**Assessment Trend Report**
**Student Learning Outcomes in Quantitative Reasoning**

November 2009

The goal of this report is to evaluate the assessment of student learning outcomes in Quantitative Reasoning. The report addresses four key questions to evaluate the quality of our assessment processes.

**(1) How have we sustained the assessment effort over a multi-year period of time?**

How many years have you completed an annual assessment report?

__X__ 2006 __X__2007 __X__2008 __X_2009

The assessment reports for the Quantitative Reasoning (QR) component of the University Studies curriculum have been prepared by Joe Stickles for the last three years, before that it was collected by Dan Miller. The learning goals were developed for the 2006-7 academic year by a team comprised of James Rauff and Joe Stickles from Math/CS, James St. James from Behavioral Sciences, and Jo Ellen Jacobs from Philosophy.

**(2) How do we systematically and comprehensively collect and analyze data about student learning?**

The learning goals for the Quantitative Reasoning requirement are:
A student who successfully completes a Millikin QR course will demonstrate the ability to:

1) Use deductive reasoning in a formal, symbolic, axiomatic system, and
2) Apply the theorems of the system to solve appropriate problems.

The data is collected as appropriate in each class, depending on the type of artifact, and then compiled and analyzed by each individual faculty member, who then sends his or her results to Dr. Stickles. Both direct and indirect assessment methods are used. The indirect assessment is done through review of syllabi to ensure that the appropriate learning goals are included for each course. For the direct assessment, each instructor randomly selects five students from each course and assesses the quality of response to two different exam questions, one targeted at each learning goal. The responses are not evaluated merely as correct or incorrect, but the quality of reasoning used in the problem-solving process is also recorded.

| | **Student Learning Outcome 1** | **Student Learning Outcome 2** |
|---|---|---|
| AY 2006-07 | GREEN | GREEN |
| AY 2007-08 | GREEN | GREEN |
| AY 2008-09 | GREEN | GREEN |

**(3) How do we use the analysis to improve curriculum and pedagogy and to inform decisions about budgets and strategic priorities?**

Faculty from three departments (Mathematical and Computer Sciences, Behavioral Sciences, and Philosophy) teach QR courses, and there is limited discussion between the departments about the contents of the annual reports, and virtually no discussion with adjunct faculty who teach QR courses in the PACE program. Within the Math/CS department (which teaches the vast majority of QR courses), there is a well-established continuous conversation between departmental members about student learning, and issues that are raised by assessment are handled through one-on-one or small group discussions, but those discussions do not generally involve members of the other two departments. Each report is emailed to the Dean of Teaching and Learning and posted on the Millikin University web page.

The student learning outcomes have been rated as green in all categories for all years for which there is data, and the percentage of students whose answers have rated as Good (versus Average or Poor) has increased each of the last two years. Part of the increase can be connected to a change made in the Statistics course taught in the Behavioral Sciences Department. Initially, the exam questions chosen for analysis in that course were multiple choice, meaning that the answers were either right or wrong, and no analysis of student reasoning could be completed. After seeing assessment data, however, this was changed, and there are now free-response questions on the Statistics exams which are used in assessment. Not only did this elicit more in-depth responses from students, but it also indicated that their reasoning skills were stronger than the multiple choice exams demonstrated.

**(4) How do we evaluate, modify, and continue to improve the student learning assessment process in this program?**

There was a significant change in the assessment process from the first year of assessment and the last three, as it was determined that the initial learning goals were not assessable, nor did they properly apply to all QR courses. The QR team from the 2006-7 academic year was formed to address this issue.

While there has been a significant pedagogical change as a result of assessment, there have not been significant curricular changes based on assessment data. The Math/CS department has added a new course which meets the QR requirement, but that was in response to the needs of students in the elementary education program.

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**Evaluation from Focus Visit Leadership Team (includes Academic Deans, Program Leaders, and Focus Visit Report Writers)**

**Rating: Green**

| Academic program | Goal 1 (multi-year) | Goal 2 (data collection) | Goal 3 (Use assessment to improve) | Goal 4 (improve assessment) | Total |
|---|---|---|---|---|---|
| **Quantitative Reasoning** | 3 | 3 | 2 | 2 | 10 |

Based on the four questions/criteria, the Focus Visit Leadership Team rates the Quantitative Reasoning requirement as Green. The learning outcomes have been rated green for the last three years, indicating that students across the university are certainly meeting the learning goals. Pedagogical changes have improved the quality of assessment, especially in the Behavioral Sciences Department. Additionally, the culture of assessment within the Math/CS Department ensures that there is an ongoing conversation about QR courses within that department. There is needed improvement in sharing data and discussing the results of assessment on QR courses across all department programs, including the PACE program.