

ONLINE ADVENTURES: Virtual Experiential Learning in Leadership Education

Abstract

COVID-19, by all accounts, forced higher education to shift to distance delivery. As a result, faculty attempted to innovate and integrate new teaching methods as courses moved online. We utilized an online, virtual reality game to teach team decision-making as a function of leadership. In teams, learners worked cooperatively, making decisions and solving progressive parts of a mystery to advance through an escape room activity. Following the activity, learners independently completed a structured written reflection designed to guide them through the experiential learning cycle. Additionally, learners' perceptions of the learning activity were measured using a short quantitative survey. Results were mixed, with learners indicating that the activity was engaging, but also suggesting that their team could have worked better in a less virtual immersive experience. Learners' written reflections indicated they successfully applied their knowledge of decision-making during the activity, along with other teamwork and leadership competencies. Recommendations include providing more time to complete the escape room game and incorporating more robust team debriefing to support reflection and learning transference. Virtual reality may provide effective leadership learning experiences, particularly for groups of learners who are geographically dispersed or participating in online education.

Keywords: experiential learning, virtual reality, team leadership, decision-making, online, escape room.

Issue Statement

The COVID-19 pandemic required educators to adopt and innovate teaching and learning strategies amenable to online delivery. During the Fall 2020 semester, all courses at the University of Florida, like most higher education institutions, were moved online. Despite the challenges presented by transitioning a project-based, formerly face-to-face course to strictly distance delivery, we continued to develop experiential activities for our learners to

practice leadership competencies. According to Alcañiz et al. (2018), leaders must possess or develop a set of diverse and complementary skills such as problem-solving, status-quo questioning, creativity, self-management, and team leadership among others, that are crucial for organizations. In our class, Communication and leadership in groups and teams, learners are expected to develop many of those crucial skills. One such skill is team decision-making. In order to facilitate experiential learning of team decision-making via distance

delivery, we integrated an online, virtual reality escape room game into our course.

Literature Review

Experiential Learning Theory. Experiential learning has a long history as an established theory of teaching and learning. Several frameworks can be helpful to leadership educators when conceptualizing the experiential learning process. Dewey (1938) noted that learners will use the various experiences of their lives as the building blocks of learning, whereby learning takes place when there is interaction between the learner and their environment. His model for experiential learning underscored the continuous nature of experiential learning, whose cycle included impulse, observation, acquisition, and judgment. This process was anchored in prior learning experiences and would aid learners in finding purpose. Kolb (1984) pointed out that experiential learning is more of a multi-sensory and holistic process with a great deal of emphasis placed on re-learning and its contributions to the learning process. Kolb's model (1984) comprised learner abilities that included concrete experience, reflective observation, abstract conceptualization, and active experimentation. Dale's work (1946; 1969) informed his Cone of Experience, which is an expression of his belief that experiential learning was a function of society's various media types ranging from the concrete to the abstract. The Cone of Experience includes direct experiences, contrived experiences, dramatic participation, demonstrations, field trips, exhibits, motion pictures, radio/recordings/still pictures, visual symbols, and verbal symbols. Finally, Roberts's Model of the Experiential Learning Process (2006) was developed in an effort to integrate elements of the preceding works on experiential learning. In effect, the model posits that learning begins with some type of initial focus that then precipitates an experience or experimentation. Reflection will then follow, leading to generalization, and the cycle will begin again. While all these models espouse principles relevant to educators in the 21st Century, an element that might not necessarily be an inherent manifestation of these models, likely as a result of when they were developed, is the relatively new and still developing tool: virtual reality. Fromm et al.

(2021) noted virtual reality has the potential to positively impact higher education, learning outcomes, and the learning process. From the framework of Kolb (1984) and through design thinking workshops with students and educators, they found that virtual reality can contribute to a holistic learning process. Nevertheless, there is still room to pose scholastic questions about the possibility of experiential learning occurring via virtual reality instructional tools and techniques (Kwon, 2019).

