

# VAIGS Mini-Report: CORE COMPETENCIES for Student Assessment and Program Effectiveness



Academic Years 2015-16 and 2016-17

## GOALS

- To discern student progression over time by evidence of scientific and professional growth
- To assess the congruence of faculty and student assessment of student achievement value
- To leverage the Core Competency outcomes as direct measures of VAIGS program effectiveness

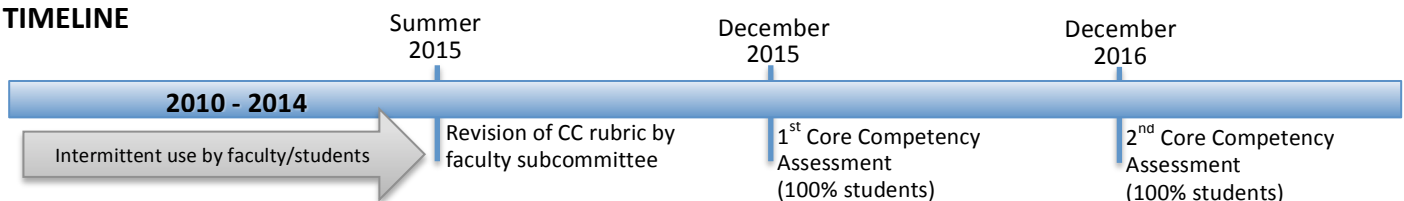
## RATIONALE

The VAIGS Core Competencies articulate the expected student outcomes for doctoral training in biomedical research at our institution. The Core Competencies rubric is used by graduate students and their thesis advisers for formative assessment of progress towards degree expectations. Data are also collected for program review, as one indication of whether the school is accomplishing appropriate learning outcomes in our students.

## BRIEF DESCRIPTION OF THE CORE COMPETENCIES

The 19 competencies in the domains of knowledge, research, communications, and professionalism and ethics were first developed in 2010, as was a rubric for evaluating student achievement of those competencies. The language of the competencies and rubric was revised in 2015. Student achievement in these areas is measured annually on a scale of five levels: beginning, intermediate, advancing, heightened, and exceptional.

## TIMELINE

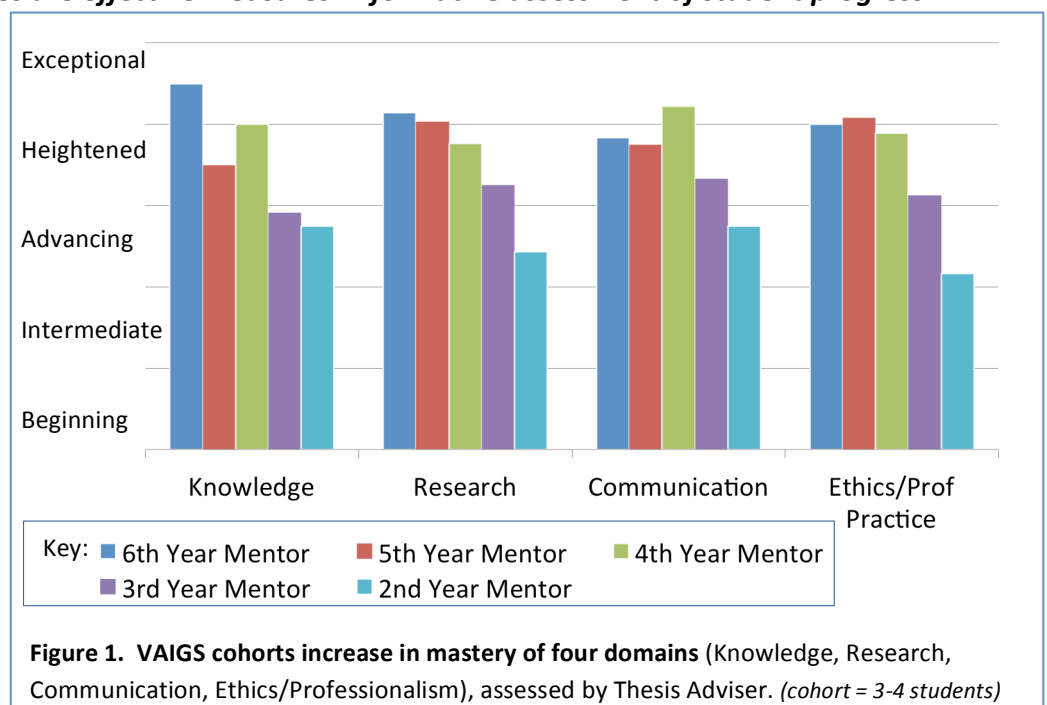


## RESULTS

### Claim 1. Core Competencies are effective measures in formative assessment of student progress.

In general, the data from Core Competencies demonstrate student progression as a function of time in VAIGS' program.

