what his/her peer(s) had previously written</p>
<p>Co-construction</p> <ul style="list-style-type: none"> - with Expert (ET→PI/PII→PIII) - with Peer (PT→PI/PII→PIII) 	<p>Following agreement or disagreement with panel expert(s), participant proposed, extended, negotiated, and/or clarified the mentioned concept/theme/issue using his/her own words, interpretation, and/or viewpoint</p> <p>Following agreement or disagreement with peer(s), participant proposed, extended, negotiated, and/or clarified the mentioned concept/theme/issue using his/her own words, interpretation, and/or viewpoint</p>
Testing and Modifying of Proposed Synthesis or Co-construction (PIV)	Participant examined the discussion content against one's own existing cognitive schema, personal experience, and or other data provided
Summarization and Metacognitive Statements (PV)	Participant summarized statements, generated metacognitive statements that express change in ways of thinking, and/or made effort to apply new understanding/knowledge to future practice

Agreement with Expert (ET→PI). An example of this interaction pattern was found in the ethical case discussion about a patient requesting to “get it over with” (Case C). One student commented:

“First, as mentioned in the video, it would probably be pertinent to question the patient further about the reasoning for their assisted suicide request. It would be important to find a reason why they desire such action now versus 6 months ago. It would also be important to assess a person's competence at the time to make sure they are capable of such decisions.”

Agreement with Peer (PT→PI). In the ethical case discussion about medication error by a student physician (Case B), one student wrote:

“I think John (*pseudonym*) makes an interesting point about the role of honesty in the doctor-patient relationship. Without honesty, any treatment we offer seems inherently compromised because it lacks the underlying aspect of working solely for the good of our patients.”

Dissonance with Expert (ET→PII). In regards to the ethical case of a patient requesting to “get it over with” (Case C), although the participant reasons through all the various points of view presented in the case discussion, in the end, it was apparent that he/she was still uncertain of what he/she would do in the real world context:

“I do not agree with physician assisted suicide. I would suspect that I probably fall in the majority within the medical community on this particular issue. However, I can see how the double effect presents an appealing alternative to many physicians. I agree with Dr. Fleming that the focus of this is to reduce suffering, not to induce death. By making this the goal, it differentiates it from PAS. However, that being said - in the end you are still effectively inducing death. While I may change my mind once I'm actually in this situation for the first time and more closely experience the pain many patients feel at the end of their life, personally I do not feel I could prescribe a high-dose of narcotics, knowing that it would likely lead to the patient's death. It is a difficult issue. I feel like I am far from understanding what the correct answer is.”

Dissonance with Peer (PT→PII). In discussing what they would do in a situation where it was noticeable that a fellow colleague had a substance abuse problem (Case D), one student commented that he would approach the matter differently than what his peer had suggested:

Student A: “I agree that our responsibility is to address the situation, not ignore it. By addressing the situation, we can not only protect patients, but also take the first step at getting the student the help he needs. In the long run, I feel like the student would probably agree with us, too.”

Student B: “I think your approach is interesting, John (*pseudonym*). I don't think that I'd want to confront the person myself, however. I would rather let the higher-up know about it first. That way, I could possibly remain friends with the person to help them out through their rehab by remaining anonymous.”

In this ethical case discussion, the statement by Student B would be considered an example of the ‘dissonance with peer’ interaction pattern.

Co-construction with Expert (ET→PI/PII→PIII). The following was another example about the concept of the physician-patient relationship during the ethical case discussion about medication error by a student physician (Case B). This was coded as co-construction with expert, rather than just agreement with expert, because the student gone in-depth to clarify the importance of trust (and honesty) in providing good, quality patient care. The student stated:

“I found that I agreed with the discussion brought up by the expert panel. Patient trust is an important factor in any doctor patient relationship. Without the patient's trust, any treatment plan offered by the physician is prone to compromise; if the patient does not trust you, she may be unwilling to commit to the treatment regimen that you're offering. She may not take the prescription, or make the lifestyle changes, or return for scheduled check-ups if you lose her trust. I think it is important to remember that the relationship between a doctor and a patient has similarities to any other relationship; the

best ones involve open communication, mutual respect, and common goals (patient well-being).”

Co-construction with Peer (PT→PI/PII→PIII). Although the student in the following quote started out by agreeing with his fellow peers, he/she continued to propose a different viewpoint regarding the ethical case discussion about the discriminatory behavior towards a fellow colleague by an attending (Case E).

“I agree with you guys that racism is never ever justified. No way. However, if this turned out to be a case where the student was overreacting to comments made, then I don't really have a problem with the Attending. If she wants to be an a-hole, then so be it. It's not the kind of thing you'd advertise on the hospital web site, but it sounds like she gets students to learn a ton. I'd rather have this type of Attending than the nonexistent type. At least in this case you learn to think on your feet and try to do your best, even if it's never going to be enough. All in all, there might be a few students in our class who could use some "tough love" or else they may end up hurting a few patients in the near future when it's their turn to be the boss.”

Testing and Modifying of Proposed Synthesis or Co-construction (PIV). One participant in the ethical case discussion about medication error by a student physician (Case B) had pointed out that things could have resulted differently under different circumstances and therefore they (meaning the participant and his/her fellow colleagues) need to be mindful of what is important in being a physician.

“I think that is also important to expand the lesson of this case to other cases. This case seems benign because the injury to the patient from the error was negligible, and the patient never gave the impression that she was 'out to get' the physician. The stakes may be higher, however, if the patient developed more severe adverse reactions. The temptation would be greater to try to cover one's tracks if the patient, for example, had gone into anaphylactic shock. However, even when the risks are greater, I think it is important to remember that our goal is excellent patient care. Any time or energy we spend back-tracking is time and energy not spent trying to correct the problem/adverse reactions.”

Others felt that telling the patient was simply the ‘right thing to do’ as one student wrote:

“I feel that there is a moral imperative to admit all wrongdoing, regardless of outcome. There are many facets of our society that live by the opposite belief, and I think that medicine is obligated to remain unequivocally honest and forthright with regards to full disclosure.”

Summarization and Metacognitive Statements (PV). In the ethical case discussion about medication error by a student physician (Case B), one student admitted that:

“I didn't think about it before because it's a hypothetical situation, but I tried to imagine talking with the patient about a mistake, and I realized that it would be a pretty scary experience, especially when most of us hate to admit we're wrong because we're supposed to have all the right answers all the time.”

Another example was a statement made regarding the ethical case discussion about a patient requesting to “get it over with” (Case C).

“Before listening to the panel's discussion, I recall thinking there were really just 2 options: helping the patient to die or not. While I did know that other options existed and that a much more extensive work up was warranted, I think I let my pre-conceived notions about physician assisted suicide make this case into a much more black and white issue than it really was.”

After the interaction patterns were identified, the quantity of the interaction patterns from each of the ethical case discussions is displayed in Table 22.

Table 22

Frequency of Interaction Patterns in Online Asynchronous Ethical Case Discussions

Interaction Pattern	Case B	Case C	Case D	Case E	Total
Agreement with Expert (ET→PI)	2	2	6	0	10
Agreement with Peer (PT→PI)	6	1	6	5	18
Dissonance with Expert (ET→PII)	6	2	3	0	11
Dissonance with Peer (PT→PII)	1	2	1	3	7
Co-construction with Expert (ET→PI/PII→PIII)	13	12	4	5	34
Co-construction with Peer (PT→PI/PII→PIII)	5	10	4	5	24
Testing and Modifying of Proposed Synthesis or Co-construction (PIV)	7	14	3	6	30
Summarization and Metacognitive Statements (PV)	4	1	2	1	8
Total	44	44	29	25	142

Chapter Summary

The major focus of this study was to determine whether or not providing third-year medical students with example videos that exhibit experts' ethical reasoning and with opportunities to engage in online asynchronous ethical case discussions will stimulate change and improvement in the students' ethical reasoning. This chapter was organized around the three main research questions, which were: (1) How does the ethical reasoning of third-year medical students who received computer-supported, case-based instruction compare to those of their peers who did not?; (2) Is there a difference in third-year medical students' perception of preparedness to deal with ethical issues in clinical settings before and after the medical ethics curriculum in the Internal Medicine clerkship rotation?; and (3) How were third-year medical students' who participated in online asynchronous ethical dilemma case discussions able to 'operate on' the reasoning of others?

The statistical procedures used to address the first research question were described and results were reported. The ANOVA results did not show any significant

difference between the CSCB instruction and non-CSCB instruction group in the four sub-scores from the pre-test to post-test.

A paired samples *t*-test was conducted in order to answer the second research question. Results revealed a significant increase on the total mean scores from pre-survey to post-survey, indicating that participants improved in their perception of their ability to deal with ethical issues in clinical settings after participating in the ethics curriculum in the Internal Medicine clerkship rotation.

A qualitative approach was used to answer the third research question. Two levels of content analyses using pre-determined coding schemes was applied in order to identify interaction patterns in the online asynchronous ethical case discussions.

CHAPTER 5

DISCUSSION

This chapter begins with a brief overview of the results and findings presented in the previous chapter. Following, the results are discussed in reference to possible explanations of the findings that are relevant to existing literature. Next, limitations and implications of this study are discussed. Finally, recommendations for future research and conclusions are provided.

Summary of the Study

Purposes

The major focus of this study was to determine whether or not providing third-year medical students with example videos that exhibit experts' ethical reasoning and with opportunities to engage in online asynchronous ethical case discussions would stimulate change and improvement in the students' ethical reasoning. It was speculated that the medical students would be able to reflect on both their own reasoning and others' reasoning and thus develop complexity in how they reason. In this study ethical reasoning consisted of four components: (1) identification of ethical issues (i.e., ethical sensitivity); (2) adoption of multiple viewpoints (i.e., ethical viewpoint); (3) resolution of ethical dilemmas (i.e., ethical options); and, (4) justification of decisions and actions (i.e., ethical justification).

In addition to examining the effectiveness of the instructional activities, the influence of the ethics curriculum on students' perception of the relevance and effectiveness of medical ethics teaching on their ability to handle ethical issues in daily clinical practice was also examined. Finally, another aim of this study was to understand how medical students interacted with their peers during online

asynchronous ethical case discussions.

The three main research questions were: (1) How does the ethical reasoning of third-year medical students who received computer-supported, case-based instruction compare to those of their peers who did not?; (2) Is there a difference in third-year medical students' perception of preparedness to deal with ethical issues in clinical settings before and after the medical ethics curriculum in the Internal Medicine clerkship rotation?; and (3) How were third-year medical students' who participated in online asynchronous ethical dilemma case discussions able to 'operate on' the reasoning of others?

Procedures

Data collected for this study included the participants' responses to pre- and post-test vignettes and surveys, discussion board postings, and the group interview; so that findings were not drawn from a single source, thus increasing both accuracy and credibility. Quantitative data (i.e., pre-test and post-test scores; pre-survey and post-survey scores) were analyzed first, followed by qualitative data (i.e., group interview transcript and discussion board postings), and findings from these methods were merged together in the interpretation of the results.

Descriptive statistics, including means, standard deviations, frequencies, percentages, and ranges were used to describe the characteristics of the participants. An independent samples *t*-test was conducted to examine whether or not pre-test differences existed between the two groups of participants. For research question 1, data were analyzed using a series of four 2 (groups) by 2 (pre/post) mixed design analysis of variances (ANOVAs) with one repeated measure. For research question 2, a paired-samples *t*-test was performed to compare the mean scores on the seven survey items in the pre- and post-surveys, in which participants' were asked to rate

their perceptions of the medical ethics training they received and their ability to deal with ethical issues in clinical settings.

Two levels of content analyses using pre-determined coding schemes was employed to analyze the data for research question 3 in order to provide an adequate overview of the patterns of interaction in the online asynchronous ethical case discussions.

Overview of the Findings

Major findings in this study are summarized below:

1. Ethical sensitivity: Both the CSCB and non-CSCB instruction groups decreased on their mean scores for the ethical sensitivity sub-scale from pre- to post-test. For the non-CSCB instruction group, the decrease was greater. However, none of these differences were statistically significant.
2. Ethical viewpoint: ANOVA results showed that there was a significant effect for the group-by-time interaction with a large effect size, indicating that the non-CSCB instruction group had a greater change (decrease) in the ethical viewpoint sub-scale mean score from pre-test to post-test than did the CSCB instruction group. Yet, follow-up paired-samples *t*-tests demonstrated that the decrease in ethical viewpoint sub-scale mean scores for the non-CSCB instruction group was not significant. Further, for the CSCB instruction group, the change (improvement) in ethical viewpoint sub-scale mean scores from the pre-test to the post-test was not significant as well. An examination of the vignette cases individually, however, indicated that the decrease in the non-CSCB groups' ethical viewpoint sub-scale score for Case B only from pre-test to post-test was significant.
3. Ethical options: Although ethical options sub-scale mean scores from pre-test

to post-test slightly increased for the CSCB instruction group and it decreased for the non-CSCB instruction group, the ANOVA results indicated that there was no significant difference between the two groups in regards to the changes in mean scores.

