2011-2012 UK Core Assessment: Quantitative Reasoning

Overview of Assessment

- Artifacts were gathered from the following areas offered in Fall 2011 (Appendix A):
    - Quantitative Foundations – 6 courses with 97 total sections
    - Statistical Inferential Reasoning – 3 courses with 79 total sections
- For each area, the faculty evaluators used an area-specific rubric (Appendix B) to complete 280 total evaluations on General Education Learning Outcome3: Students will demonstrate an understanding of and ability to employ methods of quantitative reasoning.
- All evaluations took place using the Blackboard Artifact Assessment process on the following days:
    - Quantitative Foundations – May 11, 2012 (4 faculty evaluators)
    - Statistical Inferential Reasoning – May 9, 2012 (6 faculty evaluators)

Inquiry Scores

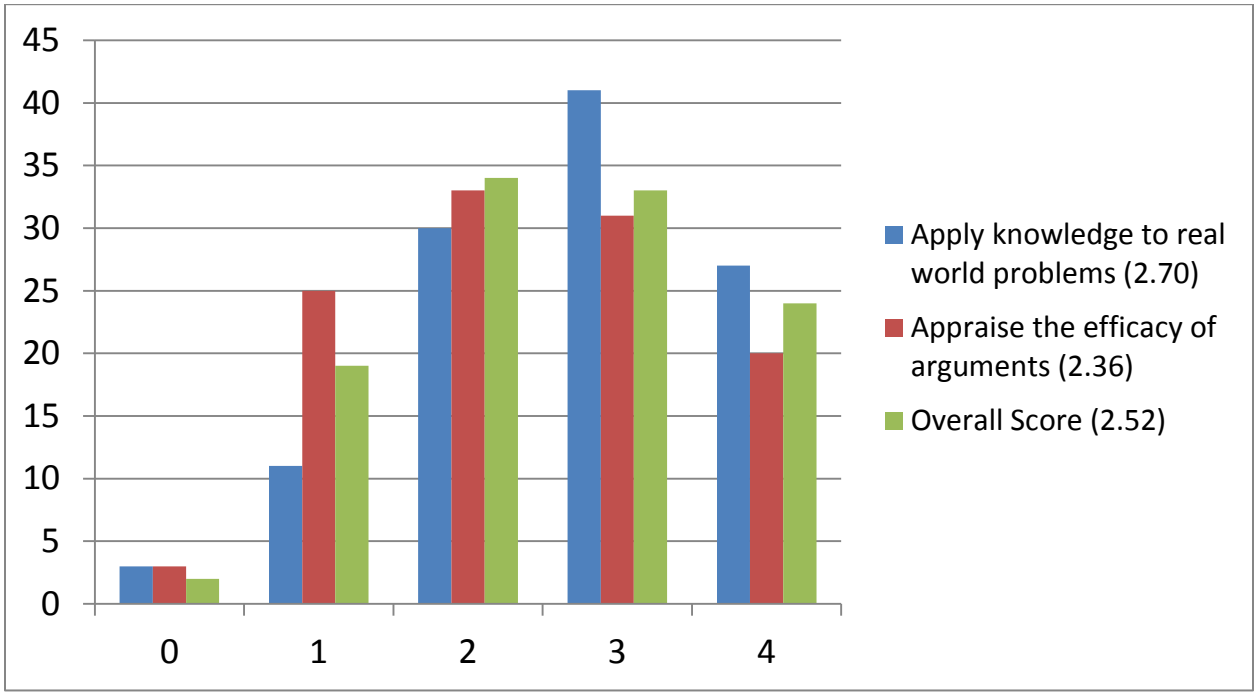
Artifacts (student assignments) were scored using the rubric on a scale of 0-4, with 4 representing the highest level of performance and 0 being the lowest level. All accessible artifacts (those which could be opened by evaluators for scoring in Blackboard) were scored at least once. Approximately ten percent of the artifacts were distributed to multiple evaluators for additional scoring. This over-sampling was to estimate the inter-rater reliability of the evaluators. Artifacts were scored using a hybrid method which assigns both an overall score to the given artifact (holistic) as well as individual scores to particular subcategories as defines by the rubric (analytic).

