Analysis of Artifacts aligned to Marshall's Baccalaureate Degree Profile (BDP)

Academic Year 2023 – 2024

Summer Assessment Team Members: Marie Archambault, Clinton Brown, Kim DeTardo-Bora, Victor Fet, Marty Laubach, Leslie Dawn Quick, and Anita Walz

Summer Assessment Support Staff: Mary Beth Reynolds, Adam Russell, and Diana Adams

Executive Summary

Background

Recommendations from the 2023 Assessment Team

The 2023 Summer Assessment Team made the following recommendations:

1. That, as per the provost's recommendation, we review the Core Curriculum during academic year 2023-2024 (please refer to responses to last year's recommendations at the beginning of this report), paying special attention to reviewing the traits of each Baccalaureate Degree Profile (BDP) outcome, with special attention to the appropriateness of each outcome's traits. Marshall University has established a Task Force, led by the Dean of the College of Liberal Arts, and including representation from each academic and student services unit from within the university, to review the Core Curriculum. It conducted regular meetings throughout academic year 2023-2024.
2. That the Office of Assessment download each undergraduate degree program's alignment of its outcomes to those of the BDP and conduct an analysis of the extent to which program specific coursework at the 300/400 level extends students' proficiency with each of the BDP outcomes. Starting in academic year 2023-2024, these alignments will be included in each program's five-year program review. This

recommendation remains a work in progress; however, each undergraduate program reviewed this year included their program's outcome alignment to the outcomes of Marshall's BDP. We will continue this practice in the coming years.

3. That we work with the university's General Education Council, which is in the process of recertifying courses that are currently certified as *multicultural* or *international,* to make sure programs understand that creating at least one substantive assignment that allows students to upload authentic work to the assignment module in Blackboard so that these artifacts may be randomly drawn for assessment is required of all courses bearing these certifications. The Chair of the University's General Education Council is a member of the Summer Assessment Team. As part of this year's five-year program review, we asked programs to indicate how many courses they offered that were approved for multicultural or international credit and to indicate whether (or not) these course instructors regularly assigned projects or papers that students uploaded to Blackboard to be included in our assessment of *Intercultural Thinking* and perhaps other BDP outcomes as well.
4. That, as part of the review of the Core Curriculum, we pay special attention to the context & assumptions trait of *Information Literacy*. From last year's recommendations, we also recommend careful review of the *Creative Thinking* outcome and rubric. We further recommend a review of both traits of *Metacognitive Thinking*. We reviewed *Creative Thinking* again this year and wish to reiterate that this outcome, and how it is assessed, needs attention. We will pass this information to the General Education Review Task Force.
5. That next summer's assessment include a comparison of matched courses where one section is taught face-to-face, and the other section is taught via distance delivery. For this analysis, distance delivery should be clearly defined as either virtual, asynchronous, or some combination. Although we did not include this analysis in the Summer Assessment Team's work, the University Assessment Committee reviewed paired syllabi for courses that included at least one section taught online.

Procedures for 2024 Assessment

General Procedures

In May 2024 we evaluated student artifacts produced in response to course assignments aligned to *Creative Thinking*, *Inquiry-Based Thinking*, and *Quantitative Thinking*. A group of seven faculty representing the Colleges of Liberal Arts, Science, and Business evaluated a sample of these artifacts using rubrics adapted from Marshall's Baccalaureate Degree Profile outcomes and the AAC&U Value Rubrics. These rubrics are included in the supporting documentation. Our sample initially consisted of 336 artifacts, 112 per outcome.

We used the rubrics we had updated in spring 2021 (the last time we assessed these outcomes) again this year. Please refer to our 2021 report for a full explanation regarding the process we used to update our rubrics. Before beginning the assessment this spring, we spent a day reviewing all assignments aligned to the three outcomes to determine if there were assignments that either did not align to the outcome in question or did not align to one or more traits. Assignments that reviewers agreed did not align to the outcome were removed from the sample and reviewers were instructed to note the traits to which each assignment that remained in the sample did not align and to assign these artifacts

scores of N/A for those traits. The following chart shows that total number of assignments that aligned to each trait of each outcome and the total number of artifacts that received scores.

Outcome	Trait (MU rubric)	Total Assignments Aligned	Total Artifacts Aligned
Creative Thinking	Ambiguities/Possibilities/Problem	2	38
	Risk Taking	1	47
	Integrative Thinking	2	38
	Synthesizing/Connecting/Transforming	3	64
Total for Creative Thinking		**8**	**187**
Inquiry-Based Thinking	Problem/Question/Issue	10	91
	Research of Existing Knowledge/Evidence	12	112
	Data Collection and Analysis/Student's Position	12	112
	Conclusions and Related Outcomes	12	112
Total for Inquiry-Based Thinking		**46**	**427**
Quantitative Thinking	Context	5	112
	Interpretation	3	52
	Representation	3	52
	Calculation	5	112
	Application/Analysis	5	112
Total for Quantitative Thinking		**21**	**440**
Totals		**75**	**1,054**

Each artifact was read by two independent reviewers. This project was coordinated by the Office of Assessment and Quality Initiatives.

Scoring Procedures

Evaluators assessed each artifact using the following scale:

Special Scoring Codes	
Score	**Explanation**
0	In the opinion of the evaluator, the evaluator saw no evidence of the trait in the student's work. Note: When two reviewers agreed on scores of "0," or when this score was confirmed by a third reviewer, the score was dropped from the final analysis.
Regular Scoring Codes These codes were given to artifacts that, in the opinion of the evaluator, were aligned with appropriate outcomes/traits and contained enough information to allow assessment.	
1	The artifact demonstrated Level 1 performance.
2	The artifact demonstrated Level 2 performance.
3	The artifact demonstrated Level 3 performance.
4	The artifact demonstrated Level 4 performance.

Please see the supporting information that follows this summary for a detailed explanation of scoring procedures.

General Information about the Sample

Three hundred eight (308; 92%) of the artifacts in our sample were drawn from courses at the 100/200 level, with the remaining 28 (7%) drawn from courses at the 300/400 level.

Results and Analysis

Results based on course level were as follows:

Creative Thinking				**Inquiry-Based Thinking**				**Quantitative Thinking**			
Trait	Course Level	Number	Mean (SD)	**Trait**	Course Level	Number	Mean (SD)	**Trait**	Course Level	Number	Mean (SD)
Ambiguities/ Possibilities/ Problem	100/200	25	1.86 (0.569)	**Problem/ Question/ Issue**	100/200	65	1.92 (0.614)	**Context**	100/200	109	2.19 (0.577)
	300/400	12	1.71 (0.620)		300/400	16	2.38 (0.500)		300/400	0	N/A
Risk Taking	100/200	47	1.84 (0.591)	**Research of Existing Knowledge/ Evidence**	100/200	86	2.09 (0.644)	**Interpretation**	100/200	51	2.19 (0.693)
	300/400	0	N/A		300/400	16	2.56 (0.479)		300/400	0	N/A

Creative Thinking				Inquiry-Based Thinking				Quantitative Thinking			
Innovative Thinking	100/200	26	2.31 (0.471)	**Data Collection and Analysis/ Student's Position**	100/200	89	1.92 (0.688)	**Representation**	100/200	51	2.37 (0.599)
	300/400	12	2.58 (0.359)		300/400	16	2.34 (0.625)		**300/400**	0	N/A
Synthesizes/ Connects/ Transforms	100/200	52	2.00 (0.602)	**Conclusions and Related Outcomes**	100/200	77	1.97 (0.590)	**Calculation**	100/200	112	2.34 (0.593)
	300/400	12	2.29 (0.397)		300/400	16	2.38 (0.342)		300/400	0	N/A
								Application/Analysis	100/200	109	2.23 (0.551)
									300/400	0	N/A

First, we ran several series of paired samples *t-tests* to test for statistical significance in student performance among each outcome's rubric traits. We used the following adjusted alpha levels to control for Type I error (*Creative Thinking*: .008; *Inquiry-Based Thinking*: .008; and *Quantitative Thinking*: .005). Results were as follows: *Creative Thinking* – no significant differences in performance among traits; *Inquiry-Based Thinking* – mean performance for evidence was significantly higher than for all other traits (issues, position, and conclusions); Quantitative Thinking – mean performance for calculation was significantly higher than for context and interpretation.

Next, we ran a mixed model repeated measures analysis for *Creative Thinking* and for Inquiry-Based Thinking to determine if there was a difference in means between artifacts from 100/200 level courses and those from 300/400 level courses. These results showed no difference between mean scores based on course level for *Creative Thinking*, but significantly higher scores on 300/400 level courses for *Inquiry-Based Thinking*.

A perusal of the chart above shows mean performance for artifacts uploaded from 100/200 level courses ranged from 1.84 for *Creative Thinking*: risk taking to 2.37 for *Quantitative Thinking*: representation. Means for 300/400 level courses ranged from 1.71 for *Creative Thinking*: ambiguities/possibilities/problem to 2.58 for *Creative Thinking*: innovative thinking.

Frequency Analysis

Creative Thinking					Inquiry-Based Thinking					Quantitative Thinking				
Trait	**Course Level**	**% Scoring 3.5 to 4.0**	**% Scoring 2.5 to 4.0**	**% Scoring 1.5 to 4.0**	**Trait**	**Course Level**	**% Scoring 3.5 to 4.0**	**% Scoring 2.5 to 4.0**	**% Scoring 1.5 to 4.0**	**Trait**	**Course Level**	**% Scoring 3.5 to 4.0**	**% Scoring 2.5 to 4.0**	**% Scoring 1.5 to 4.0**
Possibilities	100/200	0%	28%	84%	**Issue**	100/200	0%	32%	86%	**Context**	100/200	0%	50%	94%
	300/400	0%	17%	75%		300/400	6%	56%	100%		300/400	N/A	N/A	N/A
Risk	100/200	0%	23%	83%	**Evidence**	100/200	1%	45%	86%	**Interpretation**	100/200	4%	49%	88%
	300/400	N/A	N/A	N/A		300/400	6%	81%	100%		300/400	N/A	N/A	N/A
Innovation	100/200	0%	62%	100%	**Position**	100/200	1%	36%	80%	**Representation**	100/200	0%	65%	96%
	300/400	0%	83%	100%		300/400	6%	56%	94%		300/400	N/A	N/A	N/A
Synthesis	100/200	0%	40%	88%	**Conclusion**	100/200	0%	35%	87%	**Calculation**	100/200	0%	65%	95%
	300/400	0%	58%	100%		300/400	0%	63%	100%		300/400	N/A	N/A	N/A
Overall	**100/200**	**0%**	**38%**	**89%**	**Overall**	**100/200**	**1%**	**37%**	**85%**	**Analysis**	100/200	0%	51%	97%
	300/400	**0%**	**53%**	**92%**		**300/400**	**5%**	**64%**	**99%**		300/400	N/A	N/A	N/A
										Overall	**100/200**	**1%**	**56%**	**94%**
											300/400	**N/A**	**N/A**	**N/A**

While the number of artifacts from 300/400 level courses was small (16 for each trait of Inquiry-Based Thinking and 12 for the 1st, 3rd, and 4th traits of Creative Thinking), only 5% of these artifacts had overall scores of 3.5 or higher, while just 64% had scores of 2.5 or higher in artifacts aligned to *Inquiry-Based Thinking*. For *Creative Thinking* no artifact at any level received a score of 3.5 or higher and only 53% of those from 300/400 level courses received scores of 2.5 or higher, while only 38% from 100/200 level courses received these scores. We note final scores of 2.5 indicate that at least one rater scored the trait at level 3; for traits with a final score of 3.5 at least one rater scored the trait at level 4.

When considering artifacts aligned to *Creative*, *Inquiry-Based*, and *Quantitative Thinking* from 100/200 level courses, 89%, 85%, and 97% of students scored between 1.5 and 4.0, respectively. This finding means that, at minimum, at least one rater assigned a score of 2 to the rubric trait.