4. Ethical justification: While the ethical justification sub-scale mean scores had increased from pre-test to post-test for both groups, ANOVA results indicated there was no statistically significant difference between the two groups.
5. Ethical reasoning: The overall total mean score increased from the pre-test (27.70) to the post-test (28.93) for the CSCB instruction group, whereas it decreased for the non-CSCB instruction group (pre-test = 28.32, post = 26.41). However, the changes in mean scores were not statistically significant. Further, the mean scores on the pre-test and post-test for both the CSCB instruction group and non-CSCB instruction group were relatively low considering the total possible points was 91.
6. Perception of preparedness: There was a statistically significant increase in the survey total score from pre-survey to post-survey for all of the participants as a whole, with a large effect size. Further paired-samples *t*-tests by treatment group (CSCB, non-CSCB) were performed on each of the seven survey items. Results revealed that the scores for each of the seven survey items had significantly increased for participants in both groups.
7. All students' discussion board postings were collected and analyzed to identify two types of triggers (expert and peer), which was the first level of analysis. Afterwards, using the adapted IAM coding scheme, the discussion board postings were coded again for a second level of analysis. Chi-square tests for comparison results revealed that the frequencies of coded triggers

among the three discussion groups were not significant indicating that the actual amount of triggers had an equal likelihood to occur in any one of the discussion groups. However, chi-square results revealed that differences in frequencies of coded triggers among the four ethical case discussions were significant. In reviewing the ethical case discussions, it was found that Case B (medication error by a student physician) had a higher percentage of expert triggers, whereas Case E (discriminatory behavior of an attending physician towards a fellow colleague) had a higher percentage of peer triggers, than the statistically expected values. In regards to interaction phases, results from chi-square tests concluded that the frequencies of coded interaction phases were not significantly different from the statistically expected values for the ethical case discussions and among the discussion groups.

8. Interaction patterns: Five major interaction patterns types with a total of 8 sub-categories were identified, which consists of: Agreement (agreement with expert or peer); Dissonance (dissonance with expert or peer); Co-construction (co-construction with expert or peer); Testing/Modifying (testing and modifying of proposed synthesis or co-construction); and Summarization (summarization and metacognitive statements).

Discussion of the Findings and Implications

Computer-supported, Case-based Instruction and Medical Students' Ethical Reasoning

It is well documented in the literature that the use of cases and dilemma case discussions support the teaching of medical ethics in clinical settings (Schlaefli et al., 1985; Self et al., 1993; Smith et al., 2004). Previous studies of educational interventions designed to stimulate development in moral judgment reported that

treatments of 3-12 weeks, and those that involve dilemma discussion, all show larger treatment effect sizes (Schaepli et al., 1985). In this study, participants were provided with computer-supported, case-based (CSCB) instruction for a period of 5 weeks, within the suggested treatment time, in which they were able to observe the reasoning of expert ethicists and engage in online asynchronous ethical case discussions with their peers. Kohlberg (1969) postulated that interaction with peers and the environment, along with cognitive prerequisites, provide catalyst for changes in the individual's perspective of the self and other, which would impact one's moral perspective. However, despite the instructional intervention, as stated earlier, the data analysis of the participants' ethical reasoning performance on the pre- and post-test vignettes showed that no significant difference existed between the CSCB instruction and non-CSCB instruction group. Nevertheless, although not statistically significant, it is still encouraging to note that there was a slight increase in the overall ethical reasoning mean score for the CSCB instruction group from pre-test to post-test (gain of 1.23 points) whereas, conversely, the non-CSCB instruction group demonstrated a decrease (decrease of 1.91 points).

Extant literature suggests that students' ethical skills usually decrease during their medical school training, especially in the clinical third and fourth years (Lind, 2000; Patenaude, Niyonsenga, & Fafard, 2003). Examining the findings of this study in the context of that literature suggests that the inability of the CSCB instructional intervention to significantly enhance medical students' ethical reasoning may not indicate that it is entirely ineffective. For example, Hebert et al. (1992) measured ethical sensitivity among medical students in different years of the medical school curriculum and found an increase in sensitivity between years one and two, but a decrease in the later clinical years of the curriculum. In the present study, although

both the CSCB and non-CSCB instruction groups demonstrated a slight decline in the Ethical Sensitivity sub-scales score from pre-test to post-test (decreases of 0.16 points and 0.81 points for the CSCB instruction group and the non-CSCB instruction group respectively), the lesser decrease for the CSCB instruction group than the non-CSCB instruction group suggests that the instructional intervention may have deferred some of the “ethical erosion” that most medical students experience during the clinical years of medical school.

Further, for the CSCB instruction group participants in this study, although not statistically significant, it appeared that having the opportunity to engage in ethical case discussion with others stimulated awareness of alternative perspectives. The Ethical Viewpoint sub-scale score of all four of the ethical cases (Cases B, C, D, and E) that the CSCB instruction group had participated in online asynchronous ethical case discussions had increased from pre-test to post-test (gains of 0.31, 0.41, 0.14, and 0.23 points, respectively). Moreover, the only ethical case, Case A, that the CSCB instruction group did not engage in an online asynchronous ethical case discussion, had a decrease of 0.23 points on the Ethical Viewpoint sub-scale score from pre-test to post-test. Therefore, it is speculated that had the CSCB instruction group engaged in an online asynchronous ethical case discussion regarding Case A, the Ethical Viewpoint sub-scale score may have increased from pre-test to post-test, similar to the other ethical cases’ Ethical Viewpoint sub-scale scores, instead of decreasing.

As for the non-CSCB instruction group participants who did not have the opportunity to interact with others and discuss the ethical cases, they displayed a decrease on the Ethical Viewpoint sub-scale score from pre-test to post-test for all five of the ethical cases, implying there was no gain of new or alternative perspectives. Worthy to point out was that the decrease in the Ethical Viewpoint sub-scale score for

Case B (medication error by student physician) from pre-test to post-test for the non-CSCB instruction group was statistically significant [$t(10) = 3.73, p < .005$]. Interestingly, for the CSCB instruction group, the online asynchronous ethical case discussion regarding Case B also had a significantly higher percentage of expert triggers (68%) compared to the other three ethical case discussions. Therefore, it is possible that the significant decline in ethical viewpoint pertaining to Case B for the non-CSCB instruction group may be that they did not observe the expert panel's discussion about the case, and thus were not "triggered" to think about the case from alternative perspectives. Therefore, this finding suggests that increasing awareness of alternative viewpoints of an ethical issue could be promoted by providing additional expert reasoning examples in group discussions.

Though the overall results of this study do not support the literature that suggests dilemma case discussions significantly enhance medical students' moral development and reasoning (Self, Wolinsky, & Baldwin, 1989), the improvements in the students' ethical reasoning was in the anticipated direction. Although, it appears that computer-supported, case-based instruction offers some potential value as an instructional approach in delivering medical ethics education, the existing issue (i.e., decrease of ethical sensitivity and moral reasoning of medical students) may be a non-instructional problem (e.g., habits of mind, personality types, culture of the medical profession, etc.), in which case, using instruction would not be the best or most effective resolution. Nevertheless, there may be several possible reasons why the findings failed to support the existing literature and the research hypotheses and, thus, are discussed below.

Comfort Level in Using Technology. Although there were no incidents in which the participants in the CSCB instruction group had problems with accessing and

navigating Blackboard, their relatively low comfort level ($M = 5.64$ on a 10-point scale) in using technology may have contributed to the lack of interest displayed for online discussions. The total number of postings in each weekly discussion board forum was approximately 21 messages, an estimate of 2 messages on average for each participant, which was the minimum number of messages that they were required to post, thereby suggesting that the participants' level of engagement was also at a minimum level. Also, in the follow-up group interview, a participant said that during the first ethical case discussion she had tried to initiate a "debate" with one of her discussion group members, but when he failed to respond to the questions in her posting, she decided against initiating any more debates in later discussions.

With the exception of one to two rural track students in each block, a majority of the participants usually can and do attend regular face-to-face seminars on campus during the IM clerkship rotation. Hence, a number of participants had commented on the "Water Cooler" discussion board forum and in the follow-up group interview that they did *not* perceive using Blackboard as an effective way to increase the accessibility of information or to facilitate learning. A majority of the participants noted that they preferred to meet face-to-face rather than communicate online. For instance, one participant stated that he felt that it would have been more helpful to his learning if he received immediate comments and reactions when discussing ethical issues rather than reading a delayed written response. It seems that because the main curriculum during their first and second years of medical school was a PBL curriculum, the participants were used to learning in the format of small group face-to-face discussions and therefore preferred face-to-face discussions to the online discussions.

Value Put on Medical Ethics. Another possible reason for the unsuccessful impact of the CSCB instructional intervention may be due a lack of value medical students put on medical ethics that may be subtly communicated by the medical school curriculum. The formal curricula in many medical schools emphasize overwhelmingly the scientific and factual basis of medicine (Roberts & Fincher, 1997) and ethics instruction is perceived as “soft, non-verifiable, and....separate from the technical considerations of medicine” (Loewy, 1986, p.661). In most cases, the teaching of medical ethics is competing with other, more traditional disciplines for identified time in the curriculum (Miles et al., 1989). Thus, as Coulehan and Williams (2003) pointed out, it is often difficult for medical students to conceptualize ethic discussions as educational if there are no facts to be learned, or unique “right” conclusions to be reached.

Yet, in recent years it has become widely recognized that it is important for students to understand that ethical theory and practice is relevant to their clinical work. Singer, Pellegrino, and Siegler (2001) asserted that the teaching of medical ethics need to be integrated into the teaching of clinical medicine, so that it becomes what Hafferty and Franks called the “hidden curriculum” (1994). The hidden curriculum, according to Hafferty (1998), highlights the importance and impact of organizational structure and culture on the learning process. This concept challenges medical educators to acknowledge their training institutions as both cultural entities and moral communities that are closely involved in constructing definitions as to what is “good” and “bad” medicine (p. 404).

As discussed earlier the medical ethics training that the participants received prior to the instructional intervention was primarily based on didactic lectures and seminars. The medical school did not offer a stand-alone ethics course, nor was

medical ethics heavily integrated into any of the existing curricula. This phenomenon is not uncommon. A brief survey of the curricula of medical colleges in the United States and Canada revealed that of the 142 colleges accredited by the American Association of Medical Colleges, only 26 reported having medical ethics as a part of courses or clerkships in their curricula for the graduating class of 2005. Moreover, for the medical students who will graduate in 2008, only seven colleges reported such course content (American Association of Medical College Curriculum Directory, 2004). In regards to the medical students, most think that the time allotted for clinical education is barely sufficient to impart basic clinical skills. They also believe that any attempt to incorporate the teaching of medical ethics into the clinical curriculum would thereby require a proportional decrease in the time available to learn about clinical medicine (Siegler, 1978). As a result, medical students in general, including several participants in this study, feel that the valuable time used to learn about medical ethics would be more effective if it were used to prepare for board exams or used to learn more about the technical aspects of medicine. Thus, this perception of ethical skills as being a “soft” skill that was not as important as learning “hard” skills may have contributed to the participants’ lack of response to the instructional intervention. Therefore, it is suggested that the medical school at the study site and medical schools in general, longitudinally integrate medical ethics education into the medical curriculum so that it is deeply embedded in all aspects of the curriculum, to be taught at all levels, in all courses, and not be considered as a separate course (knowledge and skill) to learn.

In Search for the Best Option. In examining the participants’ responses to the pre-test and post-test vignettes as well as the discussion board postings, the participants appeared to approach ethical reasoning and decision-making as an

attempt to choose the best option. In other words, the participants were focused on identifying the “clear-cut” right or wrong answer (as they would often do in a diagnosis), thereby limiting the scope of what the ethical issues were, from what perspectives they viewed the ethical situation, what options existed that would address the ethical issues, and what principles could be used to justify their decisions. A possible explanation is that as students go through the first two years of medical school they are in the process of preparing for the United States Medical Licensing Examination (USMLE) Step 1 exam given by the National Board of Medical Examiners (NBME). The USMLE Step 1 exam only includes multiple-choice questions in which several options may be partially correct, but there is only one best answer. The purpose of this exam is to assess the students’ understanding and ability to apply important concepts of the basic sciences subjects. As a result, the focus of the students during these years is to acquire as much knowledge as they can and to process it as efficiently as possible in order to be able to come up with the best and most correct answer (Coulehan & Williams, 2003). Therefore, the tendency to seek the best option may have been reflected in the way the students responded in the test vignettes thereby explaining the rather low scores they received ($n = 22$; pre-test = 28.01, post-test = 27.67; total possible score was 91).

