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DEVELOPMENT

MedEthEx Online: A Computer-Based Learning Program in Medical Ethics and Communication Skills

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Background: Bioethics education often focuses on lectures and discussions to set a foundation for ethical decision making. Our goal was to bridge the gap between classroom learning and bedside competence through computer-assisted instruction. This article assesses the efficacy of MedEthEx Online, a computer-based learning program as part of a required Bioethics course.

Description: Of 173 American medical students, 89 in Section 1 attended 8 bioethics lectures and 8 small-group discussions. Eighty-four in Section 2 had a similar course, although two group discussions were replaced with computerized learning. We compared (a) final exam scores, (b) topic-specific question scores, (c) performance with standardized patients, (d) self-assessments, and (e) course evaluations.

Evaluation: Exam scores were comparable, although computerized-learning students scored higher in specific exam areas, felt somewhat more clinically prepared, and rated the course slightly better. Standardized patient interactions differed, although they were comparable overall.

Conclusion: MedEthEx Online is a viable option for fostering effective communication and problem resolution skills.

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Virtually every American medical school includes medical ethics in the curriculum,^{1–3} and medical ethics education is flourishing internationally.^{4–6} However, there is a potentially wide gap between the educational objectives that medical ethics courses espouse and the goals they achieve. In 1983, a highly respected panel of American physicians and medical ethicists met and established basic curricular goals in medical ethics, stat-

ing that a medical ethics curriculum should “provide practicing physicians with the conceptual, moral-reasoning, and *interactional abilities* [italics added] to deal successfully with most of the moral issues they confront in their daily practice”⁷ (p. 253). Similarly, many experts in the field have concluded that one of several key objectives of medical ethics education is “to equip physicians with *the interactional skills* [italics

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added] needed to apply this insight, knowledge, and reasoning to human clinical care”⁸ (p. 706).

Yet medical ethics is often taught in the classroom, largely without patient contact, during the first 2 years of medical school.⁹ Instruction is frequently lecture-based and followed by small-group discussions. However, recognizing and resolving ethical dilemmas posed in a classroom and participating in small-group discussions are only the first steps toward providing ethically sound, empathic care to patients. Without appropriate communication skills to serve as a vehicle for ethical concepts, students may be unable to apply the knowledge gleaned in the classroom to appropriate patient care at the bedside.

Ideally, medical ethics education should include direct observation of how a student elicits a patient’s concerns, identifies dilemmas, analyzes an ethical issue, and works to resolve the issue with the patient. In the few programs with longitudinal curricula spanning the 3rd and 4th years, students’ classroom experiences are augmented by simulated patient encounters and rounds with attending physicians or an ethicist. Yet these interventions are labor intensive and not universally available. We therefore sought a practical means of imparting communication skills early in medical ethics education.

Purposes

To address what we perceive as a misalignment between medical ethics’ teaching strategies and its learning objectives, our multidisciplinary team designed a computer-based learning (CBL) program (Figure 1). It fosters active learning by providing medical students with an opportunity to improve their ethical reasoning and communication skills when confronting controversial ethical issues in clinical practice. We developed the program to fill the need for interactive teaching materials that could supplement and enhance classroom lectures and small-group discussions in a required bioethics course. We also postulated that CBL in medical ethics could be an important step in creating a “virtual clinical campus,”¹⁰ enabling students or residents at distant locations to receive personalized instruction and feedback on clinical ethics and communication skills.

Our educational objectives were to enable each learner to recognize ethical issues in a clinical context, frame questions for further exploration, identify resources, and effectively discuss pertinent ethical issues with the patient or appropriate decision maker. When the learner concludes the interaction, the program assesses the learner’s communication skills and provides feedback on the resolution chosen for the ethical issue.

This article describes the use and evaluation of a CBL program we developed on medical ethics and communication skills. It describes our experience in using CBL in a bioethics course and summarizes our

efforts to determine whether students would find CBL in bioethics helpful.

Method

We designed a Web-based program to provide easy, free access to users (Table 1). At the time of the study, we had developed two of the present four single-encounter simulations. We chose the four cases with the help of a national advisory council and by reviewing core literature in medical ethics. We created the first two of the four cases, focusing on assisted suicide and confidentiality as live simulated patient interactions, and then adapted them for computer-based instruction.

