The Schism Must Die!

If we follow Clark’s scope of thinking, media comparison studies are unnecessary and unproductive. Although I agree that single media do not determine the influence of learning, research that studies learning components, cognition, and their relationships to media will more closely contribute to a more productive, operational, and congruous theory of Instructional and Educational Technology. The schism between medium and message must unite.

Kozma (1991) stated that certain media have special characteristics relevant to learning. The combination of multiple symbol systems and their interrelationships are capable of facilitating learning, increasing comprehension, and influencing the learning process. Kozma argued that a combination of visual and auditory symbol systems results in more memory recall, and that the integration of more than one medium contributes to more effective learning. Kozma supported the hypothesis that combining audio with visual symbol systems “resulted in more recall” than just one of the two symbol systems, and believed that the collaboration between the two enhance and advance knowledge (p. 153).

Clark counter argued with the same principle: No one medium is better than another nor does it have the advantage over another in learning. Media are not unique in accomplishing learning objectives. One medium does not benefit over another. A learning objective can be accomplished through more than one medium, and no single medium is better than another.

However, with that said, how can the field of instructional media progress? If there is a constant tug-of-war between expert viewpoints, what does that do to the credibility and respectability of a field? This controversy has been in the works now for over twenty years, isn’t it about time we make a truce and look to the future?

Kozma’s theory that computers can facilitate students’ comprehension supports the computers’ ability to control and manipulate information. The computer is able to transform and link symbol systems and domains, and relate them to real life situations. Kozma’s argument that “students are frequently unable to connect their symbolic learning in school to real world situations is valid. “The transformational capabilities of the computer can be used to make this connection” (Kozma, p.158) between “symbolic learning in school to real world situations” (as quoted by Resnick, 1988, p. 158). Through computers, abstract concepts are formally constructed into concrete representations to build mental models that are relative to the real world.

Clark would argue that the computer is not the only medium capable of fulfilling this objective. He is absolutely correct, but the question should not be whether one medium has certain features that differentiate it from others but rather how media in general can influence learning and enhance a learning experience by providing real-world relationships through a rich variety of cognitive efficiencies. Computers have visual, textual, and auditory characteristics that can provide concrete and solid examples and analogies for learning.

Kozma (1991) provided three situations to prove that media enhanced instruction contributed to effective learning through its realistic application. The first was a case study by Covey (1990) titled “A Right to Die? The Case of Dax Cowart”. The goal of the program was to present
students with the personal and social situation of Dax Cowart, a Vietnam veteran requesting the right to die after being severely burned and blinded upon returning from the war. The students were able to inspect the situation from a variety of viewpoints, analyze and explore issues directly related to Dax, and formulate decisions on the issue. Through the use of computer generated video, text, and alternative options provided by the computer, the student was able to “experience” a socially difficult predicament, and formulate his/her own conclusions. Kozma stressed that the computer allowed the student to see all sides of the situation through interaction, and construct a model of the situation to more fully “understand social behavior and solve social problems” (p. 166). Although Clark would again say that this same construction is possible with other media, the fact that the medium effectively fulfilled the objective signifies that the medium has the potential to positively influence learning.

Kozma (1994) presented two other examples for using and manipulating media to influence learning. The first example referred to the concept of Newtonian mechanics with White’s (1984, 1993) “ThinkerTools”. Through the use of computers, the concepts of force and motion were presented where students were able to manipulate and control the behavior of each, view the results, and formulate laws to support their observations. The second example mentioned Vanderbilt Technology Group’s development of the “Jasper Woodbury” videodisk that provided students with a real life situation for learning “complex mathematics problem solving” to enhance learning and relate it to “real-world contexts for learning complex mathematics problem solving” (p. 184). In both these scenarios, Kozma reasoned that through the use of the medium’s multiple symbol systems, students were able to apply knowledge to real life situations and solve mathematical and physical problems successfully. The success of the medium is significant, although not limited to just that medium, as Clark would repeat again.

Kozma (1994) argued that through specific media and technology, cognitive processes were achieved based on the models, representations and operations that the particular medium provided. He concluded that a particular medium has unique characteristics that contribute to effectively constructing knowledge and complementing “learner’s prior knowledge and cognitive skills” (p. 171). He emphasized that Clark was creating a “schism” between method and medium which denied the vital interrelationship that exists between the two. He contended that additional research is necessary with media in order to understand the cognitive effects of particular media.

Kozma (1994) argued that each medium has intrinsic capabilities and attributes that distinguish it from others and that theories of instructional media must acknowledge these capabilities along with “the complexities of the social situations within which they are used” (p. 189). He added that theories of instructional and educational technology should recognize the “complex interrelationships among media, method, and situation” (p. 193). Kozma concluded that Clark’s argument against media’s influence on learning should be modified to explore “the capabilities of media to influence learning for particular students, tasks, and situations” (p. 195).

Both Anderson (1994) and Clark (1994) responded to Kozma’s unique media capabilities by stressing that the special characteristics mentioned by Kozma were not unique to the medium utilized. Each of the examples provided by Kozma was capable of being repeated through other media. They recognized the computer’s time and cost efficiency and economy, but emphasized
that the absence of one medium would not impair the ability to teach a particular concept through other means.

One of the problems with the “no significant difference” theory is that it denies particular advantages within each medium. Even though I agree with Clark’s stance on the theory, I feel that in order for the field to progress, we must move on, and try to view the field more contextually and realistically, as Kozma argued. The learning capabilities of students do not rely on the medium but rather the interrelationship between cognitive attributes, motivation, the teacher’s attitude, the context provided, and the way in which the student relates to the media. All of these variables make a significant effect and difference on individual learning.

After more than twenty years, Clark is finally exploring something worthwhile to the field. Clark is studying what and how media work within the field of educational technology. He is formulating a “cognitively-based theory of designing learning environments incorporating motivational features to maximize the transfer of learning to real-world accomplishments” through studying “human cognition, instructional methods, instructional design processes, motivation theory, and performance interventions” (p. 340). I agree with Clark that cognition and motivation influence learning, not media in and of itself. Whichever media that are designed with all these considerations will be more successful in influencing learning.

Although there is no significant difference between media, media do deserve special consideration. Research in the field of instructional media should evaluate, measure, and study cognition processes and differences between individuals; analyze contexts and their influence on learning; study mental effort and persistence effects on motivation; and investigate knowledge construction and gain. Theories developed in these areas will allow media to be generalized, transferable, replaceable, generic, scientific, and not diffused nor causal. That way, functional and influential media will not be what Clark and Estes (1994) call a craft, but a solid working technology.

It is time to unite the schism Kozma says exists between the medium and the message. Instead of disputing whether or not certain specific media make a difference, instructional theory needs to accept that media have the potential to make a difference. Learners are not equal, learning environments are diverse, the amount of mental effort and persistence to learning varies, and self efficacy, emotions, and goals are unique to the individual. Educational media does matter. What doesn’t matter is the quantity of instructional media an instructional environment has but the quality of its application in a learning environment.

References