Further, the preference for a single best option was supported by participants’ comments about the video examples. Although a majority of the CSCB instruction group participants thought that the expert videos were very helpful and effective, several did mention that they would have liked for the expert panel to come to a consensus in terms of “next steps” or “final decisions” at the end of their discussions, which was not the overall purpose of the example videos. This finding coincides with Fox et al.’s (1995) postulation that medical students have been known to complain

about medical ethics education because it often provides no “right answers”.

Even so, it was found that many of the main themes that emerged from the online asynchronous ethical case discussions were raised in the videos, suggesting that what the experts had discussed did indeed “trigger” the participants to think more extendedly about the ethical cases. Yet, surprisingly, many of the issues/topics brought up and discussed in the online asynchronous ethical case discussions (e.g., error prevention, quality of life, trust, etc.) were not reflected in the responses on the post-test vignettes. Hence, medical students’ tendency to come up with the best possible option may also probably explain this gap between what participants discussed and the lack thereof in their responses on the post-test vignettes. Specifically, in regards to the Ethical Options sub-scale, of the total score of 15 points for all five vignettes cases, the participants on average received an approximate score of 5 points ($n = 22$; pre-test = 5.56, post-test = 5.43). That is, the students, regardless of which group they were in, provided an average of one option per ethical case, which may be what the students perceived as the best option.

Informal feedback from the raters indicated that many of the students’ responses to the ethical cases were comparable to answers to technical questions in that decisions were clearly medical answers that did not consider aspects of patient care beyond the purely biomedical such as personal values and social complexities. This is similar to what Coulehan and Williams (2003) described as the “technical persona” in which students tend to abandon traditional values and adopt a purely technical view of medical practice that is consistent with contemporary hospital culture. That is they take on an objective professional identity that narrows their realm of responsibility and confines it to the technical arena in that being a good doctor is exclusively a technical accomplishment (Coulehan & Williams, 2003). This is a cause for concern

because the patient is then easily regarded as a problem to address (a case) rather than a unique individual who is part of the society (Patenaude, 2003).

Not the right “treatment” or not enough “dosage”? Yet another possible explanation for the non-significant outcomes may be due to the appropriateness of the instructional intervention (treatment) itself. The videos in this study captured the discourse among the three ethicists as they reasoned through each ethical case rather than having people role-play the ethical case scenarios. It is possible that by observing the ethical cases being acted out could prompt greater interactions among the participants. Also, appropriate “dosage”, in terms of number of videos observed and amount of discussions participated, may be another factor to consider in future research. Specifically, whether or not viewing more videos and participating in more discussions would result in better learning outcomes.

An Online Asynchronous Ethical Case Discussion: Blowing the whistle, is it worth it?

An interesting and unexpected observation was made in one of the online asynchronous ethical case discussions. In the ethical case regarding discriminatory behavior towards a fellow colleague (Case E), the discussion was mostly “triggered” by what the students (peers) were saying and not from what was said by the experts in the video. The discussion that emerged evolved around whether or not someone should report an attending physician who was deemed to be highly regarded (brings in grant dollars), known to be “tough” but was accused of making abusive and discriminatory comments towards a Hispanic student physician. The following are excerpts from the online asynchronous discussion:

If I were the Hispanic student I would probably just try to slide through the rotation as easily as possible and not do anything about it. One is always told to go up the chain of command about situations like this, however, I still feel like the department is going to take care of themselves especially when this attending appears to be bringing in lots of money in research dollars. As opposed to myself, as a student who is probably costing the department

money to train.

John (*pseudonym*) is right. It is an unfortunate fact that when money is involved, the little guy looses out. In an ideal world, the department would do what is right and confront the attending about her performance and her demeaning attitude and explain that this is completely unprofessional behavior and that action will be taken if it continues. However, no matter how much it is stressed in orientation, I believe that reporting the attending higher up would either not result in any action or only more trouble for the student. At the most, the student might be moved to another rotation or team but if it is late in the month, this is doubtful.

Knowing that I could possibly get into trouble with the Attending by blowing the whistle scares me to death. Unlike the alcoholic student/MD, no patients are at risk here, only bruised egos. It isn't right, but it isn't the end of the world. Finding a trusted Attending from another department who is a peer to the Attending in question and allow them to comment and possibly act on the situation. Sometimes it's best to grow thick skin and let it go, as opposed to rocking the boat and getting into trouble. I wonder if my colleagues would agree with me or if they would try to make something happen...?

Research has shown that medical students encounter ethical predicaments that are complicated by their role and place on medical health care team (Christakis & Feudtner, 1993; Feudtner & Christakis, 1994; Feudtner, Christakis, & Christakis, 1994). Christakis and Feudtner (1993) contended that in the hospital hierarchy of authority and responsibility, medical students strive to become “the team player”, undeniable influencing the ethical decisions they make. Struggling to maintain interpersonal relationships with a wide range of individuals (nurse, attending physicians, and other students), medical students though frequently witnesses unethical actions, remain silent and decide to do nothing (Christakis & Feudtner, 1993). According to Christakis and Feudtner (1993), this “do not rock the boat” (p. 253) attitude comes from a sense of feeling “powerless” (p. 253) and being unable to control anything. In the discussion board excerpts provided, it appears that the students are conveying this feeling and thought.

In a survey study conducted by Feudtner, Christakis, and Christakis (1994), of the 665 students who responded, 58% reported having done something they

believed was unethical and 61% had witnessed what they believed to be unethical behavior by other medical team members, and of these students, 54% felt like accomplices. Subsequently, many students reported dissatisfaction with their actions and ethical development and 62% believed that at least some of their ethical principles had been eroded or lost. Further, controlling for other factors, students who had witnessed an episode of unethical behavior were more likely to have acted improperly themselves for fear of poor evaluations or to be able to fit in with the team. Hence, students who behaved unethically for fear of poor evaluation or to fit in with the team were twice as likely to report erosion of their ethical principles.

In this study, despite the comments posted on the discussion board, which would most likely raise concern, results from the surveys suggest that students' perception of their ability to deal with ethical issues in clinical settings had significantly improved from the beginning to the end of the clerkship rotation. Nonetheless, these comments from the students should not be ignored and the medical school may need find ways to rectify students' impression of how the system works (both school and hospital), thus ultimately preventing ethical erosion.

Study Limitations

A number of limitations must be noted when considering the findings in this investigation. First, as mentioned in Chapter Three, the major limitation of this study was the small sample size. Therefore, the number of participants represented in certain ANOVA cells may not have been adequate for analysis thus limiting the ability to determine differences. Also, this study used convenience samples and the CSCB instructional intervention was only implemented in one block. The findings, therefore, cannot be generalized to other medical schools or students until the study is conducted

at more than one site and with a different participant cohort.

Further, much of the existing research done on medical ethics teaching have dealt with the effect of medical ethics teaching on medical students' moral reasoning and moral judgments and used Rest's (1979) Defining Issues Test (DIT) as a way to measure learning outcomes (e.g., Holm, Neilsen, Norup, Vegner, Guldman, & Andreassen, 1995; Self, Baldwin, & Wolinsky, 1992; Self, Wolinsky, & Baldwin, 1989). Yet, as indicated in the literature review, though one's ability to make ethical decisions is related to one's development of moral reasoning, moral reasoning is not equivalent to ethical reasoning. Therefore, in this study steps were taken to develop alternative ways to measure professional responses to ethical issues such as the clinical ethical vignettes. However, this thereby complicates the task of comparing the findings of this study with those of others.

Also, due to the fact that the researcher was blind to the identity of the participants who completed the pre- and post-test vignettes, the researcher was not able to fully explore the relationship between the interaction patterns identified in the online asynchronous ethical cases discussions and the changes in participants' ethical reasoning especially at the discussion group level and/or individual level. The data was analyzed based on the CSCB instruction group as a whole ($n = 11$). However, the CSCB instruction group was divided into 3 separate discussion sub-groups (3 to 4 group participants in each) that demonstrated different levels and amount of interaction patterns. Therefore, examination of how the group interactions affected the ethical reasoning of individual members would have provided a more accurate interpretation of the relationship between interaction patterns and changes in ethical reasoning. Additionally, researchers maintained that females tend to be more easily influenced in group settings than males (Eagly & Carli, 1981), and thus it can be

speculated that the types and amount of interaction patterns prevalent in the ethical case discussions will likely have more significant relationships with the changes in female participants' ethical reasoning than with the male participants. However, again, this could not be validated due to the de-identification of the pre-test and post-test vignette scores.

In addition, the vignettes that were used in the pretest and posttest were exactly the same. Since the time span between the tests was short (6 weeks), it was possible that some students may have reiterated their original thinking and responses to the ethical case when completing the posttest. Thus, this limitation may have affected the validity of the results of the study. This can be eliminated, however, by having different cases with similar ethical issues on the posttest that assess the same concepts and skills.

Further, in considering the findings of this study, it is also important to point out that the post-test overall mean score (28.93) for the CSCB instruction group was almost the same as the non-CSCB instruction groups' mean score on the pre-test (28.32), which was their baseline. As described in Chapter Three, the participants in the CSCB instruction group were from block 13; therefore they have already completed five clerkship rotations, whereas the participants in the non-CSCB instruction group were from block 14, thus, having already completed six clerkship rotations, one more than the CSCB instruction group. With each clerkship rotation, the level of responsibility and amount of opportunity to participate in making decisions that could have a significant impact on the patient as well as the patient's family increases for the medical student. Although crucial decisions are made in agreement with an attending physician or resident, the process of contemplating those decisions and their implications are a part of the clinical experience. What is learned during the first two years of medical school may provide a foundation with which the

medical student can develop a list of possible decisions; it is the skills, however, that are developed during the clerkship rotations, especially when making difficult decisions that impact the lives of others, that may most likely impact a medical student's morality and ethical reasoning. Hence, there is the uncertainty of whether or not the experience from the one additional block that the non-CSCB instruction group had any unintended effect on the study, even though there was no statistical difference at baseline between the two groups.

Finally, as noted earlier, the difficulty of avoiding the violation of the assumption of independent observation was another limitation of this study. Even though they were instructed not to, it was challenging to ensure that the participants did not discuss the ethical cases with one another outside of the study environment, which might have unintentionally influenced one another's thinking and responses. Researchers need to continually address this problem in flexible and creative ways.

Recommendations for Future Research

Several issues and questions are raised that future research could examine in order to extend previous research and provide further understanding of ways to enhance the ethical reasoning of medical students.

First, the fourth (and final) year of medical school holds huge potential for internal conflicts for the medical student. Particularly the stress of residency placement, which to some degree relies on the recommendations of the supervising attending physicians and residents, weighs heavily for many medical students. At the same time, they are increasingly given more critical responsibilities during their rotations, for which the pressure can be so intense that there is little time for reflection.

According to Branch (2000) several studies have found little progression in

moral maturity among medical students compared to their peers in other professional fields, and that many medical students experience considerable internal dissonance as they struggle to resolve their personal beliefs with their clinical training. Branch (2000) asserted that the lack of moral development of medical students is associated with their perceived pressures to conform to the informal culture of the medical wards, which was supported by a survey study in which a majority of medical students confirmed that their moral values had eroded during the clinical years. Thus, under such circumstances during year four of medical school, do the CSCB instruction group participants continue to be sensitive to ethical issues that they encounter in clinical settings? Do they continue to adopt ethical viewpoints? Do they continue to resolve ethical issues and be able to justify the decisions and/or actions taken? To answer these questions would require a longitudinal examination of whether or not the CSCB instruction group participants' ethical reasoning changed over time, particularly in their fourth year of medical school. Also, if there was change, how does the change compare to the non-CSCB instruction group participants? Do the CSCB instruction group participants maintain an upward movement, while the non-CSCB instruction group participants continue downwards? Furthermore, it would also be valuable to replicate this study over a longer period of time, perhaps over the course of an academic year, instead of a block (i.e., 8 weeks).

Second, a question that remains unanswered is whether or not there is any correlation between measured level of ethical reasoning and corresponding ethical behavior in practice. There were several instances in which the CSCB instruction group participants acknowledged during the online asynchronous ethical case discussions that it was easy for them to know and do "the right thing" because they were not facing these ethical issues in reality, nor had they ever. They then went on to

admit that they may not know what to do when confronted with an actual ethical situation. In this study, as part of the ethics curriculum, all the medical students, including CSCB and non-CSCB instruction group participants, had to hand in a written case analysis that described a patient case that the participant observed during their IM clerkship rotation and had considered to have ethical issues. Each medical student had to describe the case and analyze it using the ethics workup sheet that was provided to him or her. It would be interesting to examine the types of cases that the participants in this study were able to identify and write up. Specifically, what ethical issues were the participants able to recognize in real clinical settings? What were the ethical issues that were *most* recognized by the participants? Is there a difference between the cases identified by the CSCB instruction group participants and the non-CSCB instruction group participants? If the cases written up by participants were similar to that of the hypothetical clinical ethical cases from the study, how different or similar were their analyses and ethical reasoning processes and outcomes? Subsequently, the next step to this study would then be to take a look at the written clinical cases by the participants and compare them with their performance on the vignettes. In terms of the online asynchronous ethical discussions, it would also be interesting to examine in future analyses, which of the three expert ethicists (a clinician, a nurse, and a philosopher) “triggered” the most discussion and who was more credible?

