Engaging Perioperative Learners Using Online Game-Based Education

Jennifer Crowley-Barnett, MA, RN, CNOR; Teresa Pagano, MS, RN, CNOR; Martha Kent, EdD, RN, NEA-BC

ABSTRACT

Nurse educators may experience challenges (eg, distracted learners, inability to provide immediate feedback) when teaching in a classroom setting. Further, the perioperative workforce is multigenerational—younger staff members may have started using technology on a daily basis at a young age, so they may become distracted during traditional lectures and not retain important information. Online game-based learning (GBL) platforms are one technological solution that perioperative educators can use to maintain student engagement and foster learning. Educators at an academic medical center used an online GBL platform to develop presentations on instrument sterilization and surgical attire with sterile technique. At the conclusion of the sessions, the participants submitted surveys evaluating the teaching method. The survey results showed that the respondents found the GBL program to be a fun and positive interactive learning experience. Nurse educators should consider using this type of technology to improve participation and knowledge retention when developing educational programs.

Key words: *game-based learning (GBL), interactive learning, perioperative education, technology, multigenerational.*

Nurse educators are responsible for using innovative teaching methods to promote student learning.[1] Educators may be more successful when the learning environment is interactive and inclusive. Research on game-based learning (GBL) as a formative assessment (ie, methods an educator can use to assess a student's comprehension of the presented material[2]) shows that it is becoming more commonplace in medical education.[3] Study results indicate that, compared with other teaching methods (eg, slide presentations, lectures), students identify GBL as a positive way to learn.[3,4] Students sometimes may be reluctant to speak up and answer questions in the classroom out of fear that they do not know the correct answer, which may lead to them feeling ostracized from their fellow students.[5] Game-based learning, especially in formats that allow for participant anonymity, may help reduce or eliminate this fear.

Game-based learning provides participants with real-time feedback (ie, identifies correct and incorrect answers);[4] some of these learning platforms also allow educators to monitor the students' learning in the classroom.[6] When creating a program using a GBL platform that provides immediate feedback, educators can structure the content to identify those students or staff members who may require additional instruction and then provide the information in real time.

Engaging adult learners from different generations is a challenging task. Most perioperative staff members identify with the following four generations:[7]

- Baby Boomers (born between 1946 and 1964),
- Generation X (born between 1965 and 1976),
- Millennials or Generation Y (born between 1977 and 1995), and
- Generation Z (born between 1996 and present day).[8]

The inherent differences among the members of these generations may negatively affect learning in workplace

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education programs. For example, Baby Boomers may have difficulty using evolving technology, but most Millennials expect to use such technology because they most likely used computers in their grade-school classrooms.[7] In addition, Millennials and members of Generation Z have the advantage of using multiple forms of evolving technology (eg, smartphones, tablets) starting at a young age, which means educators can use these additional modalities to enhance traditional teaching and education methods.[9] Specifically, these technologies can facilitate participants' learning and classroom engagement when educators incorporate them as part of a GBL program.

Additionally, any student may use mobile devices (eg, smartphones, tablets) for noneducational purposes during educational sessions.[4] When educators use electronic devices to enhance traditional teaching strategies (eg, lectures, slides, checklists), they can enhance the students' focus and participation.[10]

BACKGROUND

Located in New York City, our facility is a large academic medical center that has received the American Nurses Credentialing Center's Magnet Recognition. Department leaders support weekly educational sessions for experienced staff members and orientation classes for recently hired nursing staff members. We provide clinical and policy updates and "back to basics" information during the weekly sessions with the experienced staff members. These sessions are essential to ensure best practice in the OR. However, we have observed that staff members appear less interested and less interactive when traditional teaching methods are used.

Additionally, we observed staff members using their smartphones and tablets for non–work-related activities during presentations. This behavior can be frustrating for presenters who believe they do not have the full attention of the audience during their lectures. When staff members become distracted during the educational presentations, they may miss critical information regarding practice or policy changes that are required to provide safe patient care. Because of these challenges, we decided to explore the possibility of using GBL during these weekly education sessions with the goal of maintaining the staff members' attention.

