Featured Article

Integrating Human Patient Simulation into Associate Degree Nursing Curricula
Faculty Experiences, Barriers, and Facilitators

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Keywords
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Abstract
Background: The use of human patient simulation (HPS) is increasing in nursing education, and nursing programs across the country are investing resources in HPS. Therefore, in order to optimize the use of this technology, it is important to share experiences, successes, and challenges of integrating HPS into nursing curricula.

Method: This study utilized online surveys to explore the current HPS resources purchased by select associate degree nursing programs in a Western state as well as the use of these resources by nursing faculty. Further, it examined faculty perceptions of barriers and facilitators for integrating HPS into nursing curricula.

Results: The survey responses indicated that nursing programs spend a disproportionately large amount of money on the initial investment in simulation equipment compared with the ongoing spending on maintenance and support for simulation. Nursing faculty identified barriers to integrating simulation into the courses they teach including lack of time, lack of support and lack of appropriate equipment. They identified facilitators to integrating simulation into the courses they teach including helpful and thorough training, individual initiative, and support from colleagues and administrators. Finally, the faculty recommended incentives for improving the integration of simulation into the nursing curriculum, including the provision of additional paid time for simulation, additional training, and additional support resources.

Conclusions: This descriptive study offers discussion and recommendations for improving the integration of simulation into nursing curricula.

Cite this article:

Introduction

Anecdotal evidence indicates that although many nursing programs are investing hundreds of thousands of dollars in human patient simulation (HPS) equipment, this valuable resource is often not being used to its full potential. Closer examination of this dilemma, including interviews with leaders in the field, conversations with nursing lab resource personnel from around the country, personal observations, and examination of the literature have provided additional support of this impression. Many organizations have allocated monies for HPS equipment, but very few institutions have set
As HPS continues to gain importance in nursing education, nursing programs across the country invest resources in HPS, and nurse educators embrace HPS as a valuable teaching tool, it is important to share experiences, successes, and challenges. This dialogue is aimed at improving the future use of resources, helping alleviate the shortage of clinical experiences for students, and ensuring the quality of nursing graduates.

Out of concern related to the underutilization of existing HPS equipment, this research study set out to (a) describe the current HPS resources purchased by select associate degree nursing (ADN) programs in a Western state, (b) identify what experiences nursing faculty in these programs have had using HPS in the nursing courses they teach, and (c) examine nursing faculty perceptions of barriers, facilitators, and incentives for integrating HPS into nursing curricula.

**Key Points**
- Integrating new technology, including human patient simulation (HPS), into nursing curricula can present challenges.
- Sharing experiences, including barriers, facilitators, and recommendations for incentives related to the integration of HPS, may improve future efforts to integrate simulation into nursing curricula.
- Further research is necessary in order to optimize the integration and use of HPS in nursing education.

**Literature Review**

The popularity of HPS has grown tremendously over the past 10 years (Jeffries, 2008). The literature reflects this explosion of growth, and there is a plethora of new research related to the use of HPS in nursing education. In contrast, very little published research has addressed the possible underutilization of this innovative technology. Research has shown that technology, including HPS, can be effective in meeting a variety of teaching and learning needs (Melnyk, 2008). Furthermore, teaching and learning theories, including Kolb’s (1984) experiential learning theory, support the use of HPS in nursing education (Howard, 2007). The literature has provided an introduction to effective strategies for integrating HPS into nursing education curriculum, highlighting facilitators and barriers to curricular change (Billings & Halstead, 2005). Further, Price and Oliver (2007) have proposed a framework to help educators investigate and explicate the phenomenon of introducing new technologies in education. The literature has not, however, adequately addressed the experiences of nursing faculty or perceptions of barriers and facilitators for integrating HPS into nursing curriculum. This investigation may help community and technical colleges and other nursing programs more effectively integrate HPS into their nursing curricula and improve the quality of their programs.

**Method**

This descriptive study involved two phases. In the first phase, the investigator contacted the director or dean of nursing at each of the ADN programs in a Western state via e-mail. In the e-mail letter, the investigator asked for permission to invite the nursing faculty at the institution to participate in the research project. The researcher also asked the director or dean of nursing to complete an online survey or designate an individual who would complete an online survey about the current simulation resources, cost, faculty training, and use at the institution. E-mail and e-surveys were selected as the data collection method to facilitate an increased geographic diversity of the sample and to reduce the expenses related to recording, transcribing, and analyzing audiorecorded data.