Third, larger sample sizes and a greater amount of discussion data is needed to validate the interaction patterns and to interpret the relationships between interaction pattern and ethical reasoning with a higher degree of confidence. Also, the students were groups into groups of 3-4 members, which may have also been the reason for the rather limited discussions. In future studies, for the purpose of generating more

discussion by creating more opportunities to build on the reasoning of others, it is suggested that participants be grouped into groups of 6-10 members.

Fourth, although the vignettes were developed to reflect common ethical issues that arise in clinical practice, they could not have, however, portrayed all potential ethical issues. The restricted scope of the vignettes was a shared comment by several students as they suggested that a more diverse selection of ethical cases would have been more ideal. Specifically, they preferred to discuss actual patient cases that were brought to the attention of an ethics committee at a hospital. Further, the high costs of the development and implementation of the vignettes and scoring schemes used in this study limit its application in other clerkship settings. Additionally, written responses and comments may provide limited insight into students' reasoning as some students may be able to reason adequately verbally but do not do so in their written work. Moreover, the reasoning seen in the participants' written work may not be reflected in the how they practice in real clinical settings. Therefore, alternative ways to measure medical students' ethical reasoning and to evaluate links between ethical reasoning and ethical performance in clinical practice need to be explored further. These alternative measures must also consider concerns such as validity, reliability, relevance, and effectiveness in terms of development and implementation.

Conclusion

In this study the instructional approach presented was a departure from the way medical ethics is traditionally taught during medical school training. While the use of cases and case discussions in teaching medical ethics is nothing new, providing instruction in a technology-based learning environment is still a relatively unexplored territory. Traditionally, medical ethics is taught either through lecture-based sessions or informal hallway discussions with attending physicians while on clinical rotations.

The researcher of this study sought to examine the effectiveness of a computer-supported, case-based (CSCB) instructional intervention that was designed to: (1) increase medical students' sensitivities to ethical issues in making clinical decisions, (2) generate medical students' alternative viewpoints and to offer students opportunities to examine their own thinking compared to others' thinking; and, (3) enhance medical students' ethical analytical skills that include resolving ethical dilemmas and justifying one's own decisions and actions. As described in this chapter, however, there were barriers and limitations to the implementation of the CSCB instructional intervention (e.g., student preference, resistance towards technology, institutional culture, learning approach towards ethics, etc.) and research study (e.g., sample size, measurement tools, etc.), which may have influenced the investigation of the effects and outcomes. Although statistical results were non-significant, the significance of this study consists of: (1) contributing to and enriching the scarce literature on technology-based instruction and tools that intend to heighten the impact of medical ethics education, (2) developing and testing alternative ways to measure ethical reasoning specific for the medical profession, and (3) adding to the existing literature regarding the importance of peer discussion in the development of ethical reasoning skills by providing a descriptive model that depicts how medical students engaged in and reasoned on the reasoning of others during ethical case discussions.

REFERENCES

- Abell, S., Cennamo, K., Anderson, M., Bryan, L., & Hug, J. (1996). Integrated media classroom cases in elementary science teacher education. *Journal of Computers in Mathematics and Science Teaching*, 15, 137-151.
- ABIM Foundation, ACP-ASIM Foundation, & the European Federation of Internal Medicine (2002). Medical professionalism in the new millennium: A physician charter. *Annals of Internal Medicine*, 136(3), 243-246.
- Alexander, C., & Becker, M. (1978). The use of vignettes in survey research, *Public Opinion Quarterly*, 42, 93-104.
- Altman, D.G. (1991). *Practical statistics for medical research*. London: Chapman and Hall.
- Angelos, P., DaRosa, D.A., Derossis, A.M., & Kim, B. (1999). Medical ethics curriculum for surgical residents: Residents of a pilot project. *Surgery*, 126(4), 701-707.
- Barclay, M.L., & Elkins, T.E. (1991). A computer conference format for teaching medical ethics. *Academic Medicine*, 66(10), 592-594.
- Barnard, D. (1985). Unsung questions of medical ethics. *Social Science and Medicine*, 21, 242-249.
- Beauchamp, T., & Childress, J. (1994). *Principles of biomedical ethics* (4th ed.). New York: Oxford University Press.
- Bebeau, M.J. (2002). The defining issues test and the four component model: Contributions to professional education. *Journal of Moral Education*, 31(3), 271-295.
- Bebeau, M.J., Rest, J.R., & Narvaez, D. (1999). Beyond the promise: A perspective on research in moral education. *Educational Researcher*, 28(4), 18-26.
- Bebeau, M.J., & Thoma, S.J. (2003). *Guide for DIT-2*. Minneapolis: University of Minnesota.
- Benjamin, M., & Curtis, J. (1992). *Ethics in nursing* (3rd ed.). New York: Oxford University Press.
- Benn, C., & Boyd, K. (1996). Ethics, medical ethics and HIV/AIDS. *Ecumenical Review*, 48, 222-233.
- Berkowitz, M.W., & Gibbs, J.C. (1983). Measuring the developmental features of moral discussion. *Merrill-Palmer Quarterly*, 29(4), 399-410.
- Bickel, J.L. (1991). Medical students' professional ethics: Defining the problems and developing resources. *Academic Medicine*, 66(12), 726-729.
- Bickel, J. (1993). *Promoting medical students' ethical development: A resource guide*. Washington, DC: Association of American Medical Colleges.
- Biggerstaff, M.A. (2005). Social work ethics online reflective learning. *Journal of Technology in Human Services*, 23(3/4), 245-257.
- Blatt, M. (1969). *The effects of classroom discussion programs upon children's level of moral development*. Unpublished doctoral dissertation, University of Chicago.

- Bogdan, R.C., & Biklen, S.K. (2003). *Qualitative research for education: An introduction to theory and methods* (4th ed.). Boston: Allyn and Bacon.
- Boom, J., Brugman, D., & Heijden, P.G.M. van der (2001). Hierarchical stage structure assessed by sorting moral statements. *Child Development*, 72, 535-548.
- Branch, W.T. Jr. (2000). Supporting the moral development of medical students. *Journal of General Internal Medicine*, 15(7), 503-508.
- Brigley, S. (2006). Teach ethics. *Education for Primary Care*, 17, 511-515.
- Brown, J.S., & Duguid, P. (2000). *The social life of information*. Boston, MA: Harvard Business School Press.
- Bulger, R.E., & Reiser, S.J. (1993). Studying science in the context of ethics. *Academic Medicine*, 68(9), S5-S9.
- Burack, J.H., Irby, D.M., Carline, J.D., Root, R.K., & Larson, E.B. (1999). Teaching compassion and respect: Attending physicians' responses to problematic behaviors. *Journal of General Internal Medicine*, 14, 49-55.
- Burstin, K.D., Doughtie, E.B., & Raphaeli, A. (1980). Contrastive vignette technique: An indirect methodology designed to address reactive social attitude measurement. *Journal of Applied Social Psychology*, 10(2), 147-165.
- Buchs, C., Butera, F., Mugny, G., & Darnon, C. (2004). Conflict elaboration and cognitive outcomes. *Theory into Practice*, 43(1), 23-30.
- Bussey, K., & Maughan, B. (1982). Gender differences in moral reasoning. *Journal of Personality and Social Psychology*, 42(4), 701-706.
- Campbell, D. T., & Stanley, J. C. (1969). *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally.
- Carse, A.L. (1991). The "voice of care": Implications for bioethical education. *Journal of Medicine and Philosophy*, 16, 5-28.
- Cavanaugh, G.F. & Fritzsche, D.J. (1985). Using vignettes in business ethics research. In *Research in corporate social performance and policy*, (pp. 279-293), Greenwich, CT: JAI Press.
- Choi, I., Kim, H., Kang, J., Jung, J. & Clinton, G. (2004). A Case-Based E-Learning Model for Professional Education: Anesthesiology for Dental Students. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2004* (pp. 1285-1292). Chesapeake, VA: AACE.
- Choi, I., Land, S. M., & Turgeon, A. (2005). Scaffolding peer-questioning strategies to facilitate metacognition during online small group discussion. *Instructional Science*, 5-6(xx), 1-29.
- Christakis, D.A., & Feudtner, C. (1993). Ethics in a short white coat: The ethical dilemmas that medical students confront. *Academic Medicine*, 68(4), 249-254.
- Christensen, L.B. (1991). *Experimental methodology* (5th ed.). Boston, MA: Allyn & Bacon.
- Christie, C.R., Bowen, D.M., & Paarmann, C.S. (2003). Curriculum evaluation of ethical reasoning and professional responsibility. *Journal of Dental Education*, 67, 55-63.

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Colby, A., & Kohlberg, L. (1987). *The measurement of moral judgment* (Vols. 1-2). New York: Cambridge University Press.
- Colby, A., Kohlberg, L., Gibbs, J., & Lieberman, M. (1983). A longitudinal study of moral judgment. *Monographs of the Society for Research in Child Development*, 48, 1-107.
- Corey, G., Corey, M. S., & Callanan, E. (1998). *Issues and ethics in the helping professions*. Pacific Grove, CA: Brooks Cole.
- Coulehan, J., & Williams, P.C. (2003). Conflicting professional values in medical education. *Cambridge Quarterly of Healthcare Ethics*, 12, 7-20.
- Crandall, S., Volk, R., & Loemker, V. (1993). Medical students' attitudes toward providing care for the underserved: Are we training socially responsible physicians? *JAMA*, 269, 2519-2523.
- Creswell, J.W. (2003). *Research design: Qualitative, quantitative, and mixed method approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Crittenden, P. (1990). *Learning to be moral: Philosophical thoughts about moral development*. Atlantic Highlands, NJ: Humanities Press International, Inc.
- Culver, C.M., Clouser, K.D., Gert, B., Brody, H., Fletcher, J., Jonsen, A., Kopelman, L., Lynn, J., Siegler, M., & Wikler, D. (1985). Basic curricular goals in medical ethics. *The New England Journal of Medicine*, 312(4), 253-256.
- Curran, V.R., Lockyer, J., Kirby, F., Sargeant, J., Fleet, L., & Wright, D. (2005). The nature of the interaction between participants and facilitators in on-line asynchronous continuing medical education learning environments. *Teaching and Learning in Medicine*, 17(3), 240-246.
- Dana, N.F., & Floyd, D.M. (1994). *When teacher educators collaboratively reflect on their practices: A case study on teaching cases*. Unpublished manuscript. (ERIC Document Reproduction Service No. ED 369 768)
- Dawson, T.L. (2002). New tools, new insights: Kohlberg's moral judgment stages revisited. *International Journal of Behavioral Development*, 26(2), 154-166.
- Dimant, R.J., & Bearison, D.J. (1991). Development of formal reasoning during successive peer interactions. *Developmental Psychology*, 27(2), 277-284.
- Doise, W., & Mugny, G. (1979). Individual and collective conflicts of centrations in cognitive development. *European Journal of Psychology*, 9, 105-198.
- Doise, W., Mugny, G., & Pérez, J.A. (1998). The social construction of knowledge: Social marking and socio-cognitive conflict. In U. Flick (Ed.), *The Psychology of the Social* (pp. 77-90). New York: Cambridge University Press.
- Dufrene, R.L., & Glosoff, H.L. (2004). The ethical decision-making scale-revised. *Measurement and Evaluation in Counseling and Development*, 37(1), 2-14.
- Eagly, A. H., & Carli, L. L. (1981). Sex of researchers and sex-typed communication as determinants of sex differences in influenceability: A meta-analysis of social influence studies. *Psychological Bulletin*, 90, 1-20.