We designed the program so that the learner at the keyboard assumes the role of an attending physician meeting with an onscreen “patient” (Figure 2). Each case contains an introduction for users and a brief patient history. The user types in questions and comments to begin the “conversation” and elicit the chief complaint and ethical issue from the “patient” (Figure 3). The “patient” responds with text, audio, and video, according to a structured database. In addition, the learner can obtain “expert” consultations from a health lawyer, medical ethicist, communications specialist, mental health professional, physician, and others with relevant expertise (Figure 4). The learner also can find print and electronic references and resources (Figure 5). A menu of suggested questions is available as well. The learner “talks” with the “patient” and then chooses a course of action. Once the learner enters a decision, the computer provides personalized feedback that addresses the specific ethical option chosen by the learner and the communication skills employed during the conversation with suggestions for improvement (Figure 6).

The participants in the program assessment phase of this project were 173 second-year medical students in the class of 2000 at MCP Hahnemann School of Medicine who were enrolled in the required bioethics course. For reasons unrelated to our project, students were randomly assigned to either Bioethics Section 1 (meeting weekly August through October) or Bioethics Section 2 (meeting weekly October through December), using groupings created for another course by alternating from an alphabetized student roster. The first group attended eight bioethics lectures followed by eight small-group discussions. The second group attended eight bioethics lectures followed by six discussions and two CBL encounters. We did not give students in the first group access to the computer program. The program was available during Section 2 on five IBM-compatible computers with soundcards and headphones in the school’s microcomputer center or via Internet access from remote sites, such as students’ homes. Technical support on site was frequently available.



Figure 1. Opening screen of the program (<http://griffin.mcphu.edu/medethex>).

Table 1. *MedEthEx Online System*

<i>MedEthEx Online</i> (http://griffin.mcphu.edu/medethex)	
System Requirements	
A computer with a Pentium 90 or better processor or equivalent PowerMac	
16 MB of RAM or greater	
A 28.8 kbps modem with Internet access, or direct Internet access	
A color monitor	
A soundcard with speakers or headphones	
Display Settings	
800 × 600 resolution	
High color setting preferably greater than 250 colors	

We set out to compare small-group discussions with CBL in just two topics from the larger bioethics course: confidentiality and assisted suicide. To make the small-group discussions and CBL module comparable, both groups focused on the same patient scenarios. The lectures, small-group discussions, and CBL modules were designed and delivered by the same faculty (Janet Fleetwood and Wayne Vaught), who made no changes in the lectures between the two sections. Both sections had a classroom lecture, and each was assigned identical readings in Fletcher's textbook, *Introduction to Clinical Ethics*.¹¹ A physician facilitator led each discussion group in Section 1 and guided students through the case analysis. Facilitators had detailed guidelines about what to discuss, including the information from the experts presented in the computer program. We instructed facilitators to discuss the

case for 45 min, covering the points in the handout and encouraging students to share their perspectives. Similarly, we designed the CBL module to take approximately 45 min. All students assigned to Section 1 attended the small-group discussions on confidentiality, and over 90% attended the discussion on assisted suicide. All students assigned to Section 2 completed both cases in the computer program.

Because data were not missing entirely at random (e.g., one standardized patient [SP] consistently failed to rate an item) most subscale means are calculated only for students with complete data on the items contributing to them. For a few subscales with only a few missing data points, means were prorated across the missing items. The two groups were compared using unpaired *t* tests or Mann-Whitney *U* tests, depending on the distribution of the data. For yes and no variables, such as single items, chi-square was used.

Results

We compared overall final exam grades between the two groups and found no statistically significant difference ($M \pm SD$: 83 ± 5 for Session 1, 83 ± 5 for Session 2, $p = .80$.) Exams were multiple choice and scored by computer. To assess students' knowledge in the two specific areas covered by the CBL program (confidentiality and assisted suicide), we isolated 15 assisted-suicide questions and 14 confidentiality questions on the final exam. The CBL group did significantly better on confidentiality questions ($p < .05$).



