

Simulation Preparation: Using Prezi Presentation Software to Develop a Virtual Module for Clinical Core Laboratory Students

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Abstract

Simulation-based training has become an essential part of medical education, especially in clinical laboratories, where simulation experience is believed to improve training efficiency of laboratory professionals. There are three distinct phases in a simulation experience: prebriefing, participation, and debriefing. Among them, prebriefing is an essential phase that contributes to fostering student engagement and enhancing critical thinking and clinical judgments. For this project, an informal review of anonymous student feedback from past simulations and a comprehensive literature review related to simulation preparation, online learning, digital presentation, and learning styles was conducted to develop a virtual module to provide students with adequate prebriefing materials. Activities and subjects within each module were developed based on best practices found in the literature related to education, prebriefing, briefing, preparation, and simulation. Prezi presentation software, an innovative tool that displays information in a non-linear format, was used to construct the virtual module to provide future students an interactive format to review and prepare for the laboratory simulation experience. By organizing layers of content like a “mind map,” Prezi may aid in the learning process by allowing students the opportunity to explore information in an interactive, self-paced method. With its unique features, such as scalability and information visualization, Prezi can become a valuable resource for students who prefer a visual learning style. Future recommendations include formal evaluation of the Prezi virtual module in preparing students for the clinical core laboratory simulation experience.

Introduction

Simulation is defined as a technique, not a technology, to mimic or amplify real situations with guided ones that reproduce important aspects of the real world interactively.¹ Simulation-based experience (SBE) was applied gradually in different areas of medicine education and they found that the simulation improved their training outcomes.² Another critical aspect of the health care system is clinical laboratories, which provide laboratory results that help healthcare providers diagnose, treat, and monitor patients. SBE in laboratory education programs has been identified as potential solution to improve the efficiency of training and increase the proficiency of laboratory professionals.³ The University of Minnesota Medical Laboratory Science (MLS) program has developed a simulation-based laboratory, which serves the purpose of improving student preparation for clinical rotations and future laboratory practice.

Simulation experience includes three different phases: (1) prebriefing, which includes preparation and briefing, (2) participation, and (3) debriefing.⁴ The whole process can be simply understood as resources provided to students so that they can prepare for the simulation experience, their feedback during participation is recorded and examined for further improvement. The prebriefing phase provides students with all the necessary knowledge and skills to work efficiently in the simulation laboratory, which are essential in designing scenarios and fostering student engagement in simulation courses.⁵ To fully address all aspects of prebriefing activities, the Healthcare Simulation Standards of Best Practice™ (HSSOBP™) created a set of criteria. The first criterion is that students must be facilitated to know about the workflow, the expectations, the agenda, and the logistics of the experience. Second, learning materials should be developed according to the experience and knowledge level of students, as well as the purpose and learning objectives of the SBE. And third, conducting a structure orientation that includes all factors and technologies that support students to achieve the objectives.⁶ For this project, those criteria are utilized to develop a virtual module, which will provide students with all the necessary materials in an interactive way to enhance the preparation process.

To improve student outcomes in a pedagogical environment, well-constructed educational materials alone are not enough. Student engagement has become an important factor as it directly affects students' final grades, and course dropout rate.⁷ Compared to a conventional e-learning environment, in which all students are introduced to the same learning procedures, an adaptive e-learning environment improved student participation significantly.⁸ To achieve this, it is necessary to have software that is powerful in presenting information. Prezi, a presentation software that has unique features, such as scalability and information visualization, was chosen to develop the virtual module. In presentation mode, Prezi allows users to zoom in or out of folders by clicking on them (Figure 1). The zooming capability along with the flexibility in adjusting the size of each element help students highlight key subjects and deliver a visual continuity between them. This continuity improves student engagement and structural thinking.^{9,10} Furthermore, Prezi facilitates students to convert lengthy lecture into a “mind map”, which is a great way to aid memory and overview of a complicated topic.¹⁰ One qualitative research study found that students responded positively when Prezi was introduced as a supplement to their learning.¹¹ Another study found no difference in cognitive load, self-efficacy, or knowledge gain between Prezi and PowerPoint, but they reported Prezi received more favorability from students.¹² Altogether, Prezi is a good candidate to be an alternative learning source for students, especially those who prefer a visual learning style.