Virtual Reality Learning. Virtual reality (VR) has a growing place in a number of settings, particularly in the university classroom (Hodgson et al., 2019). VR can be broadly defined as "a real or simulated environment in which a perceiver experiences telepresence" (Steuer, 1992, p. 76). In general, VR utilizes screen-based technologies to create a 3D environment in a 2D space (Aebersold et al., 2020). VR can be categorized into simulations, games, and virtual worlds (Merchant et al., 2014). Simulations replicate a real-life situation or process in a digital format. Games are a special type of simulation in which learners must make decisions, act, and engage with elements that interact with and react to the learners' choices. Virtual worlds involve the illusion of being in the 3D space and interacting with 3D objects through use of an avatar. Virtual worlds are more open-ended environments, providing users the ability to create objects rather than just interact with existing objects. In their meta-analysis of studies employing games, simulations, and virtual worlds for teaching and learning, Merchant et al. (2014) reported statistically significant positive effects on student learning outcomes in 62% of the studies that used VR games. Furthermore, VR games were found to be more effective than simulations or virtual worlds (Merchant et al., 2014). Merchant et al. also conducted moderator analysis, coding the studies on 13 variables. Notably, their analysis revealed that game-based instruction was more effective when learners worked independently rather than collaboratively (Merchant et al., 2014). However, specific learning outcomes of the individual studies included in the meta-analysis were not reported, nor whether those outcomes were associated with effective collaboration or teamwork. Additionally, results indicated a negative relationship between learning gains and number of sessions

when using VR games (Merchant et al., 2014). Although Merchant et al.'s meta-analysis indicated that virtual reality-based instruction is effective, they advise using appropriate instructional design principles. This was re-emphasized by Jenkins and Pickett (2022), who added that "the question for educators is not whether to include virtual games in their curriculum, but rather, how" (p. 70).

VR and simulation games have an active history as instructional tools for leadership development in formal and nonformal settings (Alcañiz, 2018; Gordon et al., 2004; Lopes et al., 2013; Suárez et al., 2021). Banter, Egan, and Burton (2022) state that games are an "effective teaching strategy worthy of more consideration by leadership educators" (p. 12). Nevertheless, Jenkins and Pickett (2022) emphasize that they must be used intentionally and accompanied by intentional and purposefully planned reflection and debriefing to draw out the learning. To that end, not all virtual games are effective for leadership learning. For example, Lopes et al. (2013) evaluated business games used in leadership development and found that the games lacked a connection to leadership theory. Further, they noted that studies they reviewed did not provide evidence of change in participant behavior or skills (Lopes et al., 2013). Alternatively, Hickman and Akdere (2018) asserted that VR can provide safe, immersive leadership-learning environments students could not otherwise experience and that could not be replicated in a traditional classroom, specifically when developing intercultural leadership competence. Other literature indicates that gamification has been used to develop leadership skills such as promoting flow, communication, collaboration, relationship building, and decision-making among others (Badibanga, & Ohlson, 2021; Lee et al., 2018; Suárez et al., 2021; Zoroja et al., 2019). We incorporated VR gaming in our course so learners could practice team decision-making as a function of leadership in teams.

Description of the Application

Communication and leadership in groups and teams is an undergraduate course taught at the University

of Florida. The course utilizes experiential learning to teach effective team processes including leadership, communication, team development, problem-solving, decision-making, conflict management, evaluation, and others. Learners are assigned to teams for the duration of the semester and must successfully apply competencies learned in the course to develop and complete a team project. In addition, teams engage in shorter duration learning experiences, called leadership labs, throughout the semester. These labs are in-class activities designed to highlight a specific competency or skill and give learners an opportunity to apply their knowledge or practice a behavior. During Fall 2020, one leadership lab utilized an online escape room game in which learners practiced team decision-making.

TEG Unlocked is an online, virtual reality escape room activity (The Escape Game, 2020). Escape rooms are "live-action team-based games where players discover clues, solve puzzles, and accomplish tasks in one or more rooms in order to accomplish a specific goal (usually escaping from the room) in a limited amount of time" (Nicholson, 2015, p. 1). Escape room games provide learners the opportunity to work in small groups and prove their content knowledge on team-based competencies (Odom & Cantrell, 2022). Specifically, Odom and Cantrell (2022) recommended that escape room games be used to develop team leadership competencies. Rather than escaping from a physical room, TEG Unlocked provides a virtual reality experience in which players work together to decipher a series of clues, decide on solutions, act, and advance from one stage to the next to solve a fictional mystery. TEG Unlocked currently provides three different mystery scenarios designed to engage 1-4 players. The TEG Unlocked virtual reality games are self-paced, have no time limit, and can be played multiple times. Although only one person can be logged into the game at a time, geographically dispersed teams can play when the 'host' uses video conferencing to share their screen with multiple players simultaneously.

