Programming Manikins: A Video Training Module for the Gaumard UNI Software

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Abstract: Nursing training has in the past relied on students' assessment of each other, and procedural practice was at the expense of actual on-the-job training with real patients. However, with today's technologies, exposure to realistic manikins that can replicate physiology is making it possible for better and safer training. Nursing simulation centers are now the hub for such education, training, and practice. But having competent staff to operate the manikins can come at a high cost for technical training. This instructional design project aims to support staff turnover and training with an online video-based instructional module that can serve as both a refresher and reference resource. The Dick and Carey model for instructional design was used to develop the module following the cognitive domain with Gagne's 9 Events of Instruction. Specifically, video modules for the Gaumard Manikin UNI Software were created using the screen-capturing tool, Camtasia, and hosted on Google Sites. The training focused on how to navigate the software to operate the manikin using pre-existing programmed scenarios, on-the-fly without a programmed scenario, and how to program one's own scenario for use. Fifteen participants completed the online self-paced module that involved a demographics pre-survey, pre-test, three parts with embedded test questions, post-test, and a post-attitudinal survey. Results showed improvements across the board from pre- to post-test, suggesting that the module is effective as a review and resource for both old and new staff regardless of their experience with the manikin technology.

Introduction

Simulation training has been used with aviation and in the military for years (Levine, A. I., DeMaria Jr, S., Schwartz, A. D., & Sim, A. J., 2013), but has only recently made its impact on the medical field. Nursing simulation in particular is making its way to the forefront of education with regards to patient safety and the prevention of medical errors through deliberate practice (Wheeler, D. S., Geis, G., Mack, E. H., LeMaster, T., & Patterson, M. D., 2013). Providing a realistic environment in which to enhance student learning and performance is at the core of these simulated experiences. Singh et al. (2013) advocate that simulation is a valuable tool to shape the future of medical education, postgraduate training, and support the maintenance of continued certification in healthcare. A landmark National Council of State Boards of Nursing (NCSBN) study on simulation in 2014 further outlined that simulation experiences can effectively replace up to 50% of clinical practice hours for pre-licensure nursing education, thus reducing the need for clinical sites that many programs face (Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R., 2014).

Nursing simulation therefore, relies on the use of high-tech computerized manikins that are life-like to replicate physiologic conditions for learning practice. Harris, Bellew, Cheng, Cendán, and Kibble's 2014 article on "High-Fidelity Patient Simulators to Expose Undergraduate Students to the Clinical Relevance of Physiology Concepts" supports this idea that realistic simulation experiences improve learning and retention, and shows that students gained deep satisfaction and improved confidence as a result. In the study, undergraduate students could learn basic physiology concepts from high-fidelity patient simulators and they were heavily engaged and enthusiastic since the activity enhanced their learning of physiology. However, the cost of training courses for staff to learn and program these manikins can be very expensive. With constant turnover and changing faculty, many Simulation Centers cannot afford to continually pay the manufacturers, and therefore must rely on their own internal re-training of new staff in order to operate. Nickerson, Morrison, and Pollard analyzed this concept of simulation as it pertains to nursing staff development in 2011. They stated that there's little literature written on the nursing implications, but hope that there will eventually be a better understanding for the incorporation of simulation through quality improvement and staff training. Without constant practice, competency and knowledge of manikin use can be lost and many expensive high-tech pieces of equipment could be left untouched at Sim Centers. Maintaining fluency and mastery is also difficult with constant software upgrades and changing technology. At the University of Hawaii at Manoa's Nursing Simulation Center for example, the staff use 3 different platforms to control at least 7 different high-fidelity manikins. Therefore, a solution that helped to alleviate training costs and provided adequate support for staff was considered beneficial. An online training module thus can be used anytime to support staff turnover and serve as a refresher or resource for review. The purpose of this instructional design project was to develop and evaluate the effectiveness of such an online video-based instructional module for training simulation staff on programming in the Gaumard Manikin UNI Software at the University of Hawaii at Manoa's Nursing Simulation Center.

Literature Review

Rutherford-Hemming (2012) took a look at cognitive, social, and constructivist learning theories and concluded that simulation methodology and how learners gain knowledge with simulation experiences is deeply rooted in adult learning theory. With this in mind, it is even more crucial that emphasis be put on adequate training of staff in manikin function and programing competency in order to aid simulation learning. Summers (2012) outlines a framework for examining how these technologies should be best developed for simulation-based training in order to address the unique demands imposed by environmental, fiscal, and security concerns. He explains that effective simulation-based training also requires an understanding of how the learning process is mediated by the fidelity of the simulation. Thus, it is fitting that the Dick and Carey (2008) model for instructional design be used to develop any such online technology training. By identifying the goals for concrete performance objectives, the model serves the appropriate purpose for conducting formative and summative evaluations. Together with a direct inductive strategy in the cognitive domain with Gagne's 9 Events of Instruction (Gagne, Wager, Golas, Keller, & Russell, 2005), an online self-paced video module using screen capturing for teaching software can be the critical reference tool that educators and simulation centers use instead of having to pay for repeated expensive courses from the manikin manufacturers. Not to mention, this cost is two-fold in Hawaii, as onsite training would also include travel expenses required for the trainers to come.

Project Design

In determining which manikin platform to develop for the video training module, an audience analysis of the Simulation Center staff was considered, and ultimately decided on the Gaumard UNI software. This would most benefit the staff because of Gaumard's recent new platform upgrade to UNI, one that many of the staff have not yet used. With no formal training and only webinars offered in Eastern-Standard time, the staff has continued to use only the old version of the platform. However, support and training for this old version has been discontinued by the manufacturer, and thus the staff will eventually be forced to transition. In addition, compared with the other two manikin platforms, where staff is somewhat familiar with the programming aspect, they do not know how to program in the Gaumard software. Figures 1-5 show different types of these Gaumard manikins that run on the UNI software, with figures 5 and 6 being the Five-Year-Old HAL manikin and its software that was used as the sample program for the module.

Figure 1. Gaumard's Noelle Birthing Manikin with her Newborn Baby Hal.

Figure 2. Gaumard's Newborn Baby Hal Manikin.

Figure 3. Gaumard's Premie Hal (premature newborn) Manikin.

Figure 4. Gaumard's Premie Hal Manikin being resuscitated.

Figure 5. Gaumard's Five-Year-Old Hal Pediatric Manikin.

Figure 6. Gaumard's Five-Year-Old Hal Pediatric Manikin on a ventilator with the UNI software running.

As a result, an online video-based instructional module focused on the Gaumard UNI platform was developed, specifically using the 5-year-old Pediatric HAL manikin for training. Screen capture videos of the software were made using the Camtasia Studio tool for both recording and editing. A free online text to speech service was also used for the narration of the module videos instead of actual voice recordings. The module is hosted on Google Sites with navigation buttons that walk learners through the entire process of using and programing in the software. Embedded test questions with Google Forms were also inserted within the module lessons and feedback provided to support learning. Figure 7 is a screenshot of what the module website looks like.

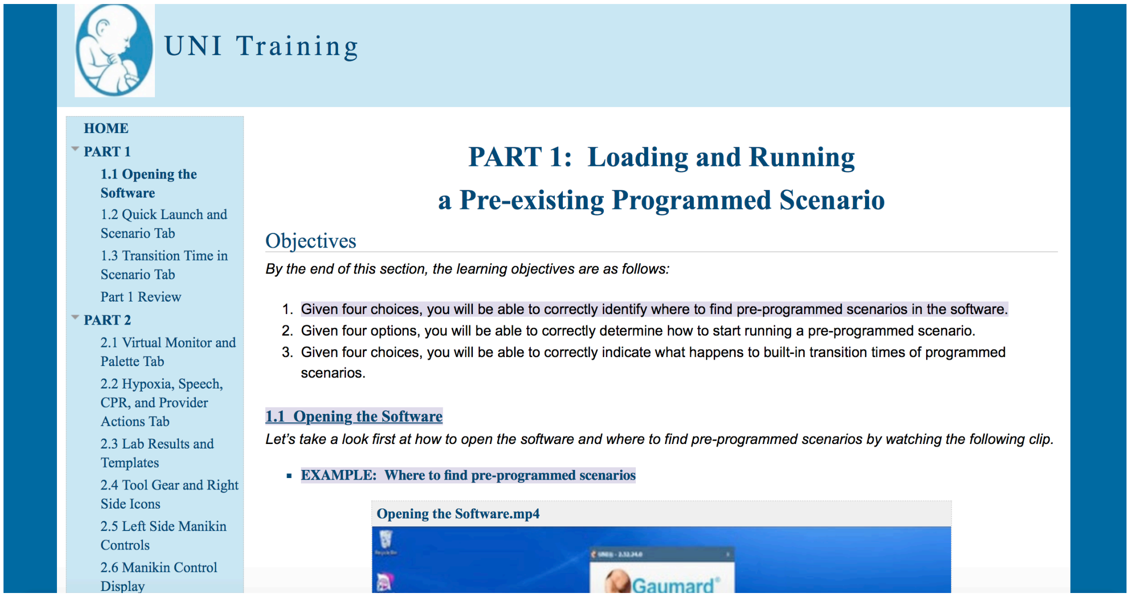

Figure 7. Layout of online video module with objectives listed and video embedded.