This report will state the frequency of all scores, regardless of the agreement or disagreement of those artifacts that were evaluated multiple times.

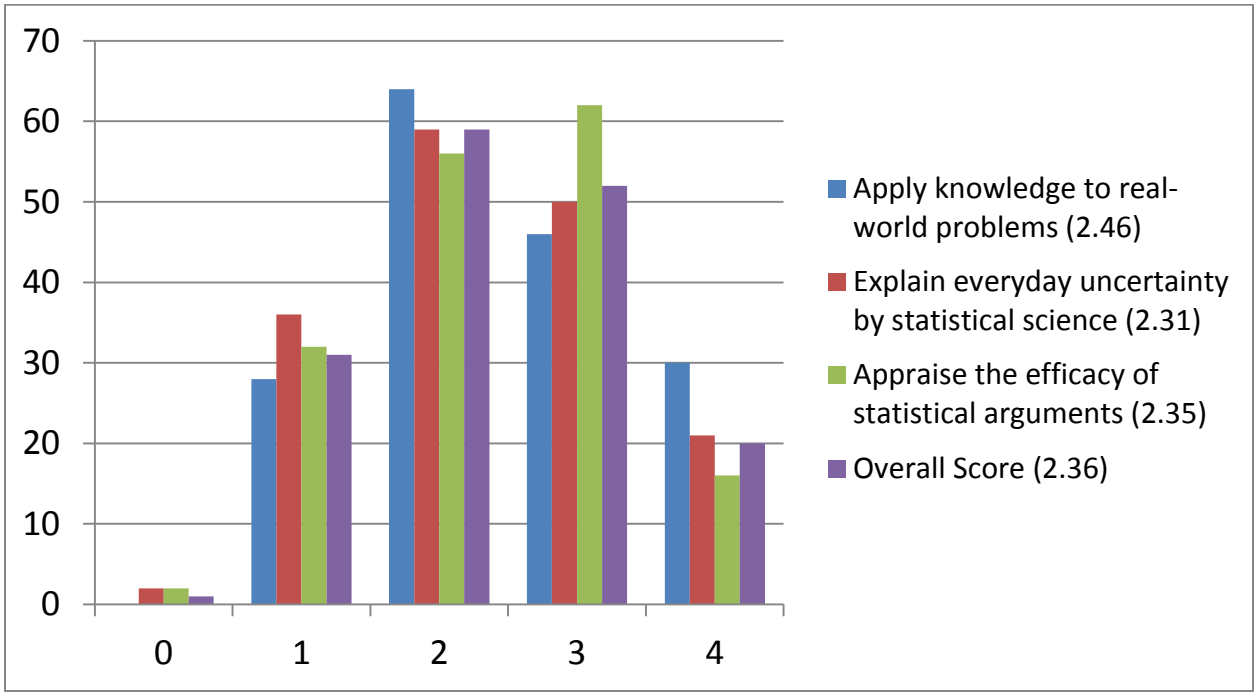
Area	N	Overall Score Mean	sd	% at 2 or better
Quantitative Foundations	112	2.52	1.07	81.3
Statistical Inferential Reasoning	168	2.36	0.95	80.4

The following charts break down area-specific scores to include the analytic scoring results.

Quantitative Foundations (n=112)



Statistical Inferential Reasoning (n=168)



