High-fidelity simulation and legal/ethical concepts: A transformational learning experience

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Abstract
Students in an undergraduate legal and ethical issues course continually told the authors that they did not have time to study for the course because they were busy studying for their clinical courses. Faculty became concerned that students were failing to realize the value of legal and ethical concepts as applicable to clinical practice. This led the authors to implement a transformational learning experience in which students applied legal and ethical course content in a high-fidelity human simulation (HFHS) scenario. A preliminary evaluation compared the new HFHS experience with in-person and online student groups using the same case. Based on both student and faculty perceptions, the HFHS was identified as the best of the three approaches for providing a transformational learning experience regarding legal and ethical content.

Keywords
Ethical and legal content, nursing education, high-fidelity human simulation, evaluation, online, United States

Introduction
After several semesters of teaching an undergraduate legal and ethical issues course, the authors were concerned that students repeatedly said they did not have time to study for the course because they were busy studying for their clinical courses. This repeated prioritization of clinical courses over the didactic course eventually convinced the authors that a new way to teach the relevance of legal and ethical content to practice was needed. The purpose of this paper is to describe the development and preliminary evaluation
of a high-fidelity human simulation (HFHS) scenario as an innovative and transformational teaching method to meet that need.

**Background**

The content of the didactic course that the authors teach is essential to all nursing programs in the United States of America according to the American Association of Colleges of Nursing’s (AACN) document, *Essentials of Baccalaureate Education for Professional Nursing Practice*. This document presents professionalism and professional values as one of nine basic elements for quality undergraduate nursing education. The content consists of values, ethics, legal concepts, professionalism, and culture, and holds graduates to the values of altruism, autonomy, human dignity, integrity, and social justice. It is expected that nursing graduates will uphold legal and ethical professional standards in their own practice and prevent illegal and unethical care.

The authors perceived that students did not assign the same value to the theoretical and principle-based legal and ethical course as they did to their clinical courses. There is a longstanding divide between theory and practice in nursing education, with practice perceived as preferable. Clinical practice is essential to nursing, and in its shadow is the theory and research that are needed to advance the science of nursing and improve its clinical application. Faculty needed a dynamic learning activity to help students recognize the importance of legal and ethical aspects of nursing care.

Educational theories and best practices provided a solid direction for the development of the new learning activity. The constructivist perspective recommends active learning experiences that enable learners to use their past knowledge and experiences and derive their own meaning from the new content. An active approach was also supported by best practices in education. However, best learning principles also suggest that while previous knowledge and experience can facilitate the learning process, they can just as easily hinder it. If the message that the divide between practice and theory is deeply entrenched and has been transmitted to students through past personal, professional, and educational experiences, then the valuing of clinical practice over legal and ethical principles would likely require more than an active learning experience.

Reviewing the literature, the authors realized that the learning experience must be not only active, but also transformative. Transformative learning encourages students to recognize the socially accepted assumptions that limit their perspectives and consciously rethink and redefine their world. As learners recognize their assumptions, find them misguided, and revise them, they become independent and critical thinkers. This process of reflection and reconstruction could address any longstanding socialization and adherent assumptions that unconsciously lead students to place practice as higher and grander than theory. Three fundamental features of this transformational approach include the ‘role of experience, rational discourse, and critical reflection’, all of which are initiated by ‘a disorienting dilemma that triggers intense feelings’.