Figure 2. Introductory page with information, patient cases, and resources, all of which are available by clicking on the screen.

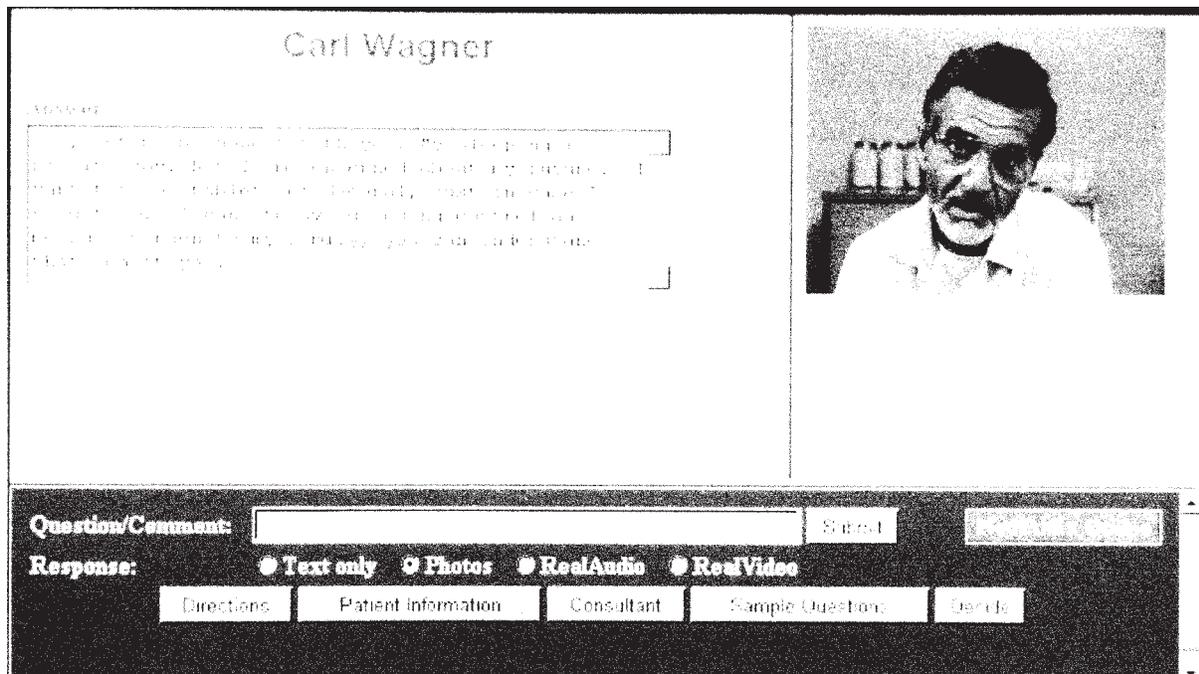


Figure 3. Conversation with a patient who poses an ethical dilemma for the learner.

There was no significant difference in scores on the assisted-suicide questions.

We also compared students in both groups on how well each student interacted with a live SP. We trained the SPs to portray the same patient who posed the confidentiality issue in the small-group discussions for Session 1 and in the CBL program for Session 2. Standardized patients were unaware of the study design, and the same group of SPs were used for both Section 1

and Section 2. These SPs then rated the students on their content knowledge of doctor–patient confidentiality (Table 2), using a list we devised that was reviewed by a national advisory group of ethicists and physicians. The communication skills checklist (Table 3) has been validated and described elsewhere.¹² The patient satisfaction checklist is derived from the checklist used by the National Board of Medical Examiners and includes issues such as how friendly the trainee

