

General Instructional Strategies

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Any handbook related to educational technology and/or instructional design has some key chapters that discuss the heart of the enterprise. This section on “general instructional strategies” presents those core chapters and shows the dynamics of the field by discussing recent research in each area. While some of these chapters reveal perspectives from which (research on) instructional strategies can be discussed, others point to strategies aimed at attaining important instructional goals, and still others focus on particular instructional strategies, approaches, or methods. This section is complementary to earlier sections in previous editions of the *Handbook* (Jonassen, 2004; Jonassen, Harris, & Driscoll, 2001; Spector, Merrill, van Merriënboer, & Driscoll, 2008) as it builds upon and elaborates on those earlier chapters by presenting new perspectives and new research insights. This section is also complementary to the next section of this *Handbook* edition in that it addresses general instructional strategies rather than domain-specific ones. In that sense, the chapters in this section are more abstract and theoretical whereas their applicability range is larger.

One of the major, more recent theoretical insights pertains to the role of context. The field has become well aware that learning and instruction are situated processes. It is no surprise, therefore, that research on the role of culture in learning is growing. The first chapter in this section by Young addresses this issue. This chapter reviews current research across disciplines (i.e., mathematics, science, and e-learning) to provide a critical analysis of applications and conceptualizations of culture in learning. Given this research, implications for culture-based instructional strategies are offered.

The cognitive revolution in research on teaching and learning has brought about a concern for developing learning ability. This has not stopped and research now focuses on the

development of self-directed and self-regulated learning skills. The chapter by Brand-Gruwel, Kester, Kicken, and Kirschner argues that the development of these skills requires a flexible learning environment with personalized learning trajectories. The chapter discusses recent research on the design of such learning environments. A rich pallet from well-structured learning materials over portfolios and advisory models is presented.

Instructional strategies and information need to be delivered. With evolutions in technology offering a more diverse set of technological possibilities, research is now delving into these new possibilities and investigating how they can stimulate learning. The chapter by Bishop reveals the need to pay far more attention to instructional messages by considering the highly interactive nature of these messages. The author argues that research on instructional messages has not yet endorsed more constructivist perspectives and reestablishing instructional message design as a valid area of inquiry in instructional design will require that recent reorientations in communication theory be considered. This will help to bring about a research domain that is oriented towards message design for learning. In the chapter on multimedia learning, Mayer provides a concise overview of multimedia research. In multimedia instruction text and images are combined with the intent of enhancing learning. The author argues that this instruction becomes more effective when cognitive architecture is considered in the design of that instruction. The design of effect multimedia instruction implies that research principles with respect to reducing extraneous processing, managing essential processing, and fostering generative processing be considered.

Research in the field of instructional design and educational technology gradually reveals the importance of a number of fundamental aspects of learning environments. Three of them are the need for authentic learning environments, for feedback, and for adaptivity. In the chapter on authentic learning environments by Herrington, Reeves, and Oliver the theoretical background of authentic learning environments is extensively discussed. Furthermore, the authors highlight the

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great potential of new technologies and review the recent research on authentic learning environments. The chapter by Molloy and Boud addresses feedback. In addition to a critical analysis of definitions and theories, the authors offer an overview of recent empirical work. The chapter concludes with the insight that feedback is an integral part of any productive learning environment, suggesting a greater focus on formative rather than on summative evaluation as well. Adaptivity and even personalization remain a goal of many learning environments, which aim to optimize learning by considering individual characteristics and providing targeted support. Vandewaetere and Clarebout discuss research on advanced technologies and personalized learning environments. The authors claim that the integration of artificial intelligence and educational data mining provides a firm basis for personalized systems. The chapter concludes with the authors' plea to use the potential of these new developments to foster learning.

Specific instructional strategies are presented in the four (or five) chapters. In each of these chapters an up-to-date overview is presented of the theoretical background and the empirical evidence with respect to one particular strategy. Goodyear, Jones, and Thompson do so for computer-supported collaborative learning; Lazonder for inquiry learning; Seel for model-based learning; and Tobias, Fletcher, and Wind for game-based learning (perhaps still reference to case-based learning chapter). Strikingly, what becomes clear in each of these chapters is that good instructional design decision making first requires that an in-depth analysis is made of the cognitive processes in which learners must engage. An instructional strategy cannot be expected to be effective unless it elicits appropriate cognitive processes.

The provision of instructional support often in the form of scaffolds is addressed in the last two chapters. Belland provides an in-depth overview of research on scaffolds. Given the broad meaning attributed to the term and hence the over-

whelming amount of research on scaffolds, some restrictions had to be considered. Great insights emerge from this overview: In order to make learners stronger, fading support is a key characteristic of powerful learning environments and general support are far less effective than scaffolds with a clear domain-specific orientation. This calls for more domain-specific instructional design research as illustrated in another section of this *Handbook*. But even well-designed scaffolds or well-designed instructional support may not be as effective as hoped; the main reason is that learners are self-regulated agents and their interpretation of the support and of the entire learning environment and their motivation will determine whether the support is actually used and/or used as intended by the designer. The issue of support use is the focus of the last chapter by Clarebout and her colleagues.

While this section is long and gives a good overview of recent thinking and current investigations on instructional strategies, it is far from exhaustive. This edition of the *Handbook* is clearly missing chapters on distributed learning. Internet and e-learning have become mainstream and this implies that instruction can now be provided anytime anywhere. The implications of these new possibilities for learning and research on appropriate instructional strategies in distributed learning settings are issues to be discussed in the fifth edition of the *Handbook*.

References

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