Methodology

To develop a comprehensive virtual module to prepare students for the clinical simulation experience, a comprehensive literature review was completed related to simulation preparation, online learning, digital presentation, and learning style topics. From the literature, best practices were identified to incorporate into the virtual module including innovative, interactive, stress-free, and adequate learning materials. As so, supplemental materials such as workflow diagrams in each bench, flag handling for the hematology analyzer, and videos about core laboratory from YouTube are included. An informal review of anonymous feedback from past simulation students was also conducted to gather suggestions for further improvement. Among those materials, the flag handling document was obtained from a clinical affiliate laboratory site. To experience the virtual module, scan the QR code that is embedded at the bottom right of the Figure 1.

Results

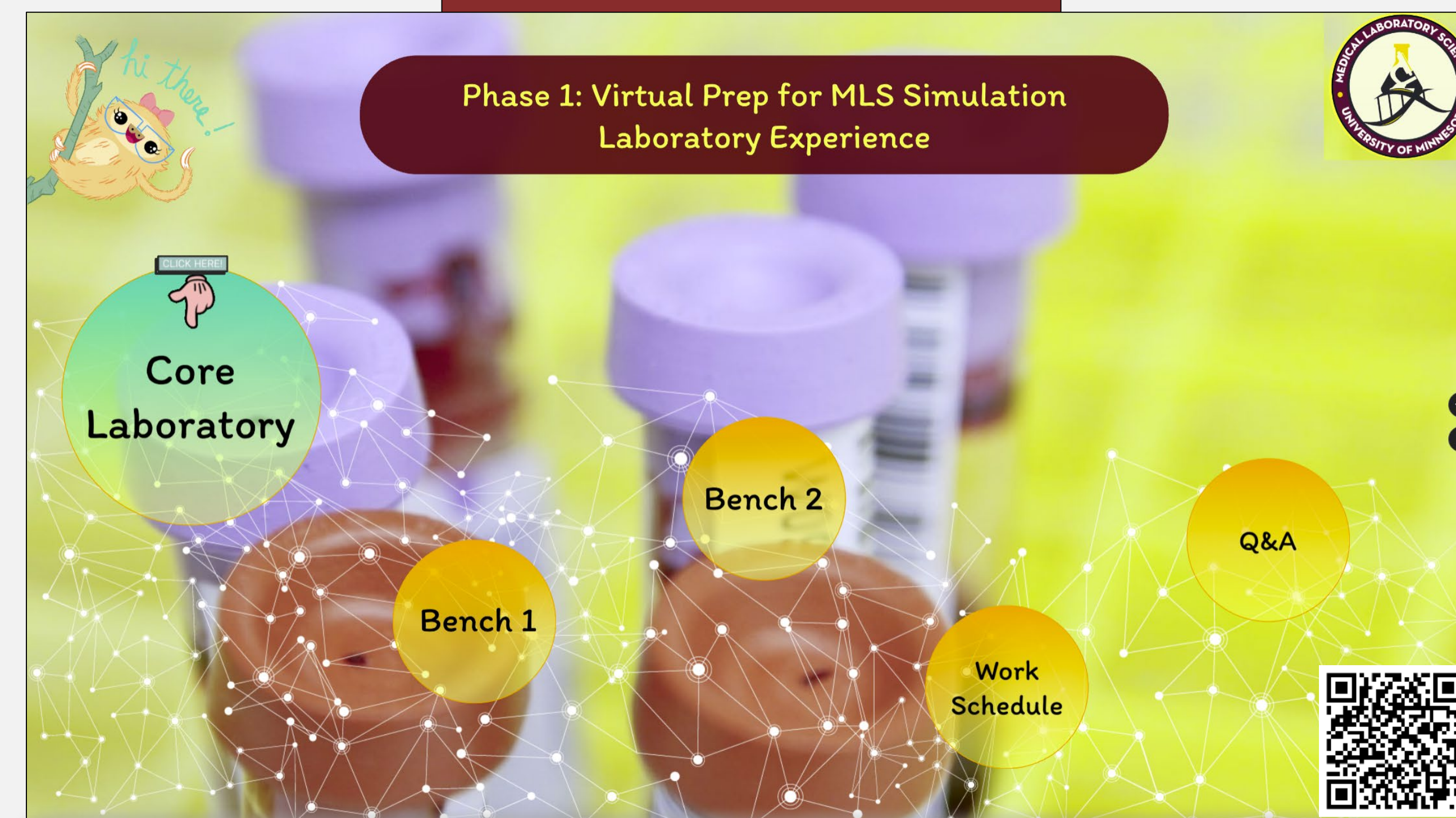


Figure 1. Home page of the virtual module. In order starting from the left, each topic is assigned a unique bubble. The bubble titled “Core laboratory” is the main are to explore with four additional small bubbles on the right containing additional information. To access each section, double-click or use the left and right navigation buttons.



Figure 2. Contents inside the bubble titled “Core Laboratory.” In this section, educational materials are further distributed to additional small bubbles within this main section. By doing that, the virtual module is designed as a “mind map,” supporting information retention and structural thinking.

Discussion

Prezi was utilized to develop a virtual module to prepare students for a clinical simulation experience because it was capable to include all of the necessary materials and it allowed for an innovative approach to presenting the prebriefing material. In this case, the innovation in presenting Prezi is shown by the ability to turn a typical lecture into an attractive one. Unlike PowerPoint presentations, where all slides are displayed in a linear format, Prezi can create layers of content in a non-linear manner (Figure 2). Contents organized in this way are similar to drawing a “mind map,” which may not only aid in the learning process but also creates curiosity to explore the information under each section. Prezi also provides a variety of icons, animated pictures, and special effects to make the presentation even more engaging. This is especially helpful for students who prefer visual learning materials.