Results for Course Type

Analyzing results by course type posed several challenges. It is possible for a single course to have multiple attributes, e.g., while courses designed at Critical Thinking (CT) or Core II must be at the 100/200 level, these courses may carry both designations. Courses designated as Multicultural, Writing Intensive, or those that are taught online may be at any level 100-400 and may have other attributes. So, when analyzing results by course type, we included all courses with the attribute we wanted to assess; this resulted in some courses being included in the analysis for more than one course type.

Critical Thinking (CT) Courses

CT courses in the assessment sample included those that aligned to each of the outcomes assessed. All CT courses are at the 100/200 level. Results are below:

Creative Thinking			Inquiry-Based Thinking			Quantitative Thinking		
Trait	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**
Possibilities	25	1.86 (0.57)	**Issue**	49	2.07 (0.60)	**Context**	109	2.19 (0.58)
Risk	47	1.84 (0.59)	**Evidence**	67	2.22 (0.61)	**Interpretation**	51	2.19 (0.73)
Innovation	0	N/A	**Position**	69	2.05 (0.68)	**Representation**	51	2.37 (0.76)
Synthesis	26	1.75 (.64)	**Conclusion**	66	2.05 (0.57)	**Calculation**	112	2.34 (0.74)
						Analysis	109	2.23 (0.64)

While, due to the relatively small /*n/*s, the results should be interpreted with caution, mean scores for students in Marshall's CT courses (which are at the 100 and 200 level) suggest performance at level 2 or higher on all traits of *Quantitative* and *Inquiry-Based Thinking* and approaching level 2 on three of the four traits of *Creative Thinking*. There were no CT artifacts in this sample that aligned to *Creative Thinking's* third trait, innovation.

Core II Courses

Core II courses in the assessment sample included those that aligned to each of the outcomes assessed. All Core II courses are at the 100/200 level, and many are also CT courses. Results are below:

Creative Thinking			Inquiry-Based Thinking			Quantitative Thinking		
Trait	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**
Possibilities	0	N/A	**Issue**	44	1.92 (0.59)	**Context**	75	2.07 (0.56)
Risk	47	1.84 (0.591)	**Evidence**	62	2.12 (0.64)	**Interpretation**	17	2.03 (0.64)
Innovation	26	2.31 (0.471)	**Position**	64	1.88 (0.63)	**Representation**	17	2.44 (0.75)
Synthesis	26	2.25	**Conclusion**	59	1.92	**Calculation**	77	2.31

Creative Thinking			Inquiry-Based Thinking			Quantitative Thinking		
Trait	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**
		(0.453)			(0.53)			(0.71)
						Analysis	75	2.14 (0.64)

Mean scores for students in Marshall's Core II courses (which are all at the 100 and 200 level) suggest performance at level 2 or higher for all traits of *Quantitative Thinking* and performance approaching or at level 2 for all traits of *Inquiry-Based* and *Creative Thinking*. No Core II artifacts aligned to the possibilities trait of *Creative Thinking.*

Multicultural (MC) Courses

MC courses in the assessment sample aligned to two outcomes assessed: *Creative Thinking* and *Inquiry-Based Thinking.* For this assessment, all MC artifacts came from 100/200 level courses. Results are given below:

Creative Thinking			Inquiry-Based Thinking		
Trait	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**
Possibilities	N/A	N/A	**Issue**	39	2.00 (0.57)
Risk	47	1.84 (0.591)	**Evidence**	57	2.17 (0.63)
Innovation	N/A	N/A	**Position**	59	1.92 (0.63)
Synthesis	N/A	N/A	**Conclusions**	56	1.95 (0.52)

Mean scores for students in Marshall's 100/200 level MC courses suggest performance at least approaching level 2 for all traits of *Inquiry-Based Thinking*. Mean score for risk-taking, the second trait of *Creative Thinking* also had a mean approaching level 2. There were no Core II artifacts that aligned to *Quantitative Thinking* or to traits of *Creative Thinking* other than to risk-taking.

Writing Intensive (WI) Courses

WI courses in the assessment sample aligned to two outcomes assessed: *Creative Thinking* and *Inquiry-Based Thinking.* All artifacts aligning to *Creative Thinking* were drawn from 100/200 level courses, but eleven artifacts aligning to *Inquiry-Based Thinking* came from 300/400 level courses. Results are given below:

Creative Thinking			**Inquiry-Based Thinking**			
Trait	Number	Mean (SD)	Trait	Course Level	Number	Mean Score
Possibilities	12	1.71 (0.620)	**Issue**	100/200	34	1.93 (0.50)
				300/400	11	2.18 (0.40)
Risk	N/A	N/A	**Evidence**	100/200	52	2.13 (0.53)
				300/400	11	2.50 (0.55)
Innovation	38	2.40 (0.453)	**Position**	100/200	54	1.89 (0.62)
				300/400	11	2.23 (0.61)
Synthesis	38	2.26 (0.431)	**Conclusions**	100/200	51	1.89 (0.49)
				300/400	11	2.32 (0.34)

While, due to the relatively small /*n*/s, the results should be interpreted with caution, mean scores for students in Marshall's WI courses suggest performance levels approaching or having reached level 2 for all traits of *Creative Thinking* and approaching or at level 2 for 100/200 level courses for all traits of *Inquiry-Based Thinking*. Performance in 300/400 level courses was between levels 2.18 and 2.50 traits of *Inquiry-Based Thinking*.

Online Courses

Online courses in the assessment sample aligned to at least one trait of all outcomes assessed: *Creative Thinking*, *Inquiry-Based Thinking,* and *Quantitative Thinking.* All artifacts aligning to the risk-taking trait of *Creative Thinking* were drawn from 100/200 level courses, as were all artifacts aligned to *Quantitative Thinking.* However, there was a good mix of both 100/200 and 300/400 level artifacts aligned to all traits of *Inquiry-Based Thinking*. Results are given below: Results are below:

Creative Thinking			**Inquiry-Based Thinking**				**Quantitative Thinking**		
Trait	**Number**	**Mean (SD)**	**Trait**	**Course Level**	**Number**	**Mean (SD)**	**Trait**	**Number**	**Mean (SD)**
Possibilities	0	N/A	**Issue**	100/200	30	2.12 (0.57)	**Context**	8	2.69 (0.37)
				300/400	16	2.38 (0.50)			
Risk	47	1.81 (0.58)	**Evidence**	100/200	48	2.20 (0.59)	**Interpretation**	8	2.38 (0.83)
				300/400	16	2.56 (0.48)			
Innovation	0	N/A	**Position**	100/200	50	2.15 (0.69)	**Representation**	9	2.17 (0.83)
				300/400	16	2.34 (0.63)			
Synthesis	0	N/A	**Conclusion**	100/200	47	1.99 (0.59)	**Calculation**	9	2.56 (0.53)
				300/400	16	2.38 (0.34)			
							Analysis	8	2.63 (0.44)

The mean score for the 47 100/200-level artifacts aligned to the risk-taking trait of *Creative Thinking* are in line with results from other course types, it is nevertheless disappointing that the mean has not yet reached level 2. Likewise, no mean for *Inquiry-Based Thinking*, regardless of course level, reached Level 3. Means for *Quantitative Thinking,* which were all drawn from 100/200 level courses, ranged from 2.17 to 2.69, suggesting level appropriate performance.

Conclusion

Based on our statistical analysis of means across all artifacts scored, we determined that research of existing knowledge/evidence emerged as a relative strength among the traits of *Inquiry-Based Thinking,* while calculation emerged as a relative strength among the traits of *Quantitative Thinking*. Although our statistical analysis did not reveal significant strengths or weaknesses within *Creative Thinking*, examination of mean scores across traits of all outcomes showed low mean scores for two traits of *Creative Thinking* (1.71 for 300/400 level artifacts aligning to the ambiguities/possibilities/problem trait and 1.84 for the 100/200 level artifacts aligning to the risk-taking trait), suggesting that these traits are relative weaknesses.

Our analysis also revealed that there was no difference between performance on artifacts drawn from 100/200 level courses aligned to *Creative Thinking*, but that performance on 300/400 level course artifacts aligned to *Inquiry-Based thinking* was significantly stronger than performance on 100/200 level artifacts. As noted, there were no 300/400 level artifacts aligned to *Quantitative Thinking*.

We used rubrics this year that measured student performance according to the level of sophistication they demonstrated in achievement of each trait of the three Baccalaureate Degree Profile (BDP) outcomes we assessed. BDP outcomes specify what students are expected to achieve at the time they receive their baccalaureate degrees. Admittedly, the proportion of artifacts from 300/400 level courses in our sample was small this year, with only 16 artifacts aligning to *Inquiry-Based Thinking*, none to *Quantitative Thinking*, and 12 to three traits of *Creative Thinking*. We note that only 64% of students who submitted artifacts from 300/400 level courses received overall scores of 2.5 or higher in *Inquiry-Based Thinking,* which is down 10 percentage points from our results (74%) in 2021. Furthermore, only 57% of artifacts from 300/400 courses aligned to *Creative Thinking* received scores of 2.5 or higher. Note that a score of 2.5 means that at least one rater assigned a score of "3." More concerning is that only five percent (5%) of *Inquiry-Based Thinking* artifacts at the 300/400 level received scores of 3.5 or higher, down 20 percentage points from the 25% noted in 2021.

Although we had only artifacts from 100/200 level courses that aligned to *Quantitative Thinking*, results here were more in line with expectations, as more than half (56%) of artifacts received scores of 2.5 or higher. Our Course Type analysis also showed that, for course types exclusive to 100/200 level courses (CT, Core II, etc.), student performance was appropriate for the course level. This suggests that students are performing as expected in our traditional general education program, which consists of courses at these levels. However, if we wish to adequately ascertain whether these levels of performance are being enhanced beyond the 200-level general education courses, we need a strategy to collect larger samples of artifacts from courses at these levels.

Recommendations from the 2024 Assessment Team

The Summer Assessment Team made the following recommendations:

1. That, since we assess each BDP outcome only once every three years, we use the past three years of uploads to form the population from which our sample is drawn each year.
2. That we form a group (perhaps a subcommittee of the University Assessment Committee) to revise the *Quantitative* and *Creative* Thinking rubrics.
3. That we return to last summer's recommendation to include a comparison of matched courses where one section is taught face-to-face, and the other section is taught via distance delivery. For this analysis, distance delivery should be clearly defined as asynchronous online.
4. That we conclude our analysis of the alignment between each undergraduate degree program's alignment to Marshall's Baccalaureate Degree Profile (BDP).

5. That we make a renewed effort to communicate to all faculty the importance of aligning at least one assignment in each of their courses to at least one outcome of the BDP in the assignment module in Blackboard and require students to submit the final paper/project to ensure an adequate population of artifacts available for university assessment.
6. That we work with the MU Online Design Center to ensure a seamless transition from our current system to Blackboard Ultra in terms of its alignment with Blackboard Outcomes.

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Supporting Documentation

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Baccalaureate Degree Profile Artifact Assessment

Academic Year 2023 – 2024

Outcomes Assessed: MU Rubrics

Outcome	Abbreviation	Traits	Abbreviations
Creative Thinking	**Creative**	Ambiguities/Possibilities/ Problem	Possibilities
		Risk Taking	Risk
		Innovative Thinking	Innovation
		Synthesizes/Connects/ Transforms	Synthesis
Inquiry-Based Thinking	**IBT**	Problem/Question/Issue	Issue
		Research of Existing Knowledge/Evidence	Evidence
		Data Collection and Analysis/Student's Position	Position
		Conclusions and Related Outcomes	Conclusions
Quantitative Thinking	**QT**	Context	Context
		Interpretation	Interpretation
		Representation	Representation
		Calculation	Calculation
		Application/Analysis	Analysis

Course Types

The following course types were evaluated this year.

