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Methodological Choices Made When Using Design Based Research to Explore Mathematics Education: An Updated Analysis

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Design Based Research (DBR) has become a popular methodology for exploring various aspects of mathematics education due to its focus on our theoretical understanding of learning and teaching whilst also establishing effective practical implementations. This richer and more contextual view of education has led to increased adoption of DBR throughout the education research community — particularly in investigations relating to mathematics — but the complexity of its ideals has also led to greatly varying interpretations. As such it is important to examine the current practical application of DBR in order to identify whether the original conception of DBR is aligned with its actual implementation. Drawing on a recent meta-study into trends in mathematically focused DBR studies, this paper explores how this method is being used in comparison to its original goals. To ensure quality studies were investigated, only peer-reviewed papers demonstrating well thought out and practically implemented projects were included. The search period included papers published from after the Anderson and Shattuck (2012) review until February 2022, when the search was conducted. Findings indicate that most studies presenting as DBR are essentially isolated case studies exploring individual teaching interventions lacking the iterative development needed to meet the intentions of DBR. Addressing this lack of genuine iteration, which ought to be the primary driver of theoretical development in the DBR methodology, will be critical if DBR is to support sustainable and scalable change. After almost two decades of use, it is not likely that this problem will be addressed simply though upskilling researchers. Rather, we would argue that to fully realise the potential of DBR seen by Anderson and Shattuck, as well as in our own studies, that our field must give consideration to some parts of our research practice and infrastructure. A clear reason for a lack of iteration, for example, is that DBR is a resource intensive research methodology. This was a key finding in our initial study which showed that studies involving multiple iterations almost exclusively emanated from the richer OECD countries, and even then were primarily the result of a PhD program with at least the candidate devoted to the project full time for 3-4 years. A way forward may be the development of 'grey literature' DBR project sites that support groups with common goals to report and iteratively build on each other's work whilst providing opportunities for educational sites to indicate interest in projects. Partnerships will progress this popular methodological genre towards not only matching, but exceeding, the original goals of DBR.

References

Anderson, T., & Shattuck, J. (2012). Design-Based Research: A Decade of Progress in Education Research? *Educational Researcher*, *41*(1), 16-25. https://doi.org/10.3102/0013189x11428813