- Edwards, C.P. (1981). The comparative study of the development of moral judgment and reasoning. In R.H. Munroe, R.L. Monroe, & B.B. Whiting (Eds.), *Handbook of cross-cultural human development*. New York: Garland Press.
- Eraut, M. (1994). *Developing professional knowledge and competence*. London: Falmer Press.
- Feudtner, C., & Christakis, D.A. (1994). Making the rounds: The ethical development of medical students in the context of clinical rotations. *Hasting Center Report*, 24(1), 6-12.
- Feudtner, C., Christakis, D.A., & Christakis, N.A. (1994). Do clinical clerks suffer ethical erosion? Students' perceptions of their ethical environment and personal development. *Academic Medicine*, 69(8), 670-679.
- Ford, M.R., & Lowery, C.R. (1986). Gender differences in moral reasoning: A comparison of the use of justice and care orientations. *Journal of Personality and Social Psychology*, 50(4), 777-783.
- Forrow, L., Arnold, R.M., & Frader, J. (1991). Teaching clinical ethics in the residency years: Preparing competent professionals. *The Journal of Medicine and Philosophy*, 16, 93-112.
- Fox, E., Arnold, R.M., & Brody, B. (1995). Medical ethics education: Past, present, and future. *Academic Medicine*, 70, 761-69.
- Frankena, W., & Granrose, J. (1974). *Introductory readings in ethics*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Galbraith, R.E., & Jones, T.M. (1976). *Moral reasoning: A teaching handbook for adapting Kohlberg to the classroom*. Minneapolis, MN: Greenhaven Press Inc.
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of distance education*, 15(1), pp. 7 – 23.
- Garrison, D. R. (2003). Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction and metacognition. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice and direction*, Vol. 4 Sloan-C Series, pp. 47-58, Needham, MA: The Sloan Consortium.
- Gartland, M. (2003). *CaseNEX evaluation data*. Unpublished manuscript. University of Virginia, Charlottesville.
- Gibson, C.H. (1993). Underpinnings of ethical reasoning in nursing. *Journal of Advanced Nursing*, 18, 2003-2007.
- Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.
- Gilligan, C. (1988). Remapping the moral domain: New images of self and relationship. In C. Gilligan, J.V. Ward, & J.L. Taylor (Eds.), *Mapping the moral domain: A contribution to women's thinking to psychological theory and education*. (p. 8), Cambridge, MA: Harvard University Press.
- Gillon, R. (1994). *Principles of health care ethics*. Chichester, England: John Wiley & Sons.
- Goldie, J.G. (2004). The detrimental ethical shift towards cynicism: Can medical educators help prevent it? *Medical Education*, 38(3), 232-234.

- Goldie, J., Schwartz, L., McConnachie, A., & Morrison, J. (2002). The impact of three years' ethics teaching in an integrated medical curriculum on students' proposed behavior on meeting ethical dilemma. *Medical Education*, 36(5), 489-497.
- Goldman, E., & Barron, L. (1990). Using hypermedia to improve the preparation of elementary teachers. *Journal of Teacher Education*, 41(3), 21-31.
- Green, S. B., & Salkind, N. J. (2005). *Using SPSS for the Windows and Macintosh: Analyzing and understanding data* (4th ed.). Upper Saddle River, NJ: Prentice Hall.
- Greene, D. (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.
- Gross, M.L. (2001). Medical ethics education: To what ends? *Journal of Evaluation in Clinical Practice*, 7(4), 387-397.
- Grundstein-Amado, R. (1991). An integrative model of clinical-ethical decision making. *Theoretical Medicine*, 12, 157-170.
- Gunawardena, C.N., Lowe, C.A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17(4), 397-431.
- Hafferty, F.W. (1998). Beyond curriculum reform: Confronting medicine's hidden curriculum, *Academic Medicine*, 73(4), 403-407.
- Hafferty, F.W., & Franks, R. (1994). The hidden curriculum, ethics teaching and the structure of medical education. *Academic Medicine*, 69(11), 867-871.
- Hara, N., Bonk, C.J., & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology course. *Instructional Science*, 28(2), 1-38.
- Harasim, L. (1993). Collaborating in cyberspace: Using computer conferences as a group learning environment. *Interactive Learning Environments*, 3(2), 119-130.
- Harasim, L., Hiltz, S., Teles, L., & Turoff, M. (1995). *Learning networks: A field guide to teaching and learning online*. Cambridge, MA: MIT Press.
- Harrington, H.L. (1995). Fostering reasoned decisions: case-based pedagogy and the professional development of teachers. *Teaching and Teacher Education*, 11(3), 203-214.
- Harrington, H. L., & Garrison, J.W. (1992). Cases as shared inquiry: A dialogical model of teacher preparation. *American Educational Research Journal*, 29(4), 715-736.
- Hattab, A.S. (2004). Current trends in teaching ethics of healthcare practice. *Developing World Bioethics*, 4(2), 160-172.
- Heath, C., Luff, P., & Svensson, M.S. (2007). Video and qualitative research: Analyzing medical practice and interaction. *Medical Education*, 41, 109-116.
- Hebert, P., Meslin, E., & Dunn, E. (1992). Measuring the ethical sensitivity of medical students: A study at the University of Toronto. *Journal of Medical Ethics*, 18, 142-147.

- Hebert, P., Meslin, E., Dunn, E., Byrne, N., & Reid, R.R. (1990). Evaluating ethical sensitivity in medical students: Using vignettes as an instrument. *Journal of Medical Ethics*, 16, 141-145.
- Hersh, R., Miller, J.P., & Fielding, G.D. (1980). *Models of moral education: An appraisal*. New York: Longman.
- Hewitt, J., Pedretti, E., Bencze, L., Vaillancourt, B., & Yoon, S. (2003). New applications for multimedia cases, promoting reflective practice in preservice teacher education. *Journal of Technology and Teacher Education*, 11(4), 483-500.
- Hogan, K., Nastasi, B. K., & Pressley, M. (2000). Discourse patterns and collaborative scientific reasoning in peer and teacher-guided discussions. *Cognition and Instruction*, 17(4), 379-432.
- Holm, S. (1997). *Ethical problems in clinical practice: The ethical reasoning of health care professionals*. Manchester, UK: Manchester University Press.
- Huijter, M., van Leeuwen, E., Boenik, A., & Kimsma, G. (2000). Medical students' cases as empirical basis for teaching clinical ethics. *Academic Medicine*, 75(8), 834-839.
- Hunt, S.D., & Vitell, S. (1986). A general theory of marketing ethics. *Journal of Macromarketing*, 6, 5-16.
- Jacobson, M. J., & Spiro, R. J. (1995). Hypertext learning environments, cognitive flexibility, and the transfer of complex knowledge: An empirical investigation. *Journal of Educational Computing Research*, 12(4), 301-333.
- Jonsen, A.R., Siegler, M., & Winslade, W. (1998). *Clinical ethics: A practical approach to ethical decisions in clinical medicine* (4th ed.). New York: McMillan Publishing Co.
- Kaldjian, L.C., Weir, R.F., & Duffy, T.P. (2005). A clinician's approach to clinical ethical reasoning. *Journal of General Internal Medicine*, 20, 306-311.
- Kerfoot, B.P., Baker, H., Jackson, T.L., Hulbert, W.C., Federman, D.D., Oates, R.D., & DeWolf, W.C. (2006). A multi-institutional randomized controlled trial of adjuvant Web-based teaching to medical students. *Academic Medicine*, 81(3), 224-230.
- 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.
- Kohlberg, L. (1969). *Stage and sequence: The cognitive-developmental approach to socialization theory and research*. Chicago: Rand McNally.
- Kohlberg, L. (1975). The cognitive-development approach to moral education. *Phi Delta Kappa*, June, 670-678.
- Kohlberg, L. (1976). Moral stages and moralization: The cognitive-developmental approach. In T. Lickona (Ed.), *Moral development and behavior: Theory, research, and social issues*. New York: Holt, Rinehart, & Winston.
- Kohlberg, L. (1984). *The psychology of moral development: Moral stages, their nature and validity Vol. 2 of essays in moral development*. San Francisco: Harper & Row.

- Kohlberg, L., & Turiel, E. (1973). *Moralization, the cognitive development approach*. New York: Holt, Rinehart, & Winston.
- Krichbaum, K., Rowan, M., Duckett, L., Ryden, M., & Savik, K. (1994). The clinical evaluation tool: A measure of the quality of clinical performance nursing of baccalaureate students. *Journal of Nursing Education*, 33(9), 395-404.
- Lampert, M. & Ball, D. (1999). Aligning teacher education with contemporary K-12 reform visions. In L. Darling-Hammond & G. Sykes (Eds.), *Teaching as the learning profession. Handbook of policy and practice* (pp. 33 – 53). San Francisco: Jossey-Bass.
- Landy, D. & Aronson, E. (1969). The influence of the character of the criminal and his victim on the decisions of simulated jurors. *Journal of Experimental Social Psychology*, 5, 141.
- Lapsley, D.K. (1996). *Moral psychology*. Boulder, CO: Westview Press.
- Latif, D.A. (1999). Using ethical dilemma case studies to develop pharmacy students' moral reasoning. *Journal of Pharmacy Teaching*, 7, 51-66.
- Latif, D.A. (2000). The relationship between ethical dilemma discussion and moral development. *American Journal of Pharmaceutical Education*, 64, 126-133.
- Latif, D.A., & Berger, B.A. (1997). Moral reasoning in pharmacy students and practitioners. *Journal of Social and Administrative Pharmacy*, 14, 166-179.
- Latif, D.A., Berger, B.A., Harris, S.G., Barker, K.N., Felkey, B.G., & Pearson, R.E. (1998). The relationship between community pharmacists' moral reasoning and components of clinical performance. *Journal of Social and Administrative Pharmacy*, 15(3), 210-224.
- Leming, J.S. (1981). Curricular effectiveness in moral/value education: A review of research. *Journal of Moral Education*, 10, 147-64.
- Lewin, L.O., Olson, C.A., Goodman, K.W., & Kokotailo, P.K. (2004). UME-21 and teaching ethics: a step in the right direction. *Family Medicine*, 36, S36-S42.
- Levin, B.B. (1995). Using the case method in teacher education: The role of discussion and experience in teachers' thinking about cases. *Teaching & Teacher Education*, 11(1), 63-79.
- Levin, B.B. (1999). The role of discussion in case pedagogy: Who learns what? and how? In M. A. Lundeberg, B. B. Levin, & H. L. Harrington (Eds.), *Who learns what from cases and how? The research base for teaching and learning with cases* (pp.139-157). Mahwah, NJ: Lawrence Erlbaum Associates.
- Levine, J. M., Resnick, L. B., & Higgins, E. T. (1993). Social foundations of cognition. *Annual Review of Psychology*, 44, 585-612.
- Liaison Committee on Medical Education. (2006, October 27). Retrieved October 27, 2006, from <http://www.lcme.org/functionslist.htm>
- Loewy, E.H. (1986). Teaching medical ethics to medical students. *Journal of Medical Education*, 61, 661-665.
- Lundeberg, M.A., & Scheurman, G. (1997). Looking twice means seeing more: Developing pedagogical knowledge through case analysis. *Teaching and Teacher Education*, 13(8), 783-797.

- Lurie, N., Margolis, K., McGovern, P.G., & Mink, P. (1998). Physicians self-report of comfort and skill in providing preventive care to patients of the opposite sex. *Archives of Family Medicine*, 7, 134-137.
- Lynn, L.E. (1999). *Teaching and learning with cases: A guidebook*. New York: Chatham House.
- MacLennan, R. L. (1993). Interrater reliability with SPSS for Windows 5.0. *American Statistician*, 47, 292-296.
- Malek, J.I., Geller, G., & Sugarman, J. (2000). Talking about cases in bioethics: the effect of an intensive course on health care professionals. *Journal of Medical Ethics*, 26, 131-136.
- Manouchehri, A. (2002). Developing teaching knowledge through peer discourse. *Teaching and Teacher Education*, 18, 715-737
- Marra, R.M., Moore, J.L., & Klimczak, A.K. (2004). Content analysis of online discussion forums: A comparative analysis of protocols. *ETR&D*, 52(2), 23-40.
- Marx, R.W., Blumenfeld, P.C., Krajcik, J.S., & Soloway, E. (1998). New technologies for teacher professional development. *Teaching and Teacher Education*, 14(1), 33-53.
- Mattison, M. (2000). Ethical decision making: The person in the process. *Social Work*, 45(3), 201-212.
- McAlpine, H., Kristjanson, L., & Porocho, D. (1997). Development and testing of the ethical reasoning tool (ERT): An instrument to measure the ethical reasoning of nurses. *Journal of Advanced Nursing*, 25, 1151-1161.
- McAninch, A.R. (1993). *Teacher thinking and the case method: Theory and future directions*. New York: Teachers College Press.
- McNeel, S. P. (1994). College teaching and student moral development. In J.R. Rest and D. Narvaez (Eds.), *Moral Development in the Professions: Psychology and applied ethics*, (pp. 27-49), Hillsdale, NJ: Lawrence Erlbaum Associates.
- Merriam, S.B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Merseth, K.K. (2000). A rationale for case-based pedagogy in teacher education. In M.A. Lundeberg, B.B. Levin, & H.L. Harrington (Eds.), *Who learns what from cases and how? The research base for teaching and learning with cases* (pp. ix ± xv). Mahwah, NJ: Erlbaum.
- Merseth, K.K. (1994). *Cases, case methods, and the professional development of educators*. ERIC Document Reproduction Service No. ED401272.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: A sourcebook of new methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Miles, S.M., Lane, L.W., Bickle, J., Walker, R.M., & Cassel, C.K. (1989). Medical ethics education: Coming of age. *Academic Medicine*, 64, 705-714.
- Mitchell, K.R., Myser, C., & Kerridge, I.H. (1993). Assessing the clinical ethical competence of undergraduate medical students. *Journal of Medical Ethics*, 19, 230-236.

