Is Technology in the Physical Therapy Classroom a Fad or an Asset?

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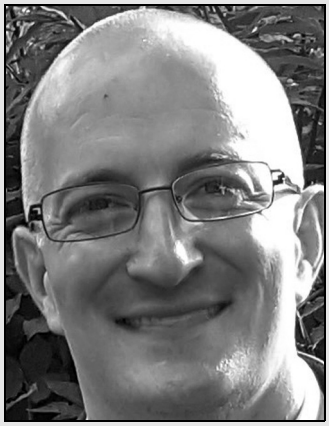
Richard Clark is a pioneer in the field of educational research. In his 1983 paper, Clark stated that the use of technology is a *mere vehicle* in the education process. Clark demonstrated that no learning is gained from employing any specific media to deliver instruction. He noted that curriculum reform is likely the cause for student improvement rather than a change in the delivery of instruction. The root of his argument is that the substance of information trumps delivery. Physical therapy education is unique as in addition to the classroom dynamic, the laboratory component is equally as important as the classroom dynamic. These technological advancements will ensure that students will enter the clinical arena with an appropriate understanding of this technology.



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Several arguments support Clark's claim that technology is a vehicle for information delivery. Differences in technology will not directly influence the student's performance, but rather, the information itself. Clark argues that the effect of media essentially disappears when the same instructor utilizes a variety of technologies (Kulik et al., 1980), which means that students' performance may be the same regardless of the technology modality that was chosen. Also, Clark argues that study design is lacking in the majority of education research studies that support the use of technology. According to Mielke (1968), technology must be the only variable in studies that examine differences in technology. Different instructional designs or different instructors may provide a variety of content. The reader is unable to ascertain which intervention caused an improvement in student performance. Therefore, either the technology or

instructional design is the cause of improvement in student performance.

Physical therapy education also is challenged in the implementation of technology. A major hurdle to the effective implementation of technology in a physical therapy program can be the instructors themselves. Faculty experience has demonstrated both internal and external barriers that affect technology integration efforts (Donlan, 2018). Face-to-face and judicious technology integration is perceived as crucial to program integrity. Teaching experience may also contribute to a resistance to technology. Newer teachers will be more likely to introduce technology as a younger generation is more acclimated to technology itself (Aydin, 2016). Teachers with much more experience will likely be more resistant to technology implementation as it causes an increased learning curve for the teacher (Aydin, 2016). On a more macroscopic scale, Jensen et al. (2016) found that although basic science research and clinical research in physical therapy have expanded through growth in the numbers of funded physical therapist researchers, the profession still lacks a robust and vibrant community of education researchers. A growing body of evidence suggests that technology is beneficial in a physical therapy education setting because of improved collaboration between students, increased variety of materials, and asynchronous approaches that may be more advantageous for students when technology is used to deliver instruction.

Nontraditional students currently comprise approximately 40% of undergraduates in American colleges and universities (Hittepole, 2019). These are students who do not traditionally matriculate to college directly from high school. One of the largest hurdles for this type of student to overcome is schedule conflicts. One scenario that would support an increased usage of technology is schools that are located in rural settings. Technology will allow a university to employ different teaching methods that may not be available in a face-to-face environment. Cronin (2018) suggested that one way that technology can benefit rural schools are the possible collaboration opportunities they can provide. Technology will allow schools to promote interaction between professionals that are limited by distance constraints. Schools may be limited by the physical materials and equipment within their programs. If a certain type of technology is not directly available, students will not be able to utilize it. With the implementation of a wider array of technology, students will be able to interact with instructors over a great distance and utilize the instructor's expertise. Not only can instructor presence increase, but students will be able to interact with patients more directly.

Augmented reality is a technology that takes anatomical structures and superimposes them over a body in motion. This type of technology is extremely beneficial as it allows students to directly visualize the muscle system in motion. Which will directly enhance the dynamic understanding of muscle as current education models only utilize cadaveric dissection. The literature suggests that augmented reality promotes the creation of an engaging teaching and learning experience and the facilitation of communication between teachers and students (Kelly et al., 2018). A secondary approach to enhancing students' understanding of anatomy has been achieved with the usage of real-time ultrasound imaging. Diagnostic ultrasound has been established to be effective in the identification and evaluation of the musculoskeletal system (Mohammadrezaei, 2017). Physical therapy students can struggle with palpation accuracy when initially learning this skill. Ultrasound has been shown that during laboratory teaching improvements were demonstrated with students' learning and accuracy in palpation of knee ligaments. Ultrasound provides immediate feedback to students in

their skill development as well as their accuracy in palpation (Day et al., 2018). Without the use of ultrasound, this feedback would be impossible. As students progress through their classroom education, their instructors can provide a wealth of information regarding treatment patterns and interventions.

Knight et al. (2015) proposed that the utilization of social media could innovate the way physical therapists engage patients in rehabilitation and health promotion practices, thus contributing to the evolution of the profession. Social media will allow a therapist to reach a wider number of people who may be geographically limited by not only availability, but access to information. Directly being able to access specific physical therapy information will assist the population to make informed decisions. The majority of students currently in a physical therapy program have at one time or another engaged in social media. This platform is familiar to them, and engagement with patients will not require a steep learning curve. Clark's viewpoints are thoroughly supported by the literature. However, the amount of evidence supporting the use of technology is more convincing. Clark's original paper was published in 1983, and research has progressed since that time. His thoughts may be more applicable to a traditional, liberal arts style education, but technology greatly enhances healthcare education. Regardless of whether the reader supports or disagrees with Clark's assertions, it cannot be argued that the information included in a presentation must be sound. A presentation can have the best graphics and transitions and visually appear stunning, but when the quality of the information is lacking, how beneficial can the presentation itself be?

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