The module has three overarching goals in mind. By the end of the training, learners are first able to load and run a pre-existing programmed scenario that came with the manikin. Second, learners are able to navigate the software to run the manikin on-the-fly without using a pre-programed scenario. Third, learners are able to program their own scenarios into the software for use. In order to load and run pre-existing programed scenarios for the first goal, learners must identify where to find pre-programed scenarios, determine how to start running it, and indicate what happens to the built-in transition times. Figure 8 shows the entire view of the embedded video in the module and Figure 9 is an image of what the software program looks like when a programmed scenario is loaded.

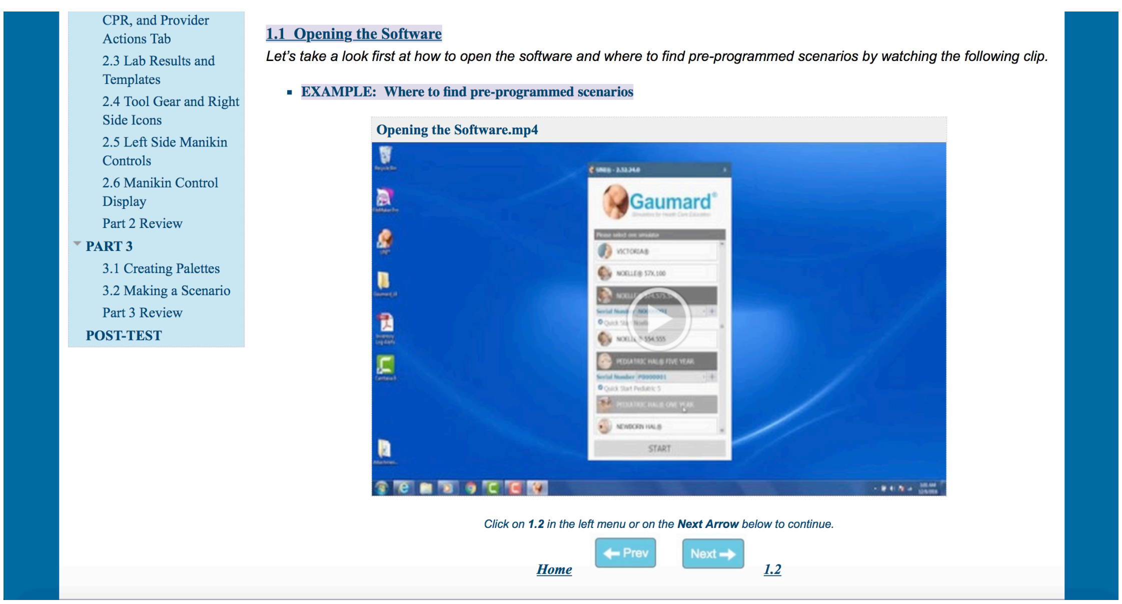

Figure 8. Entire view of embedded video in the module.

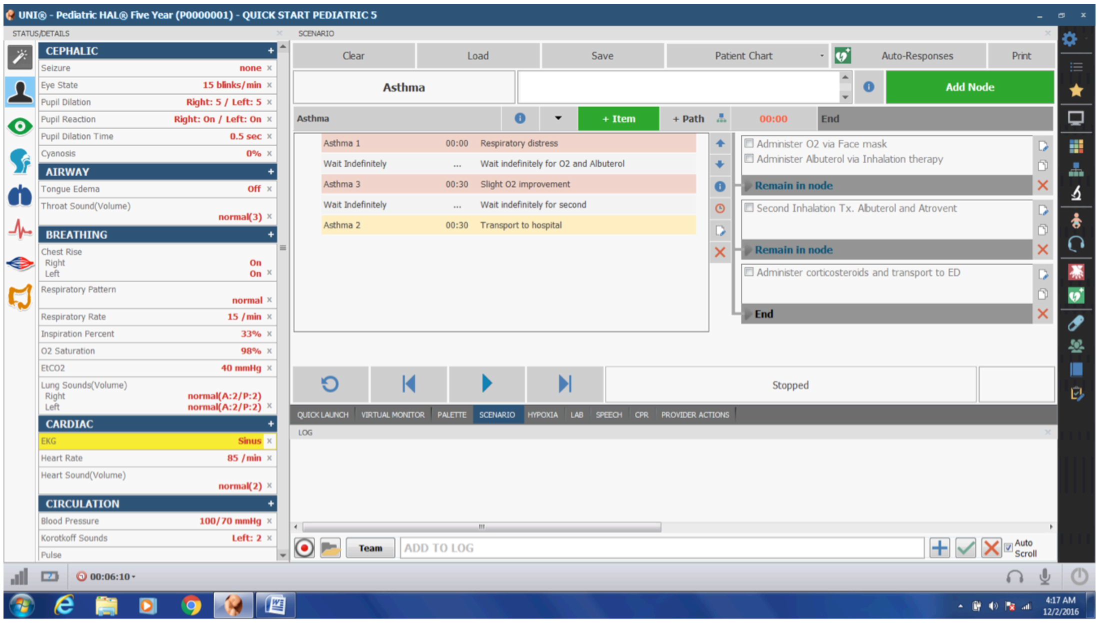

Figure 9. Image of a loaded programmed scenario in the Gaumard UNI software.

For the second goal of being able to navigate the program to run the manikin on-the-fly without a pre-programed scenario, learners have to identify colors used for categorizing palettes, distinguish tabs in the software by their features, determine what can and cannot be done with labs, indicate how to start a new healthy patient, identify manikin controls by systems, and determine how to manage those manikin control displays. Figure 10 below shows what the program looks like when running the manikin on-the-fly.

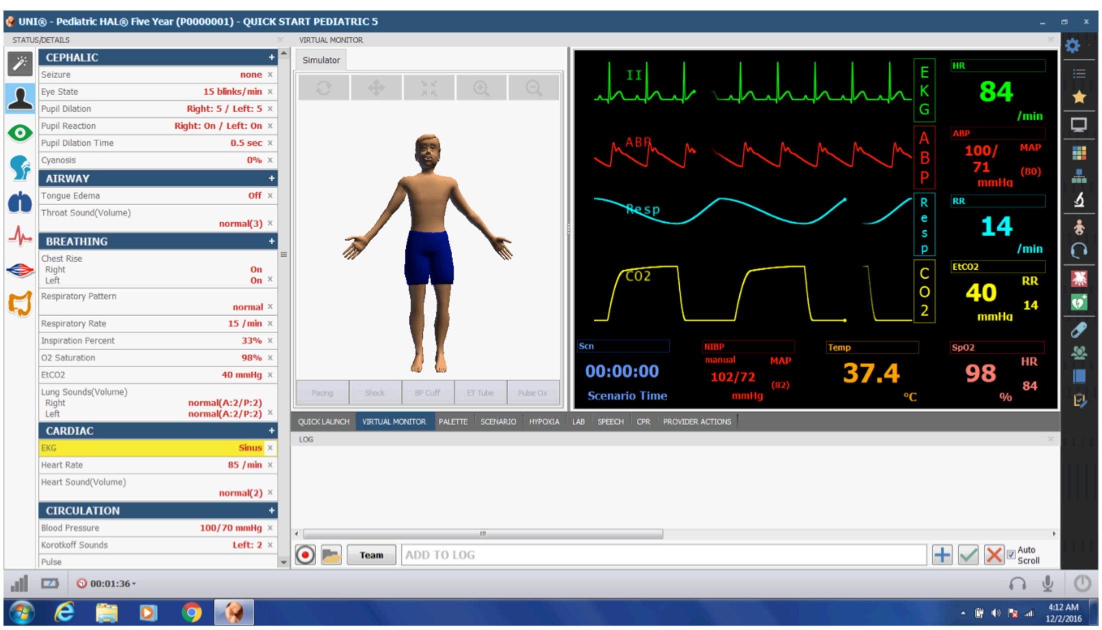

Figure 10. Image of running the manikin on-the-fly in the Gaumard UNI software.

