

Assessment Plan Reporting Template (APRT)
Virginia Community College System
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Quantitative Reasoning, Spring 2008

PART A

1.0 Definition of Terms

- 1.1: Identify the core area to be assessed. How is it defined? How does it relate to the institution's mission and goals?

Quantitative reasoning will be assessed. Quantitative reasoning is defined in the Virginia Community Colleges Policy Manual as the "skills and knowledge necessary to apply the use of logic, numbers, and mathematics to deal effectively with common problems and issues." As a General Education goal, quantitative reasoning is an expected outcome of degree graduates from the 23 diverse colleges that comprise the Virginia Community College System.

- 1.2: Identify the criterion or criteria that indicate competency in the core area. This could be a cutoff score, performance benchmark, or rubric that will be used to mark a competent student performance.

Using data from the spring 2004 pilot administration of the quantitative reasoning (QR) assessment instrument developed by James Madison University (JMU), a VCCS advisory group engaged in the 'Bookmark' standard setting procedure. The 'Bookmark' procedure involves the ranking of items from least to most difficult. Participants in the standard-setting workshop reviewed test items and placed a bookmark at the location within the items where a 'proficient' student would be expected to complete the items correctly. The same procedure was repeated for setting an 'advanced' standard. During the two-day standard-setting workshop, faculty representatives held discussions regarding item difficulty, student performance, and faculty expectations. Minimum scores were identified that corresponded to performances indicating 'proficient' and 'advanced' skills in quantitative reasoning.

- 1.3: Describe the learning objectives for the defined core area.

As defined by systemwide General Education goals and objectives, Virginia Community College degree graduates will demonstrate competency by:

- *Using logical and mathematical reasoning within the context of various disciplines.*
- *Interpreting and use mathematical formulas.*
- *Interpreting mathematical models such as graphs, tables and schematics, and draw inferences from them.*
- *Using graphical, symbolic, and numerical methods to analyze, organize, and interpret natural phenomena.*
- *Estimating and consider answers to mathematical problems in order to determine reasonableness.*
- *Representing mathematical information numerically, symbolically, and visually, using graphs and charts.*

2.0 Methodology

- 2.1 Describe the value added analytic approach being used, with reference to the *Guidelines* (p. 8, ff.)

Virginia's Community Colleges will engage in a cross-sectional analytic approach (i.e., Value-Added Approach Two from the Guidelines) to determine the value that is added to degree graduates of Virginia's Community Colleges in the core learning area of quantitative reasoning.

- 2.2 Explain how educational experiences at the institution produce student learning and reasons for choosing the analytical approach in 2.1.

As a General Education goal, quantitative reasoning is an expected outcome of degree graduates from the 23 diverse colleges that comprise the Virginia Community College System. The educational experiences that produce student learning in this goal area vary by community college and degree program. The cross-sectional analytic approach was chosen for its strength of fit with the diversity of Virginia's Community Colleges and relative to other value-added analytic approach options. As is common among students enrolled at community colleges, course taking patterns of students enrolled at Virginia's Community Colleges are non-linear and time-to-degree varies significantly among completers. Therefore, longitudinal measures of student learning, while desirable for providing evidence of changes within the same group of students, are impractical and inappropriate. Measures of student

learning that rely on the use of such instruments as the SAT and ACT to predict student performance on future assessments are equally impractical for community colleges as only a small portion of the total student population has completed and/or submitted SAT or ACT scores. A cross-sectional approach, which permits for college-level flexibility in administration, was selected to demonstrate the value added to degree graduates by Virginia's Community Colleges while accommodating the non-linear course taking and enrollment patterns and varied times-to-degree of community college students.

- 2.3 Elaborate upon the expected reliability and validity of the analytical approach mentioned in 2.1.

The cross-sectional approach will be used to draw inferences about the differences between the pre and post populations assessed and not changes within individual students. Attrition is a concern when using a cross-sectional analytical approach and is to be expected given the course-taking and enrollment patterns of community college students. In recognition of this obstacle to validity, a larger number of pre-tests will be administered relative to post-tests.

- 2.4 Explain generally the student population from which samples, cohorts, or groups will be drawn. This section should include specific mention of factors relevant to assessment, such as student population size, completion rates, number of transfers that are relevant to assessment.

All colleges will administer the JMU QR to a pre-test group which consists of students who are in their first semester and a post-test group which consists of students who are in the semester just prior to their degree graduation.