- Musick, D.W. (1999). Teaching medical ethics: A review of the literature from North American medical schools with emphasis on education. *Medicine, Health Care and Philosophy*, 2(3), 239-254.
- Myser, C., Kerridge, I.H., & Mitchell, K.R. (1995a). Ethical reasoning and decision-making in the clinical setting: Assessing the process. *Medical Education*, 29(1), 29-33.
- Myser, C., Kerridge, I.H., & Mitchell, K.R. (1995b). Teaching clinical ethics as a professional skill: Bridging the gap between knowledge about ethics and its use in clinical practice. *Journal of Medical Ethics*, 21(2), 97-103.
- Nisan, M., & Kohlberg, L. (1982). Universality and cross-cultural variation in moral development: A longitudinal and cross-sectional study in Turkey. *Child Development*, 53, 865-876.
- Orr, J.E. (1996). *Talking about machines: An ethnography of a modern job*. Ithaca, NY: Cornell University Press.
- Pallant, J. (2001). *SPSS survival manual: A step by step guide to data analysis using SPSS for Window (Versions 10 and 11)*. Maidenhead, UK: Open University Press.
- Parker, R. (1990). Measuring nurses' moral judgments. *Journal of Nursing Scholarship*, 22(4), 213-218.
- Patenaude, F., Niyonsenga, T. & Fafard, D. (2003). Changes in the components of moral reasoning during students' medical education: A pilot study. *Medical Education*, 37, 822-829.
- Pellegrino, E.D. (1988). Clinical ethics: Biomedical ethics at the bedside. *JAMA*, 260(6), 837-839.
- Pellegrino, E.D. (1989a). Teaching medical ethics: Some persistent questions and some responses. *Academic Medicine*, 64, 701-703.
- Pellegrino, E.D. (1989b). Withholding and withdrawing treatments: Ethics at the bedside. *Clinical Neurosurgery*, 35, 164-184.
- Pellegrino, E.D., Hart, R.J. Jr., Henderson, S.R., Loeb, S.E., & Edwards, G. (1985). Relevance and utility of courses in medical ethics: A survey of physicians' perceptions. *JAMA*, 253(1), 49-53.
- Pellegrino, E.D., Veatch, R.M., & Langan, J. (1991). *Ethics, trust and the professions*. Washington, D.C.: Georgetown University Press.
- Pettifor, J.L., Estay, I., & Paquet, S. (2002). Preferred strategies for learning ethics in the practice of a discipline. *Canadian Psychology*, 43, 260-269.
- Piaget, J. (1965). *The moral judgment of the child*. New York: The Free Press.
- Putnam, R., & Borko, H. (1997). Teacher Learning: Implications of new views of cognition. In B. J. Biddle (Ed.), *International Handbook of Teachers and Teaching* (pp. 1223-1296): Kluwer Academic Publishers.
- Redmon, R.B. (1989). A medical ethics project for third-year medical students. *Academic Medicine*, 64, 266-270.
- Rest, J.R. (1979). *Development in judging moral issues*. Minneapolis, MN: University of Minnesota Press.

- Rest, J.R. (1986). Moral development in young adults. In R.A. Mines and K.S. Kitchener (Eds.), *Adult cognitive development: Methods and models*, (pp.92-111), New York: Praeger.
- Rest, J.R. (1988). Can ethics be taught in professional schools: The psychological research. *Ethics: Easier said than done*, 22-66.
- Rest, J.R. (1994). Background: Theory and research. In J.R. Rest and D. Narvaez (Eds.), *Moral development in the professions: Psychology and applied ethics*, (pp. 1-26), Hillsdale, NJ: Lawrence Erlbaum Associates.
- Rest, J., & Narvaez, D. (1994) *Moral development in the professions*, Hillsdale, NJ: Erlbaum.
- Rest, J.R., & Thoma, S. (1986). Educational programs and interventions. In J.R. Rest (Ed.), *Moral development: Advances in research and theory*, (pp. 59-88), New York: Praeger.
- Rest, J., Narvaez, D., Bebeau, M., & Thoma, S. (1999). *Postconventional moral thinking: A neo-Kohlbergian approach*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Rezler, A.G., Schwartz, R.L., Obenshain, S.S., Lambert, P., Gibson, J.M., & Bennahum, D.A. (1992). Assessment of ethical decisions and values. *Medical Education*, 26, 7-16.
- Rhodes, R., & Cohen, D.S. (2003). Understanding, being and doing: Medical ethics in medical education. *Cambridge Quarterly of Healthcare Ethics*, 12(1), 39-53.
- Richardson, V. (1999). Learning from videocases. In M.A. Lundeberg, B.B. Levin & H.L. Harrington (Eds.), *Who learns what from cases and how? The research base for teaching and learning with cases* (pp. 121-138). Mahwah, NJ: Lawrence Erlbaum Associates.
- Riel, M. (1990). Cooperative learning across classrooms in electronic learning circles. *Instructional Science*, 19(6), 445-466.
- Roberts, A., & Fincher, R-M.E. (1997). Teaching third-year medical students how to handle ethical dilemmas. *The Journal of the Medical Association of Georgia*, 86, 327-329.
- Roberts, L.W., Hammond, K.A.G., Geppert, C.M.A., & Warner, T.D. (2004). The positive role of professionalism and ethics training in medical education: A comparison of medical students and resident perspectives. *Academic Psychiatry*, 28(3), 170-182.
- Rogers, G. (2002). Rethinking moral growth in college and beyond. *Journal of Moral Education*, 31(3), 325-338.
- Rossi, P.H. (1977). Vignette analysis: Uncovering the normative structure of complex judgments. In R.K. Merton, J.S. Coleman, & P.H. Rossi (Eds.), *Qualitative and quantitative social research: Papers in honor of Paul F. Lazarsfeld*, (pp. 176-186), New York: The Free Press.
- Roy, A.W.N., & Howe, C.J. (1990). Effects of cognitive conflict, socio-cognitive conflict and imitation on children's socio-legal thinking. *European Journal of Social Psychology*, 20, 241-252.

- Satterwhite, R.C., Satterwhite, W.M. III, & Enarson, C. (2000). An ethical paradox: The effect of unethical conduct on medical students' values. *Journal of Medical Ethics*, 26(6), 462-465.
- Savulescu, J., Crisp, R., Fulford, K.W.M., & Hope, T. (1999). Teaching medical ethics: Evaluating ethics competence in medical education. *Journal of Medical Ethics*, 25, 367-374.
- Schlaefli, A., Rest, J.R., & Thoma, S.J. (1985). Does moral education improve moral judgment? A meta-analysis of intervention studies using the Defining Issues Test. *Review of Educational Research*, 55(3), 319-352.
- Seedhouse, D. (1998). *Ethics: The heart of health care* (2nd ed.). Chichester, England: John Wiley & Sons.
- Self, D.J. (1993). The educational philosophies behind the medical humanities programs in the US: An empirical assessment of three different approaches. *Theoretical Medicine*, 14, 221-229.
- Self, D.J., & Baldwin, D.C. Jr. (1994). Moral reasoning in medicine. In J.R. Rest and D. Narvaez (Eds.), *Moral development in the professions: Psychology and applied ethics*, (pp. 147-162), Hillsdale, NJ: Lawrence Erlbaum Associates.
- Self, D.J., & Baldwin, D.C. Jr. (1998). Does medical education inhibit the development of moral reasoning in medical students? A cross-sectional study. *Academic Medicine*, 73, S91-S93.
- Self, D.J., & Olivarez, M. (1993). The influence of gender on conflicts of interest in the allocation of limited critical care resources: Justice vs. care. *Journal of Critical Care*, 8, 64-74.
- Self, D.J., Baldwin, D.C. Jr., & Olivarez, M. (1993). Teaching medical ethics to first-year students by using film discussion to develop their moral reasoning. *Academic Medicine*, 68(5), 383-385.
- Self, D.J., Baldwin, D.C. Jr., & Wolinsky, F.D. (1992). Evaluation of teaching medical ethics by an assessment of moral reasoning. *Medical Education*, 26, 178-184.
- Self, D.J., Baldwin, D.C. Jr., & Wolinsky, F.D. (1996). Further exploration of the relationship between medical education and moral development. *Cambridge Quarterly of Healthcare Ethics*, 5(3), 444-449.
- Self, D.J., Ellison, E.M., Saatkamp, H.J. Jr., & Wild, J.R. (2006). Teaching ethical issues in genetics: Assessment of the development of moral reasoning skill. *Annals of Behavioral Science and Medical Education*, 12(1), 21-25.
- Self, D.J., Olivarez, M., & Baldwin, D.C. Jr. (1998a). Clarifying the relationship of medical education and moral development. *Academic Medicine*, 73(5), 517-520.
- Self, D.J., Olivarez, M., & Baldwin, D.C. Jr. (1998b). The amount of small-group case-study discussion needed to improve moral reasoning skills of medical students. *Academic Medicine*, 73(5), 521-523.
- Self, D.J., Schrader, D.E., Baldwin, D.C., & Wolinsky, F.D. (1991). A pilot study of the relationship of medical education and moral development. *Academic Medicine*, 66(10), 629.
- Self, D.J., Wolinsky, F.D., & Baldwin, D.C. Jr. (1989). The effect of teaching medical ethics on medical students' moral reasoning. *Academic Medicine*, 64, 755-759.

- Shaughnessy, J.J., Zechmeister, E.B., & Zechmeister, J.S. (2003). *Research methods in psychology* (6th ed.). Boston, MA: McGraw-Hill
- Sheehan, J., Husted, S., Candee, D., Cook, C.D., & Bargen, M. (1980). Moral judgment as a predictor of clinical performance. *Evaluation and the Health Professions*, 3, 393-404.
- Shorr, A.F., Hayes, R.P., & Finnerty, J.F. (1994). The effect of a class in medical ethics on first-year medical students. *Academic Medicine*, 69(12), 998-1000.
- Shulman, L.S. (1992). Ways of seeing, ways of knowing, ways of teaching, ways of learning about teaching. *Journal of Curriculum Studies*, 28, 393-396.
- Shulman, L.S. (1996). Just in case: Reflections on learning from experience. In J. Colbert, P. Desberg, & K. Trimble (Eds.), *The case for education: Contemporary approaches for using case methods* (pp. 197-217). Boston, MA: Allyn & Bacon.
- Siegler, M. (1978). A legacy of Osler: Teaching clinical ethics at the bedside. *JAMA*, 239(10), 951-956.
- Singer, P.A., Pellegrino, E., & Siegler, M. (2001). Clinical ethics revisited. *BMC Medical Ethics*, 2, 1.
- Skiera, P., & Stirling, D. (2004). Using video cases to enhance professional development programs. In P. Kommers & G. Richards (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2004* (pp. 3194-3198). Chesapeake, VA: AACE.
- Smith, S., Fryer-Edwards, K., Diekema, D.S., & Braddock, C.H. III. (2004). Finding effective strategies for teaching ethics: A comparison trial of two interventions. *Academic Medicine*, 79(3), 265-271.
- Snarey, J.R. (1985). Cross-cultural universality of social-moral development: A critical review of Kohlbergian research. *Psychological Bulletin*, 97, 202-232.
- Snarey, J.R., Reimer, J., & Kohlberg, L. (1985). Development of social-moral reasoning among Kibbutz adolescents: A longitudinal cross-cultural study. *Development Psychology*, 21, 3-17.
- Spiro, R. J., Coulson, R. L., Feltovich, P. J. & Anderson, D. K. (1988). Cognitive flexibility theory: Advanced knowledge acquisition in ill-structured domains. In *Tenth Annual Conference of the Cognitive Science Society*, pp 375-383. Hillsdale, NJ: Erlbaum.
- Spiro, R.J., Feltovich, P.J., Jacobson, M.J., & Coulson, R.L. (1991). Cognitive flexibility, constructivism, and hypertext: Random access instruction for advanced knowledge acquisition in ill-structured domains. *Educational Technology*, 31(5), 24-33.
- Sprinthall, N.A. (1994). Counseling and social role taking: Promoting moral and ego development. In J.R. Rest and D. Narvaez (Eds.), *Moral development in the professions: Psychology and applied ethics*, (pp. 85-99), Hillsdale, NJ: Lawrence Erlbaum Associates.
- Stake, R. (1995). *The art of case research*. Thousand Oaks, CA: Sage Publications.
- Strong, C., Connelly, J.E., & Forrow, L. (1992). Teachers' perceptions of difficulties in teaching ethics in residencies. *Academic Medicine*, 67(6), 398-402.
- Sulmasy, D.P., Geller, G., Levine, D.M., & Faden, R.R. (1990). Medical house