We assigned learners to teams during the fourth week of the 15-week semester. Twenty-seven students were organized into three teams of four and three teams of five. The decision-making lesson was taught during week nine of the semester, at which point teams had been working together on various

tasks and assignments for five weeks. The decision-making lesson learning objectives included: compare and contrast individual and group decision-making; analyze decision-making approaches; describe common decision-making problems and mistakes; and apply group decision making techniques. An initial 50-minute lecture and discussion-based lesson addressed the first three learning objectives. During the following class session, learners applied their knowledge by practicing team decision-making in the online escape room game.

Two teaching assistants and the primary instructor of the course facilitated the learning activity, with each overseeing the exercise for two teams. Each team had 45 minutes to complete as much of the TEG Unlocked escape room game as they could. The game time was restricted due to having a single one hour and 55-minute class period during which to facilitate the activity for all six teams. The teams convened on Zoom with their designated facilitator (the instructor or teaching assistant) at their assigned time. The facilitator logged into the game, then shared their screen and granted one team member remote access control to lead their team through the game. From that point on, the facilitator observed the teams, providing no additional instruction.

The games provide an interactive interface where players must view and interpret videos, documents, and other 'artifacts' to solve progressive components of the mystery. At the end of the assigned time, the facilitator conducted a short team debrief to conclude the experience and promote reflection and generalization. The facilitator prompted learners to consider the following questions; How did your team make decisions during this activity? What were some challenges you faced as a team? In what ways did your team work well together? How can we use our decision-making process in our lives professionally/personally?

Following the escape room experience, learners individually completed a structured written assignment designed to guide them through the remaining phases of the experiential learning cycle, namely reflection on the learning, and generalization or transference to other contexts (Roberts, 2006). The purpose of guided reflection is to ensure the

experience is educative by challenging learners to think critically about the learning experience, analyze and explain the meaning and/or what was learned, and consider how understanding can be transferred to other situations or contexts. The critical reflection model guides learners through questions of "what", "so what", and "now what." First, learners objectively describe the learning experience. Next, learners expand on what they learned from the experience and how the concepts "came to life" during the activity. Finally, learners postulate about how they can apply their learning in the future, transferring the content into a real-life context. Learners were directed to focus specifically on the team decision-making aspects of the virtual escape room learning experience. In addition to the guided written reflection, learners were also asked to complete a post-activity survey that assessed their perceptions of the learning experience on ten Likert-type questions. The five-point scale ranged from "1" indicating strongly disagree, to "5" indicating strongly agree. We analyzed the written reflections as well as the survey data to better understand learners' perceptions of the activity and their application of learning.

Discussion of Outcomes and Implications

It is important to note that the following outcomes are those of learners in one course section who engaged in a 45-minute session of the virtual reality escape room. All six teams engaged in a TEG Unlocked escape room game experience. Each team was observed by a facilitator, either a TA or the primary instructor. All teams were able to complete multiple puzzles and advance through stages of the game; however, no teams completed the game and solved the mystery in the time they were allotted. In accordance with University IRB protocol, we sought learners' consent to analyze the data produced as a result of their participation in the class activity. Twenty-one participants consented to their data being analyzed. Although written reflections are a required component of learning lab activities in the course, only 17 learners submitted the structured written assignment. This is not particularly unusual, as learners engage in at least five learning lab activities over the course of the semester, but only

have to complete a written reflection for four of their choice. Nine learners completed the optional post-activity survey.

Perceptions reported on the post-activity survey were mixed. A majority of respondents indicated they were comfortable interacting with their team ($n = 8$, $m = 4.1$). This was expected since they had been designated as teams and started working together five weeks prior. Two-thirds felt the virtual experience was engaging ($n = 6$, $m = 3.9$), and the activity helped them live out the experience of decision-making ($n = 6$, $m = 3.6$). We found this encouraging, as our intent was to provide an engaging experience in which learners could apply their team decision-making knowledge.