**Figure 1** compiles thesis adviser scores for each domain, for each cohort. Total number of *Heightened* or *Exceptional* ratings increases in advanced cohorts, particularly for Knowledge, and Research domains. Confounding variables include rater and cohort variability.



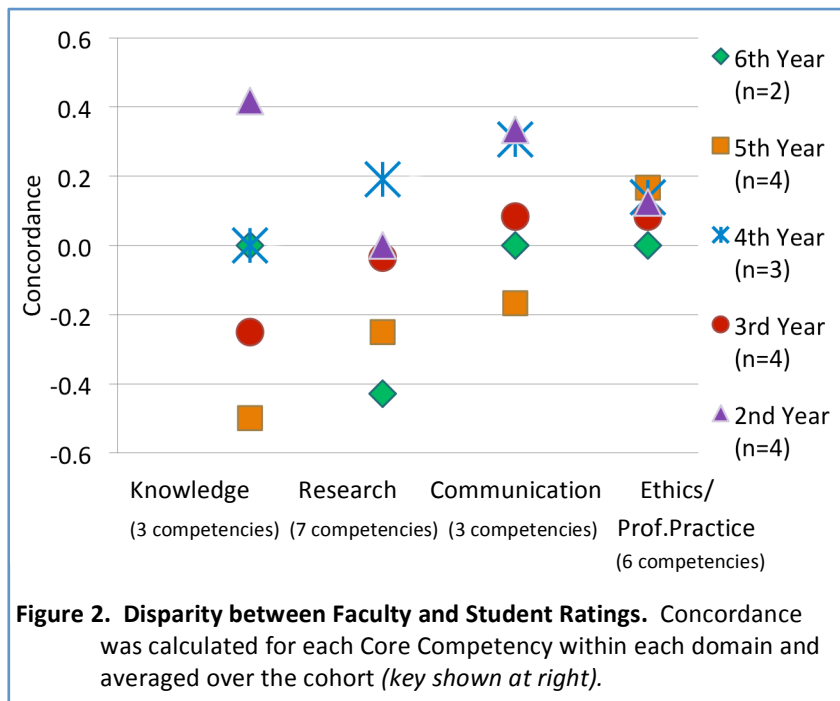
**Claim 2. Core Competencies define mastery in formative manner between thesis adviser and student.**

In order to determine the effect Core Competencies have on the understanding of mastery in science, we compared the concordance of scores from faculty to student. Concordance equals:

$$\text{average } \left[ \frac{(\text{faculty score}_x) - (\text{student score}_x)}{\text{across domain}} \right]$$

- Concordance at zero indicates that the student and faculty were in agreement.
- Positive concordance indicates that mean faculty rating of student mastery was higher than mean student rating.

Figure 2 shows highest concordance over all four domains for 6<sup>th</sup> year or 2<sup>nd</sup> year cohorts. Discordance is highest among 4<sup>th</sup> and 5<sup>th</sup> year students where student ratings are consistently higher than mentor ratings.



**Figure 2. Disparity between Faculty and Student Ratings.** Concordance was calculated for each Core Competency within each domain and averaged over the cohort (key shown at right).

**Claim 3. Evidence from Core Competencies annual assessment drive VAIGS program changes.**

To identify Core Competencies where VAIGS’ program may not adequately prepare students, thesis adviser ratings were used to determine whether VAIGS students excel or lag in development of specific core competencies.

The data indicate that by 6<sup>th</sup> year, all students have achieved *Heightened* to *Exceptional* ratings for the Research domain. However, further professional development is needed in Ethics and Professional Practice.

**CONCLUSIONS**

Core Competencies articulate a strong set of explicit expectations for student learning outcomes in our graduate program. The rubric, as a developmental framework, aids the thesis adviser in monitoring and understanding their student’s progress and facilitates accountability for the student.

**Table 1. Using Core Competencies for Program Review by evidence of Lags**

Domain / Core Competencies	2 <sup>nd</sup> yr	3 <sup>rd</sup> yr	4 <sup>th</sup> yr	5 <sup>th</sup> yr	6 <sup>th</sup> yr
<b>Knowledge</b> (3 total competencies)					
Describe key concepts in biomedical science					
Know scientific literature relevant to research area					
Place core concepts in the relevant clinical context					
<b>Research</b> (7 total competencies)					
Apply creative / appropriate experimental controls					
Use controls appropriately					
Integrate results into relevant models					
<b>Communications</b> (3 total competencies)					
Speaks effectively					
Writes effectively					
<b>Ethics &amp; Professional Practice</b> (6 competencies)					
Manage data with scientific integrity					
Engage in best authorship practices					
Address ethical problems in scientific research					
Comply with safety & regulatory standards					
Display appropriate lab citizenship					
Work collegially & effectively as a team/collaborator					
<b>LEGEND:</b>	<b>LAGS in 2015</b>	<b>LAGS in 2016</b>	<b>Lags in both 2015 and 2016</b>		

**CONTACTS**

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