Using a learning platform that assesses staff members' retention of the presented information can help educators ensure the presentation is beneficial. When conducting a literature review for articles on the use of GBL in nursing education, we noticed that there is limited research on GBL for staff development in the practice setting. In response to this lack of research, we decided to create a staff development GBL program for perioperative staff members on surgical attire and sterile technique and then evaluate its effectiveness.

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We selected a GBL platform that researchers studied in an information system strategy and governance course at a research-intensive teaching university in New Zealand. The researchers determined that the students found the interactive program engaging and competitive.[4] Further, the GBL platform maintained students' anonymity and provided a positive influence on their learning experience and retention of the information. Another group of researchers used GBL during an undergraduate nursing student informatics course.[11] They found that this teaching methodology increased class participation, provided immediate feedback, and increased learner engagement.

OVERVIEW OF GBL PROGRAM

We identified a free online GBL tool and decided to use it for perioperative education activities. This particular GBL platform allows participants to answer instructor-created questions in a quiz or survey format in real time.[12] The instructor displays the multiple-choice questions on a screen and students use their smartphones, tablets, or computers to enter their answers. Although the GBL platform we used may not be suitable for complex topics (eg, medical school coursework), it is easy to use and allows students to compete against each other when answering the questions.[3] The purpose of using this GBL platform in the classroom is to engage the students, enhance their learning, and assess their retention of the information.[12]

In 2017, we began using the GBL platform to review the instrument sterilization process with recently hired RNs and

certified surgical technologists (CSTs) during their perioperative orientation. These employees consistently provided positive verbal feedback regarding the teaching method:

- "Wow, this was so much fun."
- "I understand the material so much more clearly now."
- "You should have more classes like this!"
- "The information makes so much more sense."
- "I loved the game!"

Along with the positive feedback, we noticed that using this teaching method created an enjoyable, competitive environment for the learners. Based on these outcomes, we began to identify additional opportunities to incorporate GBL in both staff member orientation and education sessions.

In 2018, our perioperative education group began conducting remote video audits via observational livestream video in the OR to ensure safe, quality patient care; improve patient outcomes; and identify any gaps in quality and patient safety. We also used the remote auditing as a tool to identify areas for improvement and determine which patient care topics to include when providing staff member re-education. As we performed these audits, we often identified noncompliance with our surgical attire and sterile technique policies; when we discussed these concerns with the quality specialists, we inquired about developing a back-to-basics review and re-education program for sterile technique using the GBL platform and then presenting it during a perioperative staff member education session. The quality specialists supported our plan and we moved forward with program development.

BACK-TO-BASICS GBL PROGRAM CREATION

We planned to create simulation videos to test the staff members' ability to identify instances of incorrect surgical attire or sterile technique practice in a scenario and then follow those with examples of the correct practice. This method ensured that, after identifying the problem, staff members immediately learned how to address it. We created scripts for the scenarios and then used a smartphone to record the videos in an OR when staff members were not providing patient care. Using a smartphone app, we edited the videos and uploaded them to an online video-sharing web site. After completing the video upload, we added the gaming element using an online GBL platform. The program began with four questions to test the participant's knowledge. After the initial questions, there were seven video scenarios that showed incorrect and correct practices. At the end of each video scenario, the participant was asked to identify any practice issues they observed.

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Initially, we presented this program at a monthly perioperative quality and performance improvement meeting at a health facility in January 2019 and received extremely positive verbal feedback from those in attendance. Next, T.P. presented the program to medical students who were enrolled in a class on sterile technique during their surgical rotation. After the successful presentation to the medical students, we began making unit visits to present the program to the current experienced nurses and CSTs who were not participating in orientation activities. Finally, we presented the program in person and remotely at a perioperative educational session for more than 145 staff members who currently work in the ORs across our academic medical center. After these successful presentations, we added the program to our perioperative nursing orientation classes.