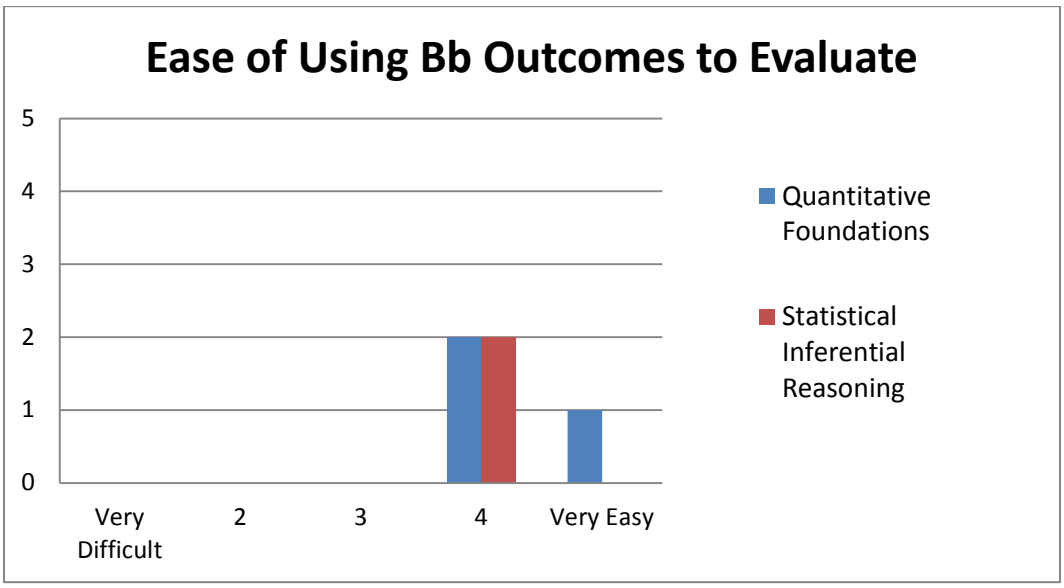
Monitoring the Evaluation Process

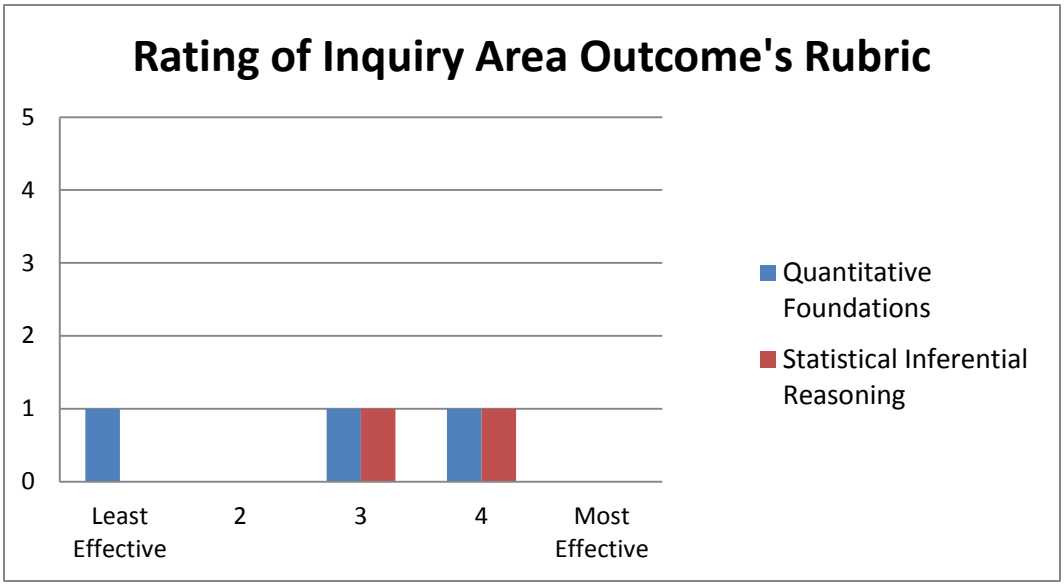
All evaluations took place using the Blackboard assessment system. The evaluators for each area were gathered and normed between May 9 - 11, 2012. During the norming process, evaluators read and scored a minimum of three artifacts, and were asked to discuss their rationale for evaluating these artifacts. Evaluators were deemed to be "normed" when the group came to an agreement on the overall score on each of the area-specific assignments being reviewed. Assignments that were scored twice were considered to be "in agreement" when the scores were within one point of each other.