Fewer than half of the respondents ($n = 4$) agreed that the experience reflected a realistic practical experience ($m = 3.3$), which might be due to the unrealistic nature of being a “secret agent” solving a mystery. Additionally, four respondents believed the activity allowed for every team member to participate ($m = 3.1$). This could have been due to the nature of screen sharing and only one teammate being able to control the game. Finally, eight of the nine respondents felt their team could have worked better in a less virtual immersive experience ($m = 4.4$). This was interesting, considering the whole course experience was limited to virtual interaction.

We further evaluated the virtual escape room activity through learners’ written reflections using deductive coding procedures (Saldaña, 2021). This structured process enabled us to better understand the decision-making approaches learners applied in their teams. The papers provided insight on if and how learners were able to relate the course content to their experiences in the virtual reality activity and apply it to their lives in the future. In addition, the learners’ writings provided an opportunity to analyze individual interpretations of their team’s decision-making beyond the short, verbal team debrief facilitated at the end of the activity.

Three decision-making approaches were taught in class: consultative approach, democratic approach, and consensus approach. Subsequently, these approaches allowed us to identify themes in the reflections and categorize them accordingly. Encouragingly, learners connected the

decision-making concepts taught to their TEG Unlocked experience, and derived meaning through application of the concepts.

Across the written reflections, applications of all three approaches were described. While some learners described their team’s application of only one of the approaches, other learners indicated a combination of approaches was employed. Three learners felt their team utilized a democratic approach. One learner said, “The democratic approach was an effective group technique that allowed team members to contribute and give suggestions on what we should do next while ultimately going with what most people thought.” Another three learners described their team’s consensus approach. One learner shared that their team came to “quick agreement” but speculated that had their team “struggled with deciding what to do, we would have turned to a more democratic approach.” Five learners described their team using a consultative approach. “We took the consultative approach by assigning [teammate] to be the person that [facilitator] gave screen control over” explained one respondent, who went on to say that the assigned team leader “decided what pages of the simulation to go through” and then “looked to us to consult with about the contents on the page before making a decision.” Surprisingly, five learners did not provide an overt reference to the approach they felt their team used, but simply described the process. This may be the result of their team decision-making process not fitting clearly into one of the approaches taught, and the learner therefore being unsure how to categorize it.

Learners also transferred the decision-making concepts to their class project. One learner shared “...while working on our project...the approach is typically a consensus way of group decision making.” Another learner said “Our team used both the consultative and consensus approaches for decision making. We relied on certain people for some areas of the project and generally agreed on the other areas.”

It should be noted that the written reflections are those of the individual, even though the activity was undertaken as a team. As such, we recognize that learners’ perceptions of the application of the three approaches might have differed between members

of the same team. However, the purpose of reviewing the participants' reflections was not to validate the correctness of each individual's interpretation of their team decision-making process; rather, it was to understand if and how learners applied the lesson content to the experiential activity and, subsequently, transferred it to a different context.

In addition to decision-making approaches, learners noted other concepts from the lecture-based lesson. Four learners explicitly listed the criteria considered in selecting the approach of decision-making: speed, quality, and acceptance. "This approach got the most team participation (acceptance and quality)" wrote one learner, "but I do not think this approach was effective in a time-dependent situation (slow speed)." Five learners specifically mentioned the Nominal Group, Ringi, and Delphi decision-making techniques. Learners then expanded on how they would apply these concepts in future leadership roles. Moreover, seven learners explicitly noted that the concepts of "open communication" and "collaboration" used during the decision-making process in the virtual simulation game could be applied in professional and personal settings. Only one learner viewed the concepts of decision-making to be absent from outside of the classroom application, simply suggesting that the activity facilitated the concepts of the course and class project well.

Overall, we believe the VR escape room games helped us facilitate experiential learning in team decision-making. Particularly in a situation where face-to-face interaction was restricted, the VR experience allowed learners to interact in real-time, making decisions as a team in pursuit of a real, common goal. Specifically, the TEG Unlocked games were easy to access, affordable, and utilized a user-friendly interface. The nature of escape room games requires that decisions be made, thus, the TEG Unlocked games provided a decision-making experience our learners could reflect on and generalize from. While we integrated this activity into a formal class on teamwork and leadership, TEG Unlocked could be used in other formal and non-formal leadership education to teach or reinforce leadership competencies in addition to decision-making. An alternative application could be in utilizing TEG Unlocked to aid in team formation by

providing a low-stakes activity in which team members can engage with one another and get to know each other, particularly teams that are geographically dispersed. Moreover, an instructor or facilitator could incorporate their own restrictions, parameters, or instructional foci to direct learners toward the desired learning outcomes.

