

SIMULATION AS A CLASSROOM TEACHING METHOD

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ABSTRACT

Simulation is an experiential instructional method that teachers create to imitate or replicate actual events, problems, procedures, or skills to achieve the desired instructional results. Students experience the situation and apply learned skills and knowledge, think critically, and gather meaning from the practice. Simulation as a teaching strategy aligns well with the principles of constructivist teaching and learning theory and can be designed for social and physical learning experiences to fit the needs of all learners. This paper supports and explores simulation through the cognitivist's belief that people learn in whole conditions, not by isolated incidences, and considers the human factor that may influence a given situation.

Keywords: Simulation, Teaching Method, Instruction, Constructivist, Student-centered, Social and Physical Learning Experiences.

INTRODUCTION

Simulation had its beginning about 1500 years ago in the game of chess. Two players attempted to simulate a battle between opposing forces. War games eventually developed from this early form of chess. Even though war games have long enjoyed popularity, it was not until the nineteen fifties and sixties that simulation began to be applied to other areas such as business and economics initially, with social sciences following a little later (Maidment and Bronstein, 1973). One would think that with such a long history of use with war games, simulation would have been applied to other disciplines much earlier. However, this method of teaching was not used in public school classrooms until the late 1950s. This was probably due to the long reign of the traditional "rote-memory" methods that persisted into modern times. The behaviorists did little to alleviate the situation by luring students into responding correctly to a given stimulus on the promise of a reward. In the early days of education, who cared if a student understood what he was learning or why?. The importance of an education was to condition a person to regurgitate information when called upon to do so. Fast forward to age

of wide-spread, high-stakes testing, and it would appear, that little has changed in terms of conditioning and regurgitation.

1. Purpose

What has changed more recently in public education is the goal to create meaningful learning experiences that result in long-term retention of knowledge and skills for all students. In addition to simulating historical events such as debates and mock trials, current technology has the potential to further change the way teachers simulate learning experiences across all disciplines, and when aligned with a constructivist approach, technology can closely simulate reality and to build rich classroom learning experiences (Hunter, 2015). In 1993, Cunningham, Duffy, and Knuth (1993) saw the potential of coupling a constructivist approach with the developing technology of the time:

The use of multimedia and virtual reality software allows teachers to create (or select) cases that have the feel of reality. The creation of online learning "adventures" (e.g., Second Life activities, web scavenger hunts, online simulations) make it possible to explore real-life learning

that is occurring in online environments.

Therefore, it could be argued that as a teaching method, simulation is perhaps best adapted to the cognitive school of psychology where social and physical learning experiences can be designed to fit the needs of all learners.

For practical purposes, simulation can be simply defined as an experiential instructional method that teachers create to imitate or replicate actual events, problems, procedures, or skills to achieve the desired instructional outcome (Sabus & Macauley, 2016). Students may be given a role to play or asked to complete a task in a simulated environment. In any case, the goal is for students to experience the situation from a realistic perspective, apply or practice new skills and knowledge, think critically, and gather meaning from the scenario. In this paper, simulation is both supported and explored through the cognitivist's belief that people learn in whole conditions, not by isolated incidences, and therefore, as a teaching method, simulation has the potential to further extend learning through the human factor where an individual's experiences and perspectives have the potential to influence a given situation or outcome in the classroom setting.

2. Review of the Literature

Exploring the many ways simulation can be used in the classroom, consider the perspective of international teachers of English language, Sharifi, Ghanizadeh, and Jahedizadeh (2017):

It [simulation] is the act of stimulating the behavior of a situation or a process by the use of a suitably analogous phenomenon. Simulation is a teaching technique in which the behavior is not controlled and participants can bring their own experience, knowledge, and skills to the situation and consequently enrich the learning process, change the academic setting to a real life situation, and provide an effective and efficient language learning experience. Simulation can also be considered as a problem-solving activity to which learners bring their own distinct opinions, feelings, and personalities.

Simulation gives educators the opportunity to create controlled circumstances that imitate life without some of

the real penalties to create more tangible learning experience for young students (Spurgeon, 1974).