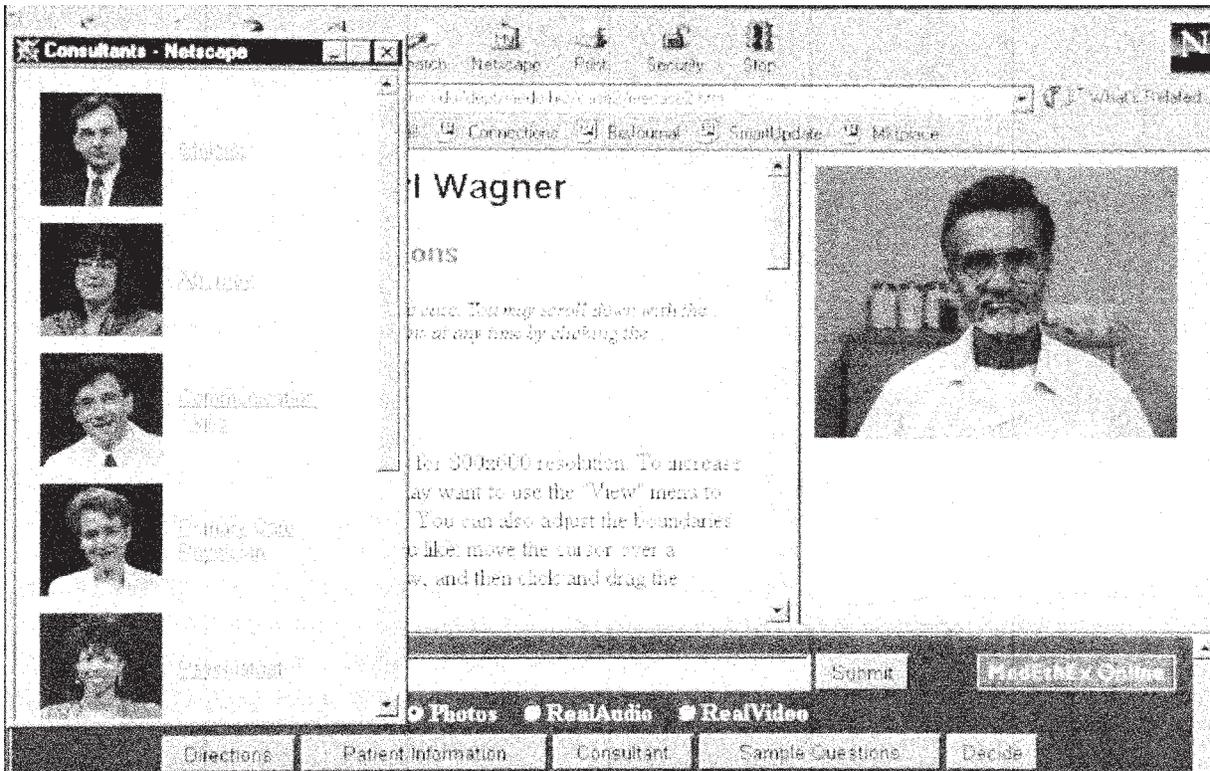


Figure 4. The learner can consult a variety of experts for "consultations."