- officers' knowledge, attitudes, and confidence regarding medical ethics. *Archives of Internal Medicine*, 150, 2509-2513.
- Sulmasy, D.P., Geller, G., Levine, D.M., & Faden, R.R. (1993). A randomized trial of ethics education for medical house officers. *Journal of Medical Ethics*, 19, 157-163.
- Sulmasy, D.P., & Marx, E.S. (1997). Ethics education for medical house officers: Long term improvements in knowledge and confidence. *Journal of Medical Ethics*, 23, 88-92.
- Swenson, S.L., & Rothstein, J.A. (1994). Navigating the ward: Teaching medical students to sue their moral compasses. *Academic Medicine*, 71(6), 591-594.
- Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics* (5th ed.). Needham Heights, MA: Allyn & Bacon.
- Tappen, M.B. (1997). Language, culture, and moral development: A Vygotskian perspective. *Developmental Review*, 17, 78-100.
- The Hastings Center. (1980). *The teaching of ethics in higher education*. Hastings-on-Hudson, NY: The Institute of Society, Ethics and the Life Sciences.
- Thoma, S.J. (1986). Estimating gender differences in the comprehension and preference of moral issues. *Developmental Review*, 6, 165-180.
- Thomasma, D.C. (1982). A cognitive approach to the humanities in primary care. *Family Practice*, 14, 18-20.
- Trevino, L.K. (1986). Ethical decision-making in organizations: A person-situation interactionist model. *The Academy of Management Review*, 11(3), 601-617.
- Turiel, E. (1966). An experimental test of the sequentially of developmental stages in the child's moral judgments. *Journal of Personality and Social Psychology*, 3, 611-618.
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Vygotsky, L.S. (1986). *Thought and language*. Boston, MA: MIT Press.
- Walker, L.J. (1983). Sources of cognitive conflict for stage transition in moral development. *Developmental Psychology*, 19(1), 103-110.
- Walker, L.J., & Taylor, J. (1991). Family interactions and the development of moral reasoning. *Child Development*, 62, 264-283.
- Waz, W.R., & Henkind, J. (1995). The adequacy of medical ethics education in an pediatrics training program. *Academic Medicine*, 70, 1041-1043.
- Webb, N.M., & Palincsar, A.S. (1996). Group processes in the classroom. In D.C. Berliner and R.C. Cafree (Eds.), *Handbook of Educational Psychology*, (pp. 841-873), New York: Simon & Schuster Macmillan.
- Yin, R.K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Zeidler, D.L., & Keefer, M. (2003). The role of moral reasoning and the status of socioscientific issues in science education. In D.L. Zeidler (Ed.), *The role of moral reasoning on socioscientific issues and discourse in science education*, (pp. 7-38), Dordrecht, Netherlands: Kluwer Academic Publishers.

APPENDIX A

Ethics Workup



An Ethics Workup

Internal Medicine Clerkship, Block _____

Date(s) _____

Name _____

What are the clinically relevant facts? (Brief)

What is (are) the ethical concern(s)?

Who are the stakeholders and what conflicts exist?

What can be done to resolve conflict?

Who ultimately decides for this patient, and why?

What clinical options exist?

What are the ethical arguments for and against each option?

What clinical action(s) is optimal for *this* patient and give ethical reasons why?

Can this decision be implemented?

If not, why and what reasonable options exist?

APPENDIX B

Instructions for the Ethics Curriculum in the Internal Medicine Clerkship

Instructions for the Ethics Curriculum in the Internal Medicine Clerkship

For this clerkship, you will be asked to fill out pre- and post-surveys. These surveys are not to test you. Therefore the responses that you give will not affect your grade. Please complete the pre-survey before the end of the 1st week of the block. Please complete the post survey during the 7th week of the block.

In addition, you will be asked to participate in weekly discussion board activities via Blackboard from the beginning of Week 2 thru the end of Week 6 of the block.

At the beginning of each week, discussion topics/questions related to medical ethics will be posted on the Blackboard Discussion Boards that should guide the discussion for that week.

You will be grouped into groups of three or four to ensure that everyone has the opportunity to participate in the discussions.

For each week, please post at least one original message to the discussion board and also respond to at least one message posted by your peers. See below for detailed information and dates.

Directions to access Blackboard

1. Please go to the Blackboard course website (<https://blackboard.missouri.edu/>).
2. Please login using you Pawprint User ID and Password
3. Please click on the “**Internal Med 6999: Internal Medicine Core Clerkship (Kerber)**” link under My Courses.

Directions to access the Discussion Boards

1. Please click on “**Discussion Boards**” that is listed in the menu section of the left side.
2. Please click on the “**Discussion Board**” link that is on the right side.
3. Please click on the Discussion Board that has the following information: the week number and your name.

For example: In Week 2 of the block, Jane Smith (Student A) should click on the following discussion board:

[Ethics: Week 2](#)

Group members: Jane Smith, John Doe, and Mary Jones

4. To create and post an original message, click on the button



5. To respond, comment, ask a question, or answer a question, click on the button



Dates	Activities and Deadlines
Week 2 (Feb. 5 – Feb.11)	<ol style="list-style-type: none">1. Check Blackboard for the new discussion topic (i.e., case) that will be posted each Monday morning. Download the video clips that are part of the weekly discussions under Course Documents in Blackboard.2. Post your original message by each Wednesday, 11:59PM (CST).3. Read and reply to <i>at least one message</i> posted by your group members by each Friday, 11:59PM (CST).4. Respond to any questions or messages posted to you before the end of the week.
Week 3 (Feb. 12 – Feb. 18)	
Week 4 (Feb. 19 – Feb. 25)	
Week 5 (Feb. 26 – Mar. 4)	
Week 6 (Mar. 5 – Mar.11)	

Note: The video clips are in Quicktime format. If you don't have Quicktime installed on your computer, please go to <http://www.apple.com/quicktime/download/win.html> to download the software for free.

APPENDIX C

Sample Vignette

Case A: A 37-year-old woman with metastatic breast cancer to bone and liver has decided to forgo further chemotherapy having had her second recurrence in five years. She has full decisions making capacity, being awake, alert, and fully aware of her circumstances. During evening rounds you offer an in-depth discussion about once again undergoing chemotherapy and radiation. She informs you that she knows her illness is incurable and that there is a high probability of increased suffering before she dies, therefore she does not want to be placed on a ventilator or undergo attempts at cardiopulmonary resuscitation, should she be in the process of dying. She does not have a written health care directive, nor has she assigned a durable power of attorney. You and the nurse present with you concur and both document this conversation in her medical record, after which you write a DNR/DNI order. The next morning she lapses into coma and begins to show signs of impending respiratory failure. Her husband, who has no knowledge of his wife's wishes, arrives and notices her declining condition and asks what you plan to do about her condition. To your surprise, when you explain your plans for palliative care and relate the content of your conversation with his wife he states that he believes that she was too ill and distressed to be capable of refusing treatment. He demands that she undergoes CPR and be intubated if necessary and that she be transferred to the intensive care unit for full treatment to save her life.

Questions:

1. What are the ethical concerns in this case? Why are they ethical concerns?
2. What options exist? What course of action should be taken?
3. What ethical principles, values, or arguments support this decision?

APPENDIX D

Sample Vignette Scoring Scheme

Vignette Scoring Scheme (Case A)

Ethical Sensitivity (total possible points 7)

<u>Ethical Issues and Concerns</u>	<u>Implicit (0.5 pt)</u>	<u>Explicit (1.0 pt)</u>
Informed decision-making (consent and refusal)	_____	_____
Decision-making capacity	_____	_____
Respecting patient choice	_____	_____
Surrogate decision making	_____	_____
Non-maleficence for the dying patient	_____	_____
Futility, balancing the benefit/burden of treatment	_____	_____
Disclosure and communication with family and surrogates	_____	_____

Points given: _____

Considering multiple viewpoints (total possible points 5)

Excellent (5)	Provided in-depth insight and consideration of <i>all/most</i> of the identified ethical issues and concerns.
Very good (3)	Provided in-depth insight and consideration of <i>at least one</i> of the identified ethical issues and concerns and <i>limited</i> insight/consideration to <i>all or most</i> of the remaining ethical issues and concerns.
Good (2)	Provided in-depth insight and consideration of <i>at least one</i> of the identified ethical issues and concerns or <i>limited</i> insight/consideration to <i>all of most</i> of the ethical issues and concerns.
Acceptable (1)	Limited insight/consideration of <i>at least one</i> of the identified ethical issues and concerns.
Unacceptable (0)	No insight or consideration was provided.

Points given: _____

Options and resolutions (total possible points 4)

One point for each

Maintain DNR status	_____
Implement comfort measures	_____
Support the husband and family; continue to inform and communicate about the patient's request and facts of the case	_____
Clinical ethics consult and/or consultation from other specialists	_____

Points given: _____

Justification using ethical principle and/or values (total possible points 6)

Implicit (0.5 pt) Explicit (1.0 pt)

Respect for autonomy and the patient's right to refuse treatment	_____	_____
Non-maleficence	_____	_____
Futility calculus	_____	_____
Respect/dignity	_____	_____
Provider-patient relationship/trust	_____	_____
Obligations of providers to respect reasonable requests and relieve suffering—quality of life as determined by the patient	_____	_____

Points given: _____

Total Points: _____/22

APPENDIX E

Inter-rater Reliability Results

Inter-rater reliability is the extent to which two or more raters yield consistent and similar results in the implementation of a rating system based on a binary variable (MacLennan, 1993). To calculate the reliability, the following steps were taken. First, I looked at all the scores provided by the raters. Next, agreement between the raters was determined by comparing consistency in giving points. For example, for Case A, according to the scoring scheme, there were 17 items that the raters were requested to identify in the participants responses. For items that the raters did give points for (either 1 point or 0.5 points), a “Y” would be noted, while for items that were not given points an “N” was noted (see below).

Table E1

Example Scoring Results for Case A

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Rater 1	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	N	Y
Rater 2	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y

The observed proportion of agreement between the two raters was 82% (that is 14 of the 17 items). However, this does not take into account the amount of agreement predicted by chance. Therefore considering that Rater 1 had given points for 71% of the 17 items, and Rater 2 had given points for 88% of the 17 items; that means, on average, they will agree with giving points for approximately 62% of the items (.71 x .88), and agree with not giving points for 3 % of the items (.29 x .12). That is, prediction of agreement by chance is 65% (62% and 3%). Taking all this into account, Cohen’s Kappa was computed as follows:

$$\text{Kappa} = (.82 - .65)/(1 - .65) = .49$$

The following inter-rater reliability table reports the consistency of scoring of the vignette responses between the two raters. Reliability was examined within each of the five cases.

Table E2

Summary of Inter-rater Reliability Results

	Proportion of Agreement	Prediction of Agreement by Chance	Cohen's Kappa	Pearson's Coefficient
Case A	.78	.13	.75	.84
Case B	.79	.12	.76	.97
Case C	.72	.08	.69	.80
Case D	.81	.08	.79	.96
Case E	.83	.08	.81	.87
Overall	.79	.10	.76	.89

APPENDIX F

Pre-Survey

Medical Ethics Pre Survey

Please answer the items below in relation to your learning experiences regarding medical ethics. This is not a test. No grade will be given.

Your responses are confidential.

Part I

Instructions: Please circle *the most appropriate* number between 1 and 9, where **1 is the lowest rating** and **9 is the highest rating**.

Question	Rating										
1. At the present time, how would you rate your <i>understanding of ethical principles</i> underpinning the practice of good medicine?	Limited	1	2	3	4	5	6	7	8	9	Very Good
2. At the present time, how would you rate <i>your ability to identify</i> medical ethical issues and/or concerns?	Unsatisfactory	1	2	3	4	5	6	7	8	9	Excellent
3. At the present time, how would you rate <i>your ability to resolve</i> medical ethical dilemmas/ conflicts?	Unsatisfactory	1	2	3	4	5	6	7	8	9	Excellent
4. At the present time, how would you rate <i>the degree</i> in which you have <i>encountered medical ethical dilemmas/conflicts</i> ?	Never	1	2	3	4	5	6	7	8	9	Constantly
5. At the present time, how <i>adequate</i> would you rate the training in <i>ethical reasoning</i> that you have received?	Insufficient	1	2	3	4	5	6	7	8	9	Sufficient
6. At the present time, how <i>much</i> has your medical education/training in ethical reasoning <i>helped you to deal with</i> ethical dilemmas/conflicts?	Not at all	1	2	3	4	5	6	7	8	9	Very Much
7. At the present time, how would you rate <i>your medical ethical competence</i> overall?	Unacceptable	1	2	3	4	5	6	7	8	9	Acceptable

Part II

1. What area of medicine are you currently interested in specializing? *(please specify)*

2. On a scale of 1 to 10, how comfortable are you with using technology such as online discussion boards with 1 being not at all comfortable and 10 being very comfortable? _____

APPENDIX G

Post-Survey

Medical Ethics Post Survey

Please answer the items below in relation to your learning experiences regarding medical ethics. This is not a test. No grade will be given.

Your responses are confidential.

