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Emergent Design Thinking, Rigorous Research, and Perseverance: Comments from a Keynote Address

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This invited article is a follow-up to the 2022 keynote address given to the Midwestern Education Research Association. This article reviews national, contemporary challenges to conducting applied education research. It also reviews broad principles that might help one continue to conduct high-quality research, namely: embracing emergent design thinking, flexibility, and perseverance.

Keywords: education research, emergent design, randomized controlled trials, researcher-practitioner partnerships, surveys

Introduction

I was delighted to deliver the keynote address to the Midwestern Education Research Association 2022 annual meeting (Hitchcock, 2022), and I'm equally delighted to offer this associated commentary for the *Midwestern Education Research Journal*. Keynotes hopefully provoke thought and some inspiration for association members, and I have the same hopes for these written comments. But this article admittedly starts out with a dark description of the current state of K-12 education. From there, I describe some of the research I've been entrusted to pursue, but I'll not focus on findings because relevant research reports are publicly available or soon will be. I instead focus on some of the challenges I've experienced and how I managed them, working as a member of experienced research teams that accommodated flexibility and perseverance.

Flexibility and perseverance are critical because education research is difficult, and from my vantage point, it has become more so in recent years, likely due to factors like the pandemic and the broader fraying of social bonds. Challenges come early and often. Identifying a problem to study in the first place can be difficult for the uninitiated; I remember struggling when in graduate school to find a good topic for my dissertation and before that, trying to convince my professor (if not myself) that I had a good idea for a topic of study in my research design courses. However, for any students reading these words, this challenge will go away if you stick with your field. It becomes normal for professionals with training in research to routinely see topics worthy of study. But unfortunately, other problems do not go away. To begin, most of us seek funding to conduct our work and the pursuit of resources entails competition, often against highly successful researchers. I have not kept count of my own grant wins and losses, but I suspect hitting averages in professional baseball are a decent proxy for win rates in the world of education research grants and contracts. A baseball player with a .300 average will be an all-star; faculty who win about a third of their grant competitions are in my view doing well (professional research firms might expect a higher win rate given additional resources). I can think of no colleague who has not lost a grant competition, but there are those who gave up when they

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should not have. When persevering through the grant pursuit process, it might help to remember that grant proposals are not publications; the writing that goes into a proposal can be recycled for future purposes, including pursuing funds for the next competition and other projects.

Challenges continue even after one wins a grant or a contract. Funders can have high expectations, convincing people to participate in a study can be challenging, and then there are almost always unanticipated troubles when conducting applied research. In my own work, I have run into any number of related headaches associated with randomized controlled trials (RCTs) and survey projects. I've lost schools from studies because of a building fire, a flood, and even a hurricane (the school was shut down for weeks, preventing summer professional development [PD] needed to deliver the intervention we were testing). In one RCT, I lost a very promising school during the recruitment process because the community the school serves issued a property tax referendum, and the superintendent I was working with had to use much of his time and social capital explaining why local schools needed more funds. He had no energy for championing my study. My research has, at times, been badly undermined because of teacher labor disputes that have led to union-led strikes, teacher walkouts, parent walk-ins, and administrator turnover. And then, there was the widespread use of unplanned, emergency remote instruction in March of 2020 due to the COVID-19 pandemic that badly undermined many research projects. There is a saying among trialists: an RCT is a quasi-experiment waiting to happen¹ (see Shadish et al., 2002 for a review of these designs), and at least two RCT projects with which I am involved have been reverted to quasi-experiments because of factors related to the pandemic.

The state of K-12 Education: Staff and Students are Stressed Out

A review of the state of education suggests that applied education research will continue to be quite challenging. Consider the overall teaching workforce in the U.S., Many school districts that serve disadvantaged communities are facing acute staff shortages (Nguyen et al., 2022). Nguyen and colleagues estimate there are 36,000 teaching vacancies, and about 160,000² positions are held by teachers who are not certified in the subject areas they are asked to teach. Poor teacher morale and high teacher stress are other concerns, especially given teachers' job satisfaction relates to student achievement (Dicke et al., 2020; Herman et al., 2018; Turner & Thielking, 2019). Steiner & Woo (2021) report that 78% of teachers responding to their national survey reported frequent job-related stress (compared to 40% in the general adult population), and 27% of teachers reported symptoms of depression (estimated to be 10% in the general population). Principals, who of course can influence teacher well-being (Cansoy, 2019; Grissom, 2011; Ingersoll, 2011) also appear to be struggling. Doan et al, (2022) found through their survey effort that 84% of principals often or always find their jobs to be stressful, and 19% report trouble coping with stress. Furthermore, just over a third of responding principals report that they: (a) work more than 60 hours per week, (b) have experienced hostility or aggression because of policies around teaching race, racism, or bias, and (c) are considering leaving the job. At the district level, in 2023, RAND surveyed superintendents from its American School District Panel

¹ I had assumed this was an actual quote in some published outlet. If it is a quote, I have not been able to locate it or different variants of it through standard searches.

