

Building Real Teams with Virtual Reality

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Goals and Objectives:

1. Discuss ways to integrate technology into teaching teamwork
2. Describe the evidence that supports the use of immersive technology to assess teamwork milestones (SBP1, ICS1) and EPA9: Collaborate as a Member of an Interprofessional Team.
3. Describe successful implementations of using virtual reality to teach teamwork.

Evidence is mounting that the traditional lecture format leaves participants disengaged. Innovators in medical education have been coming up with ways to freshen up the resident conference curriculum and medical student clerkships. Previously described opportunities to liven up the curriculum include [flipping the classroom](#) to provide interactive in-person sessions, integrating simulation into formative and summative activities, and implementing gamification such as using [Kahoot quizzes](#). Virtual reality (VR) is an emerging technology that has profound opportunities to provide exciting and engaging teaching for medical students and residents. In this session we will outline an approach to implement virtual reality technology and provide examples of how to use this technology **to successfully teach communication and teamwork**.

Communication and Teamwork are important aspects of being an effective physician. These have been defined in the ACGME milestones and the undergraduate entrustable professional activities (EPAs).

[SBP1 Patient Safety](#), Level 4 - Leads **team reflection** such as code debriefings, root cause analysis, or M&M to improve ED performance. Identifies situations when the breakdown in **teamwork or communication** may contribute to medical error

[EPA 9](#) - Collaborate as a member of an interprofessional team

- Identify team members' roles and the responsibilities associated with each role.
- Establish and maintain a climate of mutual respect, dignity, integrity, and trust.
- **Communicate** with respect for and appreciation of team members and include them in all relevant information exchange.
- Use attentive listening skills when communicating with team members.
- Adjust communication content and style to align with team-member communication needs.
- Understand one's own roles and personal limits as an individual provider and seek help from the other members of the team to optimize health care delivery.

- Help team members in need.
- Prioritize team needs over personal needs in order to optimize delivery of care

As you can see from the milestones, effective communication and teamwork is an advanced skill for a resident trainee. These topics can be difficult to teach in traditional settings, because giving a lecture on communication and teamwork can be less effective than more engaging activities. This is one reason that simulation is commonly used to address this higher-level content. Using virtual reality is not only a fun way to approach this content, but has unique technological advantages to get at the key tenets of communication, collaboration, and cooperation.

Before deciding to implement any of the following examples, we recommend first carefully considering your educational objectives for the session. Once you have decided exactly what you would like to accomplish, then decide which technology solution is best to reach your educational goals. It can be more difficult to work backwards - starting with a specific VR game and then deciding exactly how to cram it into the curriculum.

Using VR to take another's perspective

One of the unique aspects of VR technology is that it completely immerses the learner in a digital experience. This can be useful if the goal is to provide the participant with a different perspective. Here are two examples of how this could be implemented

360° video - It is possible to capture an immersive video scene that can be watched later in a VR headset to allow users to see others' perspective. One application of this technology is to record in situ simulation. This type of simulation is performed in the actual clinical environment, but with a simulation or standardized patient (actor) instead of a real patient. This allows for a more realistic simulation scenario as the entire emergency department team is there using the real-life clinical supplies. We recommend using at least two 360° cameras, one to record the session from the perspective of the team leader and the other to record the perspective of the nurse or other team members. Then, in the debrief session the team leader can watch the simulation from the experience of the other providers. This can allow them a unique perspective on their own communication and teamwork skills during the assessment.

Embodied Labs - This company takes VR simulation and flips the script. Instead of having students play the doctor and treat patients, now the student plays the patient. Because of the unique abilities of VR, then learners can have a sensory experience that mimics the patient experience. This currently is a subscription-based platform that has three cases -- macular degeneration, Alzheimer's, end-of-life discussions -- that insert

the user into an immersive VR environment where they are the patient and are interacting with a scenario. These types of cases can be used in conjunction with OSCE or clinical skills exams and may have a larger role in undergraduate medical education beyond just teaching history and exam skills.

Gamification for Communication and Teamwork

Who would object to playing video games during resident conference? There are many cooperative VR games that could spark a great learning activity for communication and teamwork. Here are a few examples:

[Keep Talking and Nobody Explodes](#) - in this game, the student wearing the VR headset can see bomb that requires completion of puzzles to defuse. The other team members have a manual that describes how to solve each puzzle. The catch is that only the person wearing the VR headset can view the bomb, so the entire team has to communicate effectively to defuse the bomb.

[Diner Duo](#) - The chef plays in VR and cooks the food while the waiter plays on the computer. The waiter takes orders from customers, serves them drinks and keeps the customers happy while they're waiting for their food. The goal is to work together to cook the food in a limited amount of time.

[Star Trek Bridge Crew](#) - In this game, the team works together to play the game. It is multiplayer across platform, which means that not everyone is required to use a VR headset.

Simulation

Simulation is certainly one of the major applications of VR technology in medical education. These specific platforms also offer the ability for multi-player and collaboration.

[Arcadius](#) - This software allows for simulation case design without the need to know how to program. It also allows for asynchronous teams;

[SimX](#) - This major platform for VR simulation also allows for multiplayer VR Sim, and can allow for team members to collaborate remotely.

VR platforms for collaboration

Virtual reality offers a unique way to work with others in a way that is more immersive and interactive than a video conference. Also, it can allow manipulation of 3D designs in the virtual environment. Here are some examples of how this technology has been used to provide an advanced collaboration platform.

[Helicopter design](#) using VR collaborator - designed in six months.

[Remote collaborations](#) - HoloLens avatar, can remotely stand around a 3D model for collaboration. This is a mixed reality/augmented reality application.

There are many benefits of virtual reality including the sense of immersion, lack of distraction from other tech like cell phones. Also, the novelty and immersion can catalyze group cohesion for an engaging session.

However, there are many potential pitfalls. The main potential problem is trying to implement the activity without considering how the technology addresses education objectives. The initial consideration should be the educational objectives, and then design the intervention to meet these objectives. It can be problematic to start in reverse - starting with the technological intervention and not fully considering how it meets core objectives. It is also important to consider other logistics of running a new technology, as these issues can really destroy the flow of a teaching session. Expect to spend a significant amount of time in preparation for any sort of technology implementation. Also, make sure to test out the activity ahead of time, and ideally in the setting you plan to use to identify tech problems such as internet connectivity issues. And always have a contingency plan for the activity if the technology completely fails.

Have you been bitten by the VR bug yet? If you want to run with this ideas and implement them at your shop, see our [VR Toolkit](#) for more information on the nuts and bolts of setting up a VR lab.

VR in Communication References

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