1. DEFINITION

Integrating simulation-based learning into your classroom begins with conceptualizing how this activity will meet the course teaching and learning objectives, as well as considerations related to time frame, class size and level instruction.

2. BEST PRACTICES

a. **Learning Objectives.** The class learning objectives will shape the simulation in important ways. Consider how the simulation might further the pedagogical goals of the course. What do you want students to take away from this experience? How could an immersive exercise help you to achieve this? What skills or capabilities are you hoping students will gain from this experience?

Below are some examples of how you can match your learning objectives with different simulation models:

1. **Skills Building.** Simulations provide realistic scenarios that allow students to develop hands-on skills in their field, including areas such as critical assessment, problem solving, communication, evaluation and management (Steadman et al., 2006; Asal & Blake, 2006).

2. **Knowledge Acquisition**. Simulations have been proven to increase student understanding of course material in the classroom (Andonova & Mendoza-Castro, 2008; Shegog et al., 2012) and in clinical settings (Mariani et al., 2017). Simulations that aim to enhance student knowledge should focus on the preparatory phase of the simulation to build the groundwork for knowledge acquisition (Asal & Blake, 2006).

3. **Student Engagement.** Simulations have been shown to increase student participation and engagement in the classroom (Weidenfeld & Fernandez, 2016). Simulations provide opportunities for students to interact with one another as they immerse themselves in the activity, which promotes hands-on learning and collaboration. These interactions promote a social network and system of peer support within the classroom, enriching students' team-based competencies.

4. **Real-world Application.** Classes that seek to immerse students in real-world events or experiences can benefit from simulations that recreate fictionalized versions of these scenarios. One of the advantages of simulation-based learning is the path within their field of study. For example, the use of patient simulations for students

seeking health professions (Zendejas et al., 2013), or advanced laboratory techniques in virtual experiments for those in natural science and engineering (Jong et al., 2013).

b. **Timeframe.** The amount of class time used to run your simulation may range from single-class sessions to multi-day or multi-month time commitments. Deciding at the outset how many in-class hours you should invest in the simulation will help narrow down the type of simulation that is best suited to your requirements.

Suggestions for shorter time frames (single-session simulations):

1. **Debates / Role Play.** Preparation is the key to a successful single-session debate or role play (e.g. Baranowski, 2006). Aim to zero in on a specific single topic to ensure that students don't get lost within the experience.

2. **Clinical Practice.** Short burst simulations (e.g. fast-paced, emergency scenarios) and other patient-based activities are models that can be completed within single sessions (e.g. Kneebone et al., 2002)

3. **Virtual Simulation.** Virtual reality activities provide students with unique immersive experiences designed to provide quick and useful hands-on learning (e.g. Amar et al., 2006; Rutten et al. 2012).

Suggestions for longer time frames (multi-day simulations):

1. **Immersive Character Role Play.** Role-play simulations allow students to immerse themselves in a fictitious process or event and represent their role in the first person. These simulations often require multiple sessions to create a full immersive experience (e.g. Druckman & Ebner, 2008; Schnurr et al., 2013).

2. **Case Studies.** Complex case studies can be designed to span over multiple class periods, enabling students to apply problem-based learning in a context that replicates the timing of real–world realities. Case studies provide students with skills that revolve centrally around specific career development objectives and are designed to illustrate work-related issues or problems (Lateef, 2010; Cant & Cooper, 2010).

c. **Class Size.** Different simulation genres are more appropriately suited to different class sizes. For example, it is much easier to facilitate character-based discussion groups, debates, and clinical practice in smaller classes, whereas larger classes can cater nicely

to complex role-play activities, or virtual simulations that can be completed on a personal computer (i.e. games, science labs, or any downloadable modelled simulation).

d. **Level of Instruction.** Simulations designed for first and second year university students pose different challenges than those utilized in upper year or graduate classes, where students already have well-rounded research, writing and analytical skills that help simulations reach 'their full potential' (Lindquist et al., 2008). Designing simulations for first or second year students requires considering how much foundational knowledge is needed for this simulation to be a success. Consider veering towards simulation models that require less knowledge going into the simulations (e.g. see Baranowski, 2006 and Greene, 2008 for good examples).

3. DISCIPLINES

Health Sciences

Learning outcomes in the health sciences often aim to develop students' skills in teamwork and problem solving by incorporating realistic career-focused scenarios. This article discusses the design and integration of a collaborative simulation between students in Nursing and Medical programs. This multi-disciplinary approach to simulation learning is a strategic approach to expose students to real-world team scenarios and encourage collaborative learning experiences (Reese et al., 2010).

Natural Sciences

Many virtual simulations are available to provide students in the natural sciences with an equivalent of "hands-on" experience for lab experiments, instrument usage, and conceptualizing complex ideas or discoveries. These activities can be tailored to an individual course and can include background information, summary questions, and highlighted points throughout to provide context and support comprehension. These experiences can give students opportunities that cannot be obtained in a normal classroom. This article discusses the conceptual development of one example of technology that has been designed and integrated into astronomy education (Zhang et al., 2014).

Social Sciences

When conducting simulations in the humanities, the complexity and depth at which the activities are carried out is up to the discretion of the educator based on the desired learning outcomes. It is important to understand the purpose of simulation learning before you integrate it into your classroom. This article discusses the value of simulations from a context of learning outcomes and design for history and political science (McCarthy & Anderson, 2000).

4. RESOURCES

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