The Columbus State University Science, Technology, Engineering, and Mathematics Education Improvement Plan

Abstract

Columbus State University has been actively involved in the University System of Georgia's STEM Initiatives for several years. Through its involvement in programs such as the Woodrow Wilson Fellowship Program, the UTeach Program, an NSF Robert Noyce Teacher Scholarship Grant, and other initiatives, Columbus State has focused on STEM and particularly in the area of STEM teacher preparation. Now Columbus State University wishes to continue this tradition by engaging in the Columbus State University Science, Technology, Engineering, and Mathematics Education Improvement Plan that aims to increase retention and progression of students in the STEM fields through enhanced pedagogy at the university level, create partnerships with area school systems, and increase recruitment of students into STEM fields and STEM education.

STEM Innovation Grants

In an effort to explore research-based pedagogies in the areas of STEM, faculty will be invited to participate in a STEM Innovation Fund grant project, which provides stipends to faculty for initiatives aimed at providing faculty development directed new pedagogies for STEM classes. This initiative is tied directly to Complete College Georgia goals to increase degree completion rates of STEM majors and STEM teacher candidates. Columbus State University proposes to better prepare STEM teachers for schools in the region, thereby creating a virtuous cycle where improved STEM teaching results in increased numbers of high school graduates ready to enter STEM fields and STEM teaching fields at the college and university level. Columbus State University has successfully piloted such a program in the past where of 75 faculty members in "traditional" STEM departments (Biology, Chemistry, Earth and Space Sciences, Computer Sciences, and Mathematics) or 75 faculty members when including Computer Science, Psychology, and Science Education faculty members, 15 faculty members completed at least one semester's faculty development activities toward flipping lectures and introducing active learning techniques: using the stricter interpretation of STEM departments, involving 20%, of STEM faculty. But there is more to be done. Columbus State University proposes the involvement of at least 20-25% of STEM faculty each year in such professional development initiatives.

Partnerships with Area School Districts

In the next year, CSU proposes to develop partnerships with area school districts in order to provide professional development opportunities for established STEM teachers, and to provide deeper induction support for less experienced STEM teachers. Induction programs provide support and guidance to teachers in the early stages of their careers.

Induction programs encompass orientation to workplace expectations, socialization, mentoring (with a content-area mentor chosen through a rigorous process and provided training). Induction programs also provide ongoing professional development, sufficient time for mentors and new educators to meet, and utilizes formative assessment to allow new educators to proceed with their professional development.

Many STEM teachers leave the profession in the first 3-5 years creating a vicious cycle in that universities and colleges must increase the numbers of STEM majors entering the teaching profession at the same time that STEM preparation of students in the K-12 schools is less rigorous. The CSU – USG STEM Education Improvement Plan proposes to reverse that cycle by providing funding so that new teachers can be supported by a graduate student and CSU Master Teachers who will visit new teachers in their classrooms in order to address new educator-identified concerns and provide support. This will be a comprehensive induction program, modeled on research based best practices such as those found discussed by the National Association of State Boards of Education.

Recruitment of STEM Majors into Teaching

Columbus State University has a history of preparing students in the STEM fields to teach in k-12 schools in the region. Columbus State, in cooperation with the UTeach and Woodrow Wilson programs, have worked to prepare both undergraduate and graduate students for teaching in the STEM fields. Now Columbus State University proposes to grow the approaches piloted in the UTeach and Woodrow Wilson programs in order to scale them to meet the current shortage in qualified mathematics and science teachers. In order to accomplish this goal, Columbus State University must continue to recruit additional STEM majors into teaching. The Step 1 and Step 2 courses developed for UTeach provide students with an introduction to teaching and gives them hands-on experience teaching inquiry based lessons in area elementary and middle school classrooms. This approach helps to recruit additional STEM majors, who might otherwise never consider teaching, into pursuing teacher certification. The success of these courses revolves around the CSU UTeach Master Teachers who are experienced classroom teachers who teach these two courses. Since these courses are also recruitment tools, it is crucial that the experiences students have in the courses and in the lessons they teach in area schools are highly engaging and representative of current best practices in education. Continued professional development for the CSU Master Teachers is important for this reason as is continued funding for these very important positions.

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