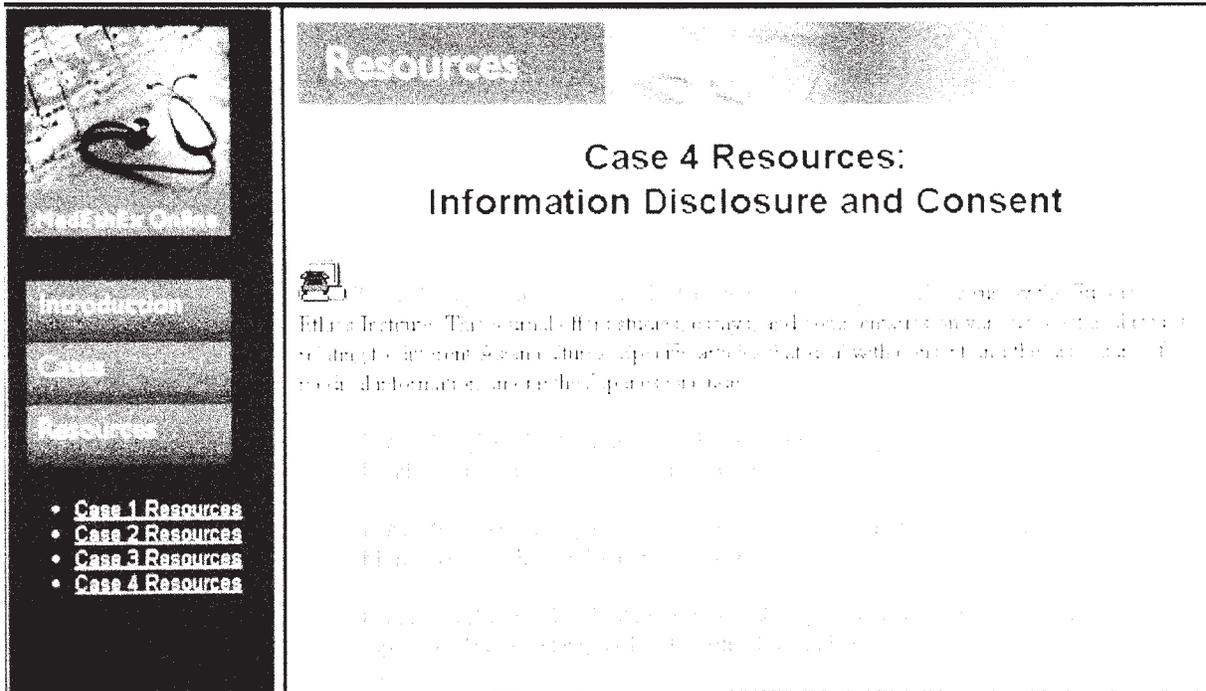


Figure 5. The learner can search for additional journal and electronic resources.

was, whether the trainee listened carefully, whether the trainee asked thoughtful questions, and whether the trainee explained problems clearly.*

*Patient Satisfaction Scale derived from the National Board of Medical Examiners and adapted from Webster.¹³

Students who completed the CBL program performed better with the SP on the bioethics content items ($M \pm SD$: 55% \pm 19 for Session 1, 69% \pm 16 for Session 2, $p < .001$). The two groups were not significantly different on the communication skills ($M \pm SD$: 86% \pm 14 for Session 1, 83% \pm 16 for Session 2, $p > .15$). The small-group discussions did better on patient

Communication Skills Feedback

During the exercise, you used the following communications and relationship skills:

The following communication and relationship skills would have been helpful:

- Open ended questions: What does the future hold?
- Specific questions: Are you concerned about pain?
- Facilitators: Tell me more
- Assess patient's knowledge: Do you know your prognosis?
- Ask patient for questions: Do you have any questions?
- Hegotiation: What if we try pain management first?
- Name or reflect patient's emotions: You seem depressed.
- Legitimize patient's feelings: This must be difficult.
- Express support for patient: I am here for you.
- Express respect for patient's coping efforts: You are doing a remarkable job.
- Express partnership: Can we meet with your family?

Figure 6. Personalized feedback is provided to learners based on the communication skills they used in "talking" with the patient and the ethical choices made during the encounter.

Table 2. Standardized Patient Content Checklist

Susan Lakeside Case (Confidentiality and HIV)	
Answer "yes" or "no" to the following questions:	
Did the examinee	
1.	Ask whether we are practicing safe sex/using condom?
2.	Say husband is at risk of contracting HIV?
3.	Say husband might already be HIV+?
4.	Say husband needs to be tested?
5.	Say risk to husband can be reduced by practicing safe sex/abstinence?
6.	Say husband needs to be told (or patient has a moral obligation to tell) about her HIV status?
7.	Say that patient's medical records are not confidential when it may cause harm to someone else?
8.	Explain relevant state law? (In Pennsylvania, law permits doctors to tell patient's partner under certain circumstances.)
9.	Give me some time to tell husband? (In comments, please write "would tell" if s/he would eventually tell Marc if patient did not or "would not tell" if s/he agreed not to tell Marc even if patient did not.)
10.	Tell me that s/he will not lie to my husband?
11.	Tell me that if husband asks about patient's condition, s/he will refer husband to me?

satisfaction ($M \pm SD$: 87% \pm 17 for Session 1, 79% \pm 20 for Session 2, $p = .003$).

In addition, we compared students' assessment of their own preparedness to deal with ethical, legal, and communication issues for a patient raising issues of confidentiality. We gave students a 10-question evaluation form. When asked how prepared they felt to "deal with confidentiality for actual patients" or "doctor-patient communication issues" or "ethical issues," there was no difference between the CBL users and the small-group discussants. When asked about

how prepared they were to deal with legal issues pertaining to confidentiality, however, CBL users felt significantly more prepared ($M \pm SD$: 4.0 \pm 1.6 for Session 1. For Session 2, $M \pm SD$: 4.8 \pm 1.5, $p = .0014$).