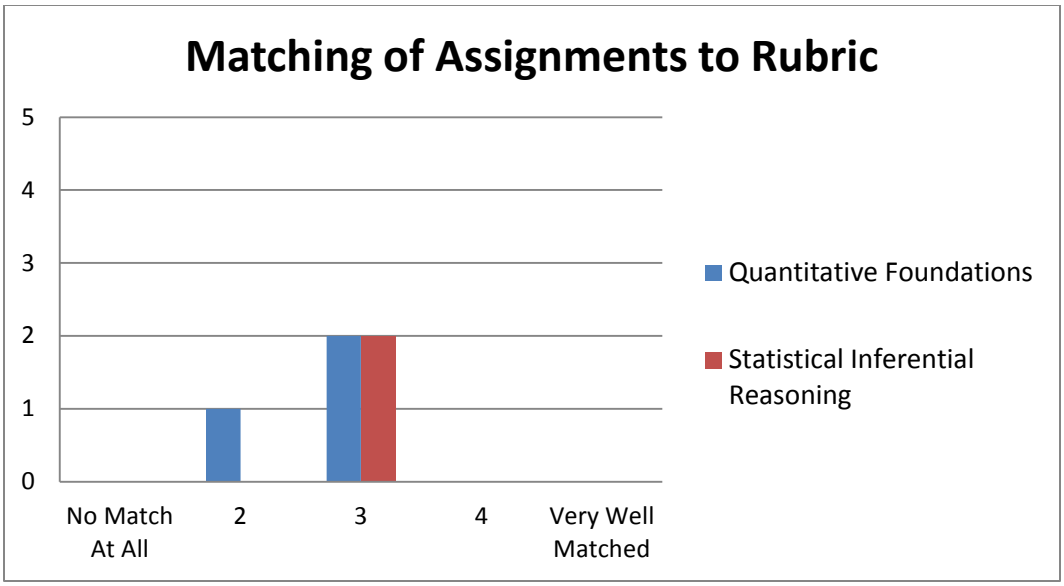
Area	Total assignments scored	Assignments scored twice	% inter-rater agreement
Quantitative Foundations	112	9	100
Statistical Inferential Reasoning	168	14	100

Evaluator Feedback

After evaluations were completed, all evaluators were sent a survey using an email distribution list. The survey (Appendix C) asked evaluators to provide feedback on the assessment process, the quality of the rubric, and the quality of the students' work. Overall, 5 out of 10 evaluators responded to the survey resulting in a response rate of 50%. Some selected responses are included below (see Appendix C) for area-specific feedback.






Matching of Assignments to Rubric
5
4
3
2
1
0
No Match At All
2
3
4
Very Well Matched
Quantitative Foundations
Statistical Inferential Reasoning

Summary of Key Findings

Overall, 81.3% of the Quantitative Foundations assignments and 80.4% of the SIR assignments scored at or above a 2 rating (which is considered "competent") with a mean score of 2.52 and 2.36, respectively. A considerable issue in this assessment cycle was that the rubrics by which the assignments were evaluated were not available to faculty until after the collection process had concluded. By making these available well in advance to faculty in the future it should help ensure the assignments are an appropriate reflection of the outcome areas being assessed. In turn, this should improve the scores overall and ensure more congruency between assignment and rubric content. In addition, all areas evaluated twice were at 100% for inter-rater agreement indicating that the norming process was effective and there was considerable consistency between evaluators. It will be important to communicate the assessment results back to the campus community and, especially, the UK Core teaching faculty. Finally, the rubrics should be reviewed and revised, as appropriate, based on the feedback given here by the evaluators. This cycle represented the first time the rubrics have been available and utilized therefore it's important that they evolve as necessary.