PROGRAM EVALUATION

To identify the benefits and barriers of this type of educational program, we surveyed participants regarding the effectiveness of the GBL platform. In addition, we wanted to assess the usefulness of the teaching tool and determine if feedback varied depending on the demographics of the respondents. Initially, we assessed the quality of the teaching tool using a seven-item paper questionnaire to collect data on the learners' feelings related to the usefulness of the presentation, their retention of the information presented, their motivation to learn, and their enjoyment of using the GBL technology. We used information from our literature review to develop the questionnaire and included three survey questions from one of the studies.[3] We modified the survey after its initial use to include questions pertaining to the participants' years of experience as an RN or CST and their age range. The final survey asked respondents to rate the following

statements based on agreement (ie, strongly agree, agree, neutral, disagree, strongly disagree):

- Playing the game helped me learn the subject matter.
- Playing the game enhanced my understanding of the subjects.
- Playing the game helped me retain knowledge.
- I think the game will help me identify staff members who are noncompliant with dress code or breaks in sterile technique.
- Playing the game motivates me to learn more.
- I enjoyed playing the game.
- There should be more games of this type to assist with learning needs.

Learning Outcomes

Feedback from the medical students indicated that they supported using the GBL platform for education activities. All of the medical students agreed or strongly agreed with three of the seven survey statements and only one participant disagreed or strongly disagreed with four of the survey statements (Figure 1). The medical students also shared comments, including

- "I loved it."
- "A lot of fun!"
- "Games for all learning."
- "Lots of fun—better than lecture."
- "The videos were tough."