Course Type	Abbreviation
Critical Thinking	CT
Core II	Core II
Writing Intensive	WI
Multicultural	MC
Online	Online

Course Types in Creative, Inquiry-Based, and Quantitative Thinking Outcome Sample

Each Course is Counted Separately for Each Category, so the n *is > 336*

Course Type	Course Level	Sample *n*	Total Sample *n*
CT	100-200	74 (Creative); 71 (IBT); 112 (QT)	257
	300-400	N/A	
Core II	100-200	74 (Creative); 66 (IBT); 77 (QT)	217
	300-400	N/A	
WI	100-200	26 (Creative); 56 (IBT); 0 (QT)	105
	300-400	12 (Creative); 11 (IBT); 0 (QT)	
MC	100-200	48 (Creative); 61 (IBT); 0 (QT)	109
	300-400	0 (Creative); 0 (IBT); 0 (QT)	
Online	100-200	48 (Creative); 51 (IBT); 9 (QT)	124
	300-400	0 (Creative); 16 (IBT); 0 (CT)	
Total	100-200	(Creative); (IBT); 0 (QT)	812
	300-400	(Creative); (IBT); 0 (CT)	

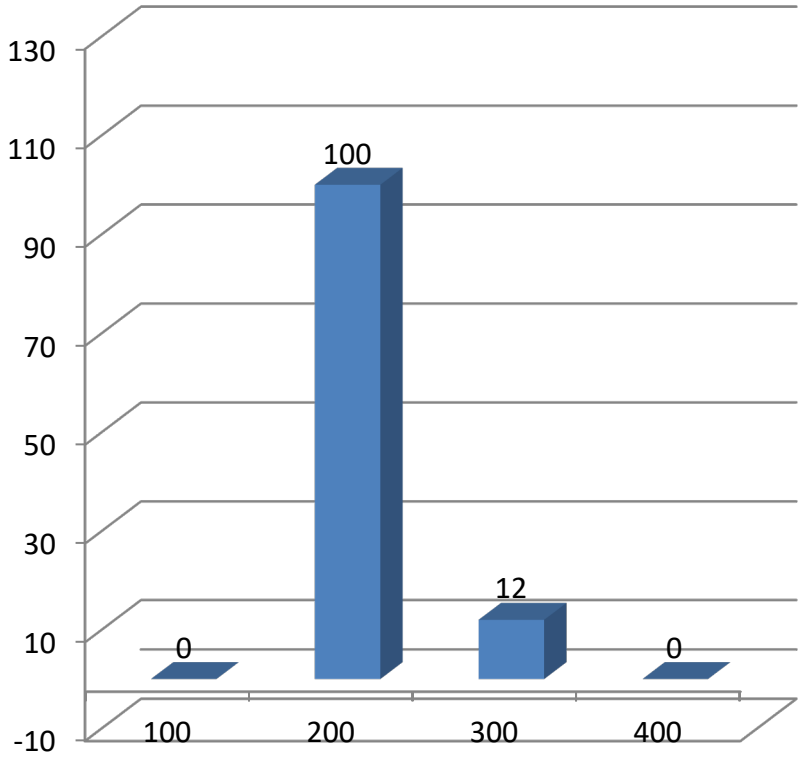
Population/Sample Comparisons for Marshall's Learning Outcomes by Course Level

Marshall Outcomes	Course Level = 100/200			Course Level = 300/400		
	Population	**Sample**	**Percent**	**Population**	**Sample**	**Percent**
Creative Thinking	153	100	65%	12	12	100%
Inquiry-Based Thinking	489	96	20%	27	16	59%
Quantitative Thinking	293	112	38%	0	0	0
Total	**935**	**308**	**33%**	**39**	**28**	**72%**

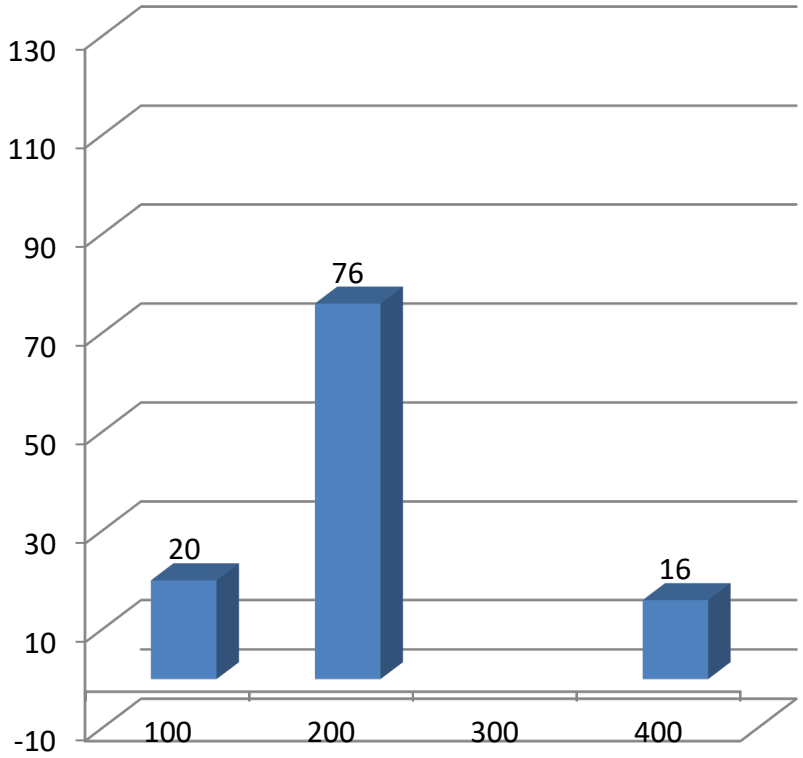
Sample Frequencies

Total # of artifacts assigned = 112 per outcome

Course Level Frequencies: Creative Thinking



Course Level Frequencies: Inquiry-Based Thinking

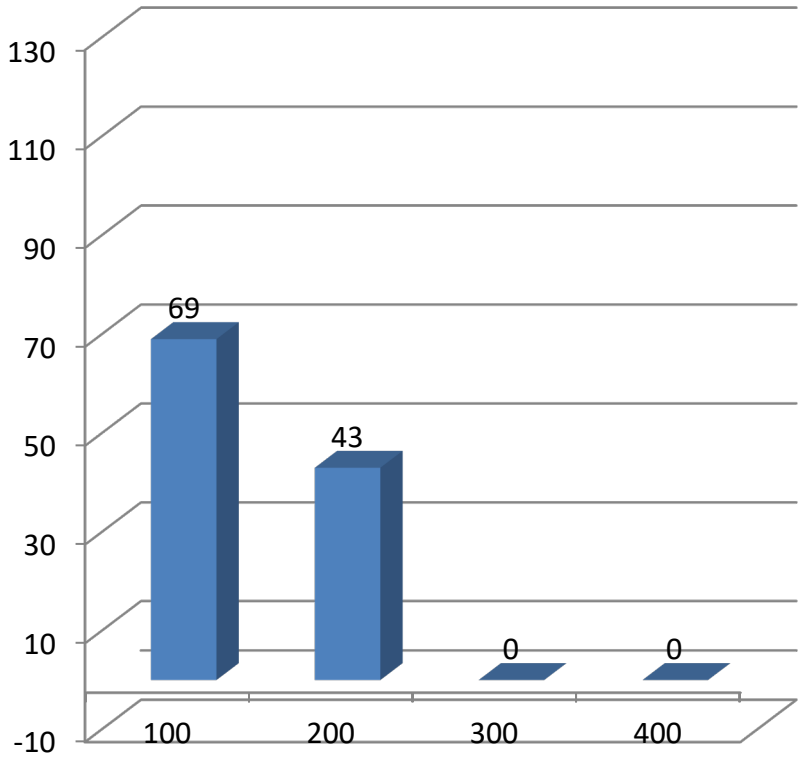


Sample Frequencies

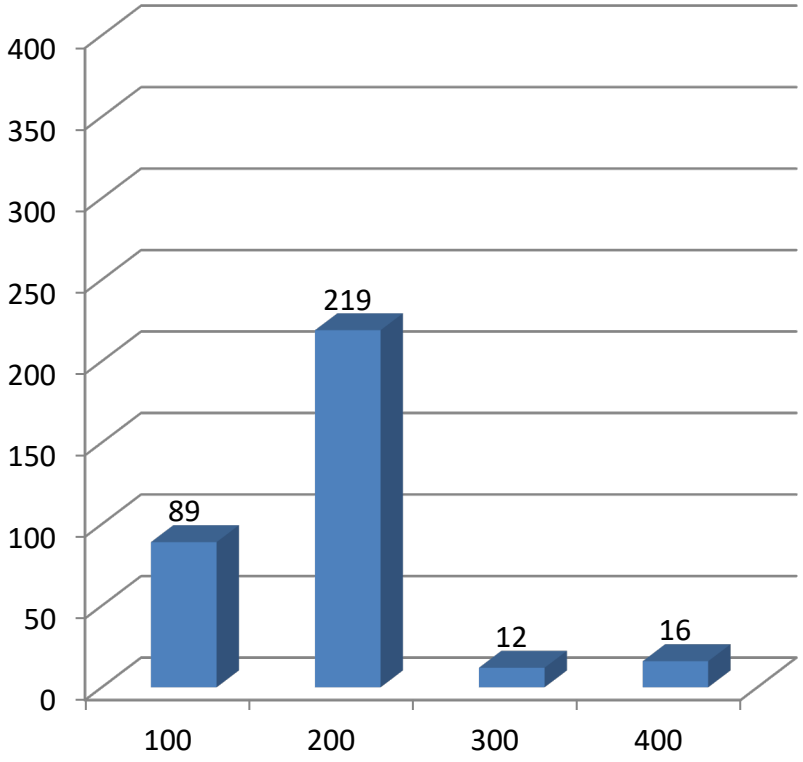
Total # of artifacts assigned = 112 per outcome

Total = 336

Course Level Frequencies: Quantitative Thinking



Course Level Frequencies: Total across the three outcomes



Review Procedures

- Each artifact had two independent raters and usable scores on the 1 – 4 scale were determined in the following manner:
  - If raters assigned the same score, that became the score for the artifact.
  - If raters' scores differed by one point, e.g., Rater 1 assigned a score of 1 and Rater 2 a score of 2, the final score was the mean, i.e., 1.5.
  - If raters' scores differed by more than one point, e.g., Rater 1 assigned a score of 1 and Rater 2 a score of 3, the raters met to discuss the rationale for their scores to see if they could agree on a score or, at minimum, scores that differed by no more than one point.
  - If raters' scores differed by more than one point and, after discussion, they were not able to resolve the differences, a third rater was assigned to review the artifact.

Review Procedures

- We also allowed reviewers to assign a score of 0 when they did not see evidence of the trait in the artifact. When one rater assigned a score of 0 and the second rater assigned a score of 1 – 4, they also met to discuss the rationale for their scores to see if they could agree on the presence (or not) of the trait in the assignment or artifact. If they could not agree, a third reader was assigned.
- We determined, as a group, which assignments did not align to specific traits of each outcome. Reviewers were instructed to score non-aligned traits as not applicable (N/A).

Third Readers for this Year's Review

- We had one artifact (total of 1 trait) that required a third review. For Quantitative Thinking artifact, the first reviewer scored the trait *Context* as Level 0 while the second rater scored it as Level 1. They were unable to agree on whether the student address the trait at all in the artifact or whether it was addressed at a rudimentary level. A third reader with no knowledge of the first two scores read it and suggested a score of Level 1. Therefore, the final score given to the trait of that artifact was Level 1.