Third, in order to meet the terminal goal of programing a scenario into the software, learners have to be able to create palettes and then make a scenario from those palettes. To create palettes, they have to know the definition for what constitutes a palette, indicate how to create one, and determine what is important when creating it. To put palettes together and make a scenario, learners have to identify the components that make up a linear scenario, determine what to program to give the most control when running it, and determine what to program for abrupt and gradual vital sign changes. Ultimately learners are able to accurately program a given scenario into the software for use. Figure 11 shows the look of the software when creating palettes that make up a scenario.

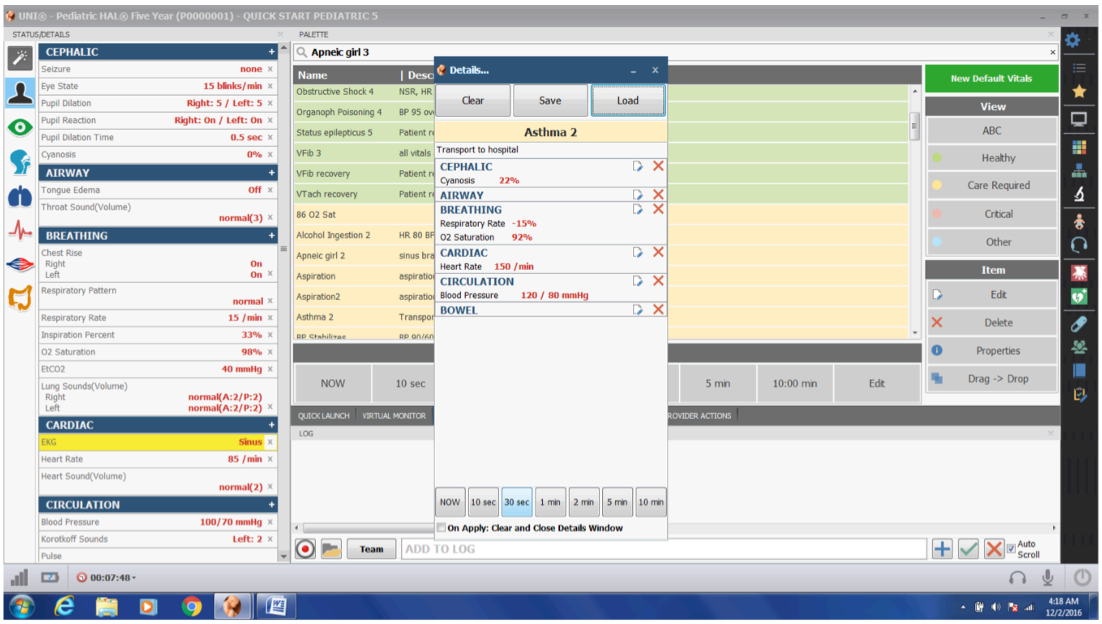

Figure 11. Image of the software when creating palettes that make up a scenario.

Methods

Eight nursing simulation staff at the University of Hawaii at Manoa and 12 other of its affiliates were recruited individually for this project. All are adult working professionals with varying technology backgrounds. They comprised of both nursing and non-nursing individuals, as well as content matter experts and technology specialists capable of providing learning experiences to both college students and healthcare professionals. All hold higher education or advanced degrees. Some were familiar with operating the manikin and the running of its software, while others only had an understanding of how it works or none at all. Training and testing were done online at the participant's own time and at the Simulation Center where they work. The subjects were asked to take a 1-2 hour self-regulated module to learn how to use the Gaumard UNI software and to program a nursing simulation scenario with vital sign changes into the manikin. Accuracy of the programming would allow for easy transition from one physical state to another when running the manikin. Doing so without a pre-programmed scenario would involve a lot of clicking in the software because every physiologic value needs to be inputted. By pre-programing a scenario, these changes are set for each state and one would only have to click on the states to advance to a new set of vitals.

Prior to the study, a one-on-one testing was done with an adult male learner who worked through the online module and provided feedback for needed changes. The learner was a representation of the targeted audience and holds a degree in computer engineering, which makes him well versed in technology, but not familiar with nursing simulation or the Gaumard UNI software as evident with his result of only 1 correct answer out of 3 Entry Level questions on the pre-test. He also showed no improvement from pre- to post-test with a score of 5 correct out of 15 questions for both. But this could have been due to his inexperience with simulation as he felt that the software was a very complex one, and was looking mostly at usability of the site and less so with content of the module. Since there was no decrease in score for the post-test, it was decided that changes to module content should be deferred until there was more data in the actual testing. Feedback that was provided from the one-on-one suggested that the site was well done and navigations were straightforward to follow, thus there was little improvement needed. The only recommendation that resulted was that embedded Google Form tests should be shortened in length to prevent scrolling of empty spaces after submission of the form. This was taken into consideration for the redesign of the site before actual testing of the module. The initial design had embedded forms set at a long length so the entire form would show on the webpage without forcing learners to have to scroll within a scroll of the page to navigate the form. However, after clicking submit at the bottom, they would see a long blank white screen and would have to scroll back to the top of the page in order to see the confirmation that their form had been submitted. This could cause problems if learners do not know what to do when presented with the blank screen. As a result, all embedded test forms were changed to 800 pixels in length for learners to scroll within a scroll of the page.

Before starting the module, participants were recruited via email (see Appendix A for sample of Recruitment Email) for the actual testing. Those who agreed to participate were asked to sign informed consents (Appendix B) about their rights as research subjects. A demographics pre-survey (Appendix C) was also administered with regards to their comfort level with computer technology, experience with simulation, and knowledge of using the Gaumard UNI software. All information collected is kept private and confidential. Data reporting is only aggregated for general purposes and do not include names or identifiable information.

In evaluating the effectiveness of the training module, a pre-test (Appendix D), embedded test, post-test (Appendix E), and an attitudinal post-survey (Appendix F) were considered for assessing learners' knowledge levels prior to and post training. These questionnaires further reveal most and least effective aspects of the module. The use of Meij's eight research guidelines for designing software training videos also helped with the transferring of knowledge (Meij, H., & Meij, J., 2013). Following Ali, Samsudin, Hassan, and Sidek's 2011 article supporting that online self-paced screen capture with narration is more effective for learner performance than without narration, an online text to speech service was also used for recording audio in the module.

This study looks specifically to answer the research question of how effective is the module in helping simulation staff acquire accurate programming skills needed to replicate realistic physiological conditions for nursing practice. The timeline for materials development and module creation occurred over two semesters, and implementation took place in the second semester.

Data summary are analyzed below using online survey tools with Google Forms and Google Sheets to describe learner statistics. Averages and ratings were ranked and open-ended responses cross-referenced with demographics pre-survey for identifiable relationships. Charts and descriptions were used to explain both quantitative and qualitative data. Results for this study also include descriptions of findings with regards to the accuracy of participants to program computerized manikins for replicating realistic physiology. Specifically, data were looked at for the correctness and accuracy of manikin physiology for a given nursing simulation scenario.

Results and Discussion

Of the 20 individuals recruited via email, all initially agreed and 19 signed consents to participate in the study. However, only 15 were able to fully complete the module, programming, and survey requirements. Table 1 outlines the demographics of those 15 that completed the study, the majority of which were females, with the most participants between the ages of 40-49 years old, and all holding higher education degrees.

Table 1. Participant Gender, Age, and Education Level.

Characteristics	Number	Percent
Gender		
Male	4	27%
Female	**11**	**73%**
Age		
20-29	1	7%
30-39	2	13%
40-49	**7**	**47%**
50-59	4	26%
60+	1	7%
Education		
Associates Degree	1	7%
Bachelor's Degree	9	60%
Master's Degree	4	26%
Doctorate Degree	1	7%

Participants were also asked how they felt about learning new computer software and to rate their comfort level with technology in the demographics pre-survey as this may impact how well they are able to navigate through the module. Almost all said that they would need some training before using new software, with 1 person indicating that they would need a lot of training and 1 person saying that they felt they do not need any training at all. Of the 15 responses, 7 also felt somewhat comfortable in their technology ability (46.2%) and 8 felt very comfortable (53.8%), thus indicating that none should have any major problems with knowing how to navigate the online module (Figure 12).