We surveyed the students about how they felt about the computer program. We assessed likability of the CBL module with attitude items in a Likert format, where 1 = *strongly disagree* and 5 = *strongly agree*. Overall, students gave the first encounter 3.5 and the second encounter 3.7 on measures including ease of use, being interesting, and being a valuable learning experience (Table 4). Most narrative comments offered constructive criticism on improving ease of use.

Finally, we compared the students' overall assessment of the bioethics course using the standard 12-question course evaluation tool used at our medical school. Again, there was no statistically significant difference in how well students rated the course on its organization or conceptual framework, whether repetition of key concepts was valuable, or the course's overall rating.

Conclusions

This study demonstrates the efficacy and student acceptance of a CBL program in medical ethics and communication skills in a required bioethics course.

Effectiveness was evaluated using overall final exam grades, study-relevant question comparison, and SP scores. Findings showed few significant differences between the use of the program and small-group discussion. Student acceptance of CBL was generally

Table 3. *Standardized Patient Overall Skills Checklist*

Susan Lakeside Case (Confidentiality and HIV)
Answer “yes” or “no” to the following questions:
Did the examinee
1. Allow me to finish my opening statement w/o interruption?
2. Establish a timeline from beginning to present (narrative thread)?
3. Repeat/restate segments of what I’ve said—at least one time?
4. Avoid multiple questions?
5. Elicit my concerns?
6. Name the emotion I’ve expressed or shown? (e.g., You seem upset/angry.)
7. Offer understanding of the emotion expressed or shown?
8. Offer partnership, reassurance, support, or praise?
9. Explains reasons for recommendations?
10. Check my understanding at least once during the encounter?
11. Solicit my questions?
12. Ask whether I am willing/able to follow recommendations?
13. Address my concerns?

positive, with students feeling comparably prepared to encounter patients.

When designing the project, we felt obliged to give all students introductory lectures on every topic and replace only small-group discussions with CBL. We felt that we could not eliminate lectures on the two topics of confidentiality and assisted suicide for half of the students and rely solely on CBL, because we had no evidence that CBL was educationally comparable and felt uncomfortable potentially compromising the students’ educational experience. This leaves open the question of whether CBL could substitute for classroom lectures—an issue that warrants further investigation.

One puzzling result was that the small-group discussion participants scored higher on patient satisfaction measures than the computer users, specifically concerning their data gathering skills. Yet an important, conflicting finding was that their interpersonal skills and information-giving skills were rated similarly. Data gathering includes the number of questions the learner asked the SP, and we conjecture that one possible explanation for the lower data gathering skills among the CBL participants may be related to the fact that the SP encounter was akin to those students’ second meeting with the SP (because they had already “met” her in the computerized encounter). Students who had talked about the patient in the small group (Bioethics Section 1) but never actually talked *with* her asked more questions of the SP. By contrast, students who had “encountered” the patient previously during the computer-based encounter (Bioethics Section 2) asked the SP fewer questions and received lower data gathering scores. Perhaps this is because this was, for the computer users, their second meeting with the pa-

tient. In essence, their first opportunity to gather data by asking the patient questions had come earlier when they did the computer-based exercise. Alternatively, perhaps the students who spent more time in small-group discussions with their peers sharpened their data gathering skills and these skills carried over into their SP interaction.

The general advantages and disadvantages of CBL have been covered elsewhere in the literature.¹³ Notable attributes of CBL that are important for teaching bioethics include the following:

- CBL can engage learners with simulated patient interactions that approximate the problem-solving and integration skills required in an actual physician–patient encounter.
- It allows students to self-pace their learning, soliciting expert information as needed and spending as little or as much time on any given case as the learner believes appropriate.
- CBL can adapt to students’ crowded schedules, enabling students to access the program at their convenience from diverse locations (including rotation sites and their homes).
- The CBL module is consistent among students, ensuring a comparable experience for all learners, and can be repeated as often as the student wishes to review.
- CBL can enable faculty to track every question or comment entered by each student to give feedback via e-mail or in class.
- It overcomes the problem of variability in small-group quality, as when a small-group facilitator is unfocused or gives misinformation, or when group participants have interpersonal issues that impede learning.
- It avoids the influence of peer pressure influencing a student’s bioethical stance. Students progress through the cases individually and only receive feedback after their decision has been entered.