To optimize the prebriefing phase, it is necessary to perceive two main focuses in this phase: information and activities. Information focus means that educators provide learning objectives and orientation to introduce the simulation settings, expectations, and student roles.¹³ By providing that information, students can improve their performance during the participation phase.¹⁴ Activities focus means that students are required to complete a web-based module or reading assignments. A list of essential skills may be provided to help students understand the skills that need to be practiced for the simulation experience. Other activities may include creating cognitive aids like cue cards or concept maps to use as reference sources during the simulation.¹⁵ Obviously, many elements need to be integrated into the prebriefing phase. With the flexibility in arranging information, Prezi can accommodate the need and delivery of all elements in an interactive manner. For instance, the objectives, expectations, and ground rules of the simulation experience are placed on the front page of each section to make them straightforward for students to identify. Educational videos from YouTube are also included in each section because they are valuable learning resources. While providing multiple materials and activities to prepare students may be beneficial, it is important to consider the physiological stress caused by workload during preparation as it may affect student performance. One study has shown that students feel comfortable in the clinical environment that they have been exposed to before, but too much stress or anxiety can leave students unable to handle their work efficiently.¹⁶ For that reason, additional documents such as work schedules, workflow diagrams, designated benches, and responsibilities for each role are provided; animated effects are also used to imply important parts. In this way, students will become more familiar with the simulation settings before participating with the hope that their performance improves.

Conclusion

The benefits of simulation-based experience in medical education are indisputable. However, if preparation materials are poorly made, students could not efficiently prepare for the simulation experience. Thus, it is necessary to have a well-designed prebriefing phase for students to optimize the SBE. During the development of the virtual module, Prezi was selected due to its potential in enhancing student engagement by presenting educational materials in a non-linear format. This makes Prezi a good candidate to become an additional source of learning for students with visual learning styles. The limitation of this study is that the module has not been assigned to students for experience, so we cannot conclude its effect on student outcomes. Also, the materials provided in the module are solely from the core laboratory section. To evaluate the effectiveness of this project, we recommend incorporating the virtual module into the next simulation and conducting qualitative research to gather feedback from students and educators. Besides studying the prebriefing phase, future studies about simulation may consider virtual reality technology such as virtual simulation games and virtual simulation laboratories, which has the potential to dramatically enhance the student experience before working in a clinical environment.

References

The references used in this poster can be obtained by scanning the QR code provided.

