

Commentary: What drives learning if media are “mere vehicles”?

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65

Introduction

When Richard E. Clark wrote “Reconsidering Research on Learning from Media” in 1983, technology had not undergone the advances that exist today (Clark, 1983). In 2024, instructional technology has advanced to include immersive virtual reality, augmented reality, holograms, social media platforms and other forms of media. The advancements in instructional technology and new evidence may require a re-examination of the statement by Clark:

The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers groceries causes changes in our nutrition. Basically, the choice of vehicle might influence the cost or extent of distributing instruction, but only the content of the vehicle can influence achievement. (Clark, 1983)

Where the debate started

Clark’s appraisal of the research comparing media use in education prior to 1983 supports his view that media does not influence learning. This conclusion is based on the flaws in instructional research, which may have led him to question the validity of the research pertaining to media and its impact on learning. Clark states that research comparing media using learning outcomes is tied to variations in methods, and strategies and the research, up until 1983, indicated no significant differences. A recommendation against future media comparison research studies was provided, believing that comparing the achievement advantages of one medium over another will confound the medium with the method of instruction (Clark, 1983). Although Clark did not support that media impacts learning, he acknowledged that media may impact other instructional problems such as costs, distribution, equity of access to instruction and the adequacy of different vehicles to carry different symbol systems.

However, this debate cannot be thoroughly examined without examining Robert B. Kozma’s point of view. In 1991, Kozma argued that some learners can construct knowledge using a particular medium’s characteristics (Kozma, 1991). Based on the interpretation of the research, Kozma wrote:

The research reviewed in this article suggests that capabilities of a particular medium, in conjunction with methods that take advantage of these capabilities, interact with an influence the ways learners represent and process information and may result in more or different learning when one medium is compared to another for certain learners and tasks. (Kozma, 1991)

He stated that the divide between medium and method is unnecessary, as both are part of the instructional design. It was proposed by Kozma that the medium can enable or constrain the method; however, there is so much shared variance between them that a good design will integrate both. The examination of the research allowed him to draw the conclusion that, while the method influenced learning, the type of media utilized exploited the medium’s cognitively relevant capabilities, thus supporting that media does play a part in student achievement. In contrast to Clark, Kozma advised for additional media research, stating that a halt on media comparison research may hurt the ability to take advantage of the power of emerging technologies, exploit the creativity of the media and understand the relationship between the capabilities and learning. In 1994, Clark responded to Kozma and accepted that a medium such as media must be present when learning occurs. However, Kozma stated that if media causes learning, then it is the result of the instructional method embedded in the media (Clark, 1994).



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Contemporary points of view

In 2004, Hastings and Tracy re-examined the ongoing debate between Clark and Kozma (Hastings & Tracey, 2005). They reframed the debate and recommended refocusing the conversation from “should” to “how” media affects learning. Advancing technology may create new forms of media (i.e. virtual reality, augmented reality and holograms) and support instructional methods that other media cannot. They believed that technological advances have turned the delivery truck into a “supersonic jet.” Although the “supersonic jet” is a modern analogy to the prior debate, this analogy does not take into account other instructional problems such as cost. If delivery of instruction is the only criterion of success utilized, then it would make no difference if the delivery truck was a rocket ship or a scooter. Although Clark indicated that other instructional problems should be considered, achievement was the primary criterion he examined in the literature. A systematic review examining the virtual and traditional education models in higher education found that distance education can reduce education costs (Pakdaman, Moghadam, Dehghan, Dehghani, & Namayandeh, 2019). This may be due to the use of media, lack of space and time limitations and admissions of large student cohorts. Some of the benefits may also include increased student satisfaction and easy and fast access to information (Pakdaman *et al.*, 2019).

A 2020 systematic review showed that approximately 80% of current research on augmented reality in education compares augmented reality to other mediums (Buchner & Kerres, 2023). The authors found that well-designed augmented reality utilization can support learning, but it is unknown whether this supports learning better than with other media. However, the authors discuss why media comparison studies are problematic. The first problem they offer is that these studies are based on a technology-centered understanding of teaching and learning whose primary focus is that of examining the media’s effect. This assumption that media influences learning neglects the instructional component. The second problem is an inherently flawed design in which the same conditions cannot be guaranteed for the experimental and control groups. Finally, media comparison studies do not inform theory or practice and do not help educational practice (Buchner & Kerres, 2023).

Educators can utilize media and technology to engage and increase the effectiveness of their instruction. The authors argue that it is not important to know if learning with augmented reality is more effective than other media. However, it may be important to know when and how learning with augmented reality works. Since the majority of augmented reality compares media studies, the authors recommend that editors and reviewers publish these studies less frequently.

A second systematic review was published in 2020 exploring the different media tools in the teaching and learning process (Abdulrahman *et al.*, 2020). Many studies utilize either experimental investigations or survey methodologies. Several studies from 2012–2018 utilized an experimental and control group to assess the impact of the multimedia tool on the student’s performance. However, almost half of the studies reviewed used surveys (Abdulrahman *et al.*, 2020). The authors note that the weakness of a survey as a methodology is that it examines a perceived impact based on judgment. Other factors may include where, when, and how media is integrated into the curriculum.

The Technological Pedagogical Content Knowledge framework was established to include technology knowledge into a construct of pedagogical content knowledge. This is the basis of effective teaching with technology by understanding the interactions of the content, pedagogy, and technology knowledge (Mishra & Koehler, 2006). An examination of this framework emphasized that educators focus on approaches to teaching instead of specific tools (Mishra, Koehler, & Kereluik, 2009). This framework may help educators reason about which technologies are worth learning and not learn about every technology and figure out a way to apply it.

Educators at the wheel

If media are “mere vehicles,” educators are left at the “wheel” of education. Instructional approaches can include traditional, instructive, transitional, responsive and reform-based

approaches. Traditional and instructive approaches represent teacher-centered beliefs, whereas responsive and reform-based approaches are student-centered. Performing an assessment using the teacher belief inventory can allow educators to adjust their own individual pedagogical practice, and adding a collaborative component with other educators can foster growth through professional development (Mattheis & Jensen, 2014).

A more contemporary approach, the open educational resource-enabled pedagogy, utilizes open education resources, which are resources with an open license (Wiley & Hilton, 2018). This may include asking students to create or revise new artifacts utilizing open education resources and creating their original work to facilitate the learning of others. This may support an individual's learning and result in new or improved open educational resources that could benefit the learning community (Wiley & Hilton, 2018). It may be important to note that none of these pedagogies place focus on technology but rather on the approach and philosophy of the educator.

Conclusion

Almost 40 years later, Clark's perspective of media as "mere vehicles" still holds. The literature exploring the effects of media on learning contains some of the same flaws Clark identified. The appraisal of the research comparing media studies has not changed despite the technological advances since 1983. Clark's beliefs, grounded in evidence, have not been disproved despite new forms of media and emerging research supporting his original notion. The body of knowledge to date supports the advancement of pedagogy, using technology as a medium for their methods of instruction.

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