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The Impact of Media and Instructional Technology on Student Learning:

The Clark Verses Kozma Debate

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The Impact of Media and Instructional Technology on Student Learning

Do media influence learning? This is the question that both Richard E. Clark and Robert B. Kozma both answered, with opposing viewpoints. Since this debate began in the 1990's, there has been a continuous explosion of technology as teachers, administrators, and other stakeholders try – sometimes successfully, sometimes unsuccessfully – to incorporate this technology into the classroom to increase student learning. But does it even matter? Is it the medium that makes a difference, whether textbook, video, or virtual reality simulation, or is it the learning strategy/method imbedded within the medium?

Clark's Position

Clark's position is quite clear considering that his 1994 rebuttal to Kozma is titled Media Will Never Influence Learning. In short, Clark views media as a delivery mechanism for content and instructional methods, each with different sets of attributes associated with cognitive functions. His main argument hinges upon his replicability test, in that "if there is no single media attribute that serves a unique cognitive effect for some learning task, then the attributes must be proxies for some other variables that are instrumental in learning gains" (Clark, 1994, p.22). Since there have been no well-designed studies proving that media does make a difference, Clark encourages designers to use the least expensive option.

Kozma's Position

Kozma agrees with Clark in that there are yet to be any studies proving media makes a difference, but is open to the possibility. He does not view learning as something that is "delivered", and instead arises from responses and interactions. Different types of media interact with learners' social and cognitive processes in different ways, depending on their capabilities. Kozma argues that media attributes are the same as capabilities, with each distinct type of media

having its own signature blend of capabilities, and that it is important to consider and plan around these capabilities. Furthermore, method should be blended with media, and as technological capabilities continue to grow, designers should look more towards interactions with media.

My Position

I am inclined to align myself with Clark, if only because I am also highly pedantic. Even when considering more modern theories of cognitive load and multimedia learning, the message is in the content and the processes, not the media. However, I do acknowledge a difference between ivory academic theory and the need for efficiency when learning, which renders much of the debate moot.

Multimedia learning focuses on the dual channels (either auditory and visual in sensory modalities, or verbal and non-verbal in representation modes) which may make learning more efficient, but is not necessary for learning in general (as demonstrated by schools for the blind and schools for the deaf), nor do the messages automatically have to involve technology. When discussing the components of multimedia learning, Richard Mayer (2014) uses an example of a computer program that integrates dynamic audio and visuals to instruct on cloud formation/lightning storms, but given great freedoms of time and location (and potentially iffy safety situations), a teacher lecturing on the steps of cloud formation as students are outside watching clouds form and using scientific tools to take measurements would fulfill all of the five forms of representation (words and pictures, acoustic and iconic representations, sounds and images, verbal and pictorial models, and prior knowledge). Physically watching storms develop is how scientists first started to learn how clouds formed, so obviously a multimedia representation of cloud formation is not the alpha and omega of nephology.

That said, it would be horribly inefficient to depend on real-time physical observations to teach about cloud formation and storm development. The length of time and the setting would potentially overwhelm students with extraneous processing (Mayer, 2014), and the poor instructional design of the activity would result in excessive cognitive load that could hinder schema development and would certainly tax working memory (Sweller, 1994). The deficiencies in the lesson could be addressed by repetition of information and element using the same or different media sources that replicate the content and instructional methods, but what teacher has time for that? What student has time for that? Given limits of time, money, and energy, both educators and students need to use the most expedient methods that insure the greatest amount of learning. Clark may have the luxury to pick and choose using a text, a video, and an audio recording instead of one multimedia computer presentation, but for Kozma and the rest of us, the expedient choice is the best choice.

In his arguments, Clark focuses on expense. In 1994, Clark commanded that "designer[s] can and must choose the less expensive and most cognitively efficient way to represent and deliver instruction" (p. 22), and in 2007 he declared that serious educational games "do not teach anyone anything that cannot be learned more quickly and less expensively some other way" (p.58). In 2007 he was judging expense based on what it cost game developers to create new games from scratch, not what it would cost teachers to implement the games in the classroom. I am willing to assume that many schools do not care what it may cost a game developer to make a product, but they do care how much a textbook costs. Likewise, an activity that costs the district ten dollars in supplies but 30 hours of teacher labor is not necessarily less expensive than a 20 dollar option that requires two hours of teacher time. Furthermore, if Clark ever specified exactly how he determines what is the most "cognitively efficient", he might very well be in agreement

with Mayer and others about the use of multimedia technology. In short, his arguments rest on technical theory that may or may not translate to the actual working classroom.

In the long run, does it matter if media influences student learning? Would it make teaching easier or harder? When analyzing the Clark vs. Kozma debate, Nathan and Robinson (2001) looked at the so-called "Mozart Effect", which refers to a study that looked at the effects of listening to Mozart, soothing music, or silence and spatial temporal reasoning skills as measured by an IQ test. The original study did find a positive link between the Mozart music and increased IQ points, and suddenly listening to Mozart was imperative for brain development, including the Mozart for Babies CD collection. Thus, it would seem, media really does affect student learning! And yet, what the study actually showed was that after listening to Mozart, adults performed slightly better on spatial reasoning tests like pencil and paper mazes for about a quarter of an hour – interesting, but not exactly a learning miracle. Until future research is conducted that proves conclusive either way, I will continue to choose the most expedient methods of instruction -- regardless of the media – but it will probably be technology-based because multimedia instruction is so efficient.

References

Clark, R. E. (1994). Media will never influence learning. *Educational Technology, Research and Development*, *42*(2), 21 - 29.

Clark, R. E. (2007). Learning from serious games? Arguments, evidence, and research suggestions. *Educational Technology. 47*, 56-59.

Kozma, R. B. (1994). Will media influence learning? Reframing the debate. *Educational Technology, Research and Development*, *42*(2), 7 - 19.

Mayer, R. E. (2014). Cognitive theory of multimedia learning. Mayer, R. (Ed.), *The Cambridge Handbook of Multimedia Learning 2nd Ed*. (pp.43-71). New York, NY: Cambridge University Press.

Nathan, M. & Robinson, C. (2001). Considerations of Learning and Learning Research: Revisiting the "Media Effects" Debate. *Journal of Interactive Learning Research, 12*(1), 69-88.

Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction, 4*, 295-312.