

CONDUCTING SUCCESSFUL CROSS-INSTITUTIONAL RESEARCH IN STATISTICS EDUCATION

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Any type of research, especially in education, is enhanced by the inclusion of multiple researchers as well as multiple institutions to allow for a greater generalization of obtained results. However, it can be very hard to know how to complete, let alone start, a successful collaboration. Examples of successful cross-institutional research, as well as an assessment of the benefits and drawbacks of conducting such studies are discussed.

INTRODUCTION

Statistics education has become a growing field in the past few decades. Not only have the Guidelines for Assessment and Instruction in Statistics Education (GAISE) been developed and modified, a larger emphasis has been placed on statistics topics in The Common Core Standards. Although the greater implementation of statistics may be considered a good thing, knowing what works and how it works in the statistics classroom is tough; what happens in one specific class, or at one specific grade level, may not happen in the next. One thing that we teach in statistics is to determine the population where we can generalize the results of a study. Thus, we need a way to take our own advice; one way to do this is through collaborative cross-institutional research projects.

EXAMPLES

An NSF funded research grant (DUE-0618790) was awarded to help create statistics research clusters, under the name CAUSEmos (CAUSE Making Outreach Sustainable). This grant was able to create a total of six research clusters; three in 2007 and three in 2009. Each time the clusters were formed, the twelve researchers involved met and got to know each other in addition to their research interests. This was done at the United States Conference on Teaching Statistics (USCOTS) in Columbus, Ohio. On the last day of the conference, the clusters were formed based on interests and each cluster was given a research advisory board (RAB) that consisted of mentor who were very successful in statistics education research. Clusters had goals of reviewing the literature for the first year and conducting a pilot study during the second year. Throughout this time the cluster had monthly (or more often) conference calls that included RAB members. Many of these clusters have given presentations and some have had their work published. (See the following webinar on CAUSEweb for more information about the research clusters: Nicolaidis & Slauson, 2011.)

As an example, one cluster that was formed in 2007 gave a presentation at USCOTS in 2009 on lexical ambiguity. In addition to this presentation, they have also had their work published in *The Journal of Statistics Education* (JSE) (Kaplan, Fisher, & Rogness, 2009, 2010) and in *Teaching Statistics* (Kaplan, Rogness, & Fisher, 2012). Another example is the research cluster that I have been part of with Herle McGowan, Leigh Weiss, and Tara Cope. We have presented our findings on context in students' understanding of sampling at a few conferences (USCOTS, Joint Statistical Meetings, & the Statistical Reasoning, Teaching, and Learning Conference). In addition, we have published our work in the *Statistics Education Research Journal* (Wroughton, McGowan, Weiss, & Cope, 2013).

The Consortium for the Advancement of Undergraduate Statistics Education (CAUSE) has also helped create some research clusters. One cluster, the Study of Fun Cluster, was formed in 2009 at USCOTS. This cluster's work involved investigating how and why instructors of statistics use fun (in different modalities) in the classroom. Their work was published in JSE (Lesser et al., 2013)

Although it is nice to have sponsors and/or support for collaborative research, this is not a necessity. Some research collaborations can occur among researchers with a shared goal and having the drive to see it through. An example of this type of research involves my current research

with April Kerby at Winona State University. Our relationship started many years ago when we were in graduate school together. We became good friends and continued to remain good friends even after graduate school. We were both on the tenure track at universities with a high teaching load (4/4). In addition to being at similar types of schools, we had very similar interests in statistics education, specifically student motivation. In 2012, we decided to conduct a research study together assessing students' attitudes after implementing a motivational daily/weekly question. We've communicated primarily through Skype and email. Early on, this was about once a month and as the project became more involved, they have become weekly. From our research thus far, we have presented at USCOTS and JSM in 2013.

BENEFITS & CHALLENGES

When trying to decide if and how you could conduct research with others, it is good to consider the pros and cons. Below are some things that I have found to be benefits of cross-institutional collaborations:

- Inference – When we do research at multiple institutions with different types of instructors and statistics classes, these results can be generalized to a much greater audience, especially when compared to doing research in only your own class or institution.
- Work load – When multiple people are working on the same projects, you have other people that are carrying part of the load so that you are not having to do it all yourself.
- Multiple Perspectives – Most of us have found that bouncing our ideas off someone helps us to think things through or to consider something we had never thought of. These sounding boards become even stronger when working together since everyone is working toward the same goal.
- People depend on you – At first this one may seem scary to some people; however, having someone that is holding you accountable for certain tasks makes you less likely to procrastinate or not complete those tasks.

Just as there are benefits to collaborative research, there are some challenges. Below are some of the challenges that I have encountered:

- Scheduling – The more people you work with, the harder this one becomes. Taking into account different teaching schedules and demands, as well as different time zones can make trying to find a time to talk seem almost impossible. The groups I have worked with have found that setting a specific time at the beginning of each semester and setting that time aside seems to make this issue happen less often.
- Depending on others – Although I listed that other people depending on you as a benefit, it becomes more of a challenge when you have to depend on others to complete their assignment. Putting some of the control out of your hands can be hard. The best ways to prevent yourself from being let down are to choose your collaborators wisely and never be the one who is letting people down.
- Institutional Review Boards (IRB) – Getting your research approved by your own IRB can sometimes be a challenge. When doing collaborative research, the group has to get approval at each institution. We have found that what is acceptable at one institution may not be acceptable at another. The best way to prevent IRB approval from slowing you down is to start this process early and be proactive about making sure that you follow your institutions expectations.

CONCLUSION

I have shown some examples of successful cross-institutional collaborative research projects and provided some benefits and challenges to consider before deciding to conduct this type of research. As the amount of statistics education research has grown, so does the need for research of a collaborative nature. Although this may seem time-consuming, I do believe the benefits, especially to the students of statistics, outweigh the challenges that we may face. One last

important thing to remember is that just as a seed takes time and nurturing to grow, so do lasting and successful collaborations – and it is well worth it.

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