At the same time that the authors were realizing that a transformational learning experience was needed to help students recognize the importance of the legal and ethical content to their practice, HFHS experiences were becoming increasingly common in nursing education. HFHS refers to structured learning experiences that allow students to interact with anatomically accurate, instructor-controlled, computerized mannequins. This advanced technology allows students the opportunity to make decisions in a pseudo-clinical setting, with the mannequin responding to student interventions in a physiologically precise manner. As the authors began to look at methods for transforming legal and ethical instruction, HFHS experiences were being integrated into all of the program’s clinical courses at the authors’ school. Implementation of the HFHS scenarios varied, but participation in a debriefing session, characterized by reflection and discussion of their experience, was standard. A body of literature supports the use of simulation learning activities to improve knowledge acquisition and retention, decision-making, and problem solving;
increase self-confidence,\textsuperscript{14} collaboration,\textsuperscript{14–17} and psychomotor skills,\textsuperscript{18,19} and provide a safe learning environment.\textsuperscript{14,15,19,20}

However, the authors found only one article\textsuperscript{21} that described using HFHS to teach a non-clinical (pharmacology) course, and only two articles that discussed the use of simulation (but not HFHS) to teach legal and ethical content in particular. One article\textsuperscript{22} reported on the use of role playing and the other\textsuperscript{23} used a mock trial form of simulation. Yet, it seemed reasonable that many of the benefits demonstrated by the use of HFHS in clinical courses could also easily apply to a didactic, non-clinical course such as legal and ethical issues. From a transformative learning perspective, the HFHS could serve as the perfect mechanism by which to expose students to the required, disorienting dilemma, followed by the usual debriefing session in which they would reflect on their experiences and discuss rationale for their actions. Thus, the HFHS experience was well suited to address all three fundamental features of transformation: experience, rational discourse, and critical reflection.

The HFHS transformational learning experience

HFHS scenario design

Freshmen (students enrolled in the first year of a 4-year undergraduate degree) in the program in which the authors teach take required general education courses. Students are admitted to the nursing program as sophomores (second year) and begin taking clinical courses that same year. Given this curricular framework, junior-level (third year) students enroll in the legal and ethical issues course in the fall, along with one general education course, a research course, and two 8-week clinical courses. The legal and ethical issues course is designed to teach the AACN’s baccalaureate essentials of professionalism and professional values by investigating medical–legal issues and exploring the implications that legal intervention and interpretation have on the scope of nursing practice and the delivery of patient care. The course also provides an opportunity to learn about ethical decision-making through the introduction of various ethical systems, concepts, and principles. The course is taught using a variety of teaching methods, including lectures, small group work, and case studies, all within the confines of a 2-hour classroom session held once a week.

It is within this overall course context that the authors decided to introduce the HFHS scenario and evaluate its effectiveness in contrast to in-person and online formats. The overall goals of the scenario were that students (a) identify legal and ethical issues in the clinical situation and (b) recognize the importance of legal and ethical aspects of nursing care. Faculty decided on a scenario in which the patient unexpectedly suffers a cardiac arrest, but the students do not have information about whether or not the patient wants to be resuscitated. The patient’s family is at the bedside and family members disagree with one another about whether the patient should be resuscitated, which ties in course content on conflict management. In the midst of this conflict, other patients require attention and the students need to delegate responsibilities. Because of the underlying values inherent in nursing practice, faculty also included a variety of cultural elements into the scenario. Finally, as documentation had previously been identified as a weakness in the curriculum, proper documentation of the scenario was included as an objective. Through this process, the following five objectives were identified: (1) recognize the legal and ethical issues associated with advanced directives; (2) choose appropriate conflict management techniques to implement; (3) delegate tasks appropriately; (4) correctly document the case study situation; and (5) demonstrate respect for cultural differences.

The HFHS scenario

Mr Yu (played by the HFHS), a 42-year-old male patient with advanced colon cancer, was admitted to the telemetry unit with dehydration, nausea, and vomiting after experimental chemotherapy. His K$^+$
(potassium) level was low. Mrs Yu (played by a school staff member with experience in community theater) and their teenage children were in the room with Mr Yu. The nurses were in the midst of a bedside report, with one reporting off from night duty and the other receiving a report for the day shift. The children and two nurses’ roles were played by students assigned to the HFHS group, all of whom received a brief introduction to their characters before the scenario started. The children were instructed that their father had cancer, but that they are not ready for him to die and wanted him to receive every possible treatment.

