eSTEM Designing Games for Education (eDGE): Giving Students the eDGE
Early Phase EIR STEM Abstract

eDGE proposes to infuse computer science (CS) and math education with computational thinking (CT) so CS is more integrated, relevant, and interesting for students, with professional development (PD) and evaluation frameworks for teachers. Students in eDGE will program games and STEM simulations in 5th grade core classrooms addressing math and *CS standards* aligned to CSTA and Common Core State Standards for Math (CCSS-M). The Design Based Implementation Research with *iterative development* is a collaboration between researchers at eMINTS, University of Missouri, University of Colorado Boulder, SRI, and 5th grade educators in Missouri rural schools. *The student outcome delayed treatment study in CS* involves 47 schools and 1880 students with a vision for scale in over 200 eMINTS supported school districts.

eDGE builds on prior research with eMINTS *What Works without Reservations* for student achievement and the *oDreams project* which *demonstrated very high student motivation* outcomes with 78% girls, 68% boys, 74% URM, and 76% white students wanting to pursue additional computer courses. eDGE focuses on *CS education as an absolute priority and STEM as a secondary,* innovatively combining CT tools of CS with math, project-first instruction, and design-based implementation for relevant and engaging learning. Teacher PD will include 2 facilitated, self-paced courses with *eMINTS coaching support*. Results will inform research on *STEM learning integrating 5th grade CS and math standards*. eDGE schools will be *high-poverty rural with underrepresented populations in STEM where at least 40% of students qualify for free and reduced lunches*. SRI will complete an external evaluation of student motivation, interest, and CT transfer, and teacher efficacy with remote PD; curriculum and coaching will be assessed for future game design projects with AgentSheets, Inc. 3D software.