The specific advantages of *MedEthEx Online* include the following:

- Its capacity to provide personalized feedback to each user based on the ethical option selected and the communications skills employed. Besides paragraphs that discuss the ethical ramifications of their choice, learners get an inventory of what communication techniques they used and which were omitted.
- It provides multidisciplinary instruction (physician, ethicist, lawyer, communications expert, etc.) in a time- and cost-efficient manner.
- The program is Web-based rather than a CD-ROM, so cost is not an impediment to potential users. A Web-based program overcomes hardware and software compatibility issues, and is easier to update than a

Table 4. *Student Evaluation of Computer-Based Learning Program*

Questionnaire Statement	Module 1: Confidentiality		Module 2: Assisted Suicide	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. Instructions were clear and easy to understand.	3.8	±1.0	4.0	±.94
2. Program was easy to use.	3.2	±1.3	3.6	±1.1
3. Information at appropriate level of difficulty.	3.8	±.95	4.0	±.92
4. Program was interesting.	3.6	±1.1	3.7	±1.0
5. Exercise will be useful.	3.3	±1.2	3.6	±1.0
6. Exposed you to new material.	3.1	±1.2	3.3	±1.0
7. Was a helpful review.	3.5	±1.2	3.6	±1.0
8. Learned a lot from the program.	3.1	±1.1	3.4	±.97
9. Time required to complete was appropriate.	3.6	±1.1	3.9	±.98
10. Consultants were helpful.	3.8	±1.0	3.7	±1.1

CD-ROM. It can be distributed easily and can provide users with access to other sites using hypertext links.

In this study we chose to substitute our CBL experience for two small-group discussions. Although generally we were pleased with the results, we have no intention of eliminating the small-group discussions from our curriculum. Small-group discussions in bioethics have many advantages beyond reinforcement of material.¹⁵ Hearing diverse perspectives on an ethical issue and seeing the positive role model of a physician guiding students through an ethical analysis have immeasurable value. In addition, an aspect of talking with classmates is hearing how students of different religions, genders, and cultural backgrounds approach issues—information that students can directly apply in the patient care setting. Although we have tried to include patients and family members in our CBL program who present a variety of religious and cultural perspectives and have drawn in experts from a variety of backgrounds, open discussions in a culturally diverse group offer unique advantages.

After some reflection, in the academic year of 1999–2000 we decided to structure our 2nd-year bioethics course to include eight weekly lectures followed by small-group discussions. CBL cases, along with readings, are assigned as “homework” for about half of the sessions. We use 10 minutes of class time to debrief students on the main points they should have gleaned from the computer-based encounter and to discuss their experiences. This approach has been very successful, as it has given students a chance to wrestle with some of the issues prior to the large lecture and small-group discussions. We also plan to try using the computerized cases as follow-up to the lectures and small groups, and to assess students’ experiences.

As with any new technology, we experienced a wide array of technical and logistical problems in creating and using the program. First, overcoming the problems in natural language programming was difficult, yet we wanted the experience to be as realistic as

possible so we did not want to resort to a purely menu-driven approach. Second, we had to ensure that enough computers with soundcards and headphones were available to students at the hours during which students wanted them. Third, students sometimes complained about lengthy response times after typing in questions, presumably caused by heavy Internet traffic. In addition, the program “crashed” occasionally in the middle of a “conversation,” frustrating students and irrevocably damaging how real the interaction felt to the learner. Finally, the cost of continually updating the database is small but of concern to the faculty who created the program using limited funds.