Interrater Reliability

- We conducted interrater reliability analyses using the Cohen's Kappa statistical procedure. In so doing, we used the following rules, similar to those suggested Stellmack, Kohneim-Kalkstein, Manor, Massey, & Schmitz (2009):
  - Since our scoring procedure was to average final scores between two raters when scores differed by only one point, we used that averaged score (e.g., 1.5) as the score for both raters, counting it as an agreement in the interrater reliability analysis.
  - When each evaluator rated an artifact trait as 0 (i.e., no evidence of the rubric trait in the artifact), these ratings were counted as agreements in the interrater reliability analysis.
  - For scores that were two or more points apart, the original score of each reviewer was used in the analysis. Therefore, these scores were counted as disagreements.
  - Any time one rater scored the artifact as 0 and another provided a score, the scores were counted as disagreements in the analysis.
  - Since scores of N/A for an artifact were determined by group consensus, those scores were omitted from the interrater reliability analysis.

Artifacts Excluded from Analysis of Means Due to Inability to Assess or Misalignment with Tagged Outcomes

Outcome	Total Artifacts	Total Artifacts Not Able to be Scored	Total Used for Analysis	Notes:
Creative Thinking	112	1	111	Error = Artifact was not able to be opened.
Inquiry-Based Thinking	112	3	109	Three artifacts had scores of 0 on all traits.
Quantitative Thinking	112	0	112	At least some traits were used for all artifacts.
Total	**336**	**4**	**332**	

Revised Creative Thinking Rubric

Some wording adapted from AAC&U Creative Thinking Value Rubric

This rubric was created using the Association of American Colleges and Universities (AAC&U) Crreative Thinking VALUE Rubric. Retrieved from https://www.aacu.org/value-rubrics

Creative Thinking: Students will **outline** multiple divergent solutions to a problem, **explore** and **develop** risky or controversial ideas, and **synthesize** ideas/expertise to **generate** innovations.

Traits: Performance Indicators/Performance Levels	N/A	Level 0	Level 1	Level 2	Level 3	Level 4
Ambiguities & Possibilities: Outlines (or considers) multiple divergent solutions to a problem.	Trait does not apply to this artifact.	Does not **outline (consider)** solutions to a given problem.	**Outlines** (or **considers**) a single solution to a problem, either feasible or infeasible.	**Outlines** (or considers) more than one solution and **rejects** less acceptable approaches to solving the problem.	Having **selected** from among alternatives, **develops** a logical, consistent plan to solve the problem.	Not only **develops** a logical, consistent plan to solve the problem, but **recognizes consequences** of the solution and **articulates reason** for choosing the solution.
Risk Taking: Explores and **develops** risky or controversial ideas.	Trait does not apply to this artifact.	Does not **explore or develop** risky or controversial ideas.	**Explores,** but does not **develop** risky or controversial ideas. **OR** Stays strictly within the guidelines of the assignment.	**Explores** risky or controversial ideas and **develops** these ideas, but only in a superficial manner. **OR** **Considers new directions** or approaches without going beyond the guidelines of the assignment.	**Explores** risky or controversial ideas and **develops** these ideas in some depth. **OR** **Incorporates new directions** or approaches to the assignment in the final product.	**Explores** risky or controversial ideas, and thoroughly **develops** these ideas. **OR** Actively **seeks out** and **follows through** on untested and potentially risky directions or approaches to the assignment in the final product.
Innovative Thinking: Generates innovations (novel/unique).	Trait does not apply to this artifact.	Does not generate innovations.	**Reformulates** a collection of available ideas.	**Experiments** with creating a novel or unique idea, question, format, or product.	**Creates** a novel or unique idea, question, format, or product.	**Extends** a novel or unique idea, question, format, or product to create new knowledge or knowledge that crosses boundaries.
Connecting, Synthesizing, Transforming: Synthesizes ideas or solutions.	Trait does not apply to this artifact.	Does not recognize connections.	**Recognizes** existing connections among ideas or solutions.	**Connects** ideas or solutions in novel ways.	**Synthesizes** ideas or solutions into a coherent whole.	**Transforms** ideas or solutions into entirely new forms.

Revised Inquiry-Based Thinking Rubric (Page 1)

Some wording adapted from AAC&U Critical Thinking Value Rubric

This rubric was created using the Association of American Colleges and Universities (AAC&U) Critical Thinking VALUE Rubric. Retrieved from https://www.aacu.org/value-rubrics

Inquiry-Based Thinking: Students will **formulate** focused questions and/or hypotheses, **evaluate** existing knowledge, **collect** and **analyze** data, and **draw** justifiable conclusions.

Traits: Performance Indicators/Performance Levels	**N/A**	**Level 0**	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Problem/Question/ Issue: Formulates focused questions and/or hypotheses.	Trait does not apply to this artifact.	No problem, question, or issue is stated.	**Formulates** a question and/or hypothesis, but not one that is necessarily focused or manageable. **OR** **Issue/problem** to be considered critically is stated without clarification or description.	**Formulates** a question and/or hypothesis that is focused and manageable. **OR** **Issue/problem** to be considered critically is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	**Formulates** a question and/or hypothesis that is focused and manageable and addresses a potentially significant area of inquiry. **OR** **Issue/problem** to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	**Formulates** a focused, and manageable question and/or hypothesis that addresses significant yet less-explored aspects of the topic. **OR** **Issue/problem** to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.
Research of Existing Knowledge/Evidence: Evaluates existing knowledge **OR** **Selects** and **uses** information to investigate a point of view or conclusion.	Not applicable to this artifact.	Does not **evaluate** existing knowledge.	**Evaluates** some existing research relevant to the problem/question, but only includes those that support one side of an issue or includes information from some questionable sources. **OR** Information is taken from sources without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.	**Evaluates** some existing research relevant to the problem/question from reputable sources. The review is balanced but not comprehensive. **OR** Information is taken from sources with some interpretation/ evaluation, but not enough to develop a coherent analysis of synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	**Uses** reputable sources to **conduct** a comprehensive evaluation of existing research relevant to the problem/question. **OR** Information is taken from sources with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	**Evaluates and synthesizes** in-depth relevant information from reputable sources representing various points of view/approaches. **OR** Information is taken from sources with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.
Data Collection and Analysis/Student's Position: Collects and **analyzes** data. **OR** Student's position (perspective, thesis/hypothesis)	Not applicable to this artifact.	Neither **collects** nor **analyzes** the data. **OR** Does not state a position.	**Collects** but does not **analyze** the data. **OR** Specific position (perspective, thesis/hypothesis) is stated, but is simplistic and obvious.	**Collects** but incompletely **analyzes** the data. **OR** Specific position (perspective, thesis/hypothesis) acknowledges different sides of an issue.	Thoroughly **analyzes** the data. **OR** Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/hypothesis).	Thoroughly **analyzes** and **synthesizes** the data. **OR** Specific position (perspective, thesis/hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/hypothesis).

Revised Inquiry-Based Thinking Rubric (Page 2)

Some wording adapted from AAC&U Critical Thinking Value Rubric

This rubric was created using the Association of American Colleges and Universities (AAC&U) Critical Thinking VALUE Rubric. Retrieved from https://www.aacu.org/value-rubrics

Traits: Performance Indicators/Performance Levels	N/A	Level 0	Level 1	Level 2	Level 3	Level 4
Conclusions and related outcomes (implications and consequences): Draws justifiable conclusions.	Not applicable to this artifact.	Does not **draw** conclusions.	Conclusions neither **address** the question and/or hypothesis nor are supported by the data. **OR** Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.	Conclusions either **address** the question and/or hypothesis or are supported by the data. **OR** Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusions both **address** the question and/or hypothesis and are supported by the data. **OR** Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	**Fulfills level 3 plus suggests** how results might apply to other problems or inform future studies. **OR** Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.

Revised Quantitative Thinking Rubric

The last four traits are taken from the AAC&U Quantitative Literacy Value Rubric

This rubric was created using the Association of American Colleges and Universities (AAC&U) Quantitative Literacy VALUE Rubric. Retrieved from https://www.aacu.org/value-rubrics

Quantitative Thinking: Students will analyze real-world problems quantitatively, explain information presented in mathematical forms, convert mathematical information into mathematical forms, perform calculations, and make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis.

Traits: Performance Indicators/ Performance Levels	**N/A**	**Level 0**	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Context: Analyzes real-world problems quantitatively.	Trait does not apply to this artifact.	Does not **explain, report,** or **analyze** real-world problems quantitatively.	**Explains** and **reports** the problem within its context quantitatively. **Identifies** basic metrics to solve the problem.	**Level 1 plus uses** appropriate tools to analyze metrics to **solve** problems in a given context.	**Level 2 plus articulates** meanings of a quantitative analysis.	**Develops** metrics, **uses** appropriate tools, and **applies** solutions to **solve** novel problems.
Interpretation: Ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).	Trait does not apply to this artifact.	Makes no attempt to explain information presented in mathematical forms.	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 the trend, perhaps by confusing positive and negative trends.*	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.*	Provides accurate explanations of information presented in mathematical forms. *For instance, accurately explains the trend data shown in a graph.*	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. *For instance, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.*
Representation: Ability to convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words).	Trait does not apply to this artifact.	Does not convert relevant information into mathematical forms.	Completes conversion of information, but resulting mathematical portrayal is inappropriate.	Completes conversion of information, but resulting mathematical portrayal is only partially appropriate or accurate.	Competently converts relevant information into an appropriate and desired mathematical portrayal.	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.
Calculation	Trait does not apply to this artifact.	No calculations are attempted.	Calculations are attempted but are both unsuccessful and are not comprehensive.	Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem.	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem.	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.)
Application/Analysis: Ability to make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis.	Trait does not apply to this artifact.	Does not use mathematical data to form judgments or to draw conclusions.	Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work.	Uses the quantitative analysis of data as the basis for a workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work.	Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.

