# OPEN SCIENCE B R I E F

To help inform the special education research community, these briefs feature information on prominent open science practices. Content comes from our series of short articles in the DR newsletter, Focus on Research, as well as additional content developed by DR members.



## **CROWDSOURCING**

Open-science reforms have the potential to strengthen the credibility of research, help address the replication crisis, and bridge the research-to-practice gap (Adelson et al., 2019; Cook et al., 2018). *Focus on Research* is featuring a series of articles introducing prominent open-science practices. In this article, we focus on **crowdsourcing** and how it may be used in conjunction with open-science practices such as pre-registration, materials sharing, and open data. In this article, we briefly describe issues in research that crowdsourcing might help to address; what crowdsourcing research is; primary benefits of crowdsourcing research, including facilitating open research practices; limitations and challenges; and an emergent example of crowdsourcing in special education research.

#### Issues in Special Education Research Addressed by Crowdsourcing

Lack of time and other resources to conduct research is often a source of frustration for researchers, especially for university faculty whose professional duties typically also include teaching classes; advising students; and providing service to the profession, university, and community. It is difficult for special education faculty to implement rigorous, adequately powered studies in applied settings on their own without additional time and resources. To obtain such resources, special education researchers can apply for grant funding. However, funding is highly competitive and is received by a relatively small proportion of faculty. In the context of the prevailing paradigm for conducting research independently and in small groups (Uhlmann et al., 2019), the scarcity of available resources to conduct research has resulted in a significant underutilization of expertise in the field. Essentially, most researchers do not have the resources needed to conduct the high-quality research they are trained to do.

Additionally, conducting adequately powered studies with representative samples is a perennial challenge for special education researchers. Given the relatively small number of students with disabilities in

any given school and classroom, it is very difficult for researchers to recruit study samples that represent a broader population and allow for adequately powered analyses when conducting studies on their own or in small groups, especially for students with lowincidence disabilities. Limited participant diversity is, indeed, a critical issue in education and special education research that can limit the generalizability of research findings (Tipton & Matlen, 2019; West et al., 2016).

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#### What is Crowdsourcing?

Crowdsourcing is one potential mechanism to address the lack of resources, underutilization of research talent, and difficulties generating large and representative samples in special education research (Makel et al., 2019). Instead of studies being conducted by small research teams or individual researchers, crowdsourcing involves combining resources across researchers to conduct studies that individual researchers could not conduct on their own (Uhlmann et al., 2019). "Crowdsourcing flips research planning from 'what is the best we can do with the resources we have to investigate our question,' to 'what is the best way to investigate our question, so that we can decide what resources to recruit" (Uhlmann et al., 2019, p. 713). Although many different aspects of research can be crowdsourced (e.g., materials, data analysis), our focus here is on crowdsourcing data collection. In this approach to crowdsourcing, many researchers collect data across many sites.

Crowdsourcing data collection has been implemented in many fields. Some disciplines have utilized laypeople as data collectors to expand the

capacity to collect data. For example, in marine science, researchers utilize citizen data collectors to collect nurdles (small plastic pellets) on beaches so they can map where they are found and investigate sources of the plastic pollution (University of Texas, 2020; see https://www.citizenscience.gov/catalog/# for opportunities to be a citizen data collector in federally funded projects). In psychology, crowdsourcing has been employed to conduct replications and other large-scale research studies. For example, in the Many Labs 2 study, 186 researchers conducted replications of 28 influential psychology studies across 125 samples (with over 15,000 total participant participants) in 36 countries and territories (Klein et al., 2018). Researchers successfully replicated just over half (n=15) of targeted studies. Because many different research labs investigated each effect in multiple samples, researchers were also able to examine variability in effects across labs. administration modes (in labs or online), and cultures. Psychological The Science Accelerator (https://psysciacc.org/), a network of 1,400 researchers in 71 countries, is currently conducting multiple largescale crowdsourced research in psychology.

#### What Are the Benefits of Crowdsourcing?

Crowdsourcing may help to democratize the research enterprise by providing a means for significantly more special education researchers to participate in high-quality, large-*N* studies. Involving more researchers will, in turn, likely diversify study samples. As is evidenced by the work being conducted in psychology, crowdsourcing could also facilitate special education researchers conducting large-scale direct and conceptual replication studies. Instead of a small group of researchers conducting a series of studies over decades to examine the effects of an intervention across different groups of participants, outcomes, settings, and variations in the intervention (Coyne et al., 2016), one or a few large-

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scale studies could address these questions by systematically varying the samples, outcomes, settings, and intervention components across many sites being studied concurrently.

Although crowdsourced studies are not necessarily open, they typically incorporate many open practices. Studies that involve crowdsourced data collection typically must have study procedures determined, operationalized, and shared with research partners before a study begins, which makes preregistration a simple step and greatly facilitates submitting the study as a registered report. Materials for conducting the study must be shared across labs, which facilitates sharing materials with research consumers. Moreover, as the data are collected by many researchers, it may be less likely for any specific researcher to take ownership of them, perhaps making it more likely for that data to be open. Extant crowdsourced research also has a strong record of being made available through sharing pre- and post-prints. Indeed, Makel et al. (2019) referred to large-scale collaborations (i.e., crowdsourcing) as Open Science 2.0 due to the alignment of crowdsourcing and open-science practices.

#### Limitations and Challenges to Crowdsourcing

Unlike crowdsourced studies in psychology that typically consist of a single session with adult research participants using a standard protocol, special education researchers are often interested in investigating complex intervention protocols implemented over extended periods of time with groups

While we envision these challenges will be difficult to overcome, we conjecture they are likely surmountable of children. These complexities raise challenges such as recruiting participants across sites, ensuring adequate intervention fidelity, standardizing, and implementing data collection procedures, and aggregating and synthesizing data sources across research sites. While we envision these challenges will be difficult to overcome, we conjecture they are likely surmountable for much of the research conducted in the field. We reason that if an education program cannot be implemented reliably across research sites, then teachers will unlikely be able to implement the program with fidelity. Indeed, difficulty implementing a program across many researchers might be a telltale sign that the program will not be feasible to implement in school settings.

### Crowdsourcing and Special Education

We were fortunate to receive an unsolicited award to develop and pilot procedures for conducting crowdsourced research in special education from the Institute for Education Sciences' National Center for Special Education Research (https://ies.ed.gov/funding/ grantsearch/details.asp?ID=3356). The Special Education Research Accelerator (https://edresear chaccelerator.org) is planning to conduct a pilot efficacy trial of a brief academic intervention for students

with high-incidence disabilities in elementary schools during the 2021/2022 academic year with multiple research partners across the United States. The Special Education Research Accelerator currently has > 200 research partners in the United States, with each of the nine U.S. Census regions represented. If you are interested in potentially being a research partner in future crowdsourced, please contact us at https://edresearchaccelerator.org/about/contact/.

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