² For a point of reference, the National Center for Education Statistics reports there were 128,961 public and private K-12 schools in the U.S. (National Center for Education Statistics [NCES], 2022a).

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member districts; 79% of respondents reported that their jobs were often or always stressful and cited political issues around schooling as one reason for their stress (Schwartz et al., 2023).³

Students are not faring better. According to the Centers for Disease Control (CDC; 2022), 37% of high school students responding to a national representative survey reported they experienced poor mental health during the pandemic, 55% of respondents reported they experienced emotional abuse by a parent or other adult in the home, 11% experienced physical abuse, and 29% reported a parent or other adult in their home lost a job. The CDC reported that school connectedness (i.e., feeling connected to adults and peers at school) was found to be a protective factor, but only 47% of students responding to this survey felt connected to school. These circumstances likely contribute to highly problematic student achievement, or lack thereof, at the national level. The National Assessment of Educational Progress (NAEP), billed as the nation's report card, shows steep drops in reading and math achievement among U.S. students (NCES, 2019, 2022). Even before this latest reporting, Mark Schneider, the director of the Institute of Education Sciences at the U.S. Department of Education, concluded: "We are failing our students" (Schneider, 2020, para. 6). Finally, students with disabilities are thought to struggle. Stelitano et al. (2022) report these students: (a) were especially impacted by decisions made around schooling in response to the pandemic, such as school closures; (b) experienced disruption in services; and (c) experienced intensified mental health concerns.

Schools of course operate in communities and there is much evidence that our community discourse has badly degraded in the last several years. The Associated Press-NORC Center for Public Affairs Research (AP-NORC) conducts numerous polls and through these efforts found, for example, that only 16% of the U.S. populace reports democracy is working well or extremely well (AP-NORC, 2021). In another poll, 76% of adults reported they think the national economy is in poor condition (AP-NORC, 2023a). In yet another poll, only 39% of respondents reported having a great deal of confidence in the scientific community (AP-NORC, 2023b). When it comes to public schools, there is now a two-year old media narrative describing how some parents act aggressively in school-board meetings because of their concerns with critical race theory⁴ and mask mandates (see, for e.g., Saavedra et al., 2021). These concerns likely contribute to a perverse need for some people in our society to spread (and apparently believe) hoaxes worthy of ridicule, such as schools placing kitty litter in bathrooms for students who identify as cats, or furrries (Peisr, 2022). This rumor appears to be a part of a transphobic backlash against efforts to offer unisex bathrooms and to offer support for students who do not fit neatly into a gender binary, in schools and other public places.

How do we Conduct Research Given these Circumstances?

It is against this backdrop that we must consider the conduct of education research in K-12 schools. Anecdotally, two years ago, I confided in a superintendent of a small rural district that I was having extreme difficulty in achieving a strong response rate to a national survey. Ever the problem solver, this colleague offered standard advice (shorten the survey, increase incentives,

³ This finding is based on 150 respondents, which is of course a small sample.

⁴ I expect this journal's audience understands that public concerns around critical race theory are a manifestation of culture wars in the U.S. (see, for e.g., Sawchuk, 2020). In my judgement reports that argue this theory underpins K-12 education needlessly undermine effective discussion of race and culture in classrooms.

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repeat communications through different methods), but after assuring him that I'd taken these steps, he offered a key insight about his work: on most mornings, he was on call to help drive a school bus. The problem he faced was he could not hire an adequate number of school bus drivers. On any given day, he might start driving at, I assume, around 5:00 a.m., move on to superintendent tasks throughout the day, and spend part of his evening dealing with community concerns around COVID-19 mitigation steps. Perhaps he had to handle queries around critical race theory and his stance on furries. This superintendent's workload helped me to understand the reasons for the low survey response in a more visceral sense. To me, this was somewhat like experiencing naturalistic generalization (Stake, 1994). Although the interaction I described was not from a case study, and I have never served as a superintendent, I have served in difficult leadership positions, and this helped me to recognize the fatigue the superintendent expressed. As a result, I pivoted to an updated framework in my research efforts. Moving forward, I resolved to renew my efforts to make practitioner participation in research easier and to make the case to them that their participation is worthwhile. I cannot always know the particulars around how to simplify matters for practitioner colleagues, but emergent design thinking (i.e., adapting as one learns more, Patton, 2014) and working with gatekeepers who offer access to schools and cultural brokers who help explain local context (Nastasi & Hitchcock, 2016) have become even more important as we conduct inquiry in stressed schools.