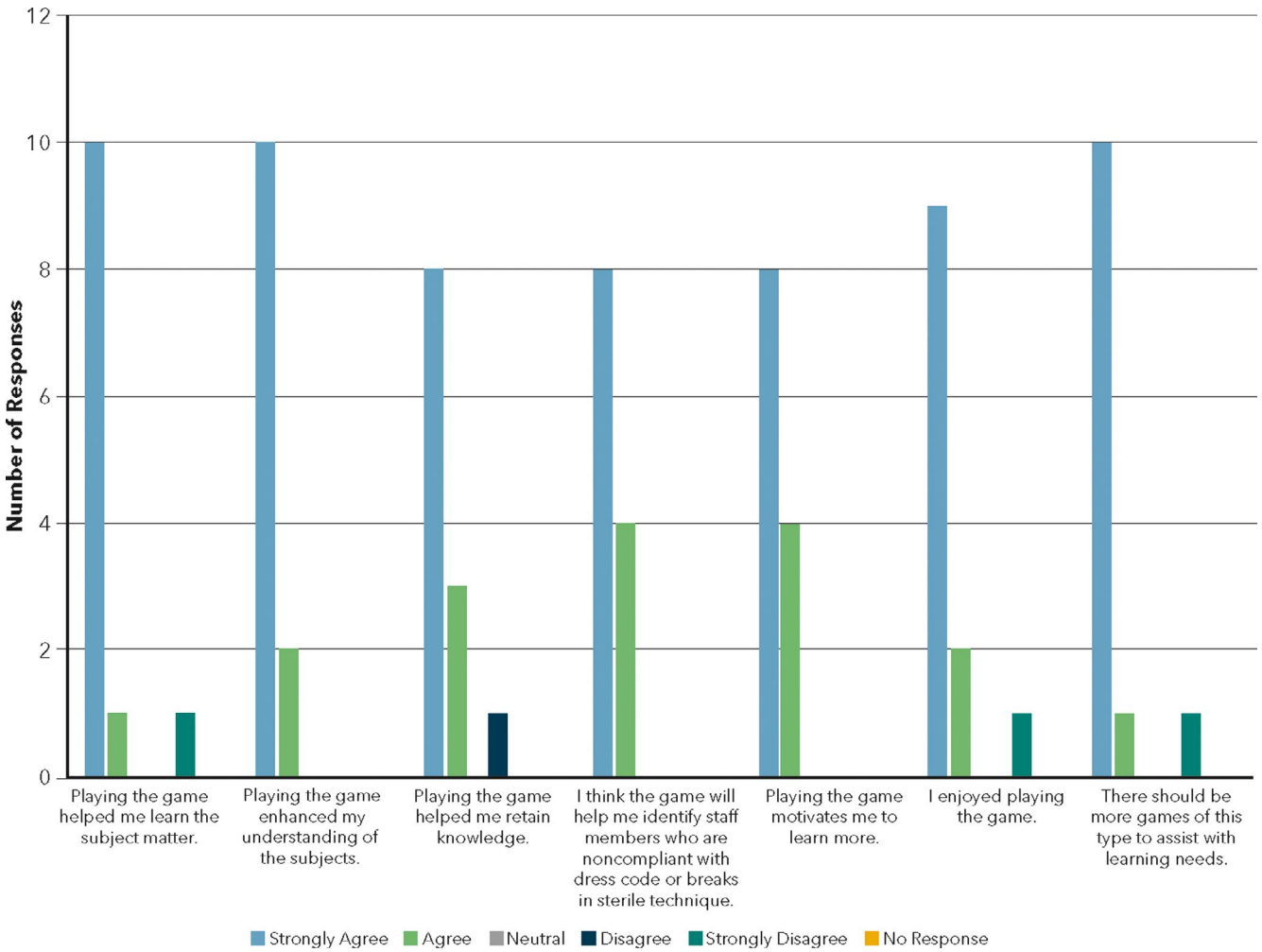

Figure 1. Survey responses of the medical students at the game-based learning program presentation on surgical attire and sterile technique.

