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How can we conduct educational research that acknowledges the complexity of educational situations while producing robust knowledge that practitioners can use? How can we move beyond simplified experimental models without losing the capacity to inform complex action, and beyond rich qualitative descriptions without renouncing scientific rigor? These questions lie at the heart of contemporary debates in educational research.

Educational research has always been a multidisciplinary and epistemologically plural field. It brings together different epistemological traditions, each offering distinct perspectives on what counts as knowledge and how it should be produced. In the field of digital education, for example, quasi-experimental studies such as Papastergiou's work on digital game-based learning aim to measure causal effects on learning and motivation (Papastergiou, 2009). These approaches are often defended within the framework of evidence-based education, notably by Slavin (2002), who argues that educational policy and practice should rely on results obtained through rigorous experimental or quasi-experimental designs. At the same time, ethnographic studies like Barab et al. (2007) explore how learners construct meaning through narrative, inquiry, and social interaction in complex cultural contexts. These approaches, valuable as they are, face persistent limitations. Quasi-experimental and post-positivist studies are frequently criticized for oversimplifying educational phenomena, for struggling to control variables in authentic settings, and for producing results whose ecological validity remains uncertain (Shamay-Tsoory & Mendelsohn, 2019). Contextual effects, such as those described by Cook (1962) in relation to the Hawthorne effect, remind us that participants' behavior may change simply because they are aware of being observed, thereby weakening causal interpretations. Ethnographic and interpretivist studies, in turn, are often questioned for the subjectivity of their analyses and the limited scope of their generalizations. The field thus seems caught between two insufficient options: rigor without sufficient attention to complexity, or complexity without sufficient generalizability of findings.

But the problem does not lie in choosing between these approaches. It lies in the very way we frame educational research. Education is not only an object to be explained; it is a domain oriented towards transformation and improvement. As emphasized in Bryk's improvement paradigm (Bryk, 2017), educational research is inherently action and change-oriented. Bryk (2017) further argues that practice-based evidence, knowledge emerging from practice, should be considered an essential complement to traditional research findings, and that improvement science, which seeks to generate knowledge through iterative cycles of testing and refining interventions in practice, gains strength when it is supported by structured, networked communities engaged in collective learning. This orientation toward improvement also raises an important challenge. Improvement cannot be reduced to the pursuit of measurable effectiveness alone. Biesta (2007, 2009) warns that when measurement becomes the main driver of educational decisions, it risks redefining what is considered valuable, rather than serving previously articulated educational aims. The challenge for educational research, then, is to determine how it can support improvement while remaining attentive to the purposes that define what counts as improvement in the first place. This raises a crucial question: what kind of research approach can simultaneously take seriously the complexity of educational situations, engage with practitioners, and produce knowledge that is both rigorous and actionable?

Design-Based Research (DBR) (Design-Based Research Collective, 2003; Sanchez et al., 2026) offers one of the compelling responses to this challenge. Rooted in pragmatic constructivism, DBR assumes that reality is inseparable from human action and that understanding a phenomenon cannot be dissociated from the subject who seeks to understand it. Knowledge is not "discovered", it is constructed through engagement with problems that emerge in authentic contexts. This epistemological stance aligns DBR with Simon's sciences of the artificial (Simon, 2019), which argue that we gain knowledge of the world not only by observing it, but also by intentionally intervening in and transforming it. For more than twenty-five years, DBR has been guided by four fundamental categories of principles (Wang & Hannafin, 2005). It is collaborative and interactive: teachers and trainers are considered research partners rather than research subjects. It is contributive and pragmatic: its

aim is to produce educational artefacts that have immediate value for practice. It is contextual and ecological: these artefacts are tested with learners in authentic educational settings. And it is iterative: each design cycle refines not only the artefacts, but also theoretical models, hypotheses, and research instruments. Through these principles, DBR attempts to address several of the major tensions in educational research. It acknowledges the systemic and dynamic complexity of educational situations through mixed and systemic approaches. It supports a transition from the transfer of researcher-generated knowledge to the collaborative production of knowledge with practitioners. Above all, it contributes to mitigating the long-standing dualism between theory and practice by showing that each can only develop in continuous dialogue with the other (Sensevy, 2011). In doing so, DBR operationalizes Bryk's call for improvement-oriented, practice-embedded forms of knowledge production.

