West Chester University of PA

2017 General Education Assessment

Goal #2: Employing Quantitative Concepts and Mathematical Methods
Goal #6: Making Decisions and Informed Choices Based on Historical, Cultural, or Philosophical Traditions

12-20-2017

GENERAL EDUCATION ASSESSMENT

Quantitative Concepts and Mathematical Methods

Summer 2017

Method

A very limited number of courses within the general education curriculum are assigned General Education Goal #2 (students' ability to employ quantitative concepts and mathematical methods) as their primary goal. In fact, this goal is primary only for courses within the Mathematics department. Thus, in an attempt to involve a larger variety of courses from across the university, instructors of Social Science courses (one of the disciplinary groups for which this goal may be selected as a secondary general education goal), were invited to participate in the assessment process. Four instructors, representing two different departments and three different courses, across two colleges, agreed to participate. Courses included two Economics courses (with 2 sections of ECO112, taught by 2 different instructors, and one section of ECO111) and one Anthropology course (ANT102). Note that all courses were 100 level courses.

Training and norming sessions occurred first during the Summer of 2016. Two different VALUE rubrics were provided to participating instructors for consideration in the assessment of students' demonstration of quantitative concepts and mathematical methods within the artifacts collected within their classes: Inquiry and Analysis rubric and Quantitative Literacy rubric. Participants were asked to consider which components of each rubric they believed were best suited to the assessment of WCU's General Education Goal #2 (students' ability to employ quantitative concepts and mathematical methods) and which components of each rubric they believed could be reliably assessed from their class artifacts. An initial draft of a revised rubric (combining multiple dimensions of each of the two original rubrics) was agreed to by the group. Individual instructors identified which of the included dimensions they believed could be assessed using their class artifacts. All participants then applied this initial combined rubric to artifacts provided by all four instructors. Following this initial assessment process, some additional revisions were made to the combined rubric and used for a second set of artifacts. The rubric accepted by the group for possible use in the assessment of General Education Goal #2 using artifacts across a wide range of possible general education classes included ten dimensions: Topic Selection; Existing Knowledge, Research, and/or Views; Analysis; Conclusions; Limitations & Implications; Interpretation; Representation; Calculation; Application/Analysis; and Communication. Of these 10 dimensions, eight were identified for assessment of General Education Goal #2 using the specific artifacts provided by the four participating instructors (all but Limitations & Applications and Calculation).

A total of 24 artifacts from these four classes were randomly selected for scoring by all four group members and the group leader across three rounds. Following each round of scoring, initial scores were compared and levels of agreement determined. This was then followed by group discussion about each artifact and about the rubrics. Some minor changes were made to

the rubric to clarify points of confusion and/or to better describe specific requirements for individual ratings. A copy of the final revised rubric is available in Appendix A.

The revised rubric was then used to assess a total of 109 artifacts from the four classes described above, with appropriate rubric dimensions identified for each class artifact by the individual instructors. All three Economics instructors selected four dimensions taken originally from the Quantitative Literacy rubric: Interpretation; Representation; Application/Analysis; and Communication. One Economics instructor also selected a dimension from the original Inquiry and Analysis Rubric: Existing Knowledge, Research, &/or Views. The Anthropology instructor selected four dimensions taken from the original Inquiry and Analysis rubric: Topic Selection; Existing Knowledge, Research, &/or Views; Analysis; and Conclusions. As a result of these differences in dimension selections, the number of artifacts assessed varies by specific dimension (as noted in the table below).

The 109 artifacts were distributed among the four coders, with two coders assigned to each artifact, one as primary and one as secondary. Artifacts were scored by both coders using only those dimensions identified as appropriate for each artifact and instructors were never asked to assess artifacts from their own class. Given this methodology, a total of 467 pairs of ratings were collected on a set of 109 artifacts. Agreement was assessed by measuring the number/percentage of rating pairs that differed by no more than 1 point on the associated 5-point rating scale (0-4).