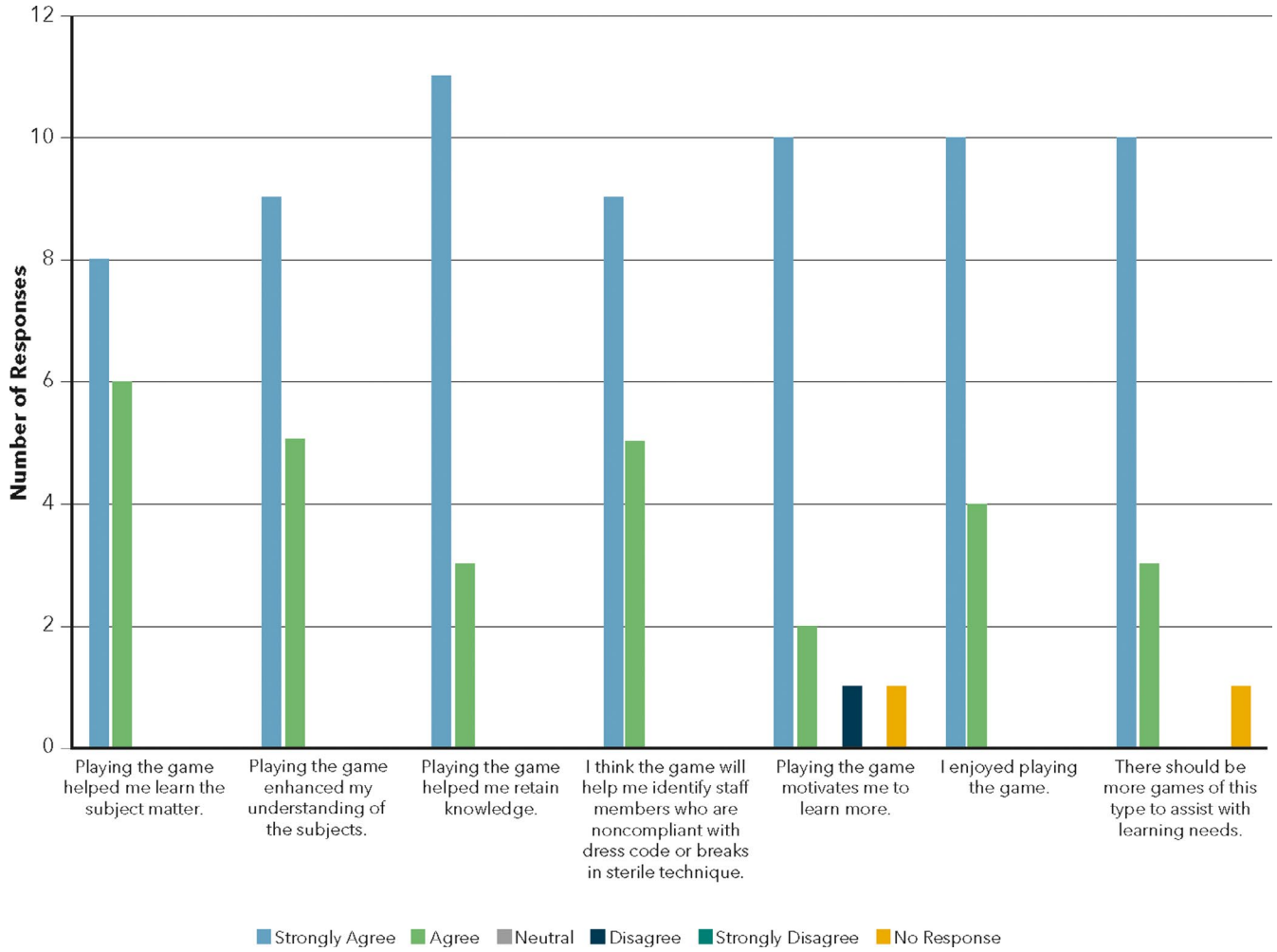

Figure 2. Survey responses of the participants at the unit-based game-based learning program presentation on surgical attire and sterile technique.

The medical students suggested that future GBL programs include clinical topics for student didactic concepts and surgical instruments.

Fourteen staff members attended our first unit-based education session on surgical attire and sterile technique and completed a survey. All of the participants either agreed or strongly agreed with five of the seven survey items (Figure 2). Participants also could provide written comments; some of these included remarks about "fun activities" and a "great inservice." After reviewing the participants' responses, we did not identify any problems or issues related to the initial staff member presentation.

Next, we presented the program at the main campus for a large group of perioperative staff members. This group included in-person attendees and participants from three offsite locations who accessed the program remotely via their unit-based conference rooms. We received 145 surveys at the completion of the session. Of the respondents who indicated their titles, there were 111 RNs, 29 CSTs, one RN and CST, and one patient support technician. Three respondents did not provide their title. Respondents indicated varying years of experience, ranging from less than one year to more than 38 years. Most of the respondents provided positive feedback about using the GBL program (Figure 3). Of the more than 24 written comments, highlights included the following:

- "This is a fun way to learn and is engaging."
- "Love interactive play!!"
- "Keeps us awake and paying attention."
- "Awesome audience participation."
- "It was fun and [I] enjoyed doing something interactive."