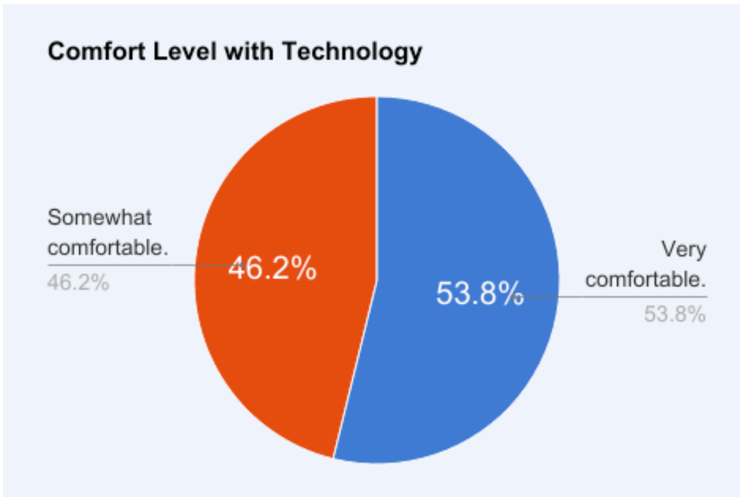

Figure 12. Comfort with technology. Each participant rated their comfort level with technology.

The learners further indicated which computer platform they were more familiar with as the Gaumard UNI Software is a PC-based only software. An equal number of participants were either more familiar with PCs than MAC (38.5%), or equally familiar with both platforms (38.5%). Only 3 individuals (23.1%) were more comfortable with MACs than PCs, which may affect their comfort with operating the software (Figure 13). However, it should be noted that if there was discomfort with operating the Gaumard UNI Software on a PC for these participants, it did not reflect on their post-test scores as all showed improvements.

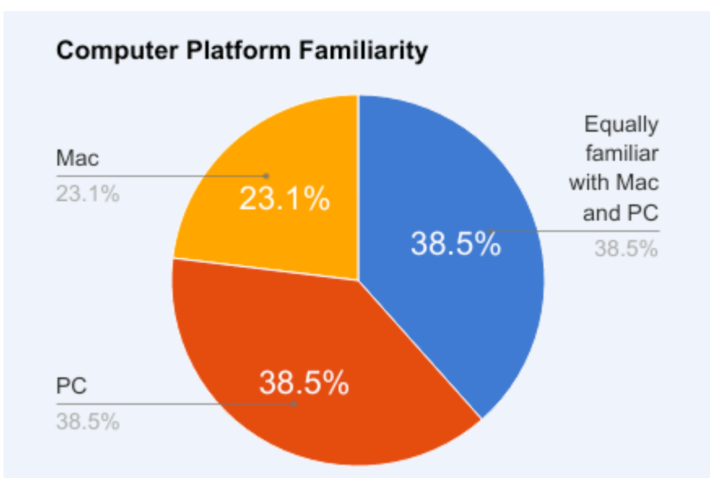

Figure 13. Familiarity with computer platforms. Participants recorded their familiarity with either PCs, MACs, or both.

Learners' experience with nursing simulation and previous use of different manikin software could also further affect their comfort level and how well they are able to grasp the training module content. The majority (61.5%) of those who participated work in nursing simulation and have previously used different manikin software. Another 30.8% have experience working in nursing simulation, but not directly using manikin software, thus leaving only 1 individual (7.7%) who had very little experience with simulation and have never used any manikin software (Figure 14). It is interesting to note that as with the one-on-one test subject who also had no experience with nursing simulation and manikin software, this individual's pre- and post-test showed no improvement with a score of 7 correct out of 15 on both. Furthermore, results suggest that participants' previous experience with using different manikin software greatly help the time they spent on the module content and programming of the scenario regardless if they had experience with the Gaumard UNI software itself. Those who have used other manikin software before spent less time overall than those who had not used manikin software previously. But it is interesting to note that this is with the exception of age, as the youngest person took the least amount of time even with no previous experience with other manikin software. This suggests that perhaps all these factors are important when learning a new manikin software, that being young, comfortable with technology, and knowing about nursing simulation or having previously worked with different manikin software may help one to better grasp the module content and programming of the manikin.

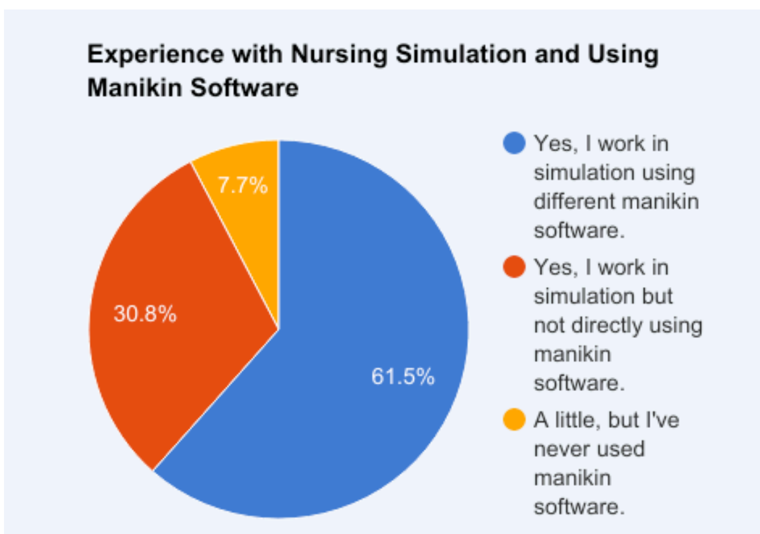

Figure 14. Experience with nursing simulation and using different manikin software. Learners reported whether they have experience in nursing simulation or have previously used different manikin software.

Finally, since the majority of participants were experienced in nursing simulation or had used manikin software before, it was worthwhile to find out how comfortable they were, if at all, with specifically the Gaumard UNI software. Figure 15 show that 23.1% reported they were comfortable and already knew how to use the software. Another

30.8% said that they were somewhat comfortable with the software, and 15.4% only used it a few times, with the remaining 30.8% having no experience with the software at all. Results show that all scores improved in the post-test regardless if they already knew the software, thus suggesting that the module is a good reference resource for review.

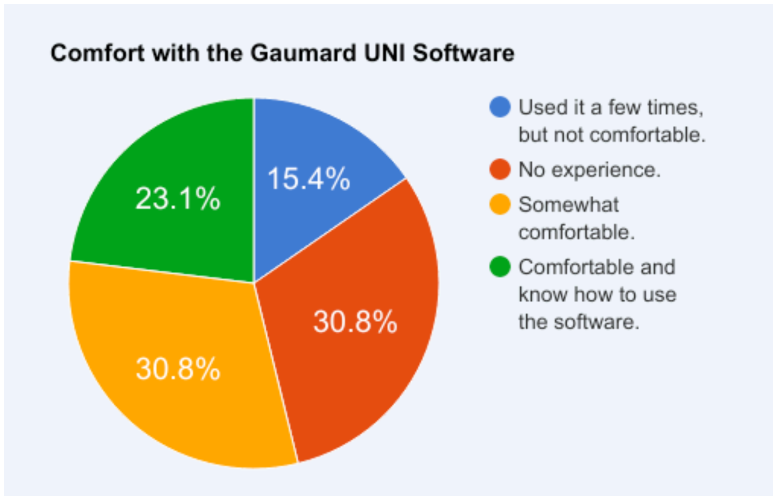

Figure 15. Comfort level with the Gaumard UNI software. Learners rate their experience with the software itself.

Measurement results for learning from pre- to embedded to post-test revealed improvements as participants progressed through the module. With an average score of 42% in the pre-test, the participants were not well versed with the Gaumard UNI software. The highest 2 scores of 60% indicated that all could benefit from the training module, even with prior knowledge of the platform. Final results in the post-test showed that the module helped to improve scores overall with an average of 76%. One person scored 93% (14/15) and 1 person scored a perfect 100%. Figure 16 below shows these results of the pre-test, embedded test, and post-test for the 15 participants in the study, with the blue line representing their pre-test scores in percentages, the red line their embedded test scores, and the yellow line their post-test scores.

