Industrial and Organizational Psychology, **1** (2008), 472–476.
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Third-Generation Instruction: "Tools in the Toolbox" Rather Than the "Latest and Greatest"

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The work of cognitive and social constructivists is not cited in the industrial and organizational (I–O) training and learning literatures, so the introduction of that work is an important contribution of the Kraiger (2008) article.[1] Our commentary delves deeper into the connection between social constructivism and Web-based instruction that is central to Kraiger's description of a third-generation instructional model. We believe that the use of the term "third generation," although intuitively appealing, is problematic because it (a) overemphasizes the connection between Web-based training delivery and constructivist instructional methods, (b) overemphasizes their respective usefulness across situations, and (c) underemphasizes the usefulness of earlier models and their associated instructional methods. In an area often accused of being overly faddish (Salas, Cannon-Bowers, Rhodenizer, & Bowers, 1999), one might mistakenly infer from Kraiger's article that Web-based instruction and social constructivist design can and should be used in all situations for all training needs. Our commentary draws from work by two prominent instructional theorists: Richard Clark and his distinction between method and media, and Charles Reigeluth and his paradigm for a new instructional theory. We also draw from the multidisciplinary research on computer-mediated communication that suggests a more tempered optimism regarding Web-based instruction than conveyed in Kraiger's article. In total, we concur that both social constructivist methods and Web-based delivery can be valuable, but we view these as being only a few of many possible tools for designing training.

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1. A search for the terms *constructivist* or *constructivism* in Ovid PsycInfo (1806 to May 2008) produced 0 hits in *Journal of Applied Psychology* and in *Personnel Psychology*. These terms do not appear in the glossaries of training textbooks written by I–O psychologists (Blanchard & Thacker, 2007; Goldstein & Ford, 2001; Noe, 2006; Wexley & Latham, 2002). In two top educational journals, *Review of Educational Research* and *Journal of Educational Psychology*, the same search produced 10 and 16 hits, respectively. A search in this database without any constraints on journal title produced 5,991 hits.

Distinguishing Method and Media

In a seminal instructional theory article, Clark (1983) advocated for distinguishing

https://doi.org/10.1111/j.1754-9434.2008.00088.x Published online by Cambridge University Press

instructional methods from media. Clark (1983, 1994) defined methods as the external events in the training environment that support cognitive processes necessary for learning (e.g., presentation of information, elicitation of practice, testing knowledge, providing feedback). Media were defined as the means by which methods are presented or transmitted to learners. That is, presentations, practice, feedback, and so forth can be delivered to learners using a variety of media, including face-to-face, television, or online. Clark further argued that media by themselves do not have a direct influence on learning processes.[2] The argument that media do not influence learning has been controversial (see, e.g., Kozma, 1994), but there is considerable evidence to suggest that the observed positive effects of online instruction often result from differences in study design or instructional methods rather than from differences in media (Clark, 1994).

Consider the common design of research comparing online and traditional classroom courses. The online courses often include additional practice exercises to keep learners' attention and involvement. If learners in the online courses perform better than those in the classroom, should we attribute that advantage to the media or to the increase in practice? The latter explanation is more parsimonious and consistent with a 100 years of psychological research. Furthermore, media comparison studies often are conducted with new technology delivered to groups of volunteers. The potential confounds here are obvious, both from selection effects and from learners using the new delivery technology working harder and being more satisfied than those using traditional technology, simply because the technology is new. Supporting this reasoning, when careful controls for training method, trainee characteristics, and other confounding factors are used, online instruction typically results in similar learning outcomes, on average, as classroom instruction (e.g., Sitzmann, Kraiger, Stewart, & Wisher, 2006). This suggests that researchers often misattribute positive effects of online instruction to media, when in reality the effects are caused by methods.

Returning to Kraiger's article, this distinction is critical because social constructivist methods and online media can be separated, and it must be clearly understood whether the advances offered as third-generation instruction are primarily those of constructivist methods, online delivery, or the confluence of both. We believe, and research in educational psychology strongly supports, that it is possible to run a classroom using social constructivist theory (e.g., Kafai & Resnick, 1996). In addition, because the distinction is not made between method and media, Kraiger treats Web-based instruction rather monolithically when in fact media can employ many different methods, some of which have little or no social component. We believe that Kraiger's article best serves as a useful call for further research on how constructivist methods, in all possible forms of media delivery, can be used in workplace training and development.