Appendix A – Quantitative Reasoning Courses and Sections Providing Assignment Information (Fall 2012)

UK CORE AREA	COURSE	SECTION	TITLE
QUANTITATIVE FOUNDATIONS	GLY 151	SECTION 002	EARTH DYNAMICS
QUANTITATIVE FOUNDATIONS	GLY 151	SECTION 004	EARTH DYNAMICS
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 002	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 003	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 005	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 008	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 009	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 010	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 012	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 014	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 016	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 018	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 111	SECTION 019	INTRO TO CONTEMP MATH
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 001	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 002	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 003	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 004	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 005	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 006	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 007	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 008	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 009	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 010	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 011	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 012	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 013	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 014	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 015	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 016	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 017	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 018	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 019	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 020	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 021	CALCULUS I

QUANTITATIVE FOUNDATIONS	MA 113	SECTION 022	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 025	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 026	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 027	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 028	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 029	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 030	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 031	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 113	SECTION 032	CALCULUS I
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 001	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 002	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 003	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 004	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 005	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 006	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 007	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 008	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 009	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 010	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 011	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 012	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 013	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 014	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 015	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 016	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 017	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 018	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 019	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 020	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 021	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 022	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 023	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 123	SECTION 024	ELEM CALC & ITS APPLICS
QUANTITATIVE FOUNDATIONS	MA 137	SECTION 001	CALCULUS I (LIFE SCI)
QUANTITATIVE FOUNDATIONS	MA 137	SECTION 002	CALCULUS I (LIFE SCI)
QUANTITATIVE FOUNDATIONS	MA 137	SECTION 003	CALCULUS I (LIFE SCI)
QUANTITATIVE FOUNDATIONS	MA 137	SECTION 004	CALCULUS I (LIFE SCI)
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 001	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 002	INTRODUCTORY LOGIC

QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 003	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 004	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 005	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 006	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 007	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 008	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 009	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 010	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 011	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 012	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 013	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 014	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 015	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 016	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 017	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 018	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 019	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 020	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 021	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 022	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 023	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 024	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 025	INTRODUCTORY LOGIC
QUANTITATIVE FOUNDATIONS	PHI 120	SECTION 026	INTRODUCTORY LOGIC
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 001	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 002	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 003	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 004	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 005	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 006	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 007	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 215	SECTION 008	EXPERIMENTAL PSYCHOLOGY
STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 001	APPS OF STATS IN PSYCHOL
STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 002	APPS OF STATS IN PSYCHOL
STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 003	APPS OF STATS IN PSYCHOL
STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 004	APPS OF STATS IN PSYCHOL
STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 005	APPS OF STATS IN PSYCHOL
STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 006	APPS OF STATS IN PSYCHOL
STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 007	APPS OF STATS IN PSYCHOL

STATISTICAL INFERENTIAL REASONING	PSY 216	SECTION 008	APPS OF STATS IN PSYCHOL
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 001	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 002	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 003	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 004	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 005	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 006	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 007	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 008	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 009	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 010	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 011	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 012	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 013	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 014	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 015	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 016	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 017	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 018	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 019	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 020	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 021	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 022	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 023	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 024	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 025	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 026	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 027	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 028	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 029	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 030	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 031	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 032	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 033	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 034	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 035	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 036	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 037	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 038	INTRO TO STATISTICAL REASONING

STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 039	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 040	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 041	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 042	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 043	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 044	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 045	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 046	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 047	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 048	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 049	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 050	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 051	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 401	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 402	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 403	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 404	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 405	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 406	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 407	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 408	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 409	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 410	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 411	INTRO TO STATISTICAL REASONING
STATISTICAL INFERENTIAL REASONING	STA 210	SECTION 412	INTRO TO STATISTICAL REASONING

Appendix B

UK Core Quantitative Foundations Rubric

UK General Education Learning Outcome 3: ***Students will demonstrate an understanding of and ability to employ methods of quantitative reasoning.***

Outcomes and Assessment Framework: Students will (a) demonstrate how fundamental elements of mathematical, logical and statistical knowledge are applied to solve real-world problems; and (b) explain the sense in which an important source of uncertainty in many everyday decisions is addressed by statistical science, and appraise the efficacy of statistical arguments that are reported for general consumption. Curricular Framework Students will take one 3-hour course on the application of mathematical, logical and statistical methods, and one 3-hour course devoted to a conceptual and practical understanding of statistical inferential reasoning.