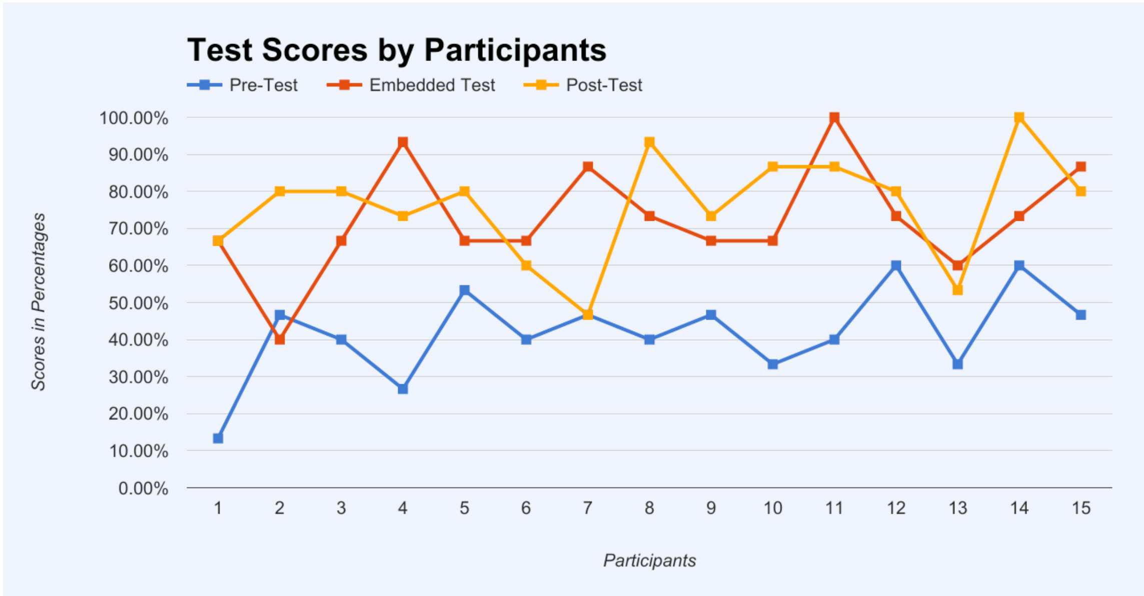

Figure 16. Participants' test scores. Pre-test, embedded test, and post-test scores shown for each of the 15 participants that completed the study.

Figure 17 further breaks these pre-, embedded, and post-test scores down by each of the 15 learning objectives that were measured in the module as 15 test questions. The same questions were used for both the pre- and embedded tests (see Appendix D), with video module content being introduced as the difference between the two. Post-test questions (Appendix E) were different, but parallel to that of the pre- and embedded tests. In looking at these scores by question items, 7 of the 15 objectives showed improvement from pre- to embedded test, and from embedded test to post-test. This is evident in Figure 18 below for questions 3, 4, 5, 6, 7, 12, and 14. Questions 1 and 8 showed a slight drop from embedded test to post-test, but significant improvement from the pre-test regardless. And question 11 showed a drastic improvement from pre- to embedded and post-test, even though scores for both embedded and post-test remained the same. As a result, these 10 out of 15 questions support the module's effectiveness in helping to improve learning. Furthermore, 9 out of the 15 participants were able to accurately program the sample vital signs scenario into the software that was part of the module's terminal objective 16. Their accuracy in replicating realistic physiological changes included the programming of 2 sets of vital signs with timing transitions for a given scenario. The remainder 6 participants also had correct programming components to varying degrees. Four had only minor missing details due to saving issues or carelessness, and only the 1 person without any simulation background had an incomplete scenario. Therefore, it can be concluded that the training videos greatly benefited the transference of knowledge as all were able to grasp the necessary concepts for programming.

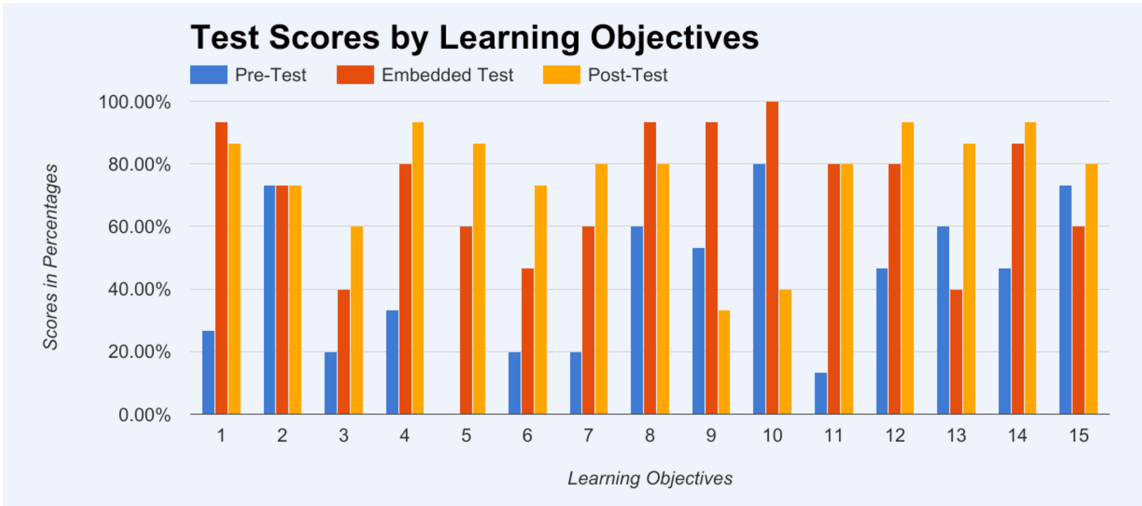

Figure 17. Test scores by learning objectives. Pre-test, embedded test, and post-test scores are shown for each of the 15 learning objectives in module.

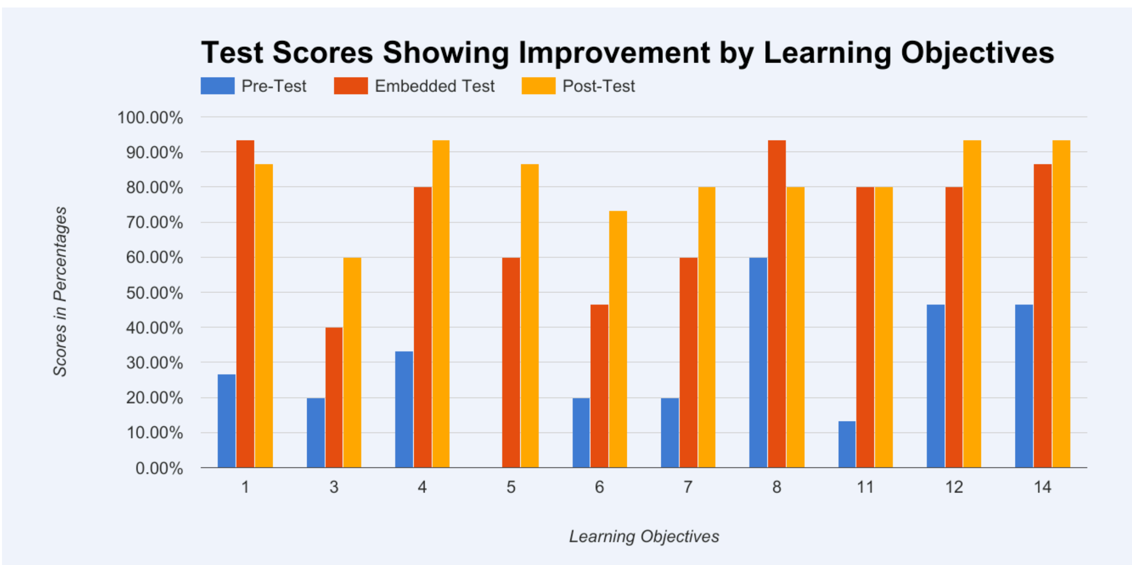

Figure 18. Test scores showing improvement by learning objectives.

In looking at the remaining 5 questions of the module, Figure 19 below shows the discrepancies that occurred. Question 2 showed the same score for all 3 pre-, embedded, and post-test, thus suggesting that perhaps the participants already had this prior knowledge and that the question can be considered as an entry level question. It might be worthwhile to switch this question with either of the Entry Level 1 or 2 questions that was in the pre-test because the majority of participants got both of those questions wrong. Only Entry Level question 3 was answered correctly by most. Furthermore, both questions 9 and 10 below showed that learning occurred with an increase in embedded test scores, but with a drop in the post-test. This is perhaps a retention problem that can be addressed with clearer explanation of content in the video module. Specifically for question 9, it should be explained that in order for all manikin system controls to be showing, it’s not enough to just click on the full human icon in the software because this only shows you all the system options. Should a particular function in a system of the manikin be removed from view, only by clicking on the "+" sign and selecting "show all" can you bring back the functions. The full human icon only shows current functions of all systems for the manikin. For question 10, it should also be noted clearly that vital sign trends are time states for changes in the manikin, and that they are added to palettes when putting together to make a scenario, not necessarily components of the created palettes themselves. What makes up a palette are individual vital sign components such as heart rate and blood pressure values that need to be inputted when creating a palette. Finally, questions 13 and 15 showed the reverse effect from that of questions 9 and 10. For questions 13 and 15, perhaps learning did not take place since scores for embedded test were lower than the pre-test. The discrepancy that post-test scores were higher for both questions could be attributed to lucky guessing and that either wording in the pre- and embedded test questions could be changed or module content be made clearer. Particularly for question 13 in the embedded test, two choices of similar answer items could be attributed to why participants got the answer wrong. "Wait times" and "time transitions" can both be considered components that make up a linear scenario when programming the manikin, so that perhaps a different choice such as "paths" or "nodes" can be used instead to clearly distinguish between linear and branching scenarios. For question 15, informational content can be clarified in the module to explain that palette trends are what dictate gradual changes in vital signs. "Wait times" and "time lapse" will still cause an abrupt change in the manikin because they are just delays for the vital signs to take place. Without trending the palette, vital signs will change abruptly from one palette to another, no matter how long you wait or have time elapse.

