

AUTHENTIC ASSESSMENT TO ENGAGE STUDENTS AND EQUIP THEM WITH MODERN SKILLS

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ABSTRACT

The ACSME 2020 theme reminds us that science graduates, including mathematics graduates, need broad skills so that they can contribute meaningfully to solving important problems and adapt quickly in the face of uncertainty. It is not enough that a graduate can solve any problem in the textbook, they need to see the potential ways that their skills can contribute to the big picture, and they must be able to articulate this potential to non-mathematicians. In a way, they must be storytellers. Well-designed authentic assessment tasks, as championed by Wiggins since the 1980s, ask students to solve problems that seem real and a little messy. They allow students to do work that seems personal, and of which they are proud. This allows students to see the value of their discipline, and to practice the many competencies that graduates need but we often do not explicitly teach or assess. Authentic assessment tasks can be implemented in courses large and small, and at any year-level.

In this workshop, you will develop an idea for an authentic assessment item in an undergraduate mathematics or science course, and a marking criteria for the assessment. The goal is to leave with a plan for a task that you can implement in a course that you teach and a marking criteria that encourages students to buy-in to the task in the way that you want them to.

To guide you, we will describe examples of authentic assessment tasks, and the corresponding marking criteria, that have proved effective for undergraduates in mathematics. These examples have been tried and tested by the presenter over 13 years teaching undergraduate mathematics in the liberal arts setting in the USA, and two years teaching quantitative material to science students in a large course for first-semester first-year science students at the University of Queensland (UQ).

Please find attached one of the example tasks and the marking criteria. This task was developed by the presenter for a large first-year interdisciplinary science course compulsory at UQ. In each semester since it was implemented, a majority of students reported that the assignment itself had a positive impact on their attitudes to and perceptions of science, mathematics and computer programming.

PLAN FOR WORKSHOP

10 minutes: Introduction and Why authentic assessment?

40 minutes: The anatomy of four examples (each a 5 minute description followed by 5 minutes of table discussion)

- A program for a fictional science museum
- An article for a fictional mathematics journal
- Peer feedback via referee's reports
- Tell the story of the course: Revision for a course by writing a mini textbook

10 minutes break

10 minutes: Identifying the skills that you want students to demonstrate (group work with groups formed by type of course)

20 minutes: Brainstorming a scenario (think, pair, share)

20 minutes: Workshopping scenarios (group work)

10 minute break:

10 minute: More scenario development (group and individual work)

10 minute: Ideas for marking criteria

25 minute: Marking criteria development (group and individual work)

5 minute: wrap up

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