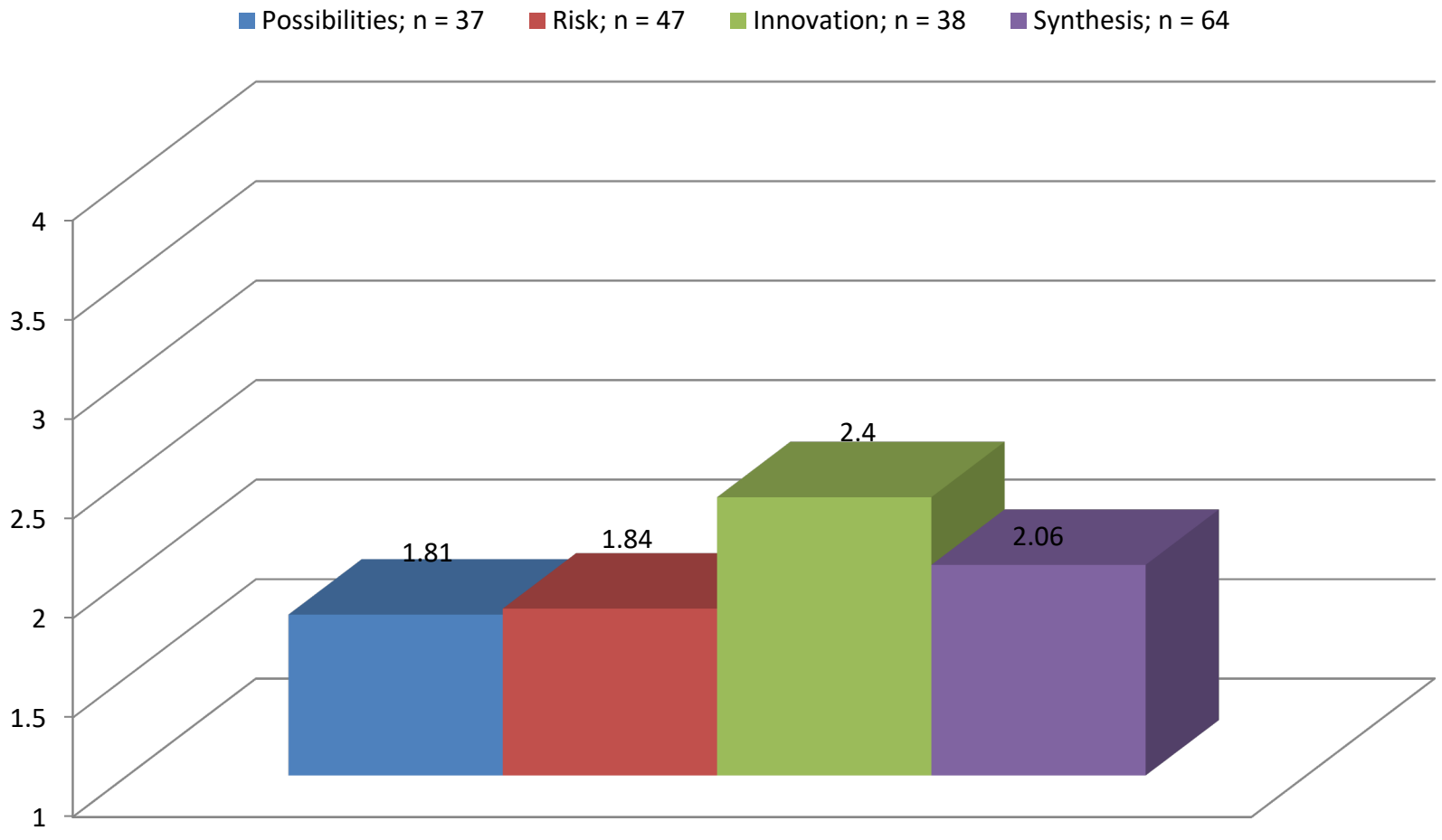
Creative Thinking

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score

(Although there were 111 artifacts in this analysis, not all artifacts aligned to every trait and, in some cases, there was no evidence the student addressed a particular trait)

A paired-samples *t-test showed no significant differences in student performance among traits.*

Overall Analysis



Creative Thinking

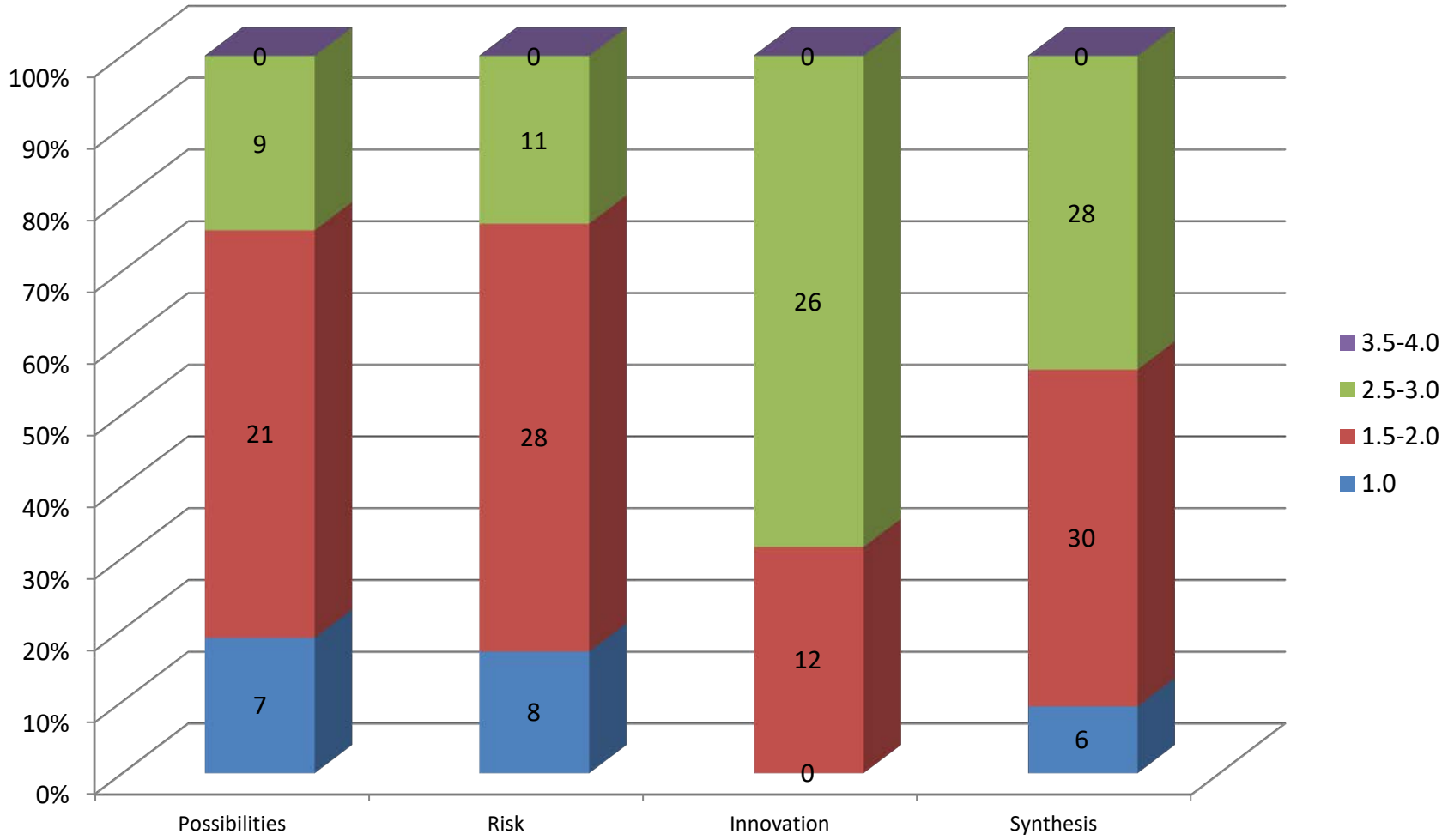
Frequency Analysis

Number of artifacts (with usable scores) scoring at each performance level

Trait/ Performance Level	Possibilities	Risk	Innovation	Synthesis	Total
1.0	7 (19%)	8 (17%)	0	6 (9%)	21 (11%)
1.5 – 2.0	21 (57%)	28 (60%)	12 (32%)	30 (47%)	91 (49%)
2.5 – 3.0	9 (24%)	11 (23%)	26 (68%)	28 (44%)	74 (40%)
3.5 – 4.0	0	0	0	0	0
Total Traits with Usable Scores	**37**	**47**	**38**	**64**	**186**

Creative Thinking

Frequency Analysis

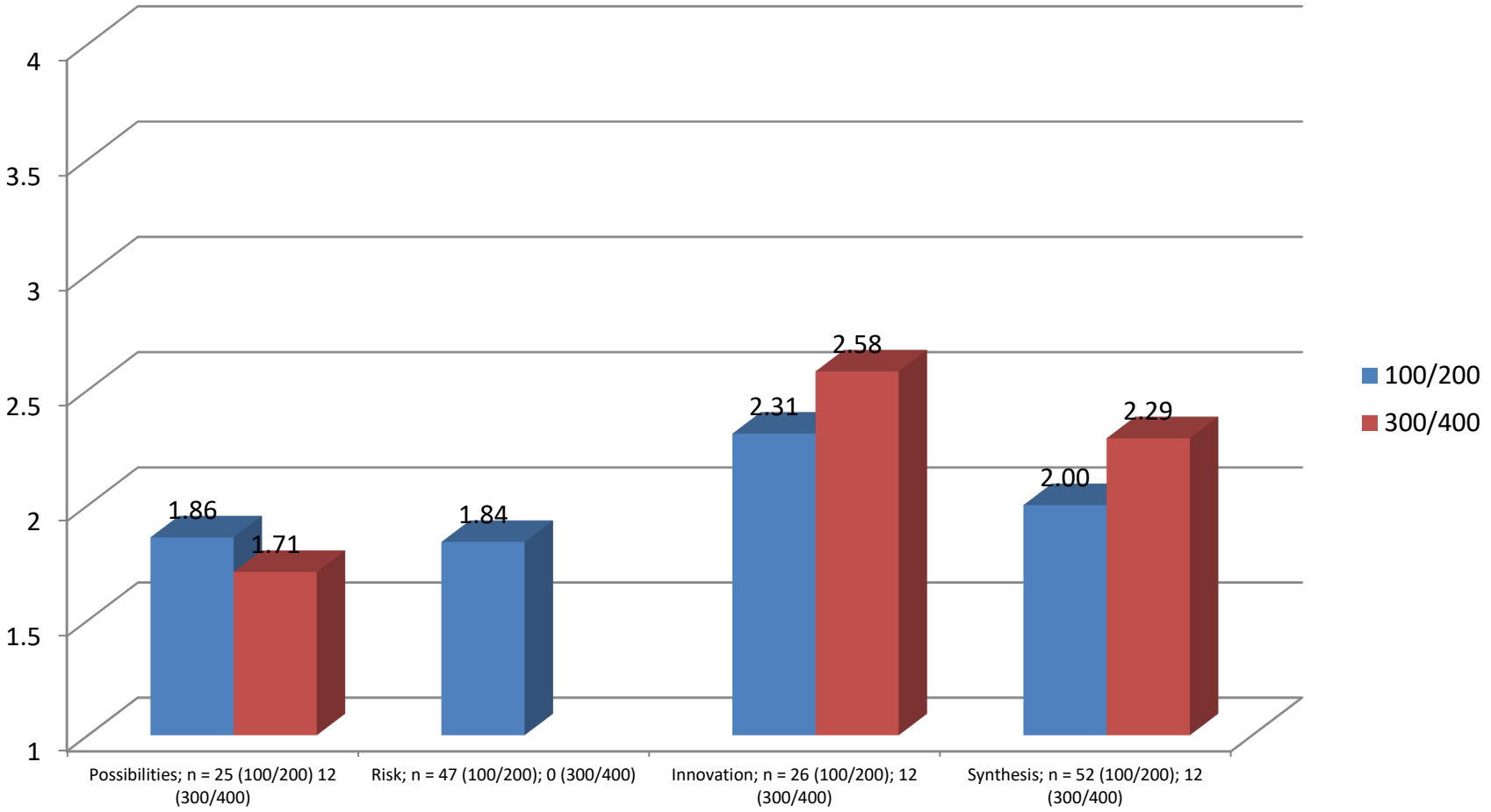


Creative Thinking: Course Level Analysis

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score

All course level differences were significant. There was no significant difference for mean scores between 100/200 and 300/400 Level courses.