The objectives served as trigger points to help move the scenario along. For example, the first trigger occurred several minutes into the nurses’ report when Mr Yu began to complain of chest and jaw pain and a crushing and throbbing ache, and stated that he could not catch his breath. He stopped talking, closed his eyes, and his cardiac rhythm changed to asystole. In case the students did not notice asystole on the cardiac monitor, Mrs Yu was cued to say, ‘What’s happening?’ and to start to panic about her husband’s condition. The next trigger came from Mr Yu’s family. If cardiopulmonary resuscitation (CPR) was initiated, Mrs Yu started yelling to stop, saying that her husband did not want CPR, but the children disagreed. In the midst of this conflict, the unit secretary’s voice was heard over the loudspeaker, announcing that one of the nurse’s patients needed a pain shot, the doctor was on the phone with orders on another patient, and the emergency room was sending up a new admission. Once these other patient needs were addressed, Mr Yu returned to a normal sinus rhythm, the family calmed down, and the scenario came to an end. Students were directed to document pertinent information.

Following the scenario, the students and faculty participated in a faculty-led debriefing session in which open-ended questions provided direction for reflection and conversation. Initial feedback was discussed regarding the students’ overall experiences. General feedback was sought by asking students to discuss the decisions they made and analyze those decisions. Students were asked what they would do differently the next time and how they could make better decisions in the future. More specific questions directed toward the scenario objectives were also asked. For example, students were asked to identify different cultures that were evident in the scenario, the impact the cultures had on the case, how well they handled the cultural aspects of the case, and how they could improve in the future. Throughout the debriefing, students were asked to reflect on their thoughts and actions and to provide systematic rationale for their responses.

Preliminary evaluation project

A preliminary evaluation of the HFHS scenario was conducted to compare it with two established methods of teaching: a traditional in-person case study discussion and an online case study discussion. The use of online learning experiences was already common, with increasing evidence supporting its effectiveness. The preliminary evaluation protocol was submitted to the institutional review board and assigned exempt status.

The 60 nursing students enrolled in the fall semester of the legal and ethical issues course participated in the evaluation project. They were randomly divided into three groups, with one group assigned to an in-person case study discussion, another group assigned to an online case study discussion, and the final group assigned to the HFHS experience. All three groups worked through the same Mr Yu scenario, but the in-person and online groups did so via a written copy of the case study/scenario. In contrast to the HFHS scenario, which moved forward in real time, the scenario was presented to the in-person and online groups as an unfolding case study, stopping at the trigger points noted in the HFHS scenario to review the information and discuss what they would do and why.

Each group of four or five students was assigned to a 1-hour slot during the day to participate in their case study scenario, which they attended instead of the regularly scheduled class. Experience suggested that four or five students were an ideal number for online small groups and this was supported by Cress et al., who stated that smaller groups such as this increase the influence of individual contributions and increase
individuals’ cooperation in the group. Four or five students per group also worked from a practical perspective, as two of the students assigned to the HFHS group were needed to portray the two nurses in the scenario and two students were needed to play the ‘patient’s’ children; if a fifth student was present, he or she was assigned to play a third child.

In order for all 60 students to move through the activity, three faculty members were needed to implement this activity. One faculty member was assigned to conduct all of the paper/pencil case studies, another to conduct all of the online case studies, and the third to conduct all of the HFHS case study scenarios. Following the conclusion of the case studies, both students and faculty provided feedback on the learning experience.

**Student feedback**

Students provided feedback on their perceptions of the learning experience via a one-page survey completed immediately after their respective sessions. The survey consisted of several open-ended questions, with the qualitative responses analyzed using content analysis. One other question asked students to rate their overall learning experience on a Likert scale. A glitch in the online program resulted in the first two online student groups not completing that evaluation immediately after their experience, and students were unreliable submitting their feedback after the day of the activity. Therefore, the data set for the online group was only 10, while that for the HFHS group was 16, and for the paper/pencil group was 17.