Over time, various researchers have distinguished between different types of simulations. For example, Maidment and Bronstein (1973), classify simulation games according to their purpose or mode of operation. Hyland (2009) states that, "a simulation is a problem-driven event that occurs in a clearly described realistic situation" (p. 10). Maxson (1974), does not categorize different types of simulations, but instead says that simulation is, "one type of game that is not a technique for creating a comparative atmosphere for content mastery" (p. 48). Probably, Adams' categorization makes the clearest distinction between the differences. Adams (1973) divides simulation games into two types:

1. Those that concentrate on how humans function in the social environment.
2. Those that concentrate on how humans function in the physical environment.

The first type requires that students or groups of students interact with one another. Rules are based on the social reality that is being studied (i.e., in Legislature); students have to use persuasion tactics within the guidelines of what they have learned about government. They cannot bribe a fellow student with the promise to buy him ice cream later on. Whether a student is successful in obtaining what he sets out to depends on how he interacts with other players, negotiation skills, and other social factors. This kind of simulation seeks to have participants relate what they learn in school with how society will affect their decisions in the real world.

A good example of how simulation is applied to demonstrate the human factor in structured academic social situations can be seen within STEM fields as educators consistently seek innovative ways to teach ethics in science, technology, engineering, and math. State and national standards directly address ethics as they relate to the cultural, social, economic, and political effects of decision-making within STEM careers. According to Weidman and Coombs (2016),

...teaching ethics in STEM courses proves challenging because the focus is often on prescriptive ethics (what

should be done) versus the descriptive side (what is being done). Using a fun simulation ...can help students realize what decisions they are making and let them observe their own actions as well as the actions of others in a low-risk setting. It also allows STEM students to plan, adjust their plans to solve problems, and learn the importance of effective communication, which supports standards... (p. 14).

As a teaching method, simulation can be particularly powerful when used in social environments to build students' understanding of the role that ethics play in everyday life (Weidman & Coombs, 2016). Integrating structured simulations, students are required to apply and practice essential 21st century skills, such as negotiation and compromise, and collaboration and collective problem-solving. Students can also learn to respect differing points of view, practice taking different roles on a team, and learn to listen to other team members. Perhaps the most powerful aspect according to Weidman and Coombs (2016) is, "simulations allow teachers to make abstract ideas real" (p. 15).

Physical environment simulations are easier to develop (Sabus & Macauley, 2016). A student does not have to always interact with fellow students or function within a group. Rules are based on exact sciences and nature. A good example of this type of simulation is experimenting with various factors that influence the growth of a given plant. There are few variables in this kind of simulation, and the student's success depends largely on how the student applies what has been learned or observed in class.

Applicable examples of physical environment simulations are integral to aviation, military, health care, medical, and nursing training (Sabus & Macauley, 2016). In Physical Therapy, medical, and health care training, simulation has become an essential aspect of teaching, "driven by the increasing sensitivity and attention to inherent risk to patients posed by novice and inexperienced health care providers" (Sabus & Macauley, 2016, p. 3). Further, Sabus and Macauley (2016) show that, simulations in the physical environment are essential in providing students with a broad array of experiences not often possible in clinical settings:

Clinical education cannot be scripted to present the range of situations that prompt the safe execution of skills and decision-making that [for example] a Physical Therapist (PT) must possess. Simulation can introduce the high risk/low frequency clinical events or highly sensitive patient interactions that have low tolerance for error within a learning experience that does not impose risk to actual patients. Furthermore, simulation allows feedback and repetition of events to achieve mastery (p. 3).

Just as in clinical settings, middle and secondary educators can apply aspects of physical environment simulations through technology and other means to enrich learning experiences in the classroom that provide students opportunities for experiential learning.

In either the social or physical environment, teachers can "flip" lessons to introduce new material, associated academic language, and facts on the topic via an online platform; then, class time could be used to carry out simulations, games, and scenarios; after the simulation, discussion follows where students can relate the outcome of the simulation to the information provided (Brame, 2013). Simulation is a natural fit with many of the tools technology provides to the learning environment.

