

Methods

Jan Elen and M.J. Bishop

At the core of scientific research are the methods. This second section of the *Handbook* is devoted to research methods with a focus on approaches that have, in previous editions of the *Handbook* (Jonassen, 2004; Jonassen, Harris, & Driscoll, 2001; Spector, Merrill, van Merriënboer, & Driscoll, 2008), attracted less attention or that have been evolving over the last several years. In contrast to the very first edition, for instance, attention on philosophical and experimental methods has shifted in this edition to more design research-based methods. This growing diversity of available research approaches in educational technology research is reflected in this section of the *Handbook*, which reviews the current research methodologies and—an interesting addition from our perspective—the tools that are used in order to support those methods as well.

The first chapter in this section is devoted to educational design research. McKenney and Reeves stress the ambition of educational design research to contribute to both practice and theory. The authors highlight the diversity of solutions that is paid attention to in educational design research. Challenges for educational design research such as finding a balance between information richness and efficiency or the need for more clear examples of impact are clearly outlined. The authors stress the need and potential for more close collaboration between researchers and practitioners in order to handle current issues in education.

The chapter on educational design research is followed by the chapter on design and development research. Through means of 11 recent publications, Richey and Klein illustrate the nature of design and development research. The authors stressed that this type of research is unique to the field of instructional design and technology. Two main categories are

distinguished: those studies that focus on products and tools, and those that are oriented towards the study of design and development models. The authors nicely describe the research space of design and development research by specifying the problems addressed, the settings and participants involved, the research methodologies used, and the role of evaluation.

Two new chapters address research practices in educational technology research that did not get a lot of attention in previous editions of the *Handbook*. Karakus presents the potential of Activity Theory for educational technology research arguing that Activity Theory provides a productive framework to analyze and understand how tools within particular contexts work. The potential is illustrated by references to examples. As an extension, Activity Network Theory is presented as a framework to analyze interactions among multiple activity systems. While the Karakus chapter shows the impact on research methods of theoretical frameworks, Manfra and Bullock reveal the practical and theoretical consequences of a widely used research method: action research. They argue that action research fundamentally transforms the relationship between practitioners and researchers by putting practice at the core. This transformation may help to close the gap between theory and practice. Concrete examples of approaches in action research are discussed in view of extending action researchers' toolkits.

The educational technology research field used to be a field dominated by quantitative research. Today, an increasing number of researchers use qualitative methods in their efforts to get to an in-depth understanding and to generate relevant and broadly applicable principles. The more widespread use of qualitative research methods in a variety of disciplines has engendered the further development of these methods. As a complement to chapters in previous editions of the *Handbook* on qualitative research, the chapter by Mardis, Hoffman, and Rich presents a well-documented overview of recent trends. Demonstrating that qualitative research is far from an easy thing to do, the chapter nicely presents the various issues of design, method selection, and

J. Elen (✉)
KU Leuven, Leuven, Belgium
e-mail: jan.elen@ppw.kuleuven.be

M.J. Bishop
Lehigh University, Bethlehem, PA, USA

knowledge generation with concrete examples of how these were tackled in recent educational technology research.

While different aspects of formative evaluation methods have been discussed in previous *Handbook* editions, a chapter solely dedicated to program evaluation has been missing. The chapter on Program and Project Evaluation by Spector fills this gap by discussing and illustrating methods used in an effort to evaluate the entire process from needs assessment through design, development, deployment, and support. The author stresses that project and program evaluation are directed towards increasing the probability of successful technology integration. Program evaluation calls for a holistic approach in order to consider the multiple and interwoven factors that affect successful integration.

This section concludes with two new chapters on data analysis tools that should be very informative for researchers. While Knezek and Christensen discuss tools for quantitative research, Gilbert, Jackson, and di Gregorio do the same for qualitative data. By discussing the tools and research in which these tools are used, Knezek and Christensen show how such tools might contribute to improving data acquisition, making data analysis even more sophisticated, and enriching data exploration often through visualization. The ongoing evolutions and developments in these tools are stressed by these authors and for qualitative research confirmed by Gilbert, Jackson, and di Gregorio. In response to frequent questions from researchers on what tools to use, these latter authors distinguish between Qualitative Data Analysis Software to support qualitative research and tools

that are especially interesting when gathering data and/or presenting results are at stake. Issues related to the use of these tools as well as the potential of Web 2.0 tools are discussed.

The variety of chapters in this section reveals the diversity of research methods used in educational technology research today. New research questions have given rise to the use of new methods that, in turn, have resulted in the more frequent use of a diversity of tools. The diversity in research methods reflects the diversity in research questions and theoretical orientations. Considering that disciplines are characterized by some methodological agreement, it must be noted that the field of educational technology is a discipline characterized not by methodological unity but by methodological diversity. Such diversity is a benefit as long as there is a shared agreement on methodological decision making, on how to decide what methods are most appropriate for what questions. Putting that agreement on paper might be the biggest challenge for a methods section in a possible fifth edition of the *Handbook*.

References

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