What is your College or School?
School of Education

What is your program?
STEM Education (M.S.E.)

Outcome(s): Identify the program learning outcome(s) that is/are the focus for the 2017-18 Academic Year.
1. Teachers will design and implement instruction and assessments that accurately reflect standards and/or reform documents (e.g. Common Core, NGSS).
2. Teachers will create and implement inquiry- and/or problem-based learning activities.
3. Teachers will effectively use student thinking (e.g. formative assessment) to guide STEM learning.
4. Teachers will effectively use questions to guide STEM learning.
5. Teachers will accurately evaluate their own STEM teaching.
6. Teachers will explicitly and reflectively implement the natures of STEM in their instruction.

Measures: Identify one to three ways you know students learn this outcome.
1) Faculty in the STEM program observe teachers in the program either directly or via video recording. Each of the outcomes listed above are looked for during these observations. Most recently, in STEM 274, course standards were aligned to these programmatic outcomes.

2) Students in the STEM Masters also turn in self-analysis assignments in which they reflect on their own teaching. This directly addresses outcome 5.

3) Students in the STEM Masters program also turn in lesson modifications. From these modifications to lessons, formative assessment of students' progress toward meeting the outcomes is determined. Final assessment/evaluation of the outcomes is determined via the observations noted in number 1.

Findings: Present and analyze your findings this year about student learning in this outcome.
Students who are further along in the program clearly meet and exceed these outcomes and even do so early in individual courses. This makes clear that the outcomes listed are a baseline measure of student learning and that students in the program go well beyond these outcomes. Our analysis also makes clear that students achieve the intended outcomes before the end of the program.

Conversely, students who are early in the program struggle to achieve the program outcomes as assessed in individual courses. This initial struggle illustrates that the program outcomes are not simply a low bar, but that students in the program must work to understand and practice implementation of STEM instruction related to the outcomes.

More specifically, students in the program tend to struggle with outcomes 1, 3, and 6. For outcome one, they struggle to create assessments aligned to the NGSS. While they are able to do

so, we find students need more support in the assessment area. For outcomes 3 and 6, students demonstrate these outcomes, but our observations indicate that they do not engage these skills as consistently as they do other outcomes.

When observing graduates of the program, we

Actions: Discuss next steps and action items for what the department will do based upon its findings and analysis.

Given the struggles with assessment, STEM coursework has already started giving increased attention to assessment of the NGSS. The new performance expectations require teachers to move away from the way they were assessed or the way they have assessed in the past. Examples are being developed and more explicit attention is and will be drawn to how the assessment of the STEM courses aligns to performance-based assessments.

For outcomes 3 and 6, more consistent attention will be given to these outcomes in STEM courses. In the past, instructors have attempted to draw students' attention to using their ideas during instruction. However, students may not fully grasp this idea because it is their ideas being used. Moving forward, one strategy that will be tried is engaging video of effective STEM instruction that can be paused and then students can be explicitly asked to reflect on how the teacher in the video used students ideas (or explicitly and reflectively addressed the natures of STEM).

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