outlier
RESEARCH & EVALUATION
CEMSE | UNIVERSITY OF CHICAGO

STEM
SCHOOL
STUDY

S3

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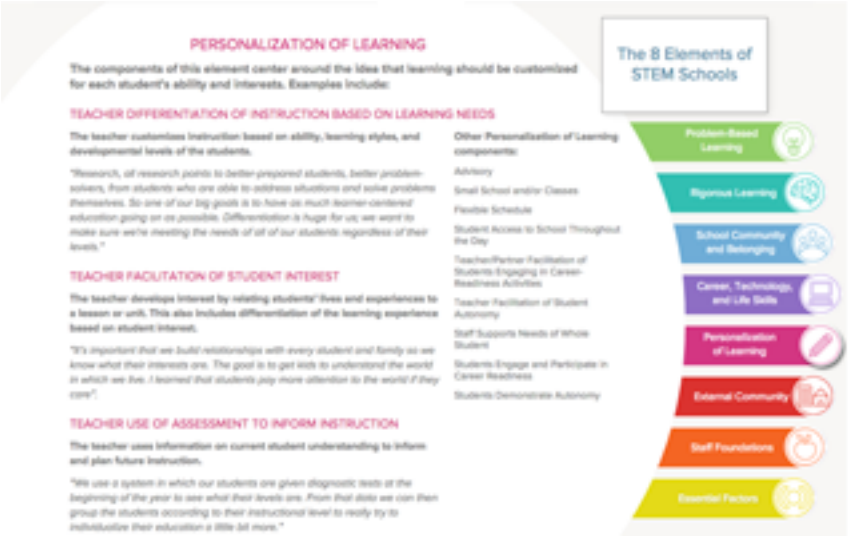
TEAM

STEM SCHOOL STUDY

The STEM School Study (S3) seeks to understand the landscape of inclusive STEM high schools across the United States. S3 examines how STEM schools define themselves, the strategies they use, and the student experience.

FINDINGS

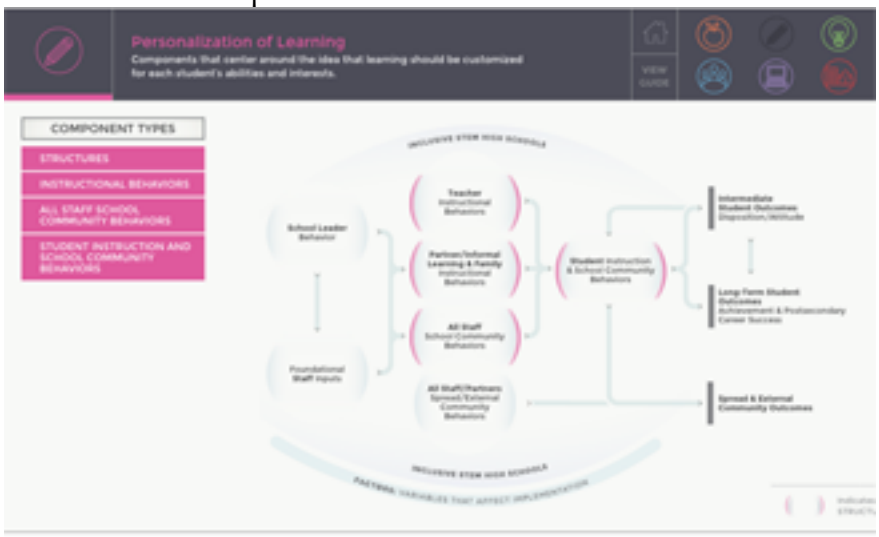


WHAT DEFINES A STEM SCHOOL?

We identified 8 Elements common to STEM schools across the country. Here, you can see the Elements that make up STEM schools, as well as examples of how they are enacted by S3 schools.