There are several limitations to this study. First, students enrolled in either of the two sections of bioethics were not completely sequestered from one another.* Although faculty tried to deliver the identical lecture and safeguarded the computer site by giving the address only to students in the second section after the first section had concluded, it is an open question whether the two sections of the course really were identical. Perhaps those in the second section did better for reasons unrelated to the CBL program; however, our prior experience teaching this course does not support that hypothesis. Second, the students’ evaluations of the CBL program included their names, which may have produced a positive rating bias. Students were assured that their ratings did not affect their grade (which was based solely on exam score, completion of the CBL, and participation in the SP exercise), but it may still have been subtly influential. Third, self-reporting of preparedness to encounter patients is a somewhat dubious measure of actual preparedness to provide good patient care. Yet our efforts surely are a first step toward teaching compassionate, ethical care to patients

*From our database and personal communication, we determined that one student in Bioethics Section 1 stumbled on an early version of our program while computer hacking. She viewed part of the program but exited without receiving feedback or expert comments. Her data was dropped from the study.¹⁶

with diverse perspectives. Finally, we have no in-depth analysis of the cost-effectiveness of CBL in medical ethics, although *MedEthEx Online* is available free of charge on the Web.

Our educational efforts in CBL stressed one part of a required course with lectures and small-group discussions. Our curriculum also offers elective rotations, clinical case conferences, grand rounds, and SP encounters. To be educationally effective, CBL needs to be fully integrated into the bioethics curriculum. Faculty should verify students' level of participation and completion. We also advocate following the CBL with a debriefing session, either "live" or electronic, designed to review issues that may have been missed or misunderstood during the experience, and enabling participants to interact with their colleagues.¹⁷ With thoughtful curricular integration, *MedEthEx Online* offers an effective educational tool in medical ethics and communication skills.

References

1. Varner KD (Ed.). *1997–1998 Association of American Medical Colleges Curriculum Directory* (26th ed.). Washington, DC: Association of American Medical Colleges, 1997 (Table 5).
2. Bickel J. Human values teaching programs in the clinical education of medical students. *Journal of Medical Education* 1987;62(5):369–78.
3. Pellegrino ED, McElhinney TK. *Teaching ethics, the humanities, and human values in medical school: A ten year overview*. McLean, VA: Institute on Human Values in Medicine, Society for Health and Human Values, 1982.
4. Doyal L, Gillon R. Medical ethics as a core subject in medical education: A core curriculum offers flexibility in how it is taught—But not that it is taught. *British Medical Journal* 1998;316(7145):1623–4.
5. Lynoe N. Medical ethics—An endeavour for social medicine? *Scandinavian Journal of Social Medicine* 1997;25(4):225–8.
6. St. Onge J. Medical education must make room for student-specific ethical dilemmas. *Canadian Medical Association Journal* 1997;156(8):1175–7.
7. Culver CM, Clouser KD, Gert B, et al. Basic curricular goals in medical ethics. *New England Journal of Medicine* 1985;312:253–6.
8. Miles SH, Lane LW, Bickel J, Walker RM, Cassel CK. Medical ethics education: Coming of age. *Academic Medicine* 1989;64:705–14.
9. Fox E, Arnold R, Brody B. Medical ethics education: Past, present, and future. *Academic Medicine* 1995;70(9):761–9.
10. Friedman CP. The virtual clinical campus. *Academic Medicine* 1996;71(6):647–51.
11. Fletcher JC, Lombardo PA, Marshall MF, Miller FG. *Introduction to clinical ethics*. Frederick, MD: University Publishing Group, 1997.
12. Novack DH, Cohen DG, O'Brien MK. Using a "core skills" checklist to assess clinical skills. *Medical Encounter* 1997;13(1):20–1.
13. Webster G. *Final report of the Patient Satisfaction Questionnaire Project*. Philadelphia: American Board of Internal Medicine, 1989.
14. Glenn J. A consumer-oriented model for evaluating computer-assisted instructional materials for medical education. *Academic Medicine* 1996;71(3):251–5.
15. Self DJ, Olivarez M, Baldwin DC. The amount of small-group case-study discussion needed to improve moral reasoning skills of medical students. *Academic Medicine* 1998;73(5):521–3.
16. Confidential. Personal communication, September 30, 1997.
17. Friedman B. Top ten reasons the World Wide Web may fail to change medical education. *Academic Medicine* 1996;71:979–81.

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