

# The Impact of Media on Learning

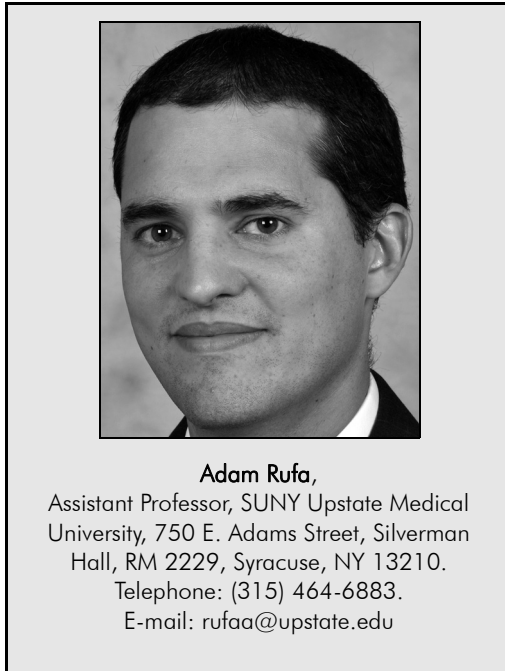
## A Perspective for Physical Therapists

Adam Rufa

### INTRODUCTION

**M**edia is defined by Merriam-Webster as “a medium of cultivation, conveyance, or expression” (Merriam-Webster, n.d.) Various types of media have been used in education and learning from the start of human history. The first types of media likely consisted of primitive drawings, hand gestures and models (Media (communication), 2016). As our culture and technology have progressed, the media used for instruction has become more sophisticated and com-

plex. In today’s educational environment, instructional media often refers to various digital tools such as images, sounds, videos and text (Adeniregun, n.d.). Over the long history of research into the use of media in education, authors have been attempting to prove that learning can be bolstered by the use of educational media (Clark, 1983). This white paper will explore the arguments and evidence, for and against the notion that educational media can enhance learning. This white paper is targeting physical therapy professionals who are either in clinical practice or in an academic setting.



### MEDIA AND LEARNING

Since at least the 1960s there has been a debate about the learning effects of media (Clark, 1983). Some educators and researchers have argued that media have a direct impact on learning, while others have suggested that media are simply a delivery method for material and do not enhance the learning effect. Richard Clark had a large impact on this debate when he published a paper in 1983 titled “Reconsidering Research on Learning From Media” (Clark, 1983). In this paper he compared media to a grocery delivery truck. He contends that media increases learning to the same extent that the truck increases the nutritional value of the groceries inside.

To determine the validity of Clark’s position, it is essential to take a close look

at the literature examining the effects of media. Studies that provide insight into this question need to have tight controls on instructional design. If different arms of a study have variations in both instructional design components and the type of media used, it is impossible to determine what caused any differences in learning. In his 1983 article, Clark cited several studies that found that learning was not impacted by media if the same instructor delivered the content. Studies which did show changes in learning across various media tools either did not adequately control for instructional design or did not control for the novelty of the media used.

Decades have passed since Clark's original article in 1983 and researchers have continued to examine the impact of media on learning. In fact, the literature is so extensive that authors are producing meta-analyses of meta-analyses. An example of such a study is one performed by Tamim and colleagues (Tamim, 2011). This second-order meta-analysis covered 40 years of studies and included 25 meta-analyses, which included 1,055 individual studies and more than 100,000 subjects. This meta-analysis included studies which compared instruction using computers versus instruction devoid of technology. The study reported a small positive result in favor of computer based instruction. Despite this finding, the authors felt that the large variability in effect sizes suggested that confounding factors may have played a role. As a result, they concluded that the findings of their study supported Clark's mere vehicles argument. Clark's ideas were further supported by Higgins, Xiao, and Katsipataki (2012), who stated that the evidence on media suggests that it is the "how rather than the what" that is the key element to learning.

In contrast to the views of Clark, Robert Kozma argues that media can have a direct effect on learning (Kozma, 1991). Kozma suggested a model that describes an active collaboration between learning and the

media. He described an interaction between the learner and the media tool, which facilitates both cognitive processes and mental representations of information. Kozma also stressed that for effective learning, the media need to be paired with pedagogy, which leverages the capabilities of the technology. Daniel Schneider agrees with Kozma and feels that the "affordances" of media can have a direct impact on learning. He argues that learners commonly pick a particular technology that has attributes which impact learning (The media debate, 2012). These arguments proposed by Kozma and Schneider are intriguing; however, they are not supported by evidence that strictly controls for differences in instructional design, the novelty effect of media, and other media attributes that are not unique to a given technology.

Despite the disagreement between the positions of Clark and Kozma, there does seem to be some common ground. Both authors stress that proper educational design is essential for learning regardless of the media used. Clark, however, focuses on studies that control for the attributes of the technology and he concludes that learning is not enhanced. Kozma focuses on evidence that includes the attributes. This discrepancy is similar to comparing well controlled bench research to messier, less controlled clinical research. In essence, Clark and Kozma are arguing different points. Kozma focuses on media's ability to impact the how, when, where, and what of learning, where Clark focuses on the direct impact media have on retention of information (Brown, n.d.).

## **RELEVANCE TO PHYSICAL THERAPISTS**

Physical therapists' use of media to communicate with patients has been increasing over the past decade (Hepp, 2013). This technology-facilitated communication can utilize basic tools, such as telephones and e-mail, or it can be more sophisticated and

include video and other telehealth technology. Recent evidence has shown that media facilitated education can be a useful tool for physical therapists and their patients (Cottrell, Galea, O'Leary, Hill, & Russell, 2016). For example, one study showed that asynchronous education delivered to patients in their homes can assist in rehabilitation after a knee replacement (Bini & Mahajan, 2016). Another study found that video-based telehealth services resulted in improved quality of life and increased function while saving participants over 2,000 miles of travel (46 hours) and reducing travel costs by an average of \$1,326 (Levy, Silverman, Jia, Geiss, & Omura, 2015). The evidence provided in this white paper, however, reminds physical therapists that educational media are tools that can be used to deliver material. To ensure learning, physical therapists need to start with sound pedagogy that maximizes learning. The media can then be used to improve the learning experience by providing advantages such as lower cost and improved access. It is important, however, that physical therapists do not focus on technology at the expense of pedagogy.


## CONCLUSION

Media have been used to convey information and impact learning since the beginning of human history. Over the years, instructional technology has become much more sophisticated and integral to education. Despite these changes in technology, the evidence has not supported a direct effect on learning. Instead, technology acts as a delivery vessel which can provide practical advantages such as reduced cost and improved access. Physical therapists who utilize media in practice should focus on sound instructional design to enhance learning, and technology should be viewed as a tool that can assist in overcoming practical constraints to learning.

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