Score Differences/Rater Agreement

Table 1: Score Differences, Quantitative Concepts & Mathematical Methods

	Rating Difference 0 Points	Rating Difference 1 Point	Rating Difference 2 Points	Rating Difference 3 Points	Total # Artifacts Rated	Within 1 Rating Point
Topic Selection	8	13	3	0	24	87.50%
Existing Knowledge, Research, &/or Views	21	29	4	1	55	90.91%
Analysis	8	11	4	1	24	79.17%
Conclusions	7	9	8	0	24	66.67%
Interpretation	47	33	5	0	85	94.12%
Representation	23	39	18	5	85	72.94%
Application/Analysis	35	31	13	6	85	77.65%
Communication	30	43	10	2	85	85.88%

Frequency of score differences within 1 rating point are highlighted. Perfect agreement between coders, across all dimensions, was achieved for 179 of the 467 score pairs (38.33%). **Agreement within one rating point was achieved for 387 of the 467 score pairs (82.87%).**

Final Scores

Primary coder ratings were assigned as final ratings for each of the dimensions for the 109 artifacts when the two coder scores were within one rating point of each other. When discrepancies greater than one rating point occurred, a third coder determined the final ratings. A total of 467 ratings, across eight different dimensions were assigned.

Table 2: Scores by Dimension, Quantitative Concepts & Mathematical Methods

	Below Benchmark (0)	Benchmark (1)	Milestone (2)	Milestone (3)	Capstone (4)	Total
Topic Selection	0	4	1	11	8	**24**
Existing Knowledge, Research, and/or Views	0	2	32	19	2	**55**
Analysis	0	2	12	8	2	**24**
Conclusions	0	1	12	9	2	**24**
Interpretation	1	7	33	19	25	**85**
Representation	1	9	41	16	18	**85**
Application/ Analysis	0	12	38	18	17	**85**
Communication	0	10	42	22	11	**85**
Total	**2 (0.43%)**	**47 (10.06%)**	**211 (45.18%)**	**122 (26.12%)**	**85 (18.20%)**	**467**

Only two of the ratings (0.43%) fell below benchmark level. Four hundred eighteen (418) of the 467 ratings (89.51%) were at milestone level or higher. Across all dimensions, the most frequent rating assigned to any artifact was a rating of Milestone (2 or 3), with more ratings at the lower milestone level than the higher milestone level overall. The preponderance of milestone ratings should have been expected in this case given that all courses included in this assessment were 100-level courses, typically taken by first- and second-year students.

Overall Findings/Interpretation

Inter-rater agreement reached adequate levels for most of the eight dimensions assessed (i.e., most are above 70% agreement within 1 rating point). The agreement level for the Conclusions dimension was somewhat lower (676.67%) than any of the others. It is unclear why the raters had a more difficult time agreeing on this specific dimension. But, in the future, it is recommended that additional time be spent on increasing inter-rate reliability to levels closer to 80% before continuing with the final assessment round.

As mentioned above, a rating of Milestone (2 or 3) was most frequently assigned both within and across all dimensions (71.30%). For seven of the eight dimensions assessed, the Milestone rating of 2 was most frequent while for the remaining dimension (Topic Selection) it was the Milestone rating of 3. As mentioned above, ratings of Milestone are appropriate for students enrolled in these 100 level courses. Interestingly, close to 20% of all artifacts were rated at capstone level overall. Clearly, there were differences between dimensions in the frequency with which this rating was assigned. But, it would be interesting to determine if Capstone ratings were awarded to more advanced students enrolled in these 100 level General Education courses.

Recommendations

The assessment group suggests that the collection of artifacts for the assessment of General Education Goal #2, Employing Quantitative Concepts & Mathematical Models, be continued and that a group of faculty be recruited next year to engage in the assessment process once again. They further suggest that an attempt be made to include a wider variety of courses from across the university in next year's assessment process including both Mathematics and Science courses.