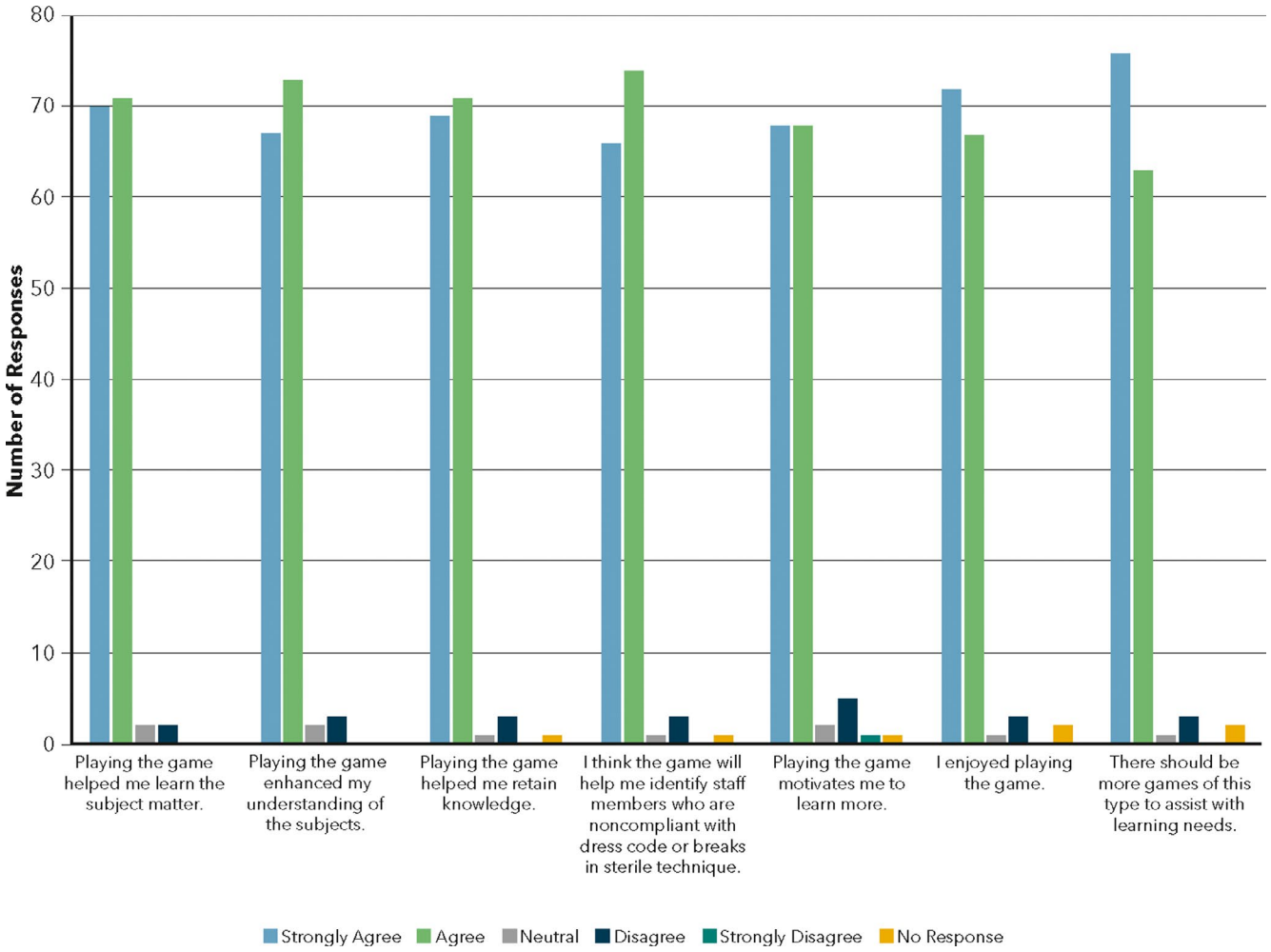

Figure 3. Survey responses of the participants at the in-person and remote game-based learning program presentation on surgical attire and sterile technique.

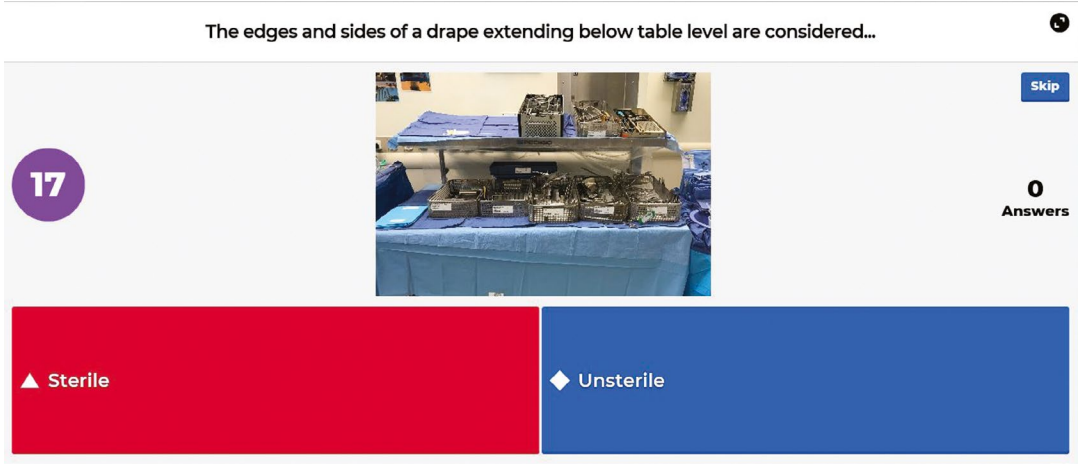

Figure 4. Question, photo, and two possible answers from the game-based learning program on surgical attire and sterile technique. The timer on the left counts down from 20 seconds. The number on the right indicates how many other participants have submitted their answers. The "Skip" button can be used to move to the next question.

Staff members also identified future topics to present in the same format that they believed would provide a valuable educational opportunity. These topics included other unspecified policies and protocols, skin injury prevention and interventions, specimen processing, ordering blood products, additional unspecified sterility topics, and processes related to reporting broken equipment.

Barriers

Although we did not identify any barriers during the in-person presentations, one participant at an offsite location identified having difficulty viewing and hearing the videos. Fortunately, participants at the other two offsite locations did not experience these issues. Therefore, we realized that we should test the technology before using it for staff member education at offsite locations.

