

The Educational Debate Continues

Old Fashion Education Versus New Fangled Technology

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Technology unequivocally has the potential to influence every aspect of our lives as it is intimately involved in every part of our daily routines. From the most mundane task of vacuuming the floor (iRobot vacuum) to brain surgery (ROSA—robotic operating surgical assistant), technology is being developed and utilized. For the most part, the invasion of these technologies is seen as having a positive impact allowing for successful completion of a task with expediency, effi-

ciency, and with increased precision. However, realms of our daily lives continue to be debated as to the influence that technology plays. The role of technology in education and the impact of technology, specifically media, influences learning is a provocative topic. Incongruous views of media's impact on learning range from those that view educational technology media as "mere vehicle(s)" which deliver information to the passive consumer to those proponents who view advanced technology media as creating an environment in which the learner is driving, physically and literally, the vehicle, playing an active role in the learning process. The key to navigating this pedagogy minefield requires critical review of questions asked in the past with a keen eye to not necessarily deciding the one right answer, but rather appreciate where we have been to route a new path to our future.

Richard Clark (1983) coined the mere vehicle debate in his 1983 paper in which he posited that pedagogy (teach practice) and not the medium (technological tools, electronic media) influenced learning (De Bruyckere et al., 2016). In this initial paper, Clark provided a thorough review of the published research. He concluded there was little empirical evidence to support one media tool over another, concluding that it was the method, not the media that impacted learning. In 1991 and then again



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in 1994, Robert Kozma offers a rebuttal to Clark's position, asserting that certain media's unique attributes can affect both learning and motivation. Kozma reasoned that "if there is no relationship between media and learning it may be because we have not made (one)" (Kozma, 1984). Kozma advocated that it was the interaction between the learner and the media tool, the active collaboration with the media to construct knowledge that influenced learning (Kozma, 1991; Kozma, 1994). Thus, he was not directly refuting Clark's claim, but instead extending the vision of media's impact to include instructional design and media type. Kozma provided evidence to demonstrate that the pairing of necessary media attributes with instructional design did have an impact on learning (Kozma, 1984).

Although these two pedagogical patriarchs may be in complete disagreement, they are answering slightly different questions. This agreement is evident in Clark's 1994 response to the latter publication by Kozma conceding that "certain media and attributes are more efficient for certain learners, learning goals and task" (Clark, 1994). However, he goes on to stress that media is not required for learning to occur (Clark, 1994). Thus, it could be inferred that both Clark and Kozma would agree that technological media has a place in the educational landscape. That place is in the hands of a teacher, to be used as a tool to facilitate learning. Indeed, knowledge is not gained because of a particular media application as posited by Clark but rather the result of a student's interaction with content that is accurately represented and organized in such a fashion as to promote learning as posited by Kozma (Shrock et al., 1994). Instructional design is the key to optimize learning, which is tailored to the subject matter, the environment (live versus virtual, classroom versus thatched shack in Africa), and the learner specifically.

Instructional design is the creation of learning experiences and materials that result in the acquisition and application of knowledge and skills. Through the lens of both learning theory and instructional design theory, Merrill identifies five principles of instruction that promote learning: (1) learners are engaged in solving real-world problems, (2) existing knowledge is activated as a foundation for new knowledge, (3) new knowledge is demonstrated to the learner, (4) new knowledge is applied by the learner, and (5) new knowledge is integrated into the learner's world (Merrill, 2002). Applying these principles, one can envision a kumbaya moment between Clark and Kozma for the sake of educational reform. Wang et al. (1997) eloquently stated this in a summary statement regarding the use of instructional design to switch the development focus of computer-based instruction from the concerns of delivery technology (media) to the fundamentals of instruction methodology (pedagogy). In essence, Wang surmised technology does not cause learning. However, it can also create an effective learning environment in which a learner can interact in multiple means of representation, expression, and engagement. Technology media affords teachers the means to engineer educational experiences that accommodate the diversity within the current student population, thereby acknowledging individual student needs and abilities.

Regarding the lack of evidence showing the superiority of learning with technology compared to the traditional classroom setting, support for the use of technology in education is inherently related to using instructional methods already known to be effective (Cook & McDonald, 2008). Cook and McDonald highlighted the advantage afforded using e-learning (which the authors use to describe learning with computers) in medical education, focusing on the advantages of e-learning with the following example: it is easier to self-pace an e-learning intervention than a lecture;

easier to show full-color pictures on a computer than on a printed handout; easier to show a video clip of an interaction between a physician and a standardized patient than to have the standardized patient return each time the course is taught; easier to put audio clips of heart sounds on the internet than to find the same heart sounds anew each time a course is taught.

The authors further concluded that the media used to provide these interactions is not magical; however, it does facilitate the use of tried and true instructional methodologies already proven to be effective (Patel et al., 2009).

The media debate is perhaps even more relevant because of the significant restrictions in place due to the COVID-19 pandemic. Without media, education would have virtually ceased in the United States during this period of mandatory social distancing. The availability of technology media to continue at least some portion of education delivery is proof of the benefits of technology in education. The educational debate regarding whether technology media is a superior or inferior method is a moot point. If the COVID-19 pandemic has taught us anything, it is more prudent not to debate if technology enhances learning, but rather which technology application works best.

The use of technology media in professional training models spans many medical professions, including physical therapy. According to Patel et al. (2009), "health professions education is dealing with major transformations in light of the changing nature of the health care delivery system, including the use of technology for 'just in time' delivery of care, evidence-based practice, personalized medical care and learning" (p. 791). There is a growing body of evidence to demonstrate the positive impact of including technology-based instruction in the professional physical therapist educational curriculum goes beyond convenience (Patel et al., 2009;

Renwick, 2019). The research includes outcomes from a hybrid program, use of simulation trainers, and student reflection on supplemental single-concept teaching podcasts, to mention a few. These studies, although not comparable to traditional educational models, have shown positive outcomes. Educators are finding creative ways to use technologies to supplement the traditional learning model to meet the demands of the 21st century student.

Virtual reality is the new reality. Technology media is here to stay. The challenge that educators (and the education profession at large) face is how to efficiently, economically, and adequately incorporate technology not to replace the teacher but to facilitate the education process by matching technology media attributes with instructional design. Lessons from the past have shown us that the traditional one-size-fits-all standardized teaching model primarily employed in classrooms today cannot meet the diverse student population's needs, nor do the assessment metrics measure. Furthermore, it ignores the potential benefits afforded by the thoughtful incorporation of technology via various media platforms.

To repurpose Clark's initial analogy of media being a vehicle, I will offer a 21st century perspective: education in the 20th century was an Oldsmobile Cutlass Supreme that got 17 miles to the gallon and went 0–60 in 11.3 seconds. In the 21st century, it is a Tesla that gets 148 miles to the gallon, does 0–60mph in 5.6 seconds, and is capable of driving and parking itself. Yes, they are both vehicles capable of delivery of information. However, the ability for the driver (pedagogy) to interact with the vehicle capabilities (technology) to optimize the student experience is unequivocally superior in the Tesla (Renwick, 2019). Technology is a tool. It does not drive instruction; instruction and pedagogy drive the way technology is integrated. It is time to move past the debate as to whether technology media impacts learning and

focus on instructional design, which utilizes attributes of media to employ instructional methods in the virtual work already known to be effective.

As for those who fear that technology is replacing the need for teachers, I would reflect on a quote by Stephen King, who wrote, “sooner or later everything old is new again.” What is old is not old, but rather new again as it is re-created in the virtual work of technology media. The teacher using instructional design is empowered to influence more learners by merely delivering information and engaging the learner in new realms.

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