Ohio STEM School Impact Study

ABSTRACT

The Ohio STEM School Impact Study is a collaborative effort between The Ohio State University (OSU) and Battelle Memorial Institute (Battelle). Its purpose is to estimate the impact of inclusive Ohio STEM Learning Network (OSLN) platform of schools on educational outcomes and to establish a process for collecting and analyzing data to monitor the impact of inclusive Ohio STEM schools in the future. Specifically, the study entails the collection and analysis of data to estimate the impact of four inclusive STEM schools in Ohio. The statistical methodology for estimating their impacts on student outcomes depends on the data available for each of the four schools. The schools employ lotteries of various types for admission. Estimating the causal impact of the STEM schools using lottery data is possible for at least one school and may be possible for the others. Additionally, the study employs matching techniques to compare the educational outcomes of the STEM school students to the outcomes of students who are similar (based on observable characteristics) but who have attended non-STEM schools.

IMPORTANCE

There is a widespread belief that quality science, technology, engineering, and mathematics (STEM) education is the key to securing America’s future. In Ohio, many believe that policies promoting STEM education will improve students’ educational achievement and attainment in STEM subjects, leading to better paying jobs and statewide economic growth. The potential of these STEM schools can be fully realized only if data on their performance is tracked systematically and analyzed rigorously. Because many inclusive STEM schools are relatively new, this also is an important opportunity to make certain that the right data are collected so that the schools’ impact may be examined in the future. The Ohio STEM School Impact Study will produce information relevant to Ohio STEM education policy and will facilitate high quality research on Ohio STEM schools in the future.

BACKGROUND

There is a consensus among US policy makers that improving science, technology, engineering, and mathematics (STEM) education is a national priority. Recent calls for STEM education reform have focused not only on improving overall achievement in the STEM fields but also on closing significant existing gender and racial STEM achievement and interest gaps. An emerging model for addressing these gaps is the inclusive STEM high school (ISHS.) ISHSs combine inclusive admission policies with a STEM-focused curriculum in order to seed interest in the STEM fields and expand the STEM workforce pipeline. Throughout the last decade ISHSs have proliferated across the country, promising enhanced educational and, ultimately, economic outcomes.

In 2006 a partnership between OSU and Battelle established Metro Early College High School, an inclusive STEM-focused high school that drew students from all school districts within the Columbus metropolitan area and employed a lottery-based admission system. Metro welcomed its first freshman class in the fall of 2006. One year later in November 2007, Battelle Memorial Institute received a $13million grant from
the Bill and Melinda Gates Foundation and contributed an equal amount of its own funds to expand its STEM education efforts by establishing the Ohio STEM Learning Network (OSLN) and creating a series of STEM platform schools across the state. The platform schools are designed to serve as laboratories for STEM education and to disseminate best practices. Platform schools must commit to inclusive admission policies and five broad Design Principles established by the OSLN. This study focuses on the OSLN’s first four STEM platform high schools.

RESEARCH QUESTIONS
The first study will answer the following questions:

- What is the impact of attending an inclusive STEM school on student outcomes on the Ohio Graduation Test, particularly in science and math?
- How does the impact of attending an inclusive STEM school vary by student demographics, such as gender and economic disadvantage?
- How does the impact of attending an inclusive STEM school change over time, as a school establishes itself?
- To what extent do inclusive Ohio STEM schools serve disadvantaged populations and students traditionally less interested in the STEM fields?

Data also are being collected to answer the following questions in future studies:

- What is the impact of attending an inclusive STEM school on the coursework that students complete, particularly in science and math?
- What is the impact of attending an inclusive STEM school on high school graduation rates and college matriculation?
- What is the impact of attending an inclusive STEM school on academic achievement and attainment in college, particularly in STEM-related majors?

RESEARCH DESIGN
The first phase of the project aims to estimate the STEM schools’ contribution to student achievement as measured by statewide tests. The statistical methodology for estimating student outcomes depends on the data we are able to collect and link to OERC data resources. The four schools employ lotteries of various types for admission. Estimating the causal impact of these STEM schools using the randomization from lottery data will be possible for at least one school and may be possible for the others in the future after more data have been collected. Additionally, the researchers are employing student-matching techniques to compare the educational outcomes of students who attended STEM schools to the outcomes of students who are similar (based on observable characteristics) but who attended non-STEM schools.

DATA
The study team is in the process of acquiring student-level data from the four sites and their respective school districts so that they may be linked to student-level Ohio Department of Education (ODE) Education Management Information System (EMIS) data and Ohio Board of Regents (BOR) data.

CONCLUSION
Further data analysis is needed before results can be disseminated.

Suggested Citation