Course Level Analysis



Creative Thinking

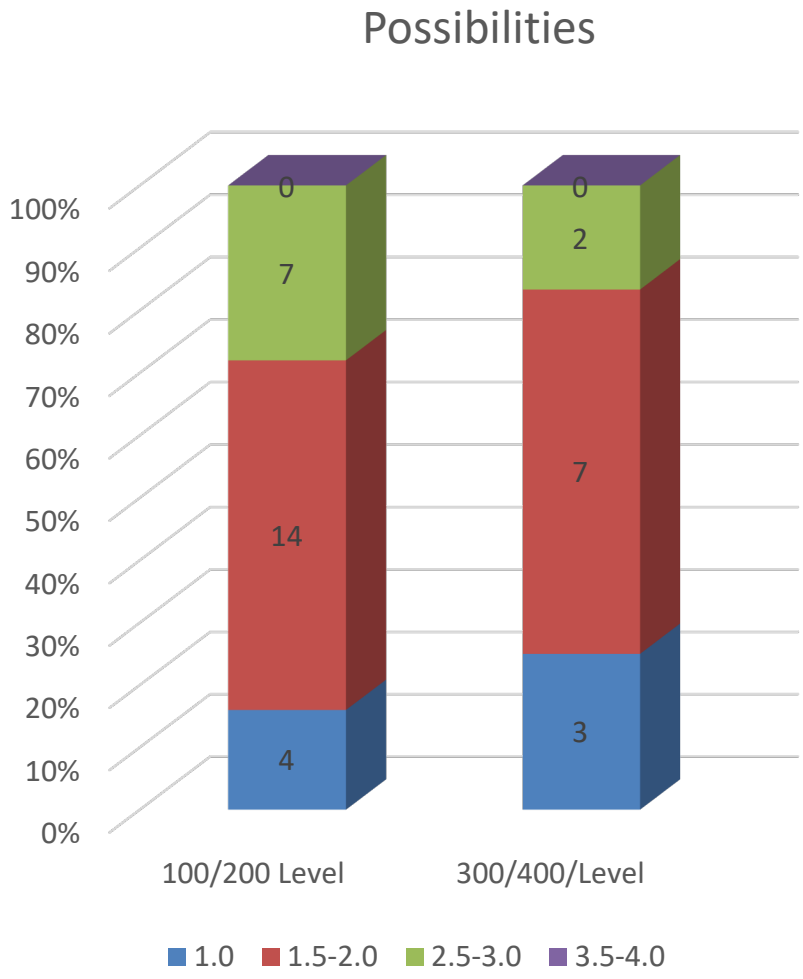
Frequency Analysis by Course Level

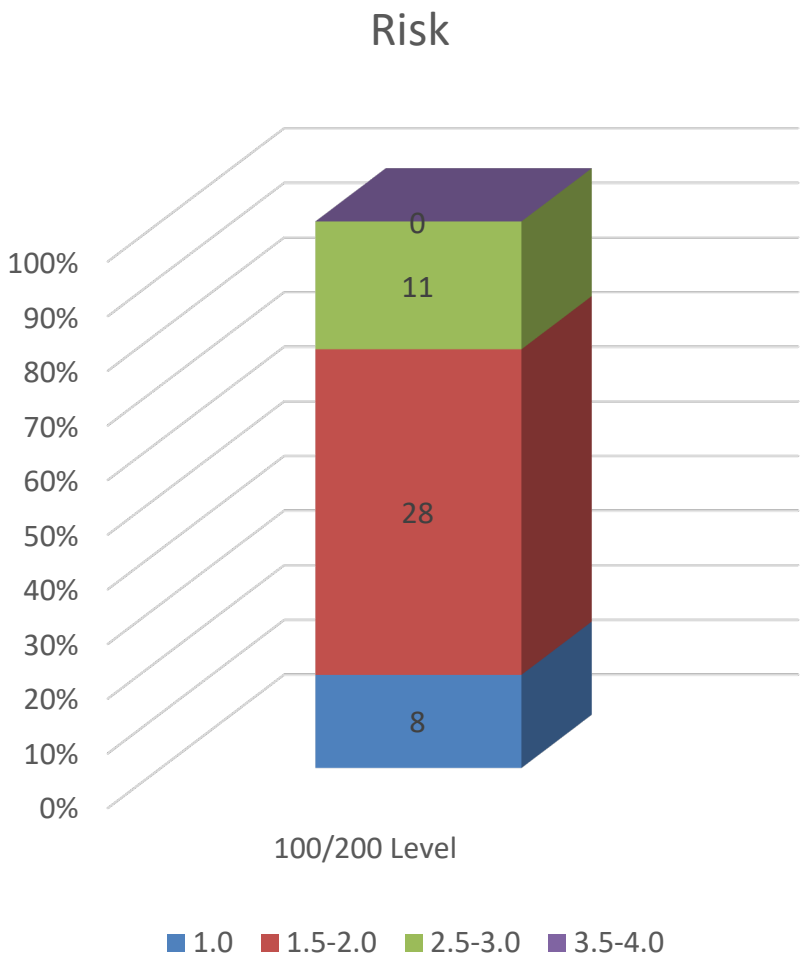
Number of artifacts (with usable scores) scoring at each performance level

Course Level	Trait/ Performance Level	Possibilities	Risk	Innovation	Synthesis	Total
100/200	1.0	4 (16%)	8 (17%)	0	6 (12%)	18 (12%)
300/400		3 (25%)	N/A	0	0	3 (8%)
100/200	1.5 – 2.0	14 (56%)	28 (60%)	10 (38%)	25 (48%)	77 (51%)
300/400		7 (58%)	N/A	2 (17%)	5 (42%)	14 (39%)
100/200	2.5 – 3.0	7 (28%)	11 (23%)	16 (62%)	21 (40%)	55 (37%)
300/400		2 (17%)	N/A	10 (83%)	7 (58%)	19 (53%)
100/200	3.5 – 4.0	0	0	0	0	0
300/400		0	N/A	0	0	0
100/200	**Total Traits with Usable Scores**	**25**	**47**	**26**	**52**	**150**
300/400		**12**	**N/A**	**12**	**12**	**36**
All Course Levels	**Grand Totals**	**37**	**47**	**38**	**64**	**186**

Creative Thinking

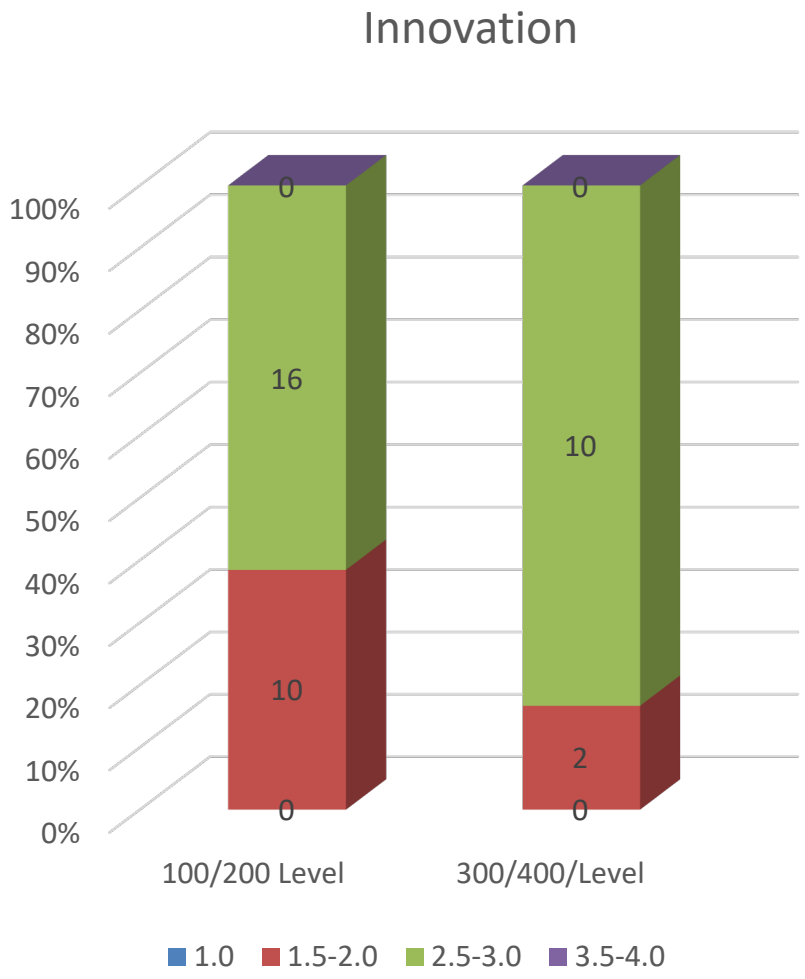
Frequency Analysis by Course Level

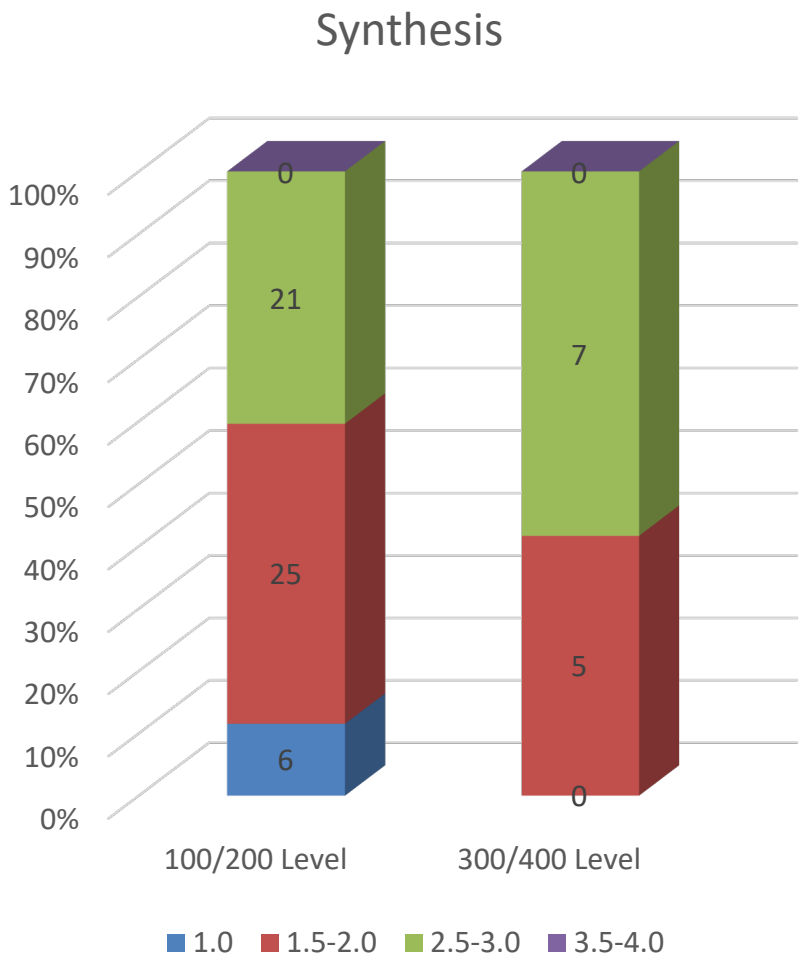




Creative Thinking

Frequency Analysis by Course Level





Creative Thinking

Inter-Rater Agreement Results

Trait/ Performance Level	Possibilities Kappa Liberal = .573	Risk Kappa Liberal = .835	Innovation Kappa Liberal = .852	Synthesis Kappa Liberal = .706
Agree on score	11 (29%)	23 (49%)	15 (39%)	20 (31%)
Difference = 1 point	14 (37%)	19 (40%)	19 (50%)	29 (45%)
Difference = 2 points	12 (32%)	5 (11%)	4 (11%)	13 (20%)
Difference = 3 points	0	0	0	0
Agree on Score of 0	0	0	0	0
Score + 0	1 (3%)	0	0	2 (3%)
Total	38	47	38	64