Three Personal Stories that Demonstrate the Need for Perseverance and Flexibility A National Survey Initially Undermined by a Low Response Rate

I offer an example of how flexibility and perseverance helped on one of my survey projects. This survey work, funded by the Wallace Foundation, entailed querying a stratified random sample of school districts about how they used American Rescue Plan dollars to continue summer learning programs in 2021 (details are in Crean Davis et al., 2022). We had a research plan for generating national estimates of district plans, but for months, our survey response rate was unacceptably low. We continued to struggle with the low response rate after using multiple strategies mentioned above (shortening the survey, enhancing incentives to respond, using highly coordinated and multimodal outreach through letters, emails, and phone calls). One always anticipates an imperfect response rate in survey work and there are statistical methods for addressing this issue (e.g., weighting, Osborn, 2011) but we did not have confidence these methods would work with the response that we had when the project started to approach its end date. An emergent, flexible design approach helped us to see that we needed a new strategy. Our solution was to use web scraping (i.e., extracting data from district websites) to learn about districts' summer learning plans. To make this work, we consulted with our sampling statistician to obtain a subsample of non-responding districts to focus on during web scraping. We conducted web scraping with a subsample to minimize project expenses given our dwindling time and financial resources. Our sampling statistician helped ensure the process would not undermine plans for constructing later survey weights that accounted for our stratified sampling. We also validated our web scraping process by comparing a set of web scrape results against survey findings from a random subsample of survey completers. We obtained consistent results (i.e., similar findings from web scraping and surveys) after conducting this test, yielding confidence the new method was a reasonable way to address the low response rate problem (Crean Davis et al., 2022). The takeaway from this story is that after viscerally grasping challenges educators face, we determined that the best solution was to stop bothering them with

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yet more follow-up requests. We instead found another way to gather the data we needed to ensure we had a large enough response sample to be confident that we could generate national estimates from our survey project. The web-scrape did not yield everything we wanted to know but it was good enough. This yields an important point: my colleagues and I aim to conduct what we hope is seen as rigorous research in the sense that rigor means exactness, or more generally that the research is good. But this term rigor has other meanings, such as being inflexible (think of rigor mortis). I submit that this story shows how being flexible and persevering through challenges as they unfolded allowed us to reach our goal of generating nationally representative estimates of summer programming (the good kind of rigor), but we had to use emergent design thinking to make this happen (hence the title of this article).

A Longitudinal RCT Interrupted by Emergency School Closures

For another example, in which flexibility mattered in an ongoing longitudinal RCT funded by Arnold Ventures, my colleagues and I are (still) testing a school-based mentoring intervention designed to promote high school graduation rates among youth who are in foster care. This design includes a multi-cohort student recruitment and treatment delivery that spanned 2018-2019 to 2020-2021, and of course, schools engaged in emergency unplanned remote instruction as of March of 2020. Any reader can imagine the complex challenge these unexpected school closures posed to the project. To accommodate remote instruction, we worked carefully with our practitioner partners to identify surface versus deep structure elements of the intervention (see Colby et al., 2013). A core structure element is one that is part of an intervention's theory of action; to not deliver a core element is akin to not delivering the intervention. In school tutoring, for example, one must actually deliver tutoring. A surface feature is one that is negotiable. It might, for example, be reasonable to offer tutoring in the morning or in the afternoon. Getting back to the RCT, we had to adapt the school-based mentoring program so that we could deliver its core, fundamental elements in the last cohort year while altering superficial elements that allowed mentoring to continue (Hitchcock et al., 2021). In this case, one of the best decisions the research team made was to ask practitioners to figure out the particulars through what I view as a researcher-practitioner partnership. After superficial intervention elements were rearranged (e.g., mentoring could be provided online) and satisfying ourselves, and our project officer, that core features could be preserved after making these changes, we were able to deliver the intervention to the last cohort. As of this writing, we are just now collating graduation rates from our last cohort of students, so I do not have a final report to offer, but I can say that carefully listening to the needs of school staff and practitioners who delivered the intervention saved the study's viability. It is not ideal for my team to have to account for delivery of a different intervention approach as we conduct impact analyses, but I argue that the combination of using cohort membership as a moderating variable and having confidence that the core key intervention ingredients were delivered allows us to proceed with an intact RCT. Here again, some emergent design thinking, flexibility, and perseverance were needed to make a study work under stressful school circumstances.