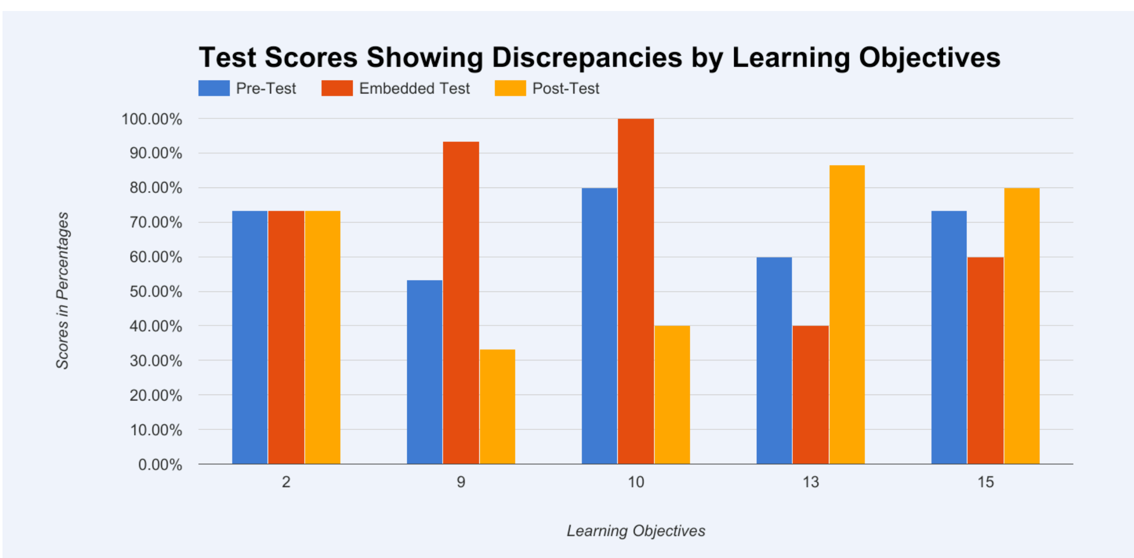

Figure 19. Test scores showing discrepancies by learning objectives.

Following completion of the post-test and programming of the manikin, all participants were asked to fill out a post attitudinal survey (Appendix F) regarding any feedback they may have for the improvement of the module. Participants first selected their agreement levels for 8 statements about the module, followed by answering 2 open-ended questions for recommended suggestions. Ratings were on a Likert Scale of 1 to 5, with 1 being

Strongly Disagree and 5 being Strongly Agree. Figure 20 shows the results of their input with the highest agreement for "understanding the concepts taught" and that "use of video-based instruction was important in helping to understand the material." This in itself is validation of the success of the module and that the correct mode of instructional design was employed. Four other statements also had higher than 4.0 ratings, thus confirming that information present was clear and easy to understand, videos were relevant and appropriate, answer key feedback in the embedded tests were helpful, and that the post-test adequately measured knowledge gained. The 2 lowest ratings were 3.64 for not enough practice questions in the module, and 3.79 for learner's confident in their ability to use and program in the software. These can be attributed to the design of the module as having only 1 question per objective for the sake of time needed to complete the module. Should this be a fully comprehensive training, perhaps more questions can be added to cover all examples of each objective. Learner's confidence level can also be due to lack of practice as learning the content alone is not sufficient for proficiency in manikin functions without repeated use of the software.

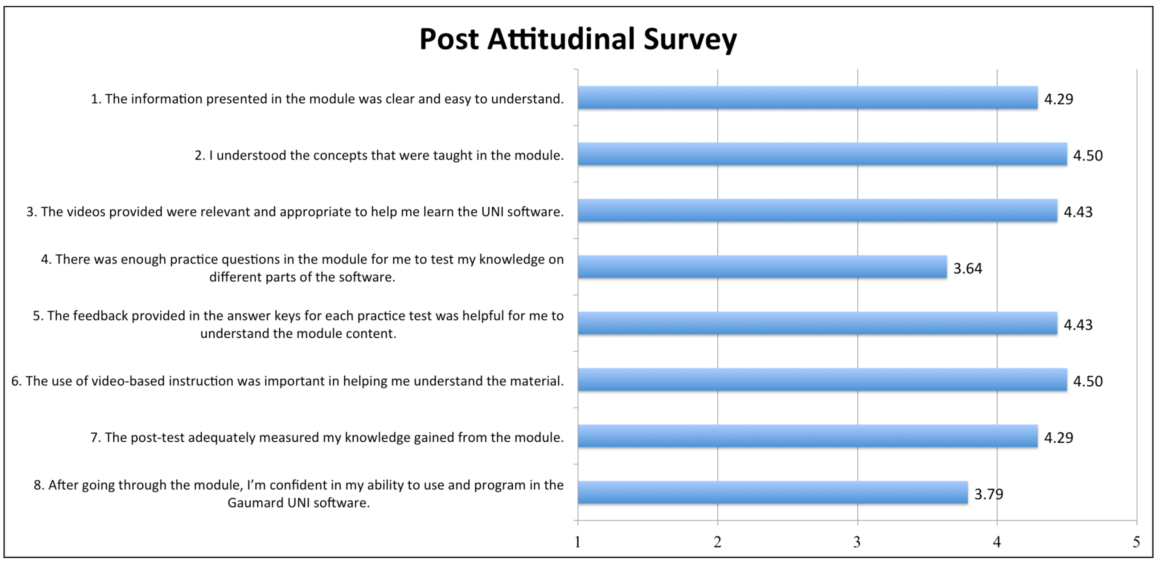

Figure 20. Post-Attitudinal Survey showing participants' ratings for their level of agreement with statements regarding the module (1 = Strongly Disagree; 5 = Strongly Agree).

The two open-ended questions at the end further asked participants for their feedback regarding recommendations for the content of the module and how materials presented can be improved, as well as suggestions for the look and feel of the website. Feedback on the module suggest that the videos were a little fast to follow, review questions were difficult and did not cover all content taught in the module, too much information was presented, and that a human voice audio recording for the narration would be better than a computerized text to speech audio. Recommendations were made to break up the videos and parts of the module even further with searchable topics or bookmarks that learners can jump to for what they need review on, perhaps even bulleted key points at the end of each video. Although, the majority of the videos were less than 5 minutes each, with only 2 videos in the module running close to 10 minutes. Many also felt that if they had time to practice or play with the software while going through the module, they would benefit a lot better, but this was not built into the study. It does affirm the study's intentions, however, that the module should be used as a reference resource for continue training and review with staff as needed. Feedback about the site itself was positive overall as navigation was easy to follow, but that the videos took too long to load for some. There was also suggestion to make the images of the screen capturing bigger to see, but perhaps that participant did not watch the videos in full screen mode. See Figures 21 and 22 for summarized word clouds of suggested comments on the module and website.

Figure 21. Word cloud of comments on the module.