However, embracing DBR implies a form of collective responsibility that extends across all stages of the research process, from problem framing and design decisions to data interpretation and the use of findings. Its development requires the institutionalization of sustained collaboration between researchers and practitioners, as well as the support of long-term funding schemes capable of sustaining durable partnerships and embedding practitioners' participation in research (Sanchez et al., 2026). Teacher education institutions are particularly well positioned to host research–development teams capable of carrying such projects over time. It also calls for a stronger mutual acculturation between researchers and practitioners, through closer collaboration and a better consideration of the realities of educational contexts. In parallel, a more explicit recognition of contributions is needed, making visible the differentiated roles of all actors involved. This would move beyond the conventional authorship model toward an approach that, like film credits, explicitly acknowledges the specific contributions made by each participant. Finally, the development and dissemination of appropriate methodological tools remain essential (Paukovics et al., 2025), as the growth of any research field depends on the instruments that allow phenomena to be constructed, observed, and discussed (Bachelard, 2000). Beyond these organizational and methodological dimensions, these perspectives call for continued epistemological reflection on collaborative research in education. Understanding how to articulate design and research in complex and constrained contexts remains a central challenge for the field.

References

- Bachelard, G. (2000). *La formation de l'esprit scientifique* (1993rd ed.). Librairie J Vrin.
- Barab, S. A., Sadler, T. D., Heiselt, C., Hickey, D., & Zuiker, S. (2007). Relating Narrative, Inquiry, and Inscriptions : Supporting Consequential Play. *Journal of Science Education and Technology*, 16(1), 59-82. <https://doi.org/10.1007/s10956-006-9033-3>
- Biesta, G. (2007). Why "What Works" Won't Work : Evidence-Based Practice and the Democratic Deficit in Educational Research. *Educational Theory*, 57(1), 1-22. <https://doi.org/10.1111/j.1741-5446.2006.00241.x>
- Biesta, G. (2009). Good education in an age of measurement : On the need to reconnect with the question of purpose in education. *Educational Assessment, Evaluation and Accountability (Formerly: Journal of Personnel Evaluation in Education)*, 21(1), 33-46. <https://doi.org/10.1007/s11092-008-9064-9>
- Bryk, A. S. (2017). Accélérer la manière dont nous apprenons à améliorer. *Éducation et didactique*, 11(2), Article 2. <https://doi.org/10.4000/educationdidactique.2796>
- Cook, D. L. (1962). The Hawthorne Effect in Educational Research. *The Phi Delta Kappa*, 44(3), 116-122.
- Design-Based Research Collective. (2003). Design-Based Research : An Emerging Paradigm for Educational Inquiry. *Educational Researcher*, 32(1), 5-8. <https://doi.org/10.3102/0013189X032001005>
- Papastergiou, M. (2009). Digital Game-Based Learning in high school Computer Science education : Impact on educational effectiveness and student motivation. *Computers & Education*, 52(1), 1-12. <https://doi.org/10.1016/j.compedu.2008.06.004>
- Paukovics, E., Prior, E., Morard, S., & Sanchez, E. (2025). Towards a Model for Characterizing instruments Used in Design-Based Research. *EDeR. Educational Design Research*, 9(2). <https://doi.org/10.15460/eder.9.2.2150>
- Sanchez, E., Bonnat, C., Bonvin, G., Jaouadi, M., Morard, S., Parmentier, H., Paukovics, E., Plumettaz-Sieber, M., Prior, E., & Sénécaïl, A. (2026). *Recherche orientée par la conception en éducation (Design-Based Research) Modèles, méthodes et outils*. ISTE Editions. <https://dx.doi.org/10.51926/ISTE.9781836120926>
- Sensevy, G. (2011). *Le sens du savoir*. De Boeck.
- Shamay-Tsoory, S. G., & Mendelsohn, A. (2019). Real-Life Neuroscience : An Ecological Approach to Brain and Behavior Research. *Perspectives on Psychological Science*, 14(5), 841-859. <https://doi.org/10.1177/1745691619856350>
- Simon, H. A. (2019). *The Sciences of the Artificial*. MIT Press.
- Slavin, R. E. (2002). Evidence-Based Education Policies : Transforming Educational Practice and Research. *Educational Researcher*, 31(7), 15-21. <https://doi.org/10.3102/0013189X031007015>
- Wang, F., & Hannafin, M. (2005). Design-based research and technology-enhanced learning environments. *Educational Technology Research and Development*, 53(4), 5-23. <https://doi.org/10.1007/BF02504682>