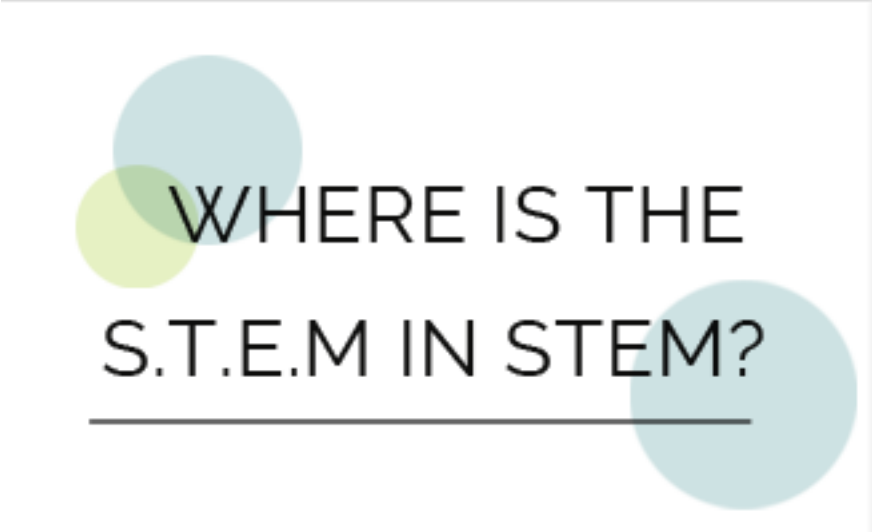
WHAT DO STEM SCHOOLS DO?

The Elements are made up of components that represent the core of what STEM schools do every day to accomplish their goals. Explore all 78 in our infographic of STEM school components.



HOW DO STEM SCHOOLS WORK?

The STEM School Roadmap is an interactive visual that demonstrates how the components work together to achieve the goals of STEM schools. On this page, explore the Roadmap and read about how it was developed and how you can use it.



WHERE IS THE S.T.E.M. IN STEM?

In our work with STEM school leaders and stakeholders, it has become clear that they may define "STEM" as more than science, technology, engineering, and math. Read about how these disciplines fit into the S3 framework.

HOW ARE INCLUSIVE STEM SCHOOLS ALIKE?

And how do they differ? We interviewed school leaders at all 20 participating schools to find out what the most essential parts of their schools are. Explore visual representations of each school's model here.

ABOUT

THE IMPORTANCE OF STEM SCHOOLS

In recent years, many states and schools have embraced a STEM focus. However, there is much debate and uncertainty about what a STEM school is. This study seeks to develop a clear, comprehensive understanding of inclusive STEM schools across the nation, as well as how the various strategies and methods employed by these schools can relate to real student outcomes.

This study is funded by the National Science Foundation.

OUR PHILOSOPHY

The fundamental goal of all Outlier projects is to provide schools and policy makers with useful, timely information to continually improve. In S3, we work hard to maintain open communication and work in collaboration with our schools. In addition to sharing our broader findings, we provide schools with detailed, school-specific findings from each questionnaire administration. Schools have also worked closely with us to articulate their models, and we encourage feedback on our work throughout the research study.

In recent years, many states and schools have embraced a STEM focus. However, there is much debate and uncertainty about what a STEM school is. This study seeks to develop a clear, comprehensive understanding of inclusive STEM schools across the nation, as well as how the various strategies and methods employed by these schools can relate to real student outcomes

What are the study outcomes? Clearly describe the essential components of inclusive STEM high school models. Understand the different ways that STEM school and teachers implement essential components (such as internships, instructional practices and other staff behaviors. Identify individual and organizational factors (such as teacher attitudes, professional development, political and community culture) that affect the implementation of STEM school practices. Identify and describe the components that are most related to desired student outcomes (such as achievement and engagement). We believe that for most education innovations and interventions, there is no one “correct” model and no single way to implement a model. In this study, our goal is to understand the reasons and processes behind the development of STEM school models. It is not an evaluation of schools. We seek to understand how and why schools may implement similar components of their models in different ways.

STUDY QUESTIONS

WHAT ARE THE ESSENTIAL COMPONENTS OF EACH INCLUSIVE STEM SCHOOL’S MODEL?

WHAT IS HAPPENING AT INCLUSIVE STEM HIGH SCHOOLS?

WHAT AFFECTS STEM SCHOOL PRACTICES?

WHAT MATTERS FOR ACHIEVEMENT?

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findings from each questionnaire administration. Schools have also worked closely with us to articulate their models, and we encourage feedback on our work throughout the research study.