As the need and desire for distance-delivered instruction increases, VR has the potential to provide engaging leadership learning opportunities. We integrated a VR game to teach decision-making, but the applicability of VR for learning is nearly limitless, given the breadth of possibilities in design, content, and context. VR provides educators the ability to place learners in situations they otherwise could not recreate or provide safely in the classroom (Hickman & Akdere, 2018). Moreover, VR can be used with different types of learners for formal and nonformal instruction.

VR is not, however, a panacea. There were some challenges with our activity, including the time restriction and the limitation of one team member controlling navigation of the game. The goal of an escape room is completion within a specified time frame. This time pressure could cause learners to engage in the quickest decision-making process rather than the process that results in the best decisions. Power imbalances and shifts in group dynamics can result from game navigation control being restricted to one team member. This is illustrated by one of the respondents who described their team's consultation approach in which the team member with screen control made and acted on their individual decisions, only consulting with the group when they deemed it necessary. While these may be considered barriers to learning, it could also be argued that working in teams presents similar challenges of time pressure and power imbalances. Thus, perhaps the activity shortcomings provide opportunity for additional relevant learning. It should also be noted that the written reflection of the learning activity was submitted for a grade, which could have impacted learner responses. However, this is one of several learning activities after which learners submit a written reflection. Each assignment encourages them to reflect honestly. Feedback provided by the instructor centers on connections learners make between the content and the activity as well as how they transfer the learning

to other contexts. Nonetheless, learners may feel compelled to write what they believe the instructor wants to read. Practitioners should consider additional factors that may affect learning outcomes. These might include but are not limited to, technology availability, learners' knowledge and experience with technology and VR simulation or simulation games, team composition, size, and stage of development, among others.

Recommendations

As a result of our experience, we recommend considering VR simulation games to facilitate experiential learning for teams, especially in distance or hy-flex courses. We found the activity provided an opportunity for team members to interact in real-time and practice learned leadership competencies. Although we focused learners' attention on team decision-making, other knowledge and skills would certainly be relevant leadership learning topics for such an experience, including problem-solving, collaboration, communication, conflict management, and others.

We also recognize improvements that could enhance the learning activity. First, teams should be given enough time to complete the entire game. This could give learners an additional point of reflection to consider the effectiveness of their team's decision-making. It could also provide teams the opportunity to engage in multiple decision-making processes or processes that result in better decisions. Second, more time should be taken to debrief the activity to extract as much relevant learning as possible. The narrow focus of our structured, written reflection did not provide ample opportunity for learners to consider additional leadership competencies. A robust team debrief would allow the instructor to probe and challenge learners' perceptions of their experience as well as their transference of learning to other contexts. Moreover, it would allow the instructor to verify if learners' identification of decision-making approaches was accurate. Next, the activity was facilitated by allowing one team member remote control of the facilitator's computer and sharing screen through a video-conferencing application. This presented technical challenges navigating

screens and accessing information throughout the game. Moreover, it potentially impacted group dynamics by creating a power imbalance among team members. We recommend teams be allowed to log directly into the game either with their own code or a generic login provided by the instructor. Additionally, requiring each team member to control navigation at a different stage of the game could help alleviate power imbalances. Finally, although it is a simulation designed to make players feel as though they are 'in' the game, the TEG Unlocked games are not realistic in the sense that players are solving puzzles and riddles to advance through the game rather than navigating real-life scenarios in which they must make high quality decisions as a team. Thus, a more appropriate competency to have learners focus on may have been team problem-solving. Alternatively, a different, more realistic game may provide a more salient experience for learners to practice authentic team decision-making.


In addition to our recommendations for implementing the TEG Unlocked escape room games, we encourage rigorous research to further explore the efficacy of using VR games to teach leadership. Research should continue to investigate achievement of learning objectives through instruction integrating VR games.

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