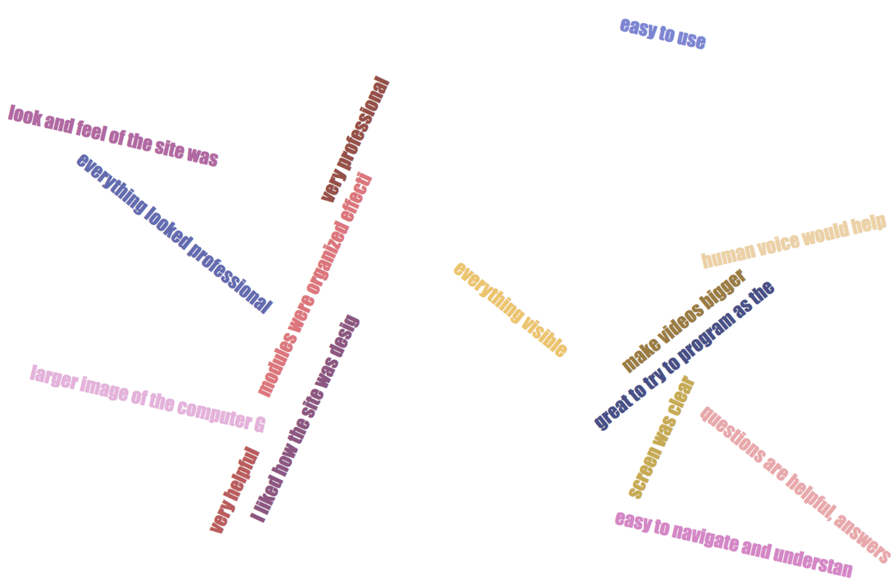

Figure 22. Word cloud of comments on the website.

Conclusion

In order to create a safe and realistic learning environment for nursing students to practice and learn from their mistakes, manikin programing is needed to replicate human physiology that would otherwise be impossible to create. Learning will become even more valuable if training modules can be designed to support staff competency in the pursuit of this endeavor. Impacts of this instructional design project can be a resource tool for other simulation programs that need a starting point or a review of manikin programing regardless of their ability to pay for staff training.

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APPENDIX A
Recruitment Email

Hi,

I'm writing to ask for your help in participating in a research project I'm doing as part of the requirement for my Master's program. The purpose of the project is to evaluate an online video-based instructional module. Therefore, I'll be asking you to take the training module on how to use the new Gaumard UNI software. I hope you will consider participating because of your technology knowledge or familiarity with nursing simulation. Your willingness to take the module is greatly appreciated because any feedback will help to improve the module for future use. Please see the attached consent form for more information on the study and what you'll have to do. If you agree to participate, please sign and date the form and return it to me either by email or in person. Should you have any questions regarding the study, please feel free to contact me at any time.

Thank you,
Lauren Thai, Principal Investigator
hthai@hawaii.edu

Appendix B
Consent Form

University of Hawaii
Consent to Participate in a Research Project
Lauren Thai, Principal Investigator
Project title: Programming Manikins: A Video Training Module for the Gaumard UNI Software

I'm doing a research project as part of the requirement for my Master's program with the Department of Learning Design and Technology. The purpose of the project is to evaluate an online video-based instructional module for training simulation staff on the use of the new Gaumard UNI software. I'm asking for your participation because of your knowledge of technology or experience with simulation.

Project Description and Time Commitment: If you choose to participate in the project, you will be asked to complete a short demographics survey prior to starting the module. The survey should take no more than 5 minutes to complete. Following the survey you will complete an online module to learn how to use the Gaumard UNI software. The module will consist of a pre-test, test questions within the module, as well as a post-test. It can be done on your own time, at your own pace, and should take about 1.5 to 2 hours to complete. At the end of the module, you will be asked to program an actual scenario into the Gaumard UNI software. I will schedule time with you for access to the software to do this part if needed. After completing the entire module, you will be asked to fill out an attitudinal survey that should take about 10 minutes.

Benefits and Risks: Your participation will help in determining the effectiveness and improvement needed for the module. There may be no direct benefit to you for taking part in this project. By going through the module, you may gain a better understanding and familiarity with the new Gaumard UNI software. You may be able to use the new interface for both running the manikin and programing scenarios. There is otherwise little to no risk to you for participating in this research project.

Privacy and Confidentiality: Any personal information collected about you will be kept confidential and secured in a safe place away from public access. Only my advisor and I will have access to your information, but the University of Hawaii Human Studies Program also has legal rights to review research records of this study. Your name and any identifiable information will not be used when reporting results. The answers you provide will be aggregated so that it cannot be connected to you personally. Your privacy and confidentiality will be kept at all times to the extent of the law.

Voluntary Participation: Your participation is completely voluntary and you may choose to stop at any time. Should you feel discomfort or stress during the module or when doing the test sections, you may take a break or skip the section. There is no penalty or loss of benefit to you if you choose to not complete all of the sections of the module.

Contact Information: Should you have any questions regarding this project, please feel free to contact me at hthai@hawaii.edu, or my University of Hawaii advisor, Dr. Catherine Fulford at fulford@hawaii.edu. If you have any concerns about your rights as a research participant, please contact the University of Hawaii Human Studies Program at uhirb@hawaii.edu.

Statement of Consent: Please sign and date below to indicate that you have read and understand the information provided. By signing, you are consenting to participate in this study.

I have read and understand the information provided. I hereby agree to participate in this research project.

Print name: ________________________________ Date: ____________________

Signature: ___________________________

Please keep a copy for your records.

Appendix C
Demographics Pre-Survey

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Programing Manikins Pre-Survey:

Prior to taking the module, please answer this demographics survey with regards to your comfort level with computer technology, experience with simulation, and knowledge of using the Gaumard UNI software.

All information collected will be kept private and confidential. Data reporting will be aggregated for general reporting only and will NOT include your name or identifiable information.

* Required

Name (Last, First) *

Your answer

1. Gender (please select your gender below): *

- ◯ Male
- ◯ Female

2. Age (please select your age range below): *

- ◯ 20-29
- ◯ 30-39
- ◯ 40-49
- ◯ 50-59
- ◯ 60+

3. What is your education level? *

- ◯ Associates Degree
- ◯ Bachelor's Degree
- ◯ Master's Degree
- ◯ Doctorate Degree

4. How would you rate your comfort level with technology? *

- ◯ Not at all comfortable.
- ◯ Somewhat comfortable.
- ◯ Very comfortable.

5. Which computer platform are you more familiar with? *

- ◯ Mac
- ◯ PC
- ◯ Neither Mac nor PC
- ◯ Equally familiar with Mac and PC

6. How do you feel when you have to learn new computer software? *

- ◯ I need a lot of training before I can use new software.
- ◯ I need some training before I can use new software.
- ◯ I don't need any training to use new software.

7. Do you have any experience with nursing simulation or using manikin software? *

- ◯ No.
- ◯ A little, but I've never used manikin software.
- ◯ Yes, I work in simulation but not directly using manikin software.
- ◯ Yes, I work in simulation using different manikin software.

8. How comfortable are you with the Gaumard UNI software? *

- ◯ No experience.
- ◯ Used it a few times, but not comfortable.
- ◯ Somewhat comfortable.
- ◯ Comfortable and know how to use the software.
- ◯ Very comfortable and an expert with the software.

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Never submit passwords through Google Forms.

613-Design-Objectives

Appendix D
Pre-Test

Programing Manikins Pre-Test

Please answer the following questions about the Gaumard UNI Software as best as you can. This is a pre-test and you are NOT expected to know the answers. Information will be provided in the module for you. These questions are NOT testing you. They are to determine the effectiveness of the module. Please DO NOT spend more than 10-15 minutes on this pre-test. If you don't know the answer, give your best guess.

* Required

Name (Last, First) *

Your answer

Entry Level Questions

EL1. At startup, can you select more than one manikin to run at the same time? * (1 point)

- a. Yes, if you don't have 2 computers to control 2 different manikins.
- b. Yes, but the software won't be able to know which vital signs is for which manikin when you enter the information.
- c. No, because if you want to transition from one manikin to another for an unfolding case, you need 2 separate computers.
- d. No, you can run only one manikin at a time in the Gaumard UNI software.

EL2. Should you leave Gaumard manikins on paused? * (1 point)

- a. No, it is recommended to never put Gaumard manikins on paused because of battery issues.
- b. Yes, you can pause the manikin to conserve power when not using it.
- c. No, because the software will close out if the manikin is left on paused too long.
- d. Yes, you can always pause the manikin if you need more time for learners to assess.

EL3. Which of the following is NOT a tab in the center view of the Gaumard UNI software? * 1 point

- a. Virtual Monitor
- b. Palette
- c. Scenario
- d. Settings

Loading Pre-programed Scenarios

1. Where does the software hold all of the pre-programed scenarios that came with the manikin? * 1 point

- a. In the default profile.
- b. In the quick start profile.
- c. Under the virtual monitor tab.
- d. Under the palette tab.

2. To start running a pre-programed scenario, you can do all of the following except _______. * 1 point

- a. click start from the quick launch tab.
- b. select the first state under the scenario tab and click play.
- c. double click on the first state of the scenario under the scenario tab.
- d. pressing the refresh button in the scenario tab.