When the investigator received a signed letter of cooperation from an institution, she sent an e-mail letter to the director or dean of nursing or this person’s designee, asking the individual to participate in an online Catalyst WebQ (WebQ, n.d.) survey about the current simulation use and resources at the institution.

The survey included the following questions:

- How many human patient simulators are there at your institution? What brand/model are they? When were they purchased?
- How many hours per week are the simulators in use for associate degree in nursing courses?
- Approximately how much money has been spent on simulation equipment? What was the source of the funding?
- Approximately how much money has been spent on maintenance and training for simulation equipment? What was the source of the funding?

In the second phase of the study, the investigator contacted each of the ADN faculty at the institutions that agreed to participate and asked them to complete a separate online Catalyst WebQ (WebQ, n.d.) survey.

This survey asked the following questions:

- How long have you been a nurse educator?
- What types of nursing courses do you teach (e.g., didactic, lab, clinical)?
• Have you used human patient simulation in the nursing courses you teach?
• Have you received training to use simulation? What type of training (i.e., was it provided by the manufacturer of the simulator, was it provided by a colleague at your institution, was it on or off campus)?
• Was the training useful? Why or why not?
• If you have used simulation in the nursing courses you teach, what conditions do you perceive as facilitators or what has made it easy for you to use simulation in the courses you teach?
• Are there any conditions that you perceive as barriers to integrating simulation into the nursing courses you teach? If so, please describe them.
• What resources or incentives would you recommend for integrating human patient simulation into the course you teach?

Results

Sample

The deans or directors from 11 of the 27 (40.7%) ADN programs in the selected Western state provided letters of cooperation to participate in the study. One director sent a letter stating that the institution did not own a simulator and therefore that institution would not participate in the study. Of the 11 schools that agreed to participate, four deans or directors or their designees responded to the survey about the current resources, cost, faculty training, and use of simulation equipment at their institution. Of the 76 faculty members who were contacted at participating schools, 24 (31.6%) completed the survey about their current use and knowledge of simulation, barriers or facilitators related to integrating simulation into the courses they teach, and opportunities for improving the use of simulation at their institution and throughout nursing education.

The investigator reviewed and assessed all the data for common threads or patterns (Richards & Morse, 2007). The qualitative narrative data were then organized according to the notable themes and concepts. Colored marking pens were used to highlight the common words, phrases, and themes in the responses in order to provide a visual marker and help important ideas in the data stand out. This framework for data analysis is broadly referred to as content analysis (Polit & Beck, 2004).

Data from Survey of Nursing Deans or Directors or Their Designees

Descriptive statistics were used to assess the baseline data gathered from the surveys completed by the deans or directors of nursing or their designees.

The hours of simulation utilization that the deans or directors or their designees reported ranged from 0 to 4 hr per week. There did not seem to be a relationship between the amount of money spent on simulation equipment and training and the number of hours that the equipment was used.

The money spent on simulation equipment that the deans or directors or designees reported ranged from $51,000 to $300,000, and sources of funding included Department of Education grants, private donor funds, High Demand grants, designated department funds, and generic grants. Money spent on maintenance and training for simulation that the deans or directors or designees reported ranged from $2,000 to $5,000, and funding sources included grants, Carl Perkins funds, institutional professional development funds, Department of Education grants, regular school budget monies, and nursing budget monies. This data provided an indication of the current resources for HPS at community and technical colleges in a Western state, their cost, and faculty training and use from the perspective of nursing program directors or their designees. It is notable that the amount of money spent on maintenance and training is a very small percentage relative to the initial investment (from less than 1% to 7%).

Data from Survey of Nursing Faculty

The length of time that the respondents have been nurse educators ranged from less than 1 year to 27 years, and the average was approximately 10 years. The respondents indicated that they taught various types of courses, including didactic, lab, clinical, preceptorship, and theory. They also indicated that they taught various subjects, including medical-surgical, obstetrics, professional issues, and advanced cardiac life support. Of the 24 faculty who responded, 17 (71%) had used simulation in the courses they teach and 7 (29%) had not.

The nursing faculty respondents perceived several common barriers to integrating simulation into the nursing curriculum at their institutions. These barriers are listed in Column 1 of Table 1.

Responses to the question, Are there any conditions that you perceive as barriers to integrating simulation into the nursing courses you teach? indicated that learning to use the technology and designing and running scenarios is time-consuming and that faculty are not allowed extra time to meet these demands. Respondents wrote answers such as, “It is very time-consuming to create scenarios for simulation”; “TIME!” and “Not enough time to prep.” Other responses, such as “Lack of dedicated simulation coordinator; and lack of setup” and “lack of support and faculty to help run the scenarios,” indicate that faculty members perceive the lack of support and equipment as a barrier to integrating simulation into the courses they
teach. Another response addressed the lack of modeling. “Faculty are hesitant to try new teaching/learning methods. Lack of experience and observations of clinical simulation in use in other programs prevents faculty from ‘seeing’ the benefits to students and the program.”