This study will comprehensively describe, measure models, and examine the implications of 20 inclusive STEM high schools in seven states: California, New York, Ohio, Texas, Washington, Tennessee, and North Carolina. Outlier is committed to providing our collaborating schools with useful and practical information that can be used to improve STEM schools as well as STEM teaching and learning

METHODOLOGY

To understand the essential components of schools, we use a detailed interview and coding process.
To measure the implementation of essential components, we use teacher, student, and school leader questionnaires. These questionnaires were developed in earlier STEM school research, and have been refined in S3 to precisely and reliably measure how schools implement strategies and practices.
We get a richer portrait of essential component implementation through our qualitative data collection. In 2014 and 2015, we will visit several of our schools to see their essential components in action. We will observe activities and classes, talk in depth to teachers and students, and generally learn what it means to be a part of an inclusive STEM high school.
To understand student outcomes, we work with schools each year to collect student-level achievement data (student GPA, test scores, and other data when available). We link questionnaire responses to school-provided data to understand how different essential components and patterns of implementation may be related to student achievement.
In addition, we are working on a post-graduate questionnaire for a sample of students who have graduated from participating schools. These questionnaires will help us understand how post-grads reflect on their STEM experience and feel that it has helped prepare them for life after high school.

MELANIE LAFORCEPrincipal InvestigatorAssociate Director, Outlier Research & Evaluation Melanie joined Outlier Research & Evaluation in July 2011 and works on a range of research and evaluation projects. Prior to her work at the University of Chicago, Melanie worked as a quantitative researcher at the Chicago Postsecondary Transition Project, a joint project between the Consortium on Chicago School Research and The School of Social Service Administration at the University of Chicago. She has also previously worked as a research analyst at Chicago Public Schools in both the Office of Math and Science and the Department of Postsecondary Education. She received her PhD in Social Psychology from Loyola

University and holds a BA from Ohio University.laforce@uchicago.edu773-702-0445

JEANNE CENTURYCo-Principal InvestigatorDirector, Outlier Research & Evaluation Prior to coming to the University of Chicago in 2005, Jeanne Century was a Senior Researcher at Education Development Center (EDC) in Newton MA. Jeanne has a BA in general science from Brandeis, and a MEd and doctorate in science education curriculum and teaching from Boston University. Her research focuses on the impact of inquiry science instruction, strategies for improving utilization of research and evaluation, sustainability of reform efforts, and measurement of intervention fidelity. Century served on the Education Policy and Department of Education Agency Review transition teams for the Obama-Biden administration where she was responsible for STEM education and education research and development issues.jcentury@uchicago.edu773-702-2276

LIZ NOBLES3 Associate Project Director, Outlier Research & EvaluationLiz has a variety of experience as both a researcher and an educator. Prior to coming to Outlier Research & Evaluation, Liz worked as Research Assistant at Northwestern University, and with the Chicago Children's Museum on an exploratory study of the Museum's early learning-focused Pritzker Playspace. She is also a trained Montessori teacher and taught in a three to six year-old classroom for several years. Liz has an M.A. in Learning Science from Northwestern University and an undergraduate degree in Psychology from Denison University.enoble@uchicago.edu773-702-3886

SANDRA HOLTResearch Associate, Outlier Research & EvaluationSandra’s experience includes a wide range of research and evaluation projects and social work. As an Assistant Program Evaluator at the Curtis Center Program Evaluation Group (CCPEG) within the School of Social Work at the University of Michigan, Sandra helped in designing, implementing and conducting program evaluations and needs assessments. Prior to graduate school, Sandra completed a term of service as an AmeriCorps member with Michigan’s Campaign to End Homelessness. Sandra worked with homeless and runaway youth and women who are victims of domestic violence or facing homelessness. This included providing community outreach services, assistance in finding housing resources, and coordinating Project Homeless Connect outreach events. Sandra earned her master of social work (MSW) degree from the University of Michigan, and bachelor’s degree with a major in psychology from Michigan State University.holtsand@uchicago.edu773-702-4022

HEATHER KINGResearch Associate, Outlier Research & EvaluationHeather earned her PhD at the University of Chicago. Her dissertation focused on the African lungfish, one of the few living fishes that is more closely related to humans than to other fish, such as trout or tuna. The walking behavior of the lungfish is important for understanding how the first tetrapods (animals with backbones) moved out of water and onto land 350 million years ago. Heather has contributed to a number of articles in peer-reviewed journals and the popular press related to this research. Heather has done extensive volunteer work encouraging youth, especially young women, to pursue careers in science. These efforts include designing and teaching science classes for middle and high school students with Project Exploration and working with a team at the Museum of Science and Industry developing out-of-school science programs for high school students. She was also a writer for the Association of Women in Science website.hking@uchicago.edu773-702-4282

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