The first question asked students what content from the legal and ethical issues course they had learned, or had reinforced, by the case study/scenario experience. Students in all three groups responded similarly by identifying numerous topics that had been presented in class and reinforced in the cases, including legal and ethical issues, cultural beliefs, ‘do not resuscitate’ orders, living wills, advanced directives, documentation, and delegation.

The second question asked about content from other nursing courses that they had learned, or had reinforced, by the case study experience. Again, all three student groups had similar responses. Students identified integrating content from a variety of courses, including fundamental concepts and skills of nursing, adult health, and health and aging. They also identified other content areas not associated with specific courses, with CPR and responding to codes being the most common responses.

The final open-ended question asked students to reflect on their case study/scenario experience and provide feedback that would be helpful to the faculty as they revised the course for the following year. All three student groups experienced a different type of learning activity in a new format, which they identified as beneficial to learning about legal and ethical content and its applicability to clinical practice. Students in all three groups identified other benefits as well, though those benefits varied from group to group. For example, the overwhelming benefit identified by the online group was the convenience of participating from home (‘I really enjoyed this experience especially because I was at home . . . ’ and ‘ . . . I liked being able to do it online. It was [nice and] convenient’). The online group also valued the opportunity to discuss content (‘It gave you the chance to express what you thought and . . . let students discuss between each other’). The in-person group echoed this, but also mentioned the idea of applying content (‘It was good to apply what we learned . . . ’). The HFHS group identified the interactive, real-life nature of the experience (‘I think this simulation experience helped me be more comfortable once I am in this type of situation’ and ‘I think this was a great scenario. It places cultural considerations, age differences, and critical thinking to students to aid them in a real-life situation’).

Both the in-person and HFHS student groups suggested that more information needed to be provided with the case study/scenario; however, faculty purposefully omitted information from the scenario so that students had to identify missing data. Students also asked for additional similar experiences in the future. While the HFHS group offered no negative feedback, both the online and in-person groups did. The online
group indicated that the discussion board format was problematic in that answers were repeated, and one student in the in-person group said the experience and discussion were not beneficial to learning. Not only were there no negative comments about the HFHS scenario but, overall, the student comments were more positive than the other two groups.

The final question asked students to rate their overall case study learning experience on a Likert scale ranging from 1 (poor) to 5 (excellent). Interestingly, none of the groups rated the case study experience below ‘average’, and none of the students in the online group rated it as high as ‘excellent’. The data were analyzed with the Kruskal–Wallis test, and showed a statistically significant difference (test statistic = 9.172, df = 2, and P < 0.05) in the overall scores across the three groups, with the HFHS students rating the case study/scenario experience significantly higher than the paper/pencil and online groups (Table 1).

**Faculty feedback**

Immediately after the sessions were over, faculty gathered to compare their own experiences and those of the students with whom they had worked. Initial conversation focused on the time and effort it took to implement the day’s activities. All three faculty members, however, identified positive student interactions and sharing of experiences during the case study/scenario, which led to the conclusion that all three groups had good experiences and benefited from the new setting and smaller groups. More detailed discussion led faculty to conclude that the HFHS scenario offered the best transformational experience because it provided an effective disarming dilemma, it was personal, and it afforded students the opportunity to reflect on and talk about their experiences in the debriefing session.

Mr Yu’s cardiac arrest served as an effective disarming dilemma in the HFHS groups, but less so for the in-person and online discussion groups. It was easier for the in-person and online students to remain detached as they read the page before them, and they had the luxury of time to review the information provided, identify information they would need to collect in the situation, discuss options, and determine what they should do if they were in that situation. Neither the in-person nor online faculty noted frustration or urgency on the part of their respective student groups. However, the HFHS students were experiencing a simulated version of the actual situation, occurring in real time, with real people, and with real emotions. They did not have the luxury of time for deliberation; the longer they took to find the necessary information and initiate resuscitation, the longer Mr Yu remained in cardiac arrest. As more time elapsed in the decision-making process, the more agitated Mrs Yu and the children became, urging the students to do (or not do) something. The HFHS faculty witnessed frustration, stress, tension, and even anger as students dealt with the disarming dilemma and attempted to make the right decision with limited information. As time literally slipped away and their emotions intensified, students realized that they did not possess the necessary information about the patient’s code status and advanced directive. The intense emotions experienced by students in the HFHS scenario served to make the disorienting dilemma more effective and left faculty with the sense that a lasting impression was made on students and, perhaps, an enduring lesson was learned.