In addition to barriers, nursing faculty at community and technical colleges in a Western state identified conditions they perceived as facilitators for integrating HPS into the curriculum at their institutions. The common facilitators that respondents wrote about are listed in Column 2 of Table 1.

Responses to the question, What conditions do you perceive as facilitators or what has made it easy for you to use simulation in the courses you teach? highlighted helpful and thorough training. Examples of these responses include, “The college has sent several of us to conferences to use the technology” and “Our program was fortunate enough to receive funding for the purchase of simulators and training at the Laerdal site in Texas.” Related responses highlighted individual initiative, support from colleagues and administrators, and adequate facilities and simulation equipment. These responses included, “I enjoy using the technology,” “networking with users,” and “well-trained faculty, support of administration, and excellent facilities.”

Faculty respondents also recommended resources or incentives for integrating HPS into the curriculum at their institutions. The incentives that were noted included, but were not limited to, those listed in Column 3 of Table 1.

Several of the recommended resources or incentives included, “Provide time to develop scenarios and provide time for faculty members with simulation training to work with others to increase their skills and ability to use” and “Resources: lab technician … money, basically.”

By describing the experiences of nursing faculty at community and technical colleges relating to their use of HPS, these survey responses provided valuable data to begin the discussion of strategies for improving those experiences. The following section discusses interpretation of findings and strengths and limitations of the study, as well as next steps, including recommendations for enhancing integration of HPS into nursing curriculum.

**Table 1** Faculty-reported Barriers, Facilitators and Incentives

<table>
<thead>
<tr>
<th>Faculty-Reported Barriers to Integrating HPS</th>
<th>Faculty-Reported Facilitators for Integrating HPS</th>
<th>Faculty-Recommended Incentives for Improving the Integration of HPS</th>
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<tbody>
<tr>
<td>Lack of time, especially for preparation and planning simulations</td>
<td>Helpful and thorough training in the use of simulation</td>
<td>Additional, paid time for learning the technology, designing scenarios, and running simulations</td>
</tr>
<tr>
<td>Lack of support, including the support of administrators, other faculty, and technical support</td>
<td>Individual initiative and motivation to learn and use simulation</td>
<td>Additional training</td>
</tr>
<tr>
<td>Lack of appropriate equipment, including accessories such as camera, prepackaged scenarios, and a pretend crash cart</td>
<td>Support from colleagues and administrators Adequate facilities and simulation equipment</td>
<td>Additional resources, including money, equipment, and technology support staff</td>
</tr>
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*Note. HPS = Human patient simulation.*

**Discussion**

**Findings in Light of the Literature**

The findings of this study are largely, but not entirely, congruent with the findings in earlier literature. This section ties the findings of this study to what has been reported in the literature and then identifies what role these findings may play as researchers continue to explore the use and underuse of simulation in nursing education.

Two of the recurrent themes from the survey responses are **time** and **support resources**, which include training and supplementary equipment and staff. Additionally, although only one respondent identified **fear of new teaching and learning methods** as a barrier to integrating simulation, this barrier has been spotlighted heavily in the literature, so it will be addressed in this section.

**Time**

Nursing faculty survey respondents indicated **lack of time** as a barrier to integrating simulation into their courses. Further, they indicated that the provision of additional time could encourage them to use simulation more extensively. Touriniemi and Schott-Baer (2008) reported that they experienced difficulty persuading the faculty at their institution to use simulation because of the time and effort required to develop and implement simulated scenarios. King, Moseley, Hindenlang, and Kuritz (2008) noted that faculty would use HPS more if they had more time. Billings and Halstead (2005) also noted that excessive time and energy demands are classic examples of barriers that may impede curricular
change. Clearly, nurse educators cannot deny the amount of time that is necessary for successful implementation of a simulation program. However, this response also indicates that respondents may not have been aware of resources, including prewritten and preprogrammed scenarios, that may be used with many of the HPS products on the market. To successfully integrate simulation into the nursing curriculum, nursing faculty need to be aware of the resources that are available and must be allowed adequate time to learn to use simulation.