Summary

The preponderance of Milestone ratings (2 and 3) in this sample was not unexpected as all artifacts were obtained from students enrolled in 100 level General Education courses. **It appears that our students are performing at an appropriate level in the area of Employing Quantitative Concepts and Mathematical Methods, at least in the 100 level courses included in this assessment.**

GENERAL EDUCATION ASSESSMENT

Making Decisions and Informed Choices Based on Historical, Cultural, or Philosophical Traditions (Formerly Ethical Decision-Making)

Summer 2017

Method

Instructors of general education courses designed to address General Education Goal #6 (formerly Ethical Decision Making, now Making Decisions and Informed Choices based on either Historical, Cultural, or Philosophical Traditions) were invited to participate in the assessment project at the beginning of the Spring 2017 semester. Four instructors, representing two different departments and three different courses, all within the College of Arts & Humanities, agreed to participate. Courses included two History courses (one section each of HIS100 and HIS101) and one Literature course (2 sections of LIT165, taught by 2 different instructors). Note that all courses were 100 level courses.

For this general education goal, participating instructors were provided an existing rubric to use as a starting point and were asked, specifically, to create a rubric that would allow assessment of the recently revised General Education Goal #6 (revised from Ethical Decision-Making to Making Decisions and Informed Choices based on Historical, Cultural, or Philosophical Traditions). The final report submitted by this assessment group is found below and a copy of the proposed rubric for use in the ongoing assessment of Gen Ed Goal #6 can be found in Appendix B.

General Education Goal 6 Review and Report

Summer 2017

Committee: Rachel Banner, Elizabeth Urban, Shannon Mrkich, Janneken Smucker, Juliet Wunsch

Process:

Reviewed existing rubric, discussed pros and cons.

Discovered and recommend that the wording of goal 6 be altered for direct assessment purposes.

Created a rubric based on the AACU rubric, but reflecting the intent of Goal 6, WCU.

Exercised a norming processes.

Applied rubric to 123 artifacts.

Findings/Proposals and Recommendation below.

Process, Proposed rubrics, Results and Report:

https://docs.google.com/spreadsheets/d/1dLu_SLP6Kl7ol67eeJDfYh7EPuXraftIJN7ktcWOD6Y/edit#gid=506299462

Findings/Proposals:

- Existing Goal 6: Making Decisions and Informed Choices based on either Historical, Cultural or Philosophical Traditions
- Discovery: The act of decision making is complicated to assess. Therefore we Identified skills and knowledge that could be assessed.
- Propose wording change to Goal 6 to make it more assessable::

  To make decisions and to understand how others make decisions based on Historical, Cultural, and/or Philosophical Traditions

- Developed a Rubric to assess goal 6 as proposed above: 4 scale rating system (2 based on knowledge, 2 based on skill set) plus an NA category when assignment does not directly address the question/criteria.)

  NOTE: THIS RUBRIC WILL NOT WORK IF THE WORDING ON THE GEN ED GOAL CAN NOT BE CHANGED!!

- Rubric worked well. No issues with applying it. Straight forward and functional.

- Larger concern: How do we engage faculty in create assignments that support and demonstrate achievement of the goal?? This seems to be the ongoing obstacle. Submissions for assessment do not directly address the goal, so there is a lot of guess work on the part of the scorer.

- This concern could and should be addressed as part of the review process. More direct links can exist once the gen ed goal is clarified and if/when the rubric is shared with the class preparer.

- Ideally the rubric should be distributed before the beginning of the semester (as syllabi are being prepared and finalized)

Rubric in brief:

Goal: To make decisions and to understand how others make decisions based on Historical, Cultural, and/or Philosophical Traditions

Criteria:

- Knowledge (Knowledge of how historical, cultural, and philosophical traditions shapes others' worldviews)
- Knowledge (Self-awareness of one's own historical, cultural and philosophical traditions and ones place within those traditions.)
- Skill (Empathetic analysis that suspends immediate personal judgement)
- Skill (Self-awareness of one's own decision making based on historical, cultural and philosophical traditions.)

