A Mastery Learning Model for Assessing Competency of Medical Students Using Portfolios

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Introduction: Student assessment in most medical schools relies on a combination of multiple-choice examinations to test factual knowledge, OSCEs (Objective Structured Clinical Examinations) scored by standardized patients or observing faculty to test clinical skills, and global assessments of knowledge, skills and professionalism ("attitudes") by faculty and residents on clerkships. Such assessment processes reinforce a reliance on "grading" by authority figures, as opposed to the self-assessment needed to become effective self-directed learners. Our objective was to create a student assessment process that would specifically develop students' skills of reflective practice[1] – their ability to accurately describe, analyze and evaluate their performance and to identify and follow through on effective learning plans – using multiple formative assessments of achievement of faculty-defined competencies.

Methods: We based our assessment process on a mastery learning model[2], using criterion-referenced, not time-referenced, and performance assessments. Students build an electronic educational portfolio across all years of the curriculum, complete formative portfolio reviews with their assigned Physician Advisers (PAs) several times each year, and are promoted based on annual reviews for which students present a summary portfolio documenting their mastery of the program's nine competencies (Figure). There are no grades or numerical scores for any components of the portfolio and no class ranking. Demonstration of competencies cuts across courses, learning experiences within courses, and years in the program.

Evidence includes feedback from faculty, peers, and other professionals. Assessment forms are linked directly to the nine competencies and use behavioral descriptors of the expected level of achievement, rather than numerical rating scales. Assessors must provide narrative comments on areas needing improvement and areas of strength. For medical knowledge, students track their own mastery of factual information using self-assessment quizzes and receive faculty feedback on answers to essay questions that require integration and application of concepts. Clinical skills and reasoning are assessed by OSCEs, direct observations by clinical preceptors, and patient logs and journals. Most of the evidence is online and immediately available to the PAs, allowing them to track performance of their students closely. Before each Formative Portfolio Review (Figure), students review the evidence, write essays reflecting on their professional development and their mastery of the competencies, and meet with their PAs to agree upon learning plans to address areas of weakness and develop areas of strength. In Year 1, as they develop skill in analyzing their evidence and creating portfolios, students review new, curriculum specific competencies for each Formative Review and all nine competencies in their first Summative Review (Figure).

Results: During this first year of implementation, we used frequent written and focus group feedback from students, PAs and other faculty to develop, modify, or enhance faculty development programs and written and workshop instructions for students. A key element of faculty development for the PAs was a review of blinded student portfolios to improve consistency of implementation.

Discussion: This unique approach to student assessment expands on prior work on using portfolios for assessment of medical students[3,4] and provides a framework for development of reflective practice skills. The mastery-learning model, learner-centered approach, and use of portfolios are well suited to

assessment in graduate medical education and potentially an effective means of accomplishing the goals of the ACGME Outcomes Project.

References:

1. Schön DA. The Reflective Practitioner. Basic Books, 1983.
2. Block JH, ed. Mastery Learning: Theory and Practice. NY: Holt, Rinehart and Winston, 1971.
3. Davis M, Friedman M, Harden R, Ker P, McGhee M, Pippard M, & Snadden D. (2001). Portfolio assessment in medical students' final examinations. Medical Teacher, 23(4), 357-366.
4. Diessen E, Tartwijk J, Vermunt J, van der Vleuten C. (2003). Use of portfolios in early undergraduate medical training. Medical Teacher, 25(1), 18-23. Supported in part by Grant L2004-0031 from The Cleveland Foundation, Cleveland, OH. Any data presented will be derived from an IRB approved database.

FIGURE. PORTFOLIO PROCESS FOR YEAR 1

Shaded boxes indicate competencies tracked for each block of the Year 1 schedule.

	Jul 12–Sep 17	*Sep 27–Nov 24*	**Nov 29–Feb 18**	**Feb 21–Apr 22**	**Apr 25–Jun 10**
Year 1 Courses	**Research**	**CV/Pulm/Heme I**	Renal and MS/Neuro	**GI and Endo/Repro**	**Heme II, Immunol, Micro**
		Foundations of Clinical Medicine			
COMPETENCIES	**Research**	**Research**	**Research**	**Research**	**Research**
	Medical Knowledge	Medical Knowledge	Medical Knowledge	Medical Knowledge	Medical Knowledge
	Communication	Communication	Communication	Communication	Communication
	Professionalism	Professionalism	Professionalism	Professionalism	Professionalism
		Personal Development	Personal Development	Personal Development	Personal Development
			Clinical Skills	Clinical Skills	Clinical Skills
			Clinical Reasoning	Clinical Reasoning	Clinical Reasoning
					Health Care Systems
	Reflective Practice				
	Formative	Formative		Formative	Summative
Student Portfolio Reviews					