### Table 1. Students’ perceptions of overall high-fidelity human stimulation (HFHS) experience.*

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFHS</td>
<td>16</td>
<td>4.5 (0.73)</td>
</tr>
<tr>
<td>In-person</td>
<td>17</td>
<td>4.2 (0.75)</td>
</tr>
<tr>
<td>Online</td>
<td>10</td>
<td>3.6 (0.52)</td>
</tr>
</tbody>
</table>

*Kruskal–Wallis test, P < 0.05; SD: standard deviation.
Faculty discussion also led to the realization that the HFHS experience was personal in nature, perhaps because of the students’ direct involvement in the scenario, which was a component lacking in the in-person and online groups. The HFHS faculty saw students embrace, identify with, and assume their assigned roles. This did not occur with the in-person and online groups, as the students were not assigned a particular role as they worked through the scenario. It also seemed that the HFHS scenario faculty witnessed more variety from group to group than the other faculty. The HFHS students saw the characters come to life and in each scenario the characters that emerged varied according to the personality of the student playing the role, as well as the creativity with which they chose (or did not choose) to embellish their character. For example, students playing the children were coached to be teenagers who wanted everything possible done for their father. Some students fulfilled that role quietly but firmly, some aggressively, some with reticence, but all with a unique twist from the personality of the student playing the part. The characters were more personalized and varied, and literally came to life in a way that was lacking in the mere written descriptions used by the in-person and online groups.

An essential aspect of the HFHS scenario was the debriefing session. In contrast to the in-person and online groups, who engaged in ongoing discussion throughout their unfolding case studies, the HFHS students reflected on and discussed their experiences in their entirety after the scenario was over. Not only did the debriefing session allow students to unleash their emotional responses to the scenario, it also provided the time to pause and reflect seriously on the scenario, their thoughts and responses, and the implications for their future nursing practice. While the in-person and online groups also discussed issues, they did so as their case unfolded and without the impact of actual people pressuring them into timely decision-making and action.

**Limitations**

This project was considered a preliminary evaluation because it is subject to several limitations. First, there was a small sample of students enrolled in just one legal and ethical issues course, so the findings are not generalizable. Second, the students were assigned to one group or the other, but had no basis for comparison between the three different (in-person, online, and HFHS) approaches. Third, as a preliminary evaluation based on written feedback from students, the project was not designed as a qualitative study with open-ended responses to interview questions that were amenable to further investigation. Therefore, the responses provided were not explored in sufficient depth to identify themes and subthemes, although this would be a rich area for further study. Finally, the data collected did not address specific student learning outcomes, which represents another area ripe for further investigation.

**Summary**

Students needed a transformational teaching experience to help them learn the importance of legal and ethical content for their nursing practice. Based on the positive student comments and their rating of the HFHS scenario, as well as the faculty’s feedback that the HFHS provided an effective disarming dilemma, a more personal experience, and the opportunity to reflect on and discuss their experiences in the debriefing session, the HFHS scenario was determined to provide the best transformational learning experience. Based on the positive feedback, this and several other HFHS scenarios (which address a variety of other legal and ethical topics, such as scope of practice, nurse practice acts, standards of care, and risk management) were integrated into the course in subsequent semesters to help students recognize the application of the legal and ethical course content in their clinical practice.
Note
1. Dr Smith was a participant of the 2011 NLN Foundation Scholarly Writing Retreat sponsored by the NLN Foundation for Nursing Education.

Funding
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References