Results from 123 scored artifacts:

123 documents accessed... 2 reviewers per artifact				
	knowledge	knowledge	skill	skill
4	4	0	4	0
3+	41	23	43	12
2+	64	33	58	31
1+	14	3	18	11
NA	0	64	0	69

Out of scorable artifacts, percentages :				
	knowledge	knowledge	skill	skill
4	4/123	0/123	4/123	0/54
3+	41/123	23/59	43/123	12/54
2+	64/123	33/59	33/123	31/54
1+	14/123	3/59	3/123	11/54

Percentages	:	knowledge	knowledge	skill	skill
	4	3%	0%	3%	0%
	3+	33%	39%	35%	22%
	2+	52%	56%	27%	57%
	1+	11%	5%	2%	20%

For full documentation:

https://docs.google.com/spreadsheets/d/1dLu_SLP6Kl7ol67eeJDfYh7EPuXraftIJN7ktcWOD6Y/edit#gid=506299462

APPENDIX A

PROPOSED RUBRIC

GENERAL EDUCATION GOAL #2

EMPLOYING QUANTITATIVE CONCEPTS AND MATHEMATICAL METHODS

GEN ED GOAL: Employ Quantitative Concepts & Mathematical Methods

SLO*: Employing Qualitative & Quantitative Methods To Examine the Patterns and Processes of Human Activities (Behavioral & Social Sciences)

(adapted from VALUE Rubrics – Inquiry & Analysis AND Quantitative Literacy)

***Inclusion of SLO is designed to allow use of rubric for upcoming revision of General Education Program**

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.

Employing Qualitative Concepts	Capstone 4	Milestones 3	Milestones 2	Benchmark 1
Topic selection	Identifies a creative, focused, and manageable topic that addresses potentially significant aspects of the topic.	Identifies a focused and manageable/doable topic that appropriately addresses relevant aspects of the topic.	Identifies a topic that while manageable/doable, is too narrowly focused and leaves out relevant aspects of the topic.	Identifies a topic that is far too general and wide-ranging as to be manageable and doable.
Existing Knowledge (Research?), and/or Views	Synthesizes in-depth information from relevant sources representing multiple points of view/approaches (if applicable).	Presents in-depth information from relevant sources representing multiple points of view/approaches (if applicable).	Presents information from relevant sources representing limited points of view/approaches.	Presents information from irrelevant sources representing limited points of view/approaches.
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.	Organizes evidence to reveal important patterns, differences, or similarities related to focus.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities.	Lists evidence, but it is not organized and/or is unrelated to focus.
Conclusions	States a conclusion that is a logical extrapolation from the inquiry findings.	States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings.	States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings.	States an ambiguous, illogical, or unsupportable conclusion from inquiry findings.
Limitations and Implications	Insightfully discusses in detail relevant and supported limitations and implications.	Discusses relevant and supported limitations and implications.	Presents relevant and supported limitations and implications.	Presents limitations and implications, but they are possibly irrelevant and unsupported.

(OVER)

Employing Quantitative Concepts	Capstone 4	Milestones 3	Milestones 2	Benchmark 1
Interpretation *Ability to explain information in mathematical forms (e.g., equations, graphs, diagrams, tables, words, statistics)*	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. *For example, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.*	Provides accurate explanations of information presented in mathematical forms. *For instance, accurately explains the trend data shown in a graph.*	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. *For instance, accurately explains trend data shown in a graph but may miscalculate the slope of the trend line.*	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. *For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.*
Representation *Ability to convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words, statistics)*	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Competently converts relevant information into an appropriate and desired mathematical portrayal.	Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate.	Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate or the conversion of information is not complete.
Calculation *Clearly convert numeric data using mathematical logic where the derivation consists of an easy to follow and interpret result (e.g., using equations and numbers to derive quantitative numerical or algebraic answers)*	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.).	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem.	Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem.	Calculations are attempted but are both unsuccessful and are not comprehensive.
Application/Analysis *Ability to make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis.*	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work. No errors that reflect a misunderstanding of cause and effect are committed.	Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work. No errors are committed.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgements, drawing plausible conclusions from this work. Some common errors may be committed.	Uses the quantitative analysis of data as the basis for tentative, basic judgements, although is hesitant or uncertain about drawing conclusions from this work. Serious errors are committed.
Communication *Expressing quantitative evidence in support of the argument or purpose of the work (in terms of what evidence is used and how it is formatted, presented, and contextualized).*	Uses quantitative information in connection with the argument or purpose of the work, presents it in an effective format, and explicates it with consistently high quality.	Uses quantitative information in connection with the argument or purpose of the work, though data may be presented in a less than completely effective format or some parts of the explication may be uneven.	Uses quantitative information, but does not effectively connect it to the argument or purpose of the work.	Presents an argument for which quantitative evidence is pertinent, but does not provide adequate explicit numerical support. (May use quasi-quantitative words such as "many", "few", "increasing", "small", and the like in place of actual quantities.