Part I

Instructions: Please circle *the most appropriate* number between 1 and 9 where **1 is the lowest rating** and **9 is the highest rating**.

Question	Rating										
1. At the present time, how would you rate your <i>understanding of ethical principles</i> underpinning the practice of good medicine?	Limited	1	2	3	4	5	6	7	8	9	Very Good
2. At the present time, how would you rate <i>your ability to identify</i> medical ethical issues and/or concerns?	Unsatisfactory	1	2	3	4	5	6	7	8	9	Excellent
3. At the present time, how would you rate <i>your ability to resolve</i> medical ethical dilemmas/ conflicts?	Unsatisfactory	1	2	3	4	5	6	7	8	9	Excellent
4. At the present time, how would you rate <i>the degree</i> in which you have <i>encountered medical ethical dilemmas/conflicts</i> ?	Never	1	2	3	4	5	6	7	8	9	Constantly
5. At the present time, how <i>adequate</i> would you rate the training in <i>ethical reasoning</i> that you have received?	Insufficient	1	2	3	4	5	6	7	8	9	Sufficient
6. At the present time, how <i>much</i> has your medical education/training in ethical reasoning <i>helped you to deal with</i> ethical dilemmas/conflicts?	Not at all	1	2	3	4	5	6	7	8	9	Very Much
7. At the present time, how would you rate <i>your medical ethical competence</i> overall?	Unacceptable	1	2	3	4	5	6	7	8	9	Acceptable

Part II

Instructions: Please mark (e.g., make bold) *the most appropriate* response to the following items by indicating your levels of agreement, in which:

S/D	D	N/A	A	S/A
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Therefore, 1 represents the lowest and most negative impression on the scale, 3 represents an adequate impression, and 5 represents the highest and most positive impression.

Statement	S/D	D	N/A	A	S/A
1. The objectives of the ethics curriculum (led by Dr. Fleming) were clear to me.	1	2	3	4	5
2. The ethics curriculum was effective in meeting all of its stated objectives.	1	2	3	4	5
3. The ethics curriculum has contributed to my development in considering ethical issues.	1	2	3	4	5
4. The ethical case write-up exercise has contributed to my awareness of the need to do an ethics workshop.	1	2	3	4	5
5. The ethical case write-up exercise has stimulated awareness of my ethical reasoning processes.	1	2	3	4	5
6. I engaged in useful discussions about approaches to ethical reasoning.	1	2	3	4	5
7. I have gained further insight into <i>my approach</i> to medical ethical reasoning.	1	2	3	4	5
8. The knowledge and skills gained through the ethics curriculum are directly applicable to my future practice.	1	2	3	4	5
9. This learning experience should result in changes to my approaches to dealing with medical ethical dilemmas/issues.	1	2	3	4	5
10. I will use what I've learned about conducting an ethics workshop in my future practice.	1	2	3	4	5
11. The ethics workshop form had provided a useful guide for me to make decisions regarding ethical dilemmas/issues.	1	2	3	4	5
12. Overall, the ethics curriculum had met my expectations.	1	2	3	4	5

APPENDIX H

Medical Ethics Curriculum in the IM Clerkship Group Interview Protocol

Group Interview Protocol

The goal of the group interview is to solicit help clarifying issues regarding the medical ethics curriculum in the Internal Medical Clerkship. The following questions are meant to probe reactions, comments and suggestions toward the ethics curriculum.

Ground Rules

1. Please say exactly what you think. Don't worry about what others think.
2. Talk about your experience and feelings, and not about what you have heard others say.
3. Express your opinions, but do not argue with other participants.
4. Let's try to have one person talking at one time. Everyone will get a turn to share their opinions.

Questions

1. Did the ethics curriculum meet your expectations? Why? How?
2. What did you learn from the ethics curriculum? What about the case write up?
Online ethical case discussions? Expert-reasoning example videos?
3. How did the ethics curriculum impact you (can either be positive or negative impact)? What about the case write up? Online ethical case discussions?
Expert-reasoning example videos?
4. What parts and/or aspects of the ethics curriculum do you think are most important? What about the case write up? Online ethical case discussions?
Expert-reasoning example videos? Why?
5. What area of the ethics curriculum did you have the most difficulty with or found the most challenging in doing? What about the case write up? Online ethical case discussions? Expert-reasoning example videos? In what way was it difficult or

- challenging? What suggestions would you give to improve it?
6. Did you see any changes in the way to conduct ethical reasoning and decision-making that you would attribute to the ethics curriculum? What about the case write up? Online ethical case discussions? Expert-reasoning example videos?
 7. How has the ethics curriculum helped you reflect on your approaches to making ethical decisions and understanding your values? What about the case write up? Online ethical case discussions? Expert-reasoning example videos? What did you learn or did not learn about yourself?
 8. Overall, how satisfied are you with your experience in the ethics curriculum? What about the case write up? Online ethical case discussions? Expert-reasoning example videos?
 9. What suggestions do you have or what do you think should be changed in the ethics curriculum to enhance the learning experience? What about the case write up, online ethical case discussions, and expert-reasoning example videos?
 10. Is there anything else that you would like to add or share that we have not discussed?

APPENDIX I

Release of Information Form



**Office of the Dean
Medical Education**
University of Missouri-Columbia

School of Medicine

MA213-215 Medical Science Building
Columbia, MO 65212

PHONE (573) 882-2923
FAX (573) 884-2988

Release of Information: Adult

I _____ hereby give Wei-Hsin Lu and/or
the Curators of the University of Missouri, a public corporation, the absolute and
irrevocable right and permission to use photographs and film, tape, and sound
recordings taken of me on _____ November 22nd, 2006 _____ for use in
distance learning or any teaching course, publication, or use on the web and

- a) to copyright the same in her and
- b) to use, re-use, publish, re-publish the same in whole or part, individually or in
conjunction with other photographs or images, in any medium, for commercial
or educational purposes, and
- c) to place said photographs, films, tape, or sound recordings on an internet site,
and understand that the same will be available for world-wide distribution on
the internet computer network.

I hereby release and discharge Wei-Hsin Lu and/or The Curators of the University of
Missouri, a public corporation, its successors and assigns, its officers, employees
agents, and members of the Board of Curators, from any and all claims and demands
arising out of or in connection with the use of such photographs film, tape, sound or
information including but not limited to defamation or invasion of privacy.

I am of legal age and have read the foregoing and fully understand the contents
thereof.

Signed

Witnessed by: _____ Date: _____

APPENDIX J

Video Content Evaluation Form

Video Content Evaluation Form

Please read each statement and circle the most appropriate answer.

1=Strongly disagree, 2=Disagree, 3=Neither agree/nor disagree, 4=Agree, 5=Strongly agree

1. The expert-reasoning example videos are presented in a way, which could assist the learner in considering the following:

(a) the relevant facts to the case.	1	2	3	4	5
-------------------------------------	---	---	---	---	---

(b) the ethical concerns about the case.	1	2	3	4	5
--	---	---	---	---	---

(c) the stakeholders in the case.	1	2	3	4	5
-----------------------------------	---	---	---	---	---

(d) the existing conflicts of the case.	1	2	3	4	5
---	---	---	---	---	---

(e) what can be done to resolve the conflicts.	1	2	3	4	5
--	---	---	---	---	---

(f) what options exists.	1	2	3	4	5
--------------------------	---	---	---	---	---

(g) what are the ethical arguments for and against each option.	1	2	3	4	5
---	---	---	---	---	---

(h) who ultimately decides the course of action.	1	2	3	4	5
--	---	---	---	---	---

(i) why course of action should be taken (why is it the optimal action for the patient, situation, etc.?)	1	2	3	4	5
---	---	---	---	---	---

Additional Comments:

- | | | | | | |
|---|---|---|---|---|---|
| 2. The expert-reasoning example videos take into account the relevant concepts/issues learners have to think about in regards to ethical reasoning. | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

3. What is your opinion in using these expert-reasoning example videos as a tool for teaching medical ethics? What are its strengths? Weaknesses? What can be improved?
4. Please describe your overall comments regarding the expert-reasoning example videos.

Results of Video Content Evaluation ($n=3$)

1. Responses to survey question: “The expert-reasoning videos are presented in a way, which could assist the learner in considering the following:”

Item	<i>M</i>	<i>SD</i>
(a) the relevant facts to the case.	4.00	.00
(b) the ethical concerns about the case.	4.67	.58
(c) the stakeholders in the case.	4.00	1.00
(d) the existing conflicts of the case.	4.33	.58
(e) what can be done to resolve the conflicts.	4.33	.58
(f) what options exists.	4.67	.58
(g) what are the ethical arguments for and against each option.	4.33	.58
(h) who ultimately decides the course of action.	4.33	.58
(i) why course of action should be taken (why is it the optimal action for the patient, situation, etc.?)	4.33	.58

Additional Comments:

Evaluator 1: All of the ethical concerns were articulated well.

2. Responses to survey question “The expert-reasoning example videos takes into account the relevant concepts/issues learners have to think about in regards to ethical reasoning” resulted in a mean score of 4.67 ($SD = 0.58$).
3. What is your opinion in using these expert-reasoning example videos as a tool for teaching medical ethics? What are its strengths? Weaknesses? What can be improved?

Evaluator 1: It is a good tool in explaining situations students will encounter in their career. The strengths are the relating to the cases and helping students realize the non-clinical judgments. Maybe an improvement would be some more cases to reach more ethical areas.

Evaluator 2: Like the level of experience in the panel and interaction of the panel.

Evaluator 3: Strengths: Overall the quality of the videos is really good, detailed insight is extremely beneficial. Weakness: The videos can be made into small clips based on different topics, which can be reviewed easily when required.

4. Please describe your overall comments regarding the expert-reasoning example videos.

Evaluator 1: It was informative to have local expert with cases people can relate to.

Evaluator 2: Great, would be good to show.

Evaluator 3: Expert panel videos were extremely helpful in understanding the dynamics involved in the cases. Ethical arguments and theories were highlighted analyzing the key characteristics.

APPENDIX K

Pre-Survey and Post-Survey Results

Table K1

Means, Standard Deviations of Pre- and Post-Survey Items, and Summary of Paired-samples t-test by Treatment Group

Item	Group	Pre-Survey Mean (SD)	Post-Survey Mean (SD)	<i>t</i> -test of difference		
				Mean	<i>t</i> (10)	Sig. (two-tailed)
1. At the present time, how would you rate your <i>understanding of ethical principles</i> underpinning the practice of good medicine?	CSCB	6.00 (1.34)	7.00 (1.34)	-1.00	-2.47	.03
	non-CSCB	6.00 (1.73)	7.55 (0.93)	-1.55	-2.75	.02
2. At the present time, how would you rate your <i>ability to identify</i> medical ethical issues and/or concerns?	CSCB	5.27 (1.49)	7.73 (1.10)	-2.46	-6.71	.00
	non-CSCB	6.45 (0.82)	7.64 (0.81)	-1.18	-3.99	.00
3. At the present time, how would you rate your <i>ability to resolve</i> medical ethical dilemmas/conflicts?	CSCB	4.73 (1.85)	6.36 (1.63)	-1.64	-3.11	.01
	non-CSCB	4.55 (1.29)	7.09 (0.70)	-2.55	-6.96	.00
4. At the present time, how would you rate <i>the degree</i> in which you have <i>encountered medical ethical dilemmas /conflicts</i> ?	CSCB	4.00 (1.61)	6.18 (1.94)	-2.18	-3.95	.00
	non-CSCB	4.36 (1.91)	6.09 (1.30)	-1.73	-3.30	.01
5. At the present time, how <i>adequate</i> would you rate the training in <i>ethical reasoning</i> that you have received?	CSCB	5.09 (1.70)	7.09 (1.30)	-2.00	-3.09	.01
	non-CSCB	5.82 (1.54)	7.36 (0.67)	-1.55	-3.26	.01
6. At the present time, how <i>much</i> has your medical education/training in ethical reasoning <i>helped you to deal with</i> ethical dilemmas/ conflicts?	CSCB	4.18 (1.60)	5.82 (2.04)	-1.64	-2.84	.02
	non-CSCB	5.18 (1.72)	7.27 (1.01)	-2.09	-4.39	.00
7. At the present time, how would you rate your <i>medical ethical competence</i> overall?	CSCB	5.09 (1.76)	6.64 (1.36)	-1.55	-4.95	.00
	non-CSCB	6.00 (1.27)	7.55 (0.82)	-1.55	-4.54	.00

VITA

Wei-Hsin Lu was born on August 7, 1971, in Taipei County, Taiwan. She received her Bachelor's degree in International Trade in 1995 from Ming Chuan University, Taipei, Taiwan. She received both her M.Ed. and Ph.D. degrees in Educational Technology from the School of Information Science and Learning Technologies at the University of Missouri-Columbia. Currently she is a Research Associate in the Department of Community Health and Social Medicine at the Sophie Davis School of Biomedical Education at the City College of the City University of New York.