In the 2006-2007 academic year, 11,585 associate degrees were awarded by Virginia's Community Colleges (from http://research.schev.edu/Completions/C1_report.asp). In the fall of 2007, VCCS colleges enrolled 50,746 first-time students (from: <http://system.vccs.edu/vccsasr/Research/stat07.htm>). A pre-test sample of least 10% or 100 first-time students, whichever is greater, will be sought from each college. A post-test sample of sample of 10% of graduates or 50 graduates, whichever is greater, will be sought from each college. The use of a larger absolute value of students (i.e. 100 first-time students versus 50 graduates) reflects a larger number of first-time students relative to graduates, while acknowledging that many colleges have fewer than 1000 first-time students each semester.

- 2.6 Explain the technique used for data collection with reference to the *Guidelines* (p. 11, ff.), including such factors as whether the data will be collected in the classroom (course embedded) or outside the classroom (single setting).

Variations in the populations served by Virginia's Community Colleges drive variations in college-level academic policy and procedure, which in turn necessitate some flexibility in the data collection. For example, the populations served by many rural community colleges have permitted for the creation of college-wide assessment days in which students are required to participate in assessments. Such policies, while desirable from the standpoint of data collection, are far less feasible in highly competitive or transient markets such as Northern Virginia and Tidewater where students may come to campus occasionally and only to participate in instructional activities. As a result of these variations in student populations, systemwide efforts to create an assessment plan have resulted in narrow set of options for pre- and post- test administration that meet the local needs of colleges.

Consistent among all colleges, two groups of students will be evaluated in a single setting using the same instrument. All colleges will administer the JMU QR to a pre-test group which consists of students who are in their first semester and a post-test group which consists of students who are in the semester just prior to their degree graduation.

Based on the student populations served by the colleges, pre-test data will be collected by administering the JMU test of quantitative reasoning to the colleges' choice of: (a) students enrolled in student development courses or (b) students participating in single setting test administrations. The sample shall include only those students who are in their first semester at the college.

Post-test data will be collected by administering the quantitative reasoning test in the colleges' choice of: (a) students enrolled in capstone courses or (b) students participating in single setting test administrations. The sample shall include only those students who are graduating at the end of the semester of test administration.

- 2.7 Describe and explain measurement strategies to be applied during the pre assessment with reference to the *Guidelines* (p. 13, ff.).

The JMU QR will be administered to students as the pre-test. The instrument consists of exclusively selected response items. The test has been aligned with VCCS learning objectives.

- 2.8 Describe and explain measurement strategies to be applied during the post assessment with reference to the *Guidelines* (p. 13, ff.).

The same JMU QR will be administered to students as the post-test.

- 2.9 Explain the nature of value added given 2.7 and 2.8.

The same instrument will be administered as the pre and post assessment to different groups. The differences in mean scores will be used as a proxy measure for the value-added by community colleges in the area of quantitative reasoning. It is acknowledged that such a measure is limited by other factors that may affect student performance on pre- and post-assessments such as maturation and student motivation to perform their best.

3.0 Process evaluation

- 3.1 Describe and explain how the results will be reported to institutional units, students, and external constituents.

College-specific results will be reported to each college president and institutional research officer. These results will include student-specific information and summary information such as pre- and post-test standard deviations, mean scores for pre- and post-test administrations, and mean score differences between administrations. College presidents and institutional research officers will be encouraged to use data to improve student learning, as possible. System-level results will be reported to the Chancellor and Vice Chancellor for Academic Services and Research.

- 3.2 Describe how the results have been and will be used to improve educational experiences and advance the mission of the college or university.

Previous administrations of the quantitative reasoning instrument, as part of a competency-based approach to assessment, have provided colleges with information concerning the competency of graduates and have been used by some colleges to make instructional improvements. Given an appropriate amount of time to analyze and make use of the results from a value-added approach to assessing student learning in quantitative reasoning, college-specific improvements in learning will be sought as identified necessary by results.

<Item 3.3 relates to the costs of the proposed assessment. The question and response are tangential to the implementation discussion and have been omitted.>

PART B

4.0 Data Presentation (leave blank until data is due)

- 4.1 Explain any challenges to data collection, and how they were addressed..
- 4.2 Describe the value-added (or competency) information/data that was collected. This information should include, but is not limited to, quantitative or qualitative summaries of the differences between pre and post assessments or any performance data
- 4.3 Describe any additional evidence of value added (or competency); this might include faculty testimony, student retention, or post graduation evidence.