APPENDIX B

PROPOSED RUBRIC

GENERAL EDUCATION GOAL #6

MAKING DECISIONS AND INFORMED CHOICES BASED ON HISTORICAL, CULTURAL, OR PHILOSOPHICAL TRADITIONS

Goal 6: Making Decisions and Informed Choices based on either Historical, Cultural or Philosophical Traditions

Gemeral Education Goal 6 Rubric

OR

Goal 6: To make choices and understand how others make choices based on Historical, Cultural and/or Philosophical Traditions.
To make decisions and to understand how others make decisions based on Historical, Cultural, and/or Philosophical Traditions

	Capstone (4)	*Milestone (3)*	*Milestone (2)*	*Benchmark (1)*	N/A
Knowledge (Knowledge of how historical, cultural, and philosophical traditions shapes others' worldviews)	Demonstrates a sophisticated understanding of the complex interplay of historical, cultural and philosophical practices and traditions important to members of other cultures.	Demonstrates a partial understanding of the interplay of historical, cultural and philosophical practices and traditions important to members of other cultures.	Demonstrates a limited understanding of the interplay of historical, cultural and philosophical practices and traditions important to members of other cultures.	Demonstrates minimal or no understanding of the interplay of historical, cultural and philosophical practices and traditions important to members of other cultures.	Assignment instructions do not address the criteria being analyzed.
Knowledge (Self-awareness of one's own historical, cultural and philosophical traditions and ones place within those traditions.)	Demonstrates a sophisticated understanding of their own historical, cultural, and philosophical traditions. Recognizes the complex interplay of those traditions and personal perspective in shaping their world view.	Demonstrates a partial understanding of their own historical, cultural, and philosophical traditions. Recognizes the interplay of those traditions and personal perspective in shaping their world view.	Demonstrates a limited understanding of their own historical, cultural, and philosophical traditions. Exhibits limited recognition of the interplay of those traditions and personal perspective in shaping their world view.	Demonstrates minimal or no understanding of their own historical, cultural, and philosophical traditions. Struggles or makes no attempt to recognize the interplay of those traditions and personal perspective in shaping their world view.	Assignment instructions do not address the criteria being analyzed.
Skills (Empathetic analysis that suspends immediate personal judgement)	Demonstrates sophisticated ability to analyze how and why others make decisions based on different historical, cultural and philosophical traditions. Is able to suspend personal judgment while perfoming this evidence based analysis.	Demonstrates partial ability to analyze how and why others make decisions based on different historical, cultural and philosophical traditions. Is somewhat able to suspend personal judgment while perfoming this evidence based analysis.	Demonstrates limited ability to analyze how and why others make decisions based on different historical, cultural and philosophical traditions. Attempts to suspend personal judgment while perfoming this evidence based analysis.	Demonstrates minimal or no ability to analyze how and why others make decisions based on different historical, cultural and philosophical traditions. Struggles or makes no attempt to suspend personal judgment while perfoming this evidence based analysis.	Assignment instructions do not address the criteria being analyzed.
Skill (Self-awareness of one's own decision making based on historical, cultural and philosophical traditions.)	Demonstrates sophisticated ability to analyze how and why the student makes their own decisions based on different historical, cultural and philosophical traditions. Is able to justify their personal judgment using evidence based analysis.	Demonstrates partial ability to analyze how and why the student makes their own decisions based on different historical, cultural and philosophical traditions. Is somewhat able to justify their personal judgment using evidence based analysis.	Demonstrates limited ability to analyze how and why the student makes their own decisions based on different historical, cultural and philosophical traditions. Attempts to justify their personal judgment using evidence based analysis.	Demonstrates minimal or no ability to analyze how and why the student makes their own decisions based on different historical, cultural and philosophical traditions. Struggles or makes no attempt to justify their personal judgment using evidence based analysis.	Assignment instructions do not address the criteria being analyzed.