Building a New Paradigm for Instructional Theory

Reigeluth (1999) advocated for a new set of instructional design theories that are similar to what Kraiger labels "third-generation instruction". Reigeluth argued that, given advances in what we know about human learning, the paradigm for instruction needs to change from "standardization to customization, from a focus on presenting material to a focus on making sure that learners' needs are met, from a focus on putting things into learners' heads to a focus on helping learners understand what their heads are into: a 'learning-focused' paradigm. This, in turn, requires a shift from passive to active learning and from teacher-directed to student-directed (or jointly directed) learning" (p. 19). Reigeluth, like Clark (1983), departs

2. Clark does acknowledge, and rightfully so, that there are consequences of media choice. Specifically, he argues that there are efficiency and cost differences across media. Computer-based instruction, for example, often takes less time than classroom instruction (Kulik & Kulik, 1991).

https://doi.org/10.1111/j.1754-9434.2008.00088.x Published online by Cambridge University Press

from Kraiger, however, in discussing methods like cooperative group learning, guided discovery, and problem solving separate from media. That is, he does not suggest that they are necessarily or even usually delivered via Web-based instruction. In addition, Reigeluth emphasized that any instructional design theory requires at least two components: methods for facilitating human learning and indications as to when and when not to use that method. In advocating for social constructivist methods generally, Kraiger has glossed over the importance of the latter situational component.[3] In this respect, we believe Kraiger was overly critical and dismissive of first-generational instructional models. Although it is true the role of the learner was often ignored in those models, they can still be effective in certain situations.

Reigeluth further suggests that there are two situational components relating to instructional methods: (a) the desired instructional outcome (e.g., effectiveness, efficiency, appeal) and (b) the instructional conditions under which learning will occur (e.g., learner characteristics, learning environment, development constraints). It is easy to imagine situations in which an organization is concerned with training efficiency and error-free trainee performance (e.g., learning to operate expensive equipment), and in those cases, prior research suggests that behavioral methods would be preferred over constructivist methods. For example, discovery learning, a method drawn from constructivist theory, generally results in longer learning times and worse learning outcomes than direct instruction (Kirschner, Sweller, & Clark, 2006). In contrast, if trainee appeal and the creation of new knowledge are desired outcomes, using social constructivist methods would be preferred over behavioral methods. In short, the choice of instructional method should be driven by desired training outcomes and situational demands.

3. Kraiger's article was not intended to introduce a new instructional design theory, so we recognize that applying Reigeluth's standards is unfair.

Taken together, these two theoretical perspectives suggest that portraying Web-based instruction as third-generation instruction might not be the most useful way to crystallize what is currently known from instructional theory. An alternative perspective is that Web-based instruction and social constructivist design theories are very valuable tools but not the only tools in the instructional toolkit. Ertmer and Newby (1993) similarly suggest that the critical question for instructional designers is, "Which theory is the most effective in fostering mastery of specific tasks by specific learners?" Davis and Davis (1998) likewise summarized seven training strategies based on different theories for use in different situations. They argue, for example, that "behavioral" training methods drawn from operant conditioning (i.e., first-generation instruction) can be used effectively to help novices develop psychomotor skills. They conclude that effective instructional design requires one to "recognize the difference in the training strategies and their theories and to draw on them selectively as needed according to their strengths for achieving different purposes" (Davis & Davis, 1998, p. 401).

Bringing a Critical Perspective

As a final point of refinement, we further balance what we feel is an unconditionally optimistic view of Web-based instruction. Online delivery can bring instruction to people and places where instruction might not occur otherwise, and there is substantial evidence that Web-based instruction generally works for obtaining desired learning outcomes (e.g., Sitzmann et al., 2006). However, Kraiger's argument that Web-based instruction can facilitate social interaction omits important moderators as there is also evidence that computer-mediated communications can be problematic. There is, for example, a substantial literature suggesting that communicating via technology can be detrimental to developing mutual understanding and building trust.

A well-cited review concludes that "distance matters" and suggests that a number of enabling conditions must be present for

https://doi.org/10.1111/j.1754-9434.2008.00088.x Published online by Cambridge University Press

computer-mediated communication to be successful, including shared goals, properly structured work, appropriate technology, and collaboration readiness (Olson & Olson, 2000). If these enabling conditions are not present, organizations that move many of their training programs online may experience problems. Research has found, for example, that using computer technology to replace face-to-face orientation programs can result in worse socialization outcomes (Wesson & Gogus, 2005). Similarly, Brown and Van Buren (2007) suggest that organizations that shift certain types of training to online delivery may inadvertently reduce the extent of collaboration among employees and work groups. There is also some evidence that blended courses, in which some face-to-face interaction accompanies Web-based instruction, are more effective than purely distance courses, particularly for complex analytical, conceptual, and interpersonal skills (Salmon, 2000). This difference is often attributed to the increased social interaction and communication richness that occurs in the face-to-face sessions. As a result, we are more cautiously optimistic about the effectiveness of Web-based instruction than Kraiger and encourage I–O psychologists to study a variety of potential outcomes so that unintended consequences can be considered along with learning outcomes.

In summary, our read of instructional theory suggests that the notion of third-generation instruction is alive and well but that it is not necessarily appropriate in all situations nor is it necessarily tied to Web-based instruction. As a result, we propose that Web-based instruction be considered as one possible media for delivery and social constructivist design be considered as one possible instructional method, each being possible tools to use, when appropriate, given the desired outcomes and instructional conditions present.

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