	4	3	2	1	0
Demonstrate how fundamental elements of mathematical and/or logical knowledge are applied to solve real-world problems	Competently translates appropriate information into fundamental elements of mathematical or logical knowledge and provides an effective interpretation for the purpose of solving real-world problems.	Adequately translates available information into fundamental elements of mathematical or logical knowledge.	Translates available information, but resulting quantitative portrayal is somewhat appropriate or accurate.	The translation of available information is incomplete or inappropriate and results in an ineffective portrayal.	Does not attempt.
Appraise the efficacy of numerical/logical arguments that are reported for general consumption	Uses appropriate quantitative language and/or constructs in connection with a mathematical or logical argument for the purpose of evaluating efficacy.	Adequately uses quantitative language and/or constructions in connection with an argument. It may be presented in an ineffectual format or some parts of the explication may be uneven.	Uses appropriate quantitative language and/or constructions but these are insufficient to evaluate the efficacy of the argument.	Presents an argument that is relevant, but does not provide adequate quantitative justification.	Does not attempt.

UK Core Statistical Inferential Reasoning Rubric

UK General Education Learning Outcome 3: *Students will demonstrate an understanding of and ability to employ methods of quantitative reasoning.*

Outcomes and Assessment Framework: Students will (a) demonstrate how fundamental elements of mathematical, logical and statistical knowledge are applied to solve real-world problems; and (b) explain the sense in which an important source of uncertainty in many everyday decisions is addressed by statistical science, and appraise the efficacy of statistical arguments that are reported for general consumption. Curricular Framework Students will take one 3-hour course on the application of mathematical, logical and statistical methods, and one 3-hour course devoted to a conceptual and practical understanding of statistical inferential reasoning.

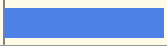
	4	3	2	1	0
Demonstrate how fundamental elements of statistical knowledge are applied to solve real-world problems	Competently converts relevant information into fundamental elements of statistical knowledge and provides an effective portrayal for the purpose of solving real-world problems.	Provides an adequate conversion of information into fundamental elements of statistical knowledge.	Provides a conversion of information, but resulting statistical portrayal is only partially appropriate or accurate.	Conversion of information is incomplete or inappropriate and results in an ineffective portrayal.	Does not attempt the problem.
Explain the sense in which an important source of uncertainty in many everyday decisions is addressed by statistical science	Competently makes appropriate decisions and provides a thoughtful defense of the decision based on statistical science.	Makes appropriate decisions and provides a defense of the decision based on statistical science.	Makes a decision and provides a defense of the decision based on statistical science, but arguments are only partially appropriate or accurate.	Makes a decision and provides a defense of the decision, but arguments are inappropriate or inaccurate.	Does not attempt the problem.
Appraise the efficacy of statistical arguments that are reported for general consumption	Uses statistical language and/or constructs in connection with an argument for the purpose of evaluating efficacy.	Uses statistical language and/or constructs in connection with an argument, though it may be presented in a less than completely effective format or some parts of the explication may be uneven.	Uses statistical language and/or constructs but does not effectively connect it to evaluating the efficacy of the argument.	Presents an argument that is pertinent, but does not provide adequate explicit statistical justification.	Does not attempt the problem.

Appendix C – Evaluator Survey Results

Quantitative Foundations — Initial Report

Last Modified: 05/11/2012

1. Q1. On a scale of 1-5, with 1 being very difficult and 5 being very easy, how would you describe the evaluation process using Bb Outcomes?

#	Answer		Response	%
1	1		0	0%
2	2		0	0%
3	3		0	0%
4	4		2	67%
5	5		1	33%
	Total		3	100%

Statistic	Value
Min Value	4
Max Value	5
Mean	4.33
Variance	0.33
Standard Deviation	0.58
Total Responses	3

2. Q2. What one change would you recommend to the Bb Outcomes system?

#	Answer		Response	%
1	Go directly to the evaluation space without having to search through 'My Places.'		0	0%
2	Only see the evaluations (i.e. the Analyze tab) and not all of the information in the packet (i.e. Collected Evidence).		1	33%
3	View the student work and rubric on the same screen.		0	0%
4	Provide an evaluator report of the scores that I submitted.		2	67%
5	Other: Please explain		0	0%
	Total		3	100%