**Support Resources**

In addition to time, a second finding from this study that was addressed in the literature was the importance of support resources. Some of the literature has emphasized the high cost of human patient simulators as being a considerable barrier for many institutions. This was not necessarily congruent with the faculty survey results. Although the cost of simulators reported by the participating schools ranged from $2,201 to $26,995, faculty largely indicated the lack of support resources and funding for support resources, not the lack of money for simulators, as a barrier to their use of simulation. Further, faculty indicated that the availability of support resources and training were key facilitators or incentives for their use of simulation. Several examples from the literature acknowledged that the initial investment in simulation requires a commitment to further maintaining that investment through maintenance, training, and support.

The surveys did not ask respondents to indicate whether their institution had a lab preceptor or facilitator who oversaw the simulation activities. Touriniemi and Schott-Baer (2008) recommended support resources in the form of lab coordinators to oversee the technical components of the simulation lab. They further highlighted the importance of support resources for maintaining the existing investment, noting that the average simulation lab costs about $15,000 per year to maintain. These authors acknowledged that it is important to view simulation as an ongoing investment rather than a one-time purchase; they wrote, “The decision to purchase a high-fidelity simulator is only the first step in the process of implementing and maintaining an HFS lab” (Touriniemi & Schott-Baer, 2008, p. 105).

Further supporting the idea that support resources are essential for the successful integration of simulation into nursing curricula, Jeffries (2008) noted that supplementary resources such as audiovisual technology and facility space must be committed for the simulation lab. She acknowledged the shortsighted tendency of many nursing programs that are trying to integrate simulation into their curriculum when she stated, “Equipment is often purchased with the expectation that faculty will embrace the new technology when the reality is that many faculty are not prepared for this type of teaching” (p. 70). Training is one example of a support resource that is necessary in a successful simulation program. This study and the current literature highlight the important role support resources play in sustaining a virtual simulation program. It is notable that the initial simulation investments of the schools participating in this study ranged from $51,000 to $300,000 but that the ongoing funding for maintenance and training was only $2,000 to $5,000. This reflects that these schools spent very little money on support resources or ongoing expenses relative to their initial investment in simulation equipment. None of the schools spent more than 7% of their initial investment on maintenance and support resources, and one school reported maintenance and support spending of less than 1% of its initial investment of $300,000.

A third idea from the data bears mentioning. A faculty member, in response to the question, Are there any conditions that you perceive as barriers to integrating simulation into the nursing courses you teach? wrote, “Faculty are hesitant to try new teaching/learning methods. Lack of experience and observations of clinical simulation in use in other programs prevents faculty from ‘seeing’ the benefits to students in the program.” This and similar responses indicate that nursing faculty are interested in research-based evidence about the efficacy of HPS. However, the literature focuses heavily on the theoretical basis of simulation as a teaching strategy (Jeffries, 2007; Mangeld, 2007). This study leaves many questions unanswered. It does, however, play an important role as researchers continue to explore the use and underuse of simulation in nursing education. King et al. (2008) indicated that nurse educators need to identify what the barriers related to adopting innovative teaching strategies are. This study is a first step in exploring these barriers. Additionally, it has provided a glimpse at facilitators and possible incentives for improving the integration of simulation into the nursing curriculum.

**Recommendations Based on the Findings of This Study**

The overall purpose of this study, to describe the experiences with simulation reported by nursing faculty at community and technical colleges in a Western state, was accomplished. However, data without interpretation and application are insufficient. Therefore, after reviewing the data, the investigator formulated three key recommendations for successful integration of simulation into nursing curricula:

- Reduce the barriers to successful integration of simulation.
- Strengthen the facilitators of integrating simulation.
- Implement incentives for integrating simulation.

Each of these recommendations is discussed in the following section.
Strategies to Reduce Barriers

One of the primary findings that emerged in the faculty responses to the question, Are there any conditions that you perceive as barriers to integrating simulation into the nursing courses you teach? was that nursing faculty do perceive common barriers that hinder their ability to integrate simulation into the courses they teach. Therefore, one of the recommendations of this study is to, whenever and wherever possible, reduce these barriers. Barriers are listed in Column 1 of Table 1.

This recommendation could be accomplished by allotting paid hours for faculty and support staff to plan and implement simulations. Rather than approaching simulation as an added burden, faculty members need to be allowed to reduce one area of workload if they are going to be expected to take on the challenge of learning and using simulation as part of their workload. Additionally, administrators must provide adequate support in the form of personnel and equipment for successful simulation activities. Many of the barriers to integrating HPS that faculty identified were congruent with the barriers identified in the original literature review. They are not new or necessarily unique to simulation.