3. Implications

As with any teaching method, simulation has its proponents and critics. Among advantages pointed out by Sharifi, Ghanizadeh, Jahedizadeh, (2017) and other simulation supporters, mostly agree on the following:

- Simulation increases students' interest and motivation in the topic being studied.
- It makes the material more realistic and relevant when compared to the traditional approach to education.
- Students can experiment with ideas without having to worry about actual consequences. They receive immediate feedback so that they can change their course of action.

Other advantages that researchers such as Weidman and Coombs (2016) also support are:

- The teacher has a non-authoritarian role in the learning process.
- It can help build communication skills, persuasion, and

influence-resisting techniques.

- Teacher and/or participants control what they will deal with if they help design the simulation. This ensures that the simulation is meaningful to the students and relates to their level of development and environmental background.
- A decision making process develops from the decisions that the students have to make in the game and carries over to real life.

Critics commonly attack the very basis of simulation citing that, because the activities only imitate reality, it gives a distorted picture of what life is, and as a direct consequence, what students learn through games and activities may not carry over to real-life (Abrudan, Saveanu, & Saveanu, 2016). With games, winning strategies sometimes obscure other objects of the game, such as social interaction, relating classroom material to the real world, etc. In some cases, students may use dishonest practices, such as lying, back-scratching, and logrolling as in Legislature, and students may carry these practices over to real life. Finally, a game or activity can be designed or the rules can be interpreted so as to support a teacher's own prejudices, which leads back to the need for strategic incorporation of the role ethics play within simulations (Weidman & Coombs, 2016).

4. Summary

Whether one is for or against simulation as a teaching method, there are some disadvantages that educators should consider. Simulation activities and games are often very time consuming, and some are designed to take place over several class periods (Sharifi, Ghanizadeh & Jahedizadeh, 2017). A teacher pushed for time may not be able to spend several hours of class time enacting a game, flipping the classroom, or structured activity. One of the greatest drawbacks can be the cost. The initial investment can be more than a teacher can afford, and due to use, parts will have to be replaced. Researchers also agree that,

Simulation can be a highly effective instruction tool, but it is resource and time consuming. To realize positive, experiential learning through simulation, proven, evidence-based strategies can be tailored to the

...practice context. Simulation opens the door for rich learning experiences that have potential to achieve the highest quality, safe, and inter-professional practice... (Sabus and Macauley, 2016, p. 3).

One solution is for teachers to collectively contribute as a team to purchase games or materials needed for a simulation or request that it be included in the department budget (Sharifi, Ghanizadeh & Jahedizadeh, 2017). Another solution to this problem is for teachers to design a game or plan a teacher-created simulation, although abundant planning time is required. In the 1970s, the Foreign Policy Association established six guidelines for teachers to develop their own simulation activities and games:

1. Identify the goals to be achieved.
2. Construct a simplified model of the activity or game.
3. Identify the roles of individuals and groups who will be participants.
4. Set the conditions for the players/students being certain to set up specified guidelines regarding procedures, resources, personnel, etc.
5. Develop specific objectives or goals for the actors.
6. Set the limits and overall rules that will govern permissible behavior (Maxson, 1974).

Currently, similar guidelines have been established on a national level for teaching in various disciplines such as Nursing for example (Nel & Stellenberg, 2015). Simulation games and activities can be constructed with students' assistance and input (Abrudan, Saveanu, & Saveanu, 2016). The design aspect can provide an educational opportunity for all as well as the acting out or experiential part of the situation (Nel & Stellenberg, 2015). Games and activities do not have to be elaborate or involve technology; however, new technologies such as virtual reality can enhance the learning experience (Weidman & Coombs, 2016). Pencil-paper games can be easy to carry out and inexpensive. Adams (1973) has an entire chapter that lists and describes various commercially produced games and teacher-made, non-competitive games.

Conclusion

Simulation as an effective teaching method could work

well in a school system with block or flexible scheduling, as simulation offers unlimited possibilities for classroom application from “flipping” the classroom to virtual reality and replicated experiences. Simulation as a teaching method holds extraordinary potential for a fresh approach to teaching and learning and has the potential to provide deeper, more meaningful learning experiences that inspire, motivate, and prepare students for life.

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