Other: Please explain

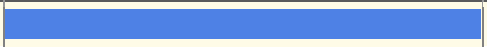
Statistic	Value
Min Value	2
Max Value	4
Mean	3.33
Variance	1.33
Standard Deviation	1.15
Total Responses	3

3. Q3. Did you experience any errors in the Bb system during your evaluation time?

#	Answer		Response	%
1	Yes - go to Q4		0	0%
2	No - go to Q5		3	100%
	Total		3	100%

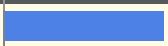
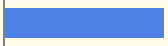
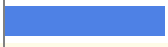
Statistic	Value
Min Value	2
Max Value	2
Mean	2.00
Variance	0.00
Standard Deviation	0.00
Total Responses	3

4. Q4. How much extra time do you estimate you spent in the system due to errors?

#	Answer		Response	%
1	0-1 hour		1	100%
2	1-2 hours		0	0%
3	More than 2 hours		0	0%
	Total		1	100%

Statistic	Value
Min Value	1
Max Value	1
Mean	1.00
Variance	0.00
Standard Deviation	0.00
Total Responses	1

5. Q5. On a scale of 1 – 5, with 1 being least effective and 5 being most effective, how would you rate the Foundations: Quantitative Reasoning outcome's rubric?

#	Answer		Response	%
1	1		1	33%
2	2		0	0%
3	3		1	33%
4	4		1	33%
5	5		0	0%
	Total		3	100%

Statistic	Value
Min Value	1
Max Value	4
Mean	2.67
Variance	2.33
Standard Deviation	1.53
Total Responses	3

6. Q6. How might the rubric be improved? (limited to 1,000 characters)

Text Response
The rubric overemphasises translation as an outcome.,especially in regards to the first outcome (demonstration outcome). There is a real difference between translation of mathematical/logical formulae and application of these formulae. In regards to the second outcome (appraise outcome), the phrase "for general consumption" is meaningless in relation to rubric. The rubric should better define how this is defined and assessed.
I feel as though more than two criteria should be present for evaluation. Perhaps these two criteria would remain at the heart of the evaluation, but more questions with a more isolated scope would make deciding the overall quality easier.

Statistic	Value
Total Responses	2

7. Q8. Based on the total of the assignments that you evaluated, what would you say is the one thing that students did well? (limited to 1,000 characters)

Text Response
This is difficult to say, since assignments from different classes (math, geology, philosophy) were so radically different. Generally, it appeared students tied their analyses to their own experiences fairly well.
Some of the papers on fair divisions were well composed.
I feel that the students followed directions very well, and in general fulfilled the requirements of the assignment that they were given.

Statistic	Value
Total Responses	3

8. Q9. Based on the total of the assignments that you evaluated, what would you say is the one thing that students need to improve? (limited to 1,000 characters)

Text Response
Explain the basic concepts they are using more effectively. Students presumed too much and did not define the fundamental concepts they used. This made their work sloppy and also made evaluating their work difficult.
Student really just need to improve the way that they explain their mathematical reasoning in simple short cogent statements.
I feel as though the students did as well as they could have, given that many of the assignments didn't leave much room to go above and beyond.

Statistic	Value
Total Responses	3

9. On a scale of 1 - 5, with 1 being no match at all and 5 being very well matched, how well would you say that the assignments matched the rubric?

#	Answer		Response	%
1	1		0	0%
2	2		1	33%
3	3		2	67%
4	4		0	0%
5	5		0	0%
	Total		3	100%

Statistic	Value
Min Value	2
Max Value	3
Mean	2.67
Variance	0.33
Standard Deviation	0.58
Total Responses	3

10. What suggestions would you make for the overall UK Core assessment process? Feel free to comment about communication with faculty, the gathering of student work, and the evaluation process.