Strategies to Increase Facilitators

The second recommendation emerged from the faculty responses to the question, If you have used simulation in the nursing courses you teach, what conditions do you perceive as facilitators or what has made it easy for you to use simulation in the courses you teach? Respondents identified four primary things that have facilitated their use of simulation. Therefore, the second recommendation of this study is to, whenever and wherever possible, reduce these barriers. Facilitators are listed in Column 2 of Table 1.

This recommendation can be accomplished by providing initial and ongoing training. One respondent recommended a “train the trainers” or “superuser” strategy, in which faculty who have received training and are comfortable using simulation can provide training and support to faculty who are not as familiar with simulation. To spark individual motivation to use simulation, nurse educators need to be exposed to the possibilities of its application. Additionally, further research is needed to validate the effectiveness of simulation in nursing education. Other facilitators that should be strengthened to promote the implementation of simulation in nursing education are the continued support of colleagues and administrators and provision of adequate facilities and equipment. In addition to the facilitators identified in the surveys, the literature emphasizes that need for a strong theoretical and philosophical basis for the use of any new teaching technology. Developing this basis and validating the effectiveness of simulation are important areas for future research.

Strategies to Use as Incentives

In addition to identifying barriers and facilitators related to the integration of simulation into nursing courses, the respondents frequently identified similar ideas in their answers to the question, What resources or incentives would you recommend for integrating HPS into the courses you teach? The third recommendation of this study is to implement the incentives that were reflected in the faculty surveys. These incentives are listed in Column 3 of Table 1.

These recommendations require the dedication of additional resources to promote the success of existing investments in HPS. To embrace simulation, faculty members may require incentives such as additional paid time for learning the technology, designing scenarios, and running simulations. They need training and additional resources such as funds, equipment, and technology-support staff.

Although implementing these recommendations will require a great deal of resources, this discussion provides a valuable glimpse into nursing faculties’ perceptions of what barriers and facilitators exist and what incentives may contribute to their success as they integrate simulation into the courses they teach. Further, whereas the participating schools reported initial investments in simulation that ranged from $51,000 to $300,000, the ongoing funding for maintenance and training was only $2,000 to $5,000. It may be necessary for schools to reserve some of their initial funding for ongoing support of their expensive purchases.

In this time of economic uncertainty and extreme budgetary constraints, the abovementioned suggestions for reducing barriers, strengthening facilitators, and implementing incentives may seem like fantasies. Very few institutions have the resources to fully address all of these recommendations. One strategy for stretching limited resources is to collaborate with other allied health programs on campus or health science institutions in the community. Shared personnel and faculty appointments can also help multiple institutions get more bang for their simulation buck. Further, additional training may be accomplished using a train-the-trainer approach. For example, one member of the nursing faculty may attend a simulation conference or training and come back and train the other members of the nursing faculty. Institutions may even consider bartering for specialized expertise: In this arrangement, nursing faculty who were able to attend a simulation conference or training (either external or internal) would train a lead faculty member in each of the allied health programs at his or her institution. In exchange, members of the faculties from other programs on campus may provide training to the nursing faculty about pedagogies that they are experts in.

In addition to innovative ways of limiting the cost of training, institutions need to make efficient use of the resources they already have. Several of the respondents to the surveys indicated that they needed additional time for
developing scenarios. However, several products from Laerdal®, METI®, and others allow nursing faculty to run a variety of prepackaged scenarios. Online repositories and informal networks for sharing scenarios may also help faculty members expand their options for simulations. The literature is beginning to address the high costs associated with developing and maintaining simulation programs. Curtin and Dupuis (2008) have provided recommendations for implementing a simulation program with a limited budget. In this tight economy, institutions must find innovative solutions in order to develop and maintain quality simulation programs with limited funds.

Study Limitations

It should be noted that the response rates for this study were considered to be relatively low (40.7% of the deans or directors and 31.6% of the faculty members at participating schools). Typically, a response rate of greater than 65% is desirable (Polit & Beck, 2004). Furthermore, although this study provides a description of experiences, facilitators, and barriers related to integrating HPS into the nursing curriculum at community and technical colleges in a Western state, it may not be considered a complete or balanced reflection of these topics. A nonresponse bias in the data and the nonrandom, self-selected sample of respondents, who were likely early adopters of HPS, may have biased the results.

Conclusions

Curricular and pedagogical changes often bring with them a certain level of disruption. With the increasing interest in HPS and the large investments that nursing programs across the country are making in HPS equipment and resources, it will be important to continue to share experiences, successes, and challenges. Further research is necessary to fully analyze the impact of this new technology on nursing education and to optimize practice for integrating HPS into nursing curricula.

References