

Rethinking TMMs

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Our Task

- Currently, the TMM descriptions consist of a wonderful “prelude” paragraph (which is often ignored) along with a detailed “topics list.” Courses are approved based on what is covered... which may or may not be representative of what the students actually learn.
- In August 2014, Jeff and Carl were tasked with re-envisioning the TMM 001 – 003 descriptions to focus more on the “core” ideas of these courses and less on a copious list of granular skills. The project was put on hold in September.
- In April 2015, Pramod and Lee volunteered to join Jeff and Carl on the re-envisioning process, with work beginning in earnest in June.
- Today, we’ll present our thoughts on a possible future framework for TMMs. We’d like feedback from the panel to see if this is a direction we should pursue.

Our Inspirations

- Our subgroup reviewed the outcome descriptions for following:
 - English Composition First Course:
<http://regents.ohio.gov/transfer/otm/english-comp/TME001-First-Writing-Course.pdf>
 - English Composition Second Course
<http://regents.ohio.gov/transfer/otm/english-comp/TME002-Second-Writing-Course.pdf>
 - Foreign Language
https://www.ohiohighered.org/transfer/foreign_language_initiative_documents
- We found the structure of these descriptions appealing: there are “big ideas” – “general area” learning outcomes – which are common to all courses in their group. Each course contains specific learning outcomes and suggested performance indicators which support these “general area” learning outcomes. The description ends with a summary of what the students should learn by the time they complete the course.
- After some discussion (including some inspiration from the 2012 Remediation Free Standards) we identified the following “big ideas” which are common to courses in the Math, Stats, and Logic area.

Some “big ideas”:

- *Communicates Mathematically:* A student clearly communicates to others situational understanding, deductions, and conclusions using mathematical tools: notation, equations, graphs, etc.
- *Reasons Mathematically:* A student can follow and make logical deductions and conclusions based on observations and interpretations of a presented situation.
- *Fluency with Notation:* A student can properly use, interpret, and apply written and graphical symbols in context.
- *Fluency with Equivalent Expressions:* A student can follow and purposefully create equivalent expressions as well as appraise equivalency.

Some more...

- *Proficient with Representations and their Correspondences:* A student is proficient at encoding and deciphering information using interrelated symbolic and graphical representations.
- *Modeling:* A student is able to build mathematical descriptions of structure, patterns, and processes.
- *Appropriate Use of Technology:* A student is proficient at choosing and applying technology as well as interpreting results within a given context.

TMM 001: “College Algebra”

Courses matched to TMM001 are those which introduce students to the analysis of elementary functions. The function families studied include linear, quadratic, higher-order polynomial, rational, exponential, logarithmic, radical, and piecewise-defined functions (including absolute value.)

TMM 001 Example:

- *Reasons Mathematically:* Can follow and make logical deductions and conclusions based on observations and interpretations of a presented situation.
- A student understands rules, including procedures, templates, theorems, conjectures, etc. and the necessary conditions for their application.
- Sample Task for Polynomial Functions: Given a polynomial function, a student uses the Rational Zeros Theorem to identify *possible* rational zeros and a graphing utility to narrow the list to *probable* rational zeros. The student then uses the Factor Theorem to verify the zeros and factor the polynomial.

Challenges:

- Determining a complete, independent set of “general area” outcomes. (Like a basis.)
- Determining a complete, independent set of indicators for each course. (Tied to the current content outcome.)
- Determining how much (or little) evidence we expect institutions to submit to show outcomes are met (and how much we’re willing to review.)
- Keeping things general enough to allow for academic freedom (since courses vary within the institution, too!) but specific enough to ensure meaningful course-to-course transfer.