RESOURCE CONSIDERATIONS

Currently, there are no financial considerations for accessing the online platform we used; educators can register for an account for free. There are two program-enhancement options that are available for a fee. If an educator

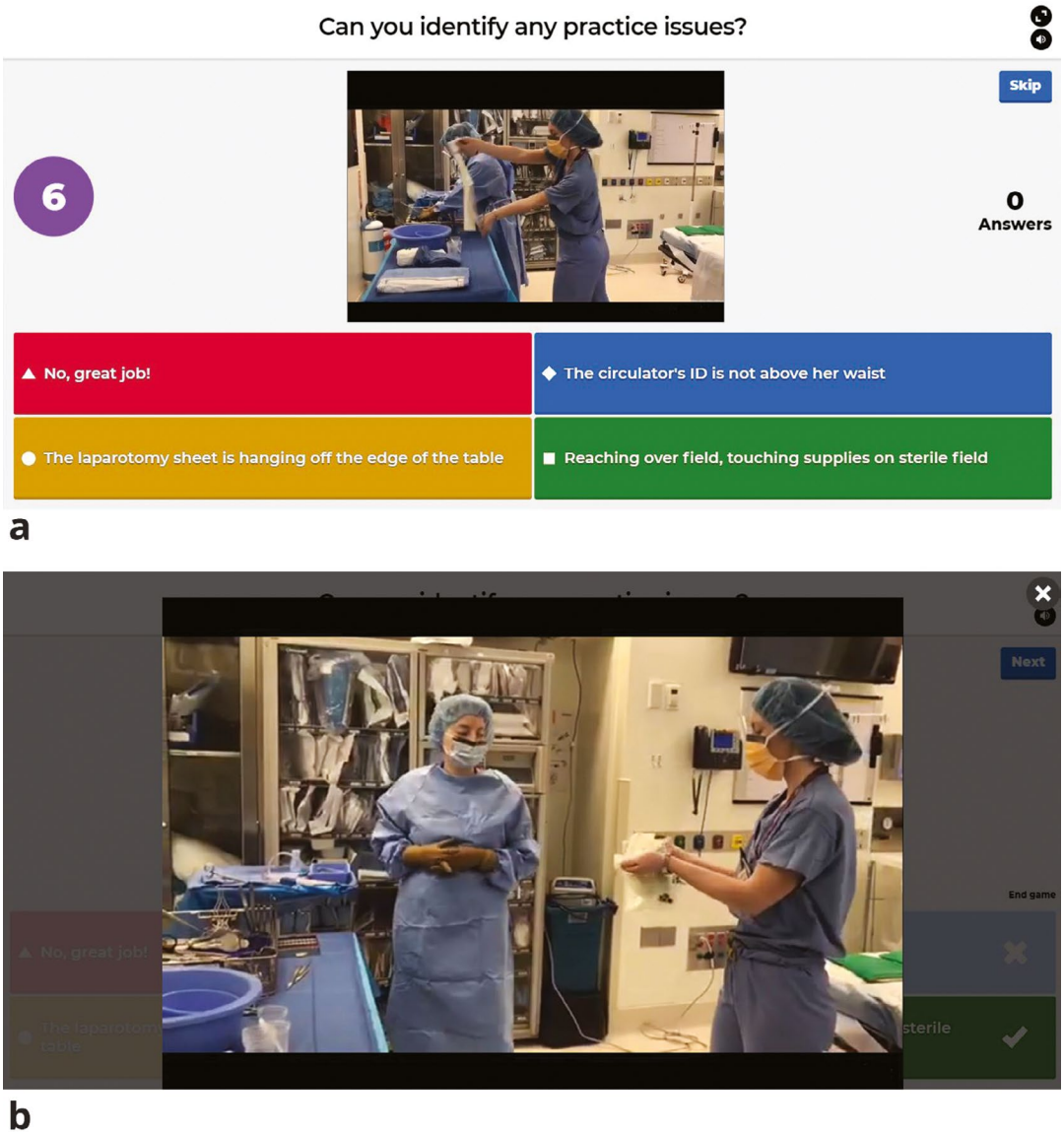

Figure 5. Question, photo, and four possible answers from the game-based learning program on surgical attire and sterile technique *(a)*. The timer on the left counts down from 20 seconds. The number on the right indicates how many other participants have submitted their answers. The "Skip" button can be used to move to the next question. Photo showing correct sterile technique *(b)*.