An RCT that Turned into a Quasi-Experiment

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For a third example, in another RCT where my colleagues and I are currently testing the impact of a mathematics intervention, we are using a design where we randomized elementary schools to either use the intervention in (a) grades K-2 or (b) grades 3-5. Teachers in the intervention condition experience PD; key student outcome data are administratively collected in the form of state tests, and a series of teacher measures are being used. Impact models will account for clustering of students and teachers in schools. Like the mentoring study focusing on school dropout, the intervention we tested had to be altered during the pandemic to account for emergency, remote instruction, and new expectations that a virtual approach to PD would be deployed. This again raised the matter of revisiting the intervention's theory of change to allow for distinguishing between deep intervention components and surface intervention components. Key to the alteration effort was understanding the elementary school context relative to our theory of change, which informed how we made alterations (cf. Goodson, 2020; Lee et al., 2008; Wandersman et al., 2008), which helped us to maintain the trial during pandemic-related school building closures. For example, we originally assumed there would be a 40-hour PD institute during which instructional leaders would learn about the intervention and then deliver PD to teachers. This was not tenable in the pandemic, but the theory of change was maintained by shifting to an apprenticeship model wherein school coaches directly lead PD with teachers. The PD was further redesigned so that a shorter, 12-hour online facilitator training was offered in the summer of 2022.

Unfortunately, as the study progressed to new school cohorts, we needed to pivot from randomization to allowing schools to determine whether they wanted to use the intervention in the K-2 or 3-5 grade band. School staff continue to deal with all the pressures I described earlier in this article, and nowadays, it is a real challenge to convince teachers and principals to continue with a study when they express disappointment in the outcome of randomization. This turned the study into a quasi-experiment, and the causal inference we will draw from the study will be more tentative, I would, however, rather have a quasi-experiment than no study at all, especially since a quasi-experiment that shows study participants are well-equated at baseline can still support high-quality causal inference (Shadish et al., 2002).

Conclusion

I am fortunate to have been entrusted with funds needed to conduct large, applied education research projects. These projects are, however, more challenging to conduct well, given the state of K-12 education in the U.S. and surrounding society. So many school staff are burned out and far too many students are struggling. Having acknowledged the broad environment is not ideal, I began this article claiming I hope to offer some inspiration. Ideally, the brief stories I shared from my own work establish that good research can be achieved even under difficult circumstances. One needs to think of emergent design principles to allow for some flexibility, and exploring different options is part of what it means to persevere. And persevere we must. Education is ever evolving, and all its elements can always be improved.

Having made that last point, as I think of K-12 education improvement guided by research, I consider: *improvement from what?* Times are tough, but I also keep in mind that educators are professionals with considerable expertise and agency. In 2018, we've seen movements like *Dressed in Red for Ed* (Ravitch, 2020) where teachers push for proper public-school funding,

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and an Internet search will show the movement continues today. Emergent design thinking, flexibility, and perseverance are all supported when seeing teachers and school leaders through an asset lens and partnering with them to figure out problems. We in the business of education research are not alone if we avoid doing research *on* schools and instead think about conducting research *with* schools. In the stories I offered above, consider how a busy superintendent took the time to help me. He did not identify web scraping as a solution, but he helped me understand that there had to be a better way to get the data I needed. In the second story, school staff were instrumental in determining how to keep an RCT going during the pandemic-related school building closures. The key to success was listening to practitioner colleagues while remaining flexible. And in the mathematics PD study, it was and continues to be essential to listen to teachers. The researcher in me laments moving the study to quasi-experiment, but I am also appreciative of teachers letting the team of which I am a part know how to make the study continue to work. When I think about improving education through research, I need to remember that because there is so much focus on how public education is flawed (and must be reformed) that it can be easy to forget that much if it has been done well. So, when I'm involved in an education RCT where two or more instructional approaches are being compared, I try to keep in mind that the so-called "control" group is often a status quo group being instructed by teachers who are working hard. If I can help teachers, principals, students, and parents see that we're introducing a new idea, we are in essence, tinkering (albeit with a strong design) to improve instruction as a function of a researcher-practitioner partnership. Seeing educators as expert partners with agency is the key to seeing problems when they arise, understanding them, and then knowing how to be flexible so that rigorous research can be pursued.

I will admit to harboring some dark thoughts about the merits of being a researcher in education. There have been times I thought I'd be more useful to schools by being a bus driver if too few drivers can be hired. See Diaz & Novak (2023) for a reminder of just how important this service is to schools. But I see value in researcher-practitioner partnerships, and I am always encouraged when educators work with me to solve problems. Education research is difficult, but I think helping public education in whatever one's subarea of interest with incremental improvement through empirical work is needed. These hard times will get better, and we'll all improve if we think about how to be flexible as we pursue inquiry.

Author Notes

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