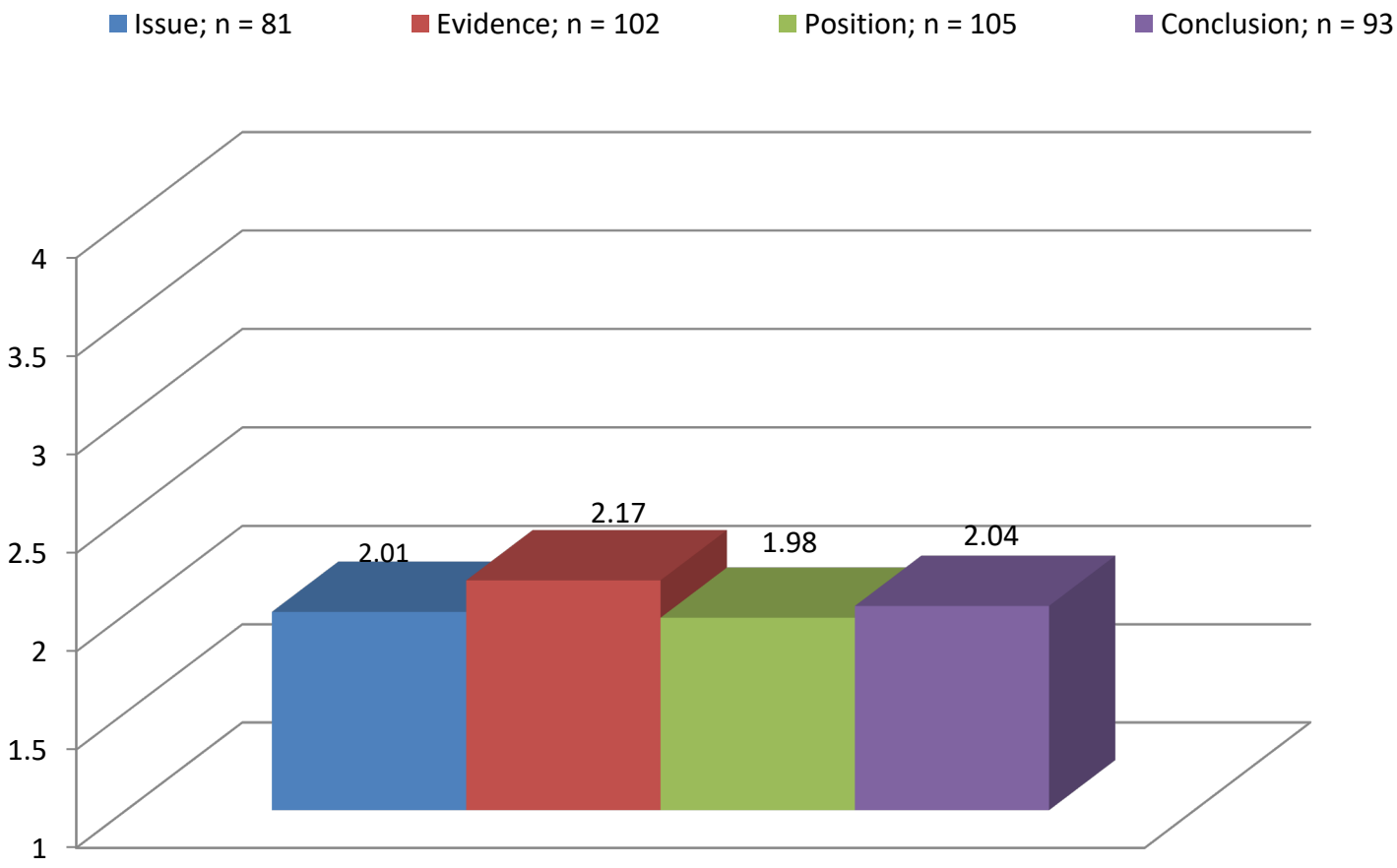
Inquiry-Based Thinking

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score.

(Although there were 109 artifacts in the analysis, not all artifacts aligned to every trait and, in some cases, there was no evidence the student addressed a particular trait)

Results showed that the mean for evidence was significantly higher than those for the other three traits.

Overall Analysis



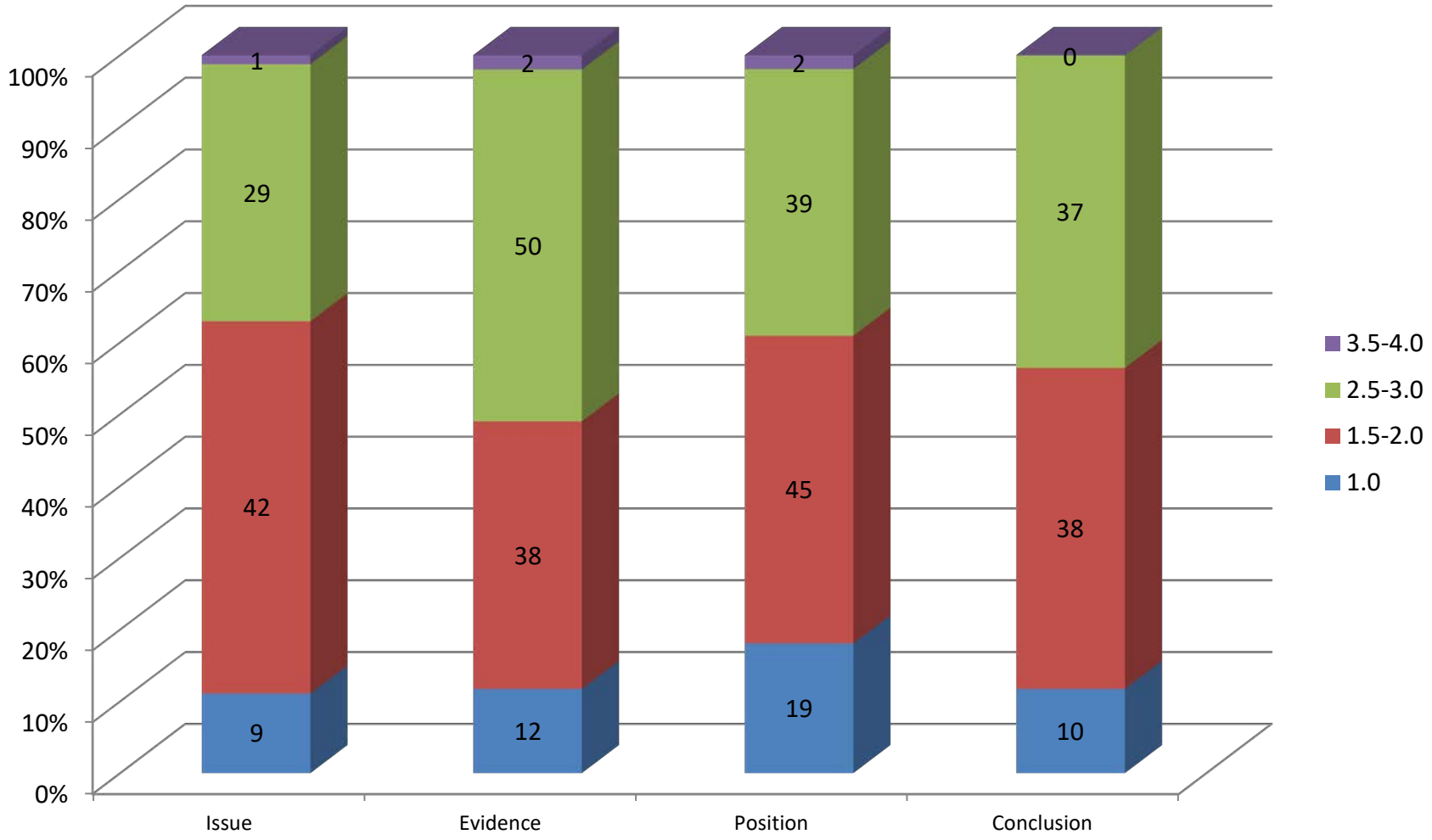
Inquiry-Based Thinking

Number of artifacts (with usable scores) scoring at each performance level

Trait/ Performance Level	Issue	Evidence	Position	Conclusion	Total
1.0	9 (11%)	12 (12%)	19 (18%)	10 (12%)	**50 (13%)**
1.5 – 2.0	42 (52%)	38 (37%)	45 (43%)	38 (45%)	**163 (44%)**
2.5 – 3.0	29 (36%)	50 (49%)	39 (37%)	37 (44%)	**155 (42%)**
3.5 – 4.0	1 (1%)	2 (2%)	2 (2%)	0	**5 (1%)**
Totals	**81**	**102**	**105**	**93**	**373**

Inquiry-Based Thinking

Frequency Analysis

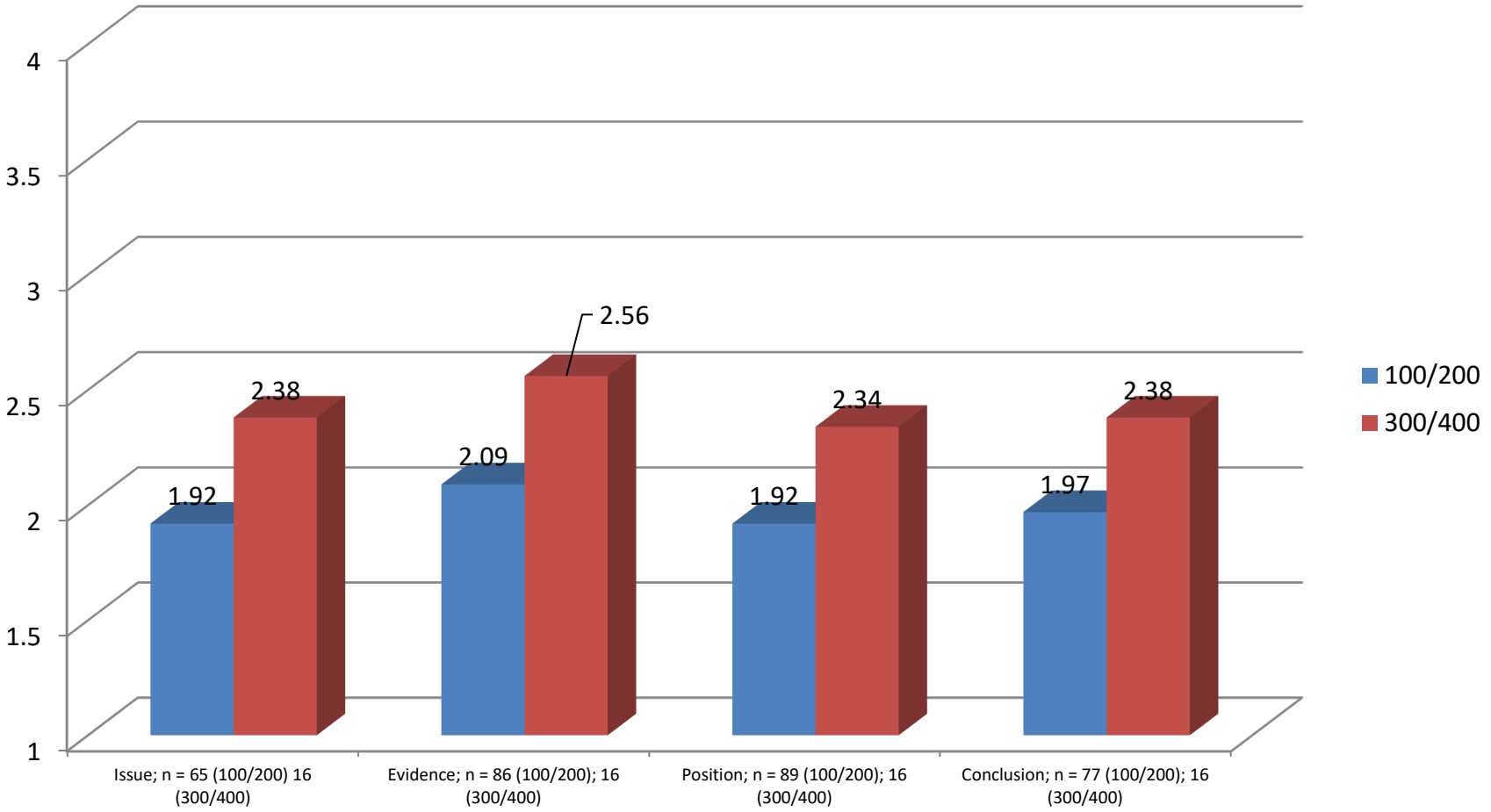


Inquiry-Based Thinking: Course Level Analysis

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score

Students enrolled in 300/400 level courses scored significantly higher than students enrolled in 100/200 level courses on all traits.