Key Takeaways

- Traditional teaching methods (eg, slide presentations, lectures) may not be effective for all learners. Nurse educators should consider using new and evolving technology to promote student learning.
- Online game-based learning (GBL) is one method that perioperative educators can use to engage learners and promote retention of information. The literature indicates that students find GBL programs engaging and effective.
- Educators at one facility implemented a GBL program for three presentations on surgical attire and sterile technique: one unit-based, one in-person and remote, and one for medical students' orientation. After the presentations, the educators surveyed the participants about their experiences.
- The survey results showed that most participants found the GBL program engaging, informative, interactive, and fun. After implementing the GBL programs, several staff nurses reached out to the education department for assistance with creating their own unit-based educational programs using the same format.

selects one of the fee-based options, additional possible financial considerations could include the required costs to use the fee-based options to create presentations.

Equipment

To create a GBL program, educators must have access to a computer. Depending on the program's content, educators also may require a video-recording device (eg, smartphone) or camera. To present the educational program in a classroom setting, educators will need Internet access and a screen or projector. In addition, learners need a device (eg, smartphone, tablet) with Internet access that is compatible with the online platform.

Educator Requirements

Educator requirements include time, video recording capabilities, and editing skills (eg, video editing, text editing). The preparation time depends on the extent and type of content that the educator plans to include in the program. When creating a program comprising only simple questions and answers (Figure 4), preparation time depends on the educator's experience with the program and may be relatively short (eg, approximately an hour). If an educator intends to develop a more comprehensive program for presentation during an education session—similar to our back-to-basics program—he or she would require video recording and editing skills and additional time to perform such work. The educator also may require text editing skills because the platform we used has an upper limit of 95 characters for each question. Educators can include two to four answers for each question with an upper limit of 60 characters for each answer section (Figure 5).

Student Needs and Issues

There are some limitations to using GBL. Although smartphones and tablets seem ubiquitous, educators should not assume that all staff members own or have access to these items. Perioperative staff members are multigenerational and may have different financial constraints that prohibit purchasing up-to-date technological devices. In addition, some staff members may not be able to operate the device when playing a game because they may use their phones only for communication rather than games.

Another limitation is Internet availability and access. Some facilities may have wireless Internet available for staff members to use when participating in GBL sessions, so educators should verify there is an Internet connection. When wireless Internet access is not available or if connectivity is intermittent, the user may be logged out of the GBL program during the session, which can lead to dissatisfaction with the experience. Internet access also may be slow because of the smartphone model or the user's Internet service provider. These limitations can hinder the use of online GBL platforms.

PROGRAM IMPLICATIONS

After implementing our GBL program, several staff nurses reached out to our education department for assistance with creating their own unit-based educational programs using the same format. Further, in response to the feedback we received from the surveys, we developed an additional program to address skin injury prevention, interventions, and required documentation using the same online platform. We presented this program at the system-wide Perioperative Skin Care Committee meeting

and added it to our surgical positioning orientation class for recently hired RNs and CSTs. Participants have provided positive feedback for this program.

CONCLUSION

To engage multigenerational learners in the classroom, nurse educators should incorporate current teaching strategies and technological advances into their courses. Although there is a paucity of literature on using GBL as a teaching strategy for nursing staff development, we received participant feedback that corroborated published results using the same GBL platform. Additional research that examines the relationship between GBL and knowledge gained and retained using this type of innovative technology in perioperative education and staff development would be helpful for nurse educators.

When we implemented our GBL programs during perioperative education sessions, participants shared that the format allowed them to focus on the information and they believed that they retained the information after the session. In addition, the majority of survey responses showed that participants found the GBL experience positive regardless of their job title, generational cohort, or years of nursing experience. Game-based learning programs can be a fun and competitive way to promote interactive learning. Perioperative educators should consider implementing GBL programs as an alternative to traditional lectures and slide-based presentations for staff member education.

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