3. What happens to built-in transition times of a state if you fast-forward the scenario? * 1 point

- a. Nothing, the scenario advances to the next state disgarding any built-in transition times.
- b. The remaining transition time is added to the total scenario time.
- c. The remaining transition time is subtracted from the total scenario time.
- d. The remaining transition time is added to the next state.

Running The Manikin

4. Which of the following is NOT a color for palettes? * 1 point

- a. Red
- b. Blue
- c. Pink
- d. Yellow

5. Under which tab can you see the learners' ventilation of the manikin? * 1 point

- a. CPR
- b. Virtual Monitor
- c. Provider Actions
- d. Hypoxia

6. Which of the following is NOT true about labs? * 1 point

- a. You can send lab results to the patient monitor.
- b. You can remove labs from the patient monitor.
- c. You can edit lab templates.
- d. You can delete lab templates.

7. You can start a new healthy patient by doing all of the following except _________. * 1 point

- a. loading "healthy patient" under the palette tab.
- b. clicking "new session" under the settings tool gear.
- c. closing the program and logging back in.
- d. loading a new scenario under the scenario tab.

8. Under which system would you go to put the manikin into a seizure? * 1 point

- a. Cardiac
- b. Breathing
- c. Circulation
- d. Cephalic

9. If you accidentally click the X and remove an option from the full list of manikin controls on the left, how can you bring it back? * 1 point

- a. You can't bring it back once you delete it.
- b. Click on the "+" sign of the system and select "clear all" to reset.
- c. Go to the system icon and double click the choice you want to add back in.
- d. Click on the "+" sign of the system and select "show all" to reset.

Programing Scenarios

10. What are palettes? * 1 point

- a. Different vital sign states for the condition of the manikin.
- b. Preprogrammed scenarios with different transitioning states.
- c. Vital sign states that are critical and red in color.
- d. Healthy and care required vital sign states that are green and yellow in color.

11. How would you create a new palette? * 1 point

- a. Turn the green magic wand on and enter a vital sign value.
- b. Go to the palette tab and double click on an existing palette to use.
- c. Turn the magic wand off and enter a vital sign value.
- d. Go to the scenario tab and click on the "+ item" icon.

12. Which of the following is NOT important when creating palettes? * 1 point

- a. Input as much information as possible so you don't miss something when transitioning from one state to another.
- b. Name all palettes of a scenario with the same string so that they're easy to find.
- c. Give a description for the palette to help identify the state or condition that the manikin is in.
- d. Always clear the palette details window of all existing vital signs so that you can start inputting new information for the next palette.

13. What components make up a complete linear scenario? * 1 point

- a. Palettes, nodes, and paths.
- b. Palettes, time transitions, and trends.
- c. Vital signs, palettes, and time lapses.
- d. Palettes, wait times, and wait indefinitely.

14. Which of the following should you program to give you the most control when running a scenario? * 1 point

- a. Wait times
- b. Wait indefinitely
- c. Time lapses
- d. Palette trends

15. What would you have to program for vital signs to gradually change instead of changing abruptly? * 1 point

- a. Palette trends
- b. Wait times
- c. Time lapses
- d. Scenario time

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Appendix E
Post-Test

Programing Manikins Post-Test

Now that you've completed the training, please answer the following post-test questions to the best of your knowledge. Again, these questions are NOT testing you, but rather to help determine the effectiveness of the module.

* Required

Name (Last, First) *

Your answer

Loading Pre-programed Scenarios

1. Where would you find the full library of all the pre-programed scenarios that came with the manikin? * — 1 point

- a. Under the palette tab.
- b. In the default profile.
- c. In the quick start profile.
- d. Under the virtual monitor tab.

2. Which of the following will NOT start a pre-programed scenario for you? * — 1 point

- a. Clicking on the scenario title bar in the scenario tab.
- b. Clicking start from the quick launch tab.
- c. Clicking play in the scenario tab.
- d. Double clicking on the first state in the scenario tab.

3. If you fast-forward a scenario, what happens to the built-in transition times of each state? * 1 point

- a. The remaining transition time is subtracted from the total scenario time.
- b. The scenario will advance to the next state and disregard any remaining built-in transition time.
- c. The remaining built-in transition time will be added to the next state of the scenario.
- d. The remaining built-in transition time will be added to the total scenario time.

Running The Manikin

4. What color are healthy palettes? * 1 point

- a. Green
- b. Blue
- c. Pink
- d. Yellow

5. Under which tab can you create a list of learners for you to evaluate during a scenario? * 1 point

- a. Hypoxia
- b. Virtual Monitor
- c. Provider Actions
- d. Speech

6. You can do all of the following with labs except ________. * 1 point

- a. create new lab templates.
- b. delete lab templates.
- c. send lab results to the patient monitor.
- d. take back labs from the patient monitor.

7. Which of the following is NOT a way to reset the manikin back to a new healthy patient? * 1 point

- a. Go to the settings tool gear and click on "new session".
- b. Close the program and log back in.
- c. Go to the virtual monitor tab and load a new scenario.
- d. Go to the palette tab and load the healthy patient palette.

8. Under which system can you find controls for manikin tongue edema? * 1 point

- a. Cephalic
- b. Airway
- c. Breathing
- d. Circulation

9. How can you make sure that all vitals controls are showing on the left? * 1 point

- a. Click on each system's "+" sign and select "show all."
- b. Click on each system's "+" sign and select "clear all."
- c. Click on each system's "+" sign and select the function you want.
- d. Click on the "all vitals" human icon.

Programing Scenarios

10. Which of the following make up a palette? * 1 point

- a. Healthy, care required, critical, and other vital sign states of the manikin.
- b. Vital sign trends for changes to the manikin.
- c. Individual vital sign values such as heart rate and blood pressure.
- d. Different sets of vital signs states in a pre-programmed scenario.

11. Which of the following is NOT a way to create a new palette? * 1 point

- a. Go to the palette tab and use an existing palette to edit and save with new name.
- b. Turn off the magic wand so the details window opens when you add a vital sign.
- c. Go to the palette tab and open the new default healthy vitals to edit and save with new name.
- d. Turn on the magic wand and enter a vital sign value.

12. Which of the following should you NOT do when creating palettes? * 1 point

- a. Select a color when saving to categorize your palettes.
- b. Clear the palette details window of existing vital signs before inputting new ones.
- c. Name all palettes of a scenario with the same string so that they're easy to find.
- d. Use an existing palette to make edits and save with a new name to keep all required information.

13. Which of the following does NOT make up a linear scenario? * 1 point

- a. Palettes
- b. Time transitions
- c. Paths
- d. Trends

14. When programming, where should you insert "wait indefinitely" to give you control when running a scenario? * 1 point

- a. At the end of all the palettes.
- b. Before the first palette and after the last palette.
- c. Before the first palette and in between every palette.
- d. In between every palette and after the last palette.

15. If you want vital signs to change right away, how long should each of your palettes play? * 1 point

- a. 30 seconds
- b. 20 seconds
- c. 10 seconds
- d. 0 second

16. The last part of this post-test will ask you to use the Gaumard software to program a simple scenario with changing vital signs. Please select one of the choices below and email or see me for the scenario. *

- a. I will program the scenario into one of the UH Sim Lab's Gaumard instructor tablets.
- b. I will program the scenario into the Gaumard software on my own and email the file.

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Appendix F
Attitudinal Post-Survey

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Programing Manikins Post-Survey:

Thank you for taking the time to complete the training module. Its purpose was to train you on the use and programming of scenarios in the Gaumard UNI software. In order to improve the module, your feedback on its effectiveness is very important. I would greatly appreciate your taking the time to answer the following questions. This survey should take about 5-10 minutes to complete. Your responses are anonymous and will be kept confidential. All responses will be compiled and analyzed for the sole purpose of helping to improve the module.

Please indicate your level of agreement by selecting the appropriate response for the following items:
(Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree)

* Required

1. The information presented in the module was clear and easy to understand. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

2. I understood the concepts that were taught in the module. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

3. The videos provided were relevant and appropriate to help me learn the UNI software. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

4. There was enough practice questions in the module for me to test my knowledge on different parts of the software. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

5. The feedback provided in the answer keys for each practice test was helpful for me to understand the module content. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

6. The use of video-based instruction was important in helping me understand the material. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

7. The post-test adequately measured my knowledge gained from the module. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

8. After going through the module, I'm confident in my ability to use and program in the Gaumard UNI software. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

9. What recommendations do you have for the content of the module or how the materials were presented? *

Your answer

10. What suggestions do you have for the look and feel of site? *

Your answer

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