Text Response
There should a radial box after each outcome to assess how well the artifact (not the student work) represented that outcome. This would greatly enhance the reliability of the two basic outcome assessments.
I feel that a standard needs to be set to determine whether or not an assignment is appropriate for the evaluation. Instructors should be encouraged to ask more open ended questions as opposed to questions with a short correct answer. Also, I feel that the assignments could have been a touch more creative. Writing fiction in which the students have characters encounter problems that they have learned to solve in their respective class could be a fun way to satisfy the criteria of the rubric while having a little bit of fun as well.

Statistic	Value
Total Responses	2

Statistical Inferential Reasoning — Initial Report

Last Modified: 05/09/2012

1. Q1. On a scale of 1-5, with 1 being very difficult and 5 being very easy, how would you describe the evaluation process using Bb Outcomes?

#	Answer		Response	%
1	1		0	0%
2	2		0	0%
3	3		0	0%
4	4		2	100%
5	5		0	0%
	Total		2	100%

Statistic	Value
Min Value	4
Max Value	4
Mean	4.00
Variance	0.00
Standard Deviation	0.00
Total Responses	2

2. Q2. What one change would you recommend to the Bb Outcomes system?

#	Answer		Response	%
1	Go directly to the evaluation space without having to search through 'My Places.'		0	0%
2	Only see the evaluations (i.e. the Analyze tab) and not all of the information in the packet (i.e. Collected Evidence).		0	0%
3	View the student work and rubric on the same screen.		2	100%
4	Provide an evaluator report of the scores that I submitted.		0	0%
5	Other: Please explain		0	0%
	Total		2	100%

Other: Please explain

Statistic	Value
Min Value	3
Max Value	3
Mean	3.00
Variance	0.00
Standard Deviation	0.00
Total Responses	2

3. Q3. Did you experience any errors in the Bb system during your evaluation time?

#	Answer		Response	%
1	Yes - go to Q4		1	50%
2	No - go to Q5		1	50%
	Total		2	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.50
Variance	0.50
Standard Deviation	0.71
Total Responses	2

4. Q4. How much extra time do you estimate you spent in the system due to errors?

#	Answer		Response	%
1	0-1 hour		1	100%
2	1-2 hours		0	0%
3	More than 2 hours		0	0%
	Total		1	100%

Statistic	Value
Min Value	1
Max Value	1
Mean	1.00
Variance	0.00
Standard Deviation	0.00
Total Responses	1

5. Q5. On a scale of 1 – 5, with 1 being least effective and 5 being most effective, how would you rate the SIR Quantitative Reasoning outcome's rubric?

#	Answer		Response	%
1	1		0	0%
2	2		0	0%
3	3		1	50%
4	4		1	50%
5	5		0	0%
	Total		2	100%

Statistic	Value
Min Value	3
Max Value	4
Mean	3.50
Variance	0.50
Standard Deviation	0.71
Total Responses	2

6. Q6. How might the rubric be improved? (limited to 1,000 characters)

Text Response
Needs to be more clear if we are evaluating the student's performance or the quality of the assignment.

Statistic	Value
Total Responses	1

7. Q8. Based on the total of the assignments that you evaluated, what would you say is the one thing that students did well? (limited to 1,000 characters)

Text Response
Finding relevant articles or examples from the real world.

Statistic	Value
Total Responses	1

8. Q9. Based on the total of the assignments that you evaluated, what would you say is the one thing that students need to improve? (limited to 1,000 characters)

Text Response
Being able to explain why a statistical desicion was made about a hypothesis.

Statistic	Value
Total Responses	1

9. On a scale of 1 - 5, with 1 being no match at all and 5 being very well matched, how well would you say that the assignments matched the rubric?

#	Answer		Response	%
1	1		0	0%
2	2		0	0%
3	3		2	100%
4	4		0	0%
5	5		0	0%
	Total		2	100%

Statistic	Value
Min Value	3
Max Value	3
Mean	3.00
Variance	0.00
Standard Deviation	0.00
Total Responses	2

10. What suggestions would you make for the overall UK Core assessment process? Feel free to comment about communication with faculty, the gathering of student work, and the evaluation process.

Text Response
The student and faculty names need to be removed before we evaluate them.

Statistic	Value
Total Responses	1