
Foundations

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This first section of the *Handbook* is focused on the foundations that inform educational technology research and development. The purpose of this section is to provide a research-based overview of the foundations of educational technology pertinent to the twenty-first century scholarship and practice. The intent is not to repeat anything explicitly covered in the three previous editions of the *Handbook* (Jonassen, 2004; Jonassen, Harris, & Driscoll, 2001; Spector, Merrill, van Merriënboer, & Driscoll, 2008), all of which are available online at no cost to members of the Association of Educational Communications and Technology (see <http://www.aect.org>) which sponsors the *Handbook*.

The emphasis in this section is on research linked to new and emerging educational technologies, including the relationships between theories, models, frameworks, perspectives, approaches, and principles. This section should provide those new to this area of research with a comprehensive understanding of the many different areas and perspectives that influence and inform research and scholarship in educational technology.

The section begins with Joost Lowyck's historical overview of educational technology and the interrelationships between theory, technology, research, and practice. The historical overview is followed by two chapters focused on research paradigms (van Merriënboer and de Bruin) and research perspectives (Morrison and Ross); taken together, these two chapters represent the complexity and diversity of views that inform educational technology research. The fourth chapter in this introductory section by Foshay, Villachica, and Stepich elaborates the relationships between human performance technology and instructional design.

The first four chapters that provide readers with the breadth of views pertaining to educational technology research are followed by five chapters that explore specific foundation areas not addressed in previous editions of the *Handbook*. Chapter 5 by Antoneko, van Gog, and Paas is focused on the implications of neuroscience for educational research. Chapter 6 by Kim and Pekrun addresses research on emotions and motivation that are pertinent to learning, performance, and the design of instruction. Chapter 7 by Branch provides an overview of instructional design models that often are the point of departure for the design of research studies. Chapter 8 by Warren, Lee, and Najmi provides readers with an update of how recent technologies have influenced the design of instruction and educational technology research. Chapter 9 by Koehler, Mishra, Kereluik, Shin, and Graham reviews research in the recently defined area of technological, pedagogical, and content knowledge (TPACK).

These nine chapters represent the breadth and depth of the broad area of educational technology research. By no means do these few chapters exhaust the full breadth of this complex area. The chapters to follow in subsequent sections should make clear that these first few chapters only tap the depth of research in this area. The final section of the *Handbook* (the epilogue) represents the editors' attempt to suggest that this large *Handbook* only touches a few important research areas—there is much we have yet to understand and there are new and emerging technologies that will surely change what researchers and practitioners do.

While all of the chapters in this *Handbook* are new and do not appear in previous editions, several chapters have been added specifically at the request of *Handbook* users. The final chapter by Moore and Ellsworth in this introductory section is one of those—it addresses the important area of ethics and standards educational technology research and practice. A code to guide instructional practice can be found in Spector, Ohrazda, Van Schaack, and Wiley (2005), and AECT has an ethics code, so it is fitting and appropriate that this topic should be included in the Foundations section of the *Handbook*.

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* An asterisk next to a reference entry throughout this Handbook indicates a reference that the author(s) considers to be central to the topic.