Course Level Analysis



Inquiry-Based Thinking

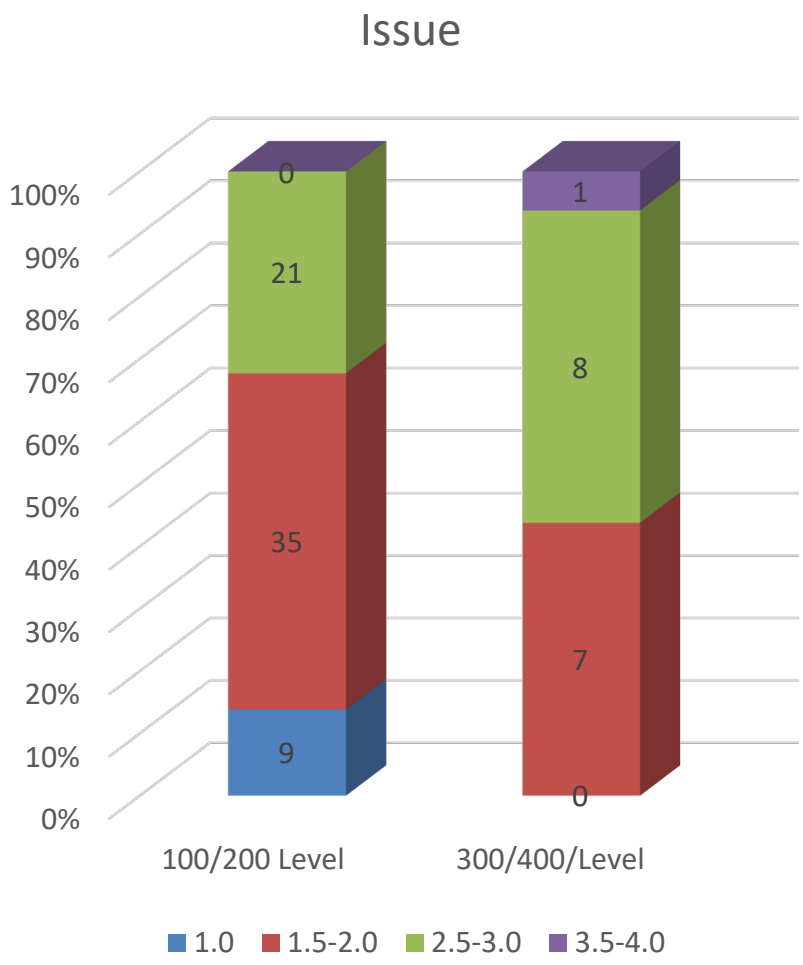
Frequency Analysis by Course Level

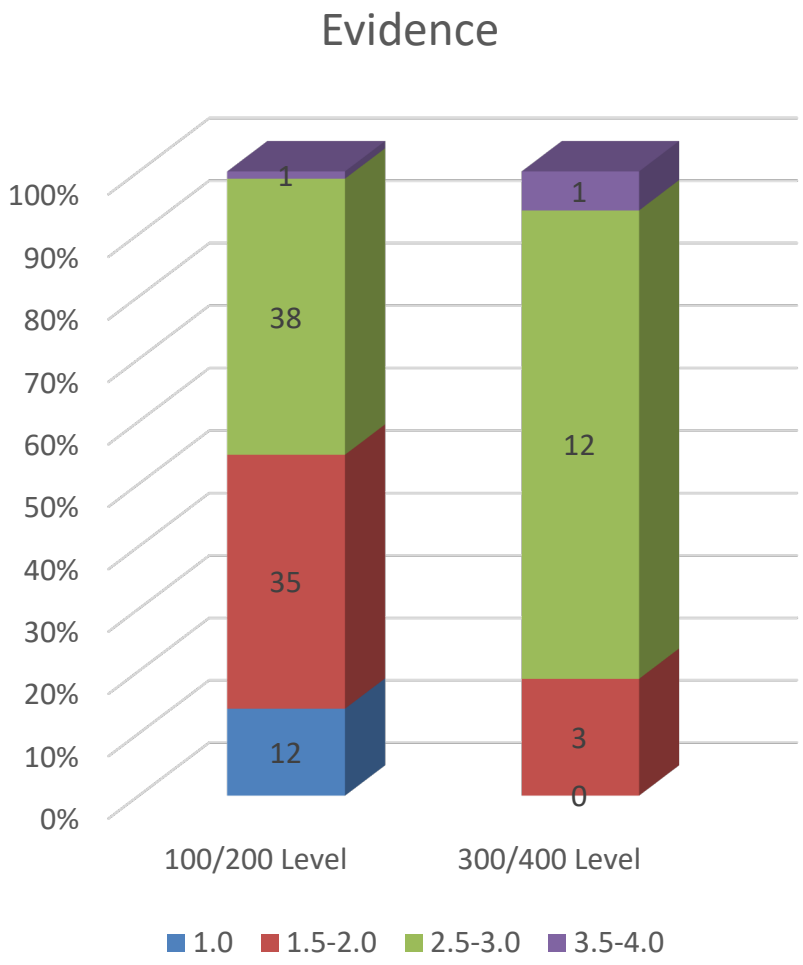
Number of artifacts (with usable scores) scoring at each performance level

Course Level	Trait/ Performance Level	Issue	Evidence	Position	Conclusion	Total
100/200	1.0	9 (14%)	12 (14%)	18 (20%)	10 (13%)	49 (15%)
300/400		0	0	1 (6%)	0	1 (2%)
100/200	1.5 – 2.0	35 (54%)	35 (41%)	39 (44%)	40 (52%)	149 (47%)
300/400		7 (44%)	3 (19%)	6 (38%)	6 (38%)	22 (34%)
100/200	2.5 – 3.0	21 (32%)	38 (44%)	31 (35%)	27 (35%)	117 (37%)
300/400		8 (50%)	12 (75%)	8 (50%)	10 (63%)	38 (59%)
100/200	3.5 – 4.0	0	1 (1%)	1 (1%)	0	2 (1%)
300/400		1 (6%)	1 (6%)	1 (6%)	0	3 (5%)
100/200	**Total Traits with Usable Scores**	**65**	**86**	**89**	**77**	**317**
300/400		**16**	**16**	**16**	**16**	**64**
All Course Levels	**Grand Totals**	**81**	**102**	**105**	**93**	**381**

Inquiry-Based Thinking

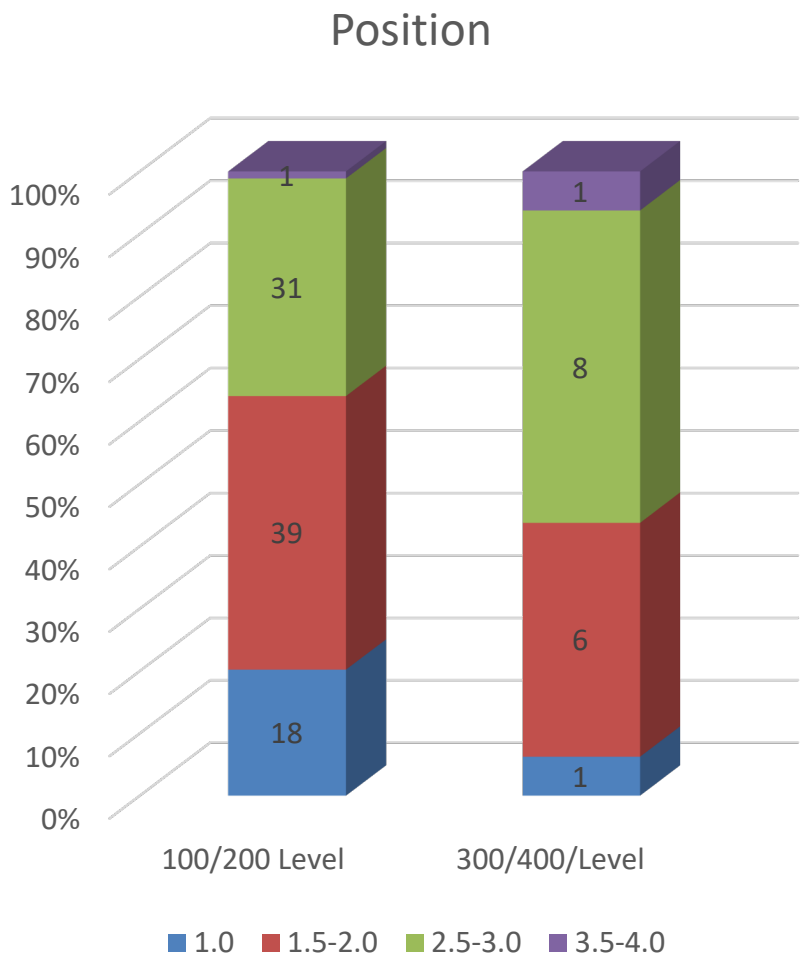
Frequency Analysis by Course Level

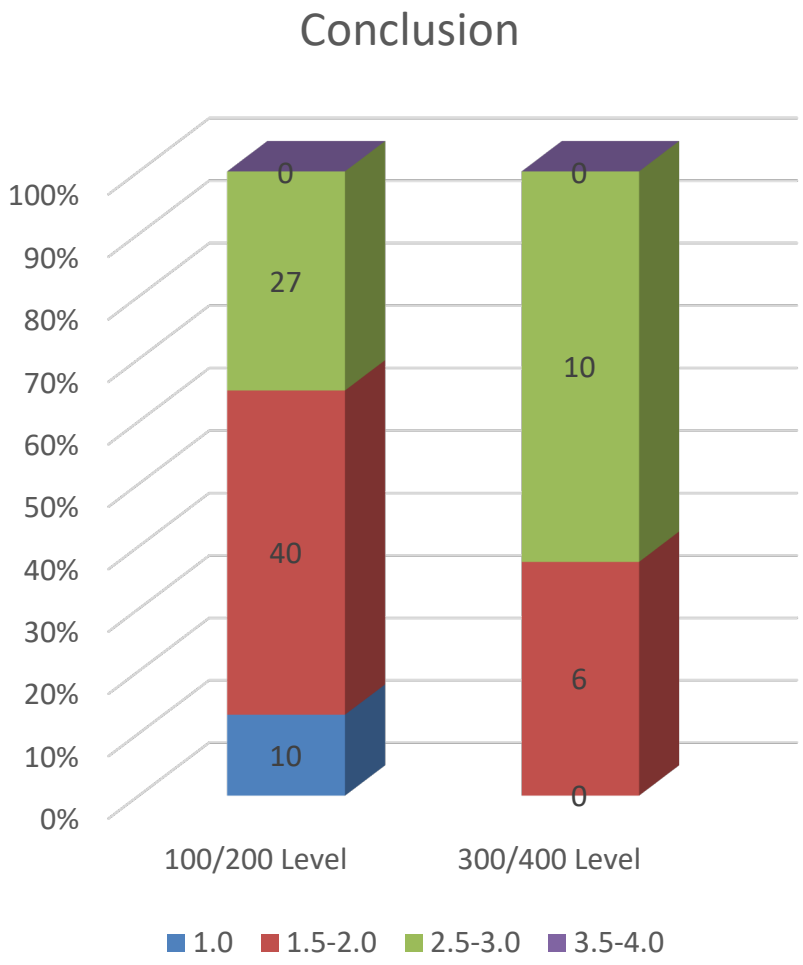




Inquiry-Based Thinking

Frequency Analysis by Course Level





Inquiry-Based Thinking

Inter-Rater Agreement Results

Trait/ Performance Level	Issue Kappa Liberal = .819	Evidence Kappa Liberal = .824	Position Kappa Liberal = .732	Conclusions Kappa Liberal = .706
Agree on score	35 (38%)	44 (39%)	38 (34%)	39 (35%)
Difference = 1 point	37 (40%)	46 (41%)	46 (41%)	41 (37%)
Difference = 2 points	9 (10%)	3 (3%)	5 (4%)	7 (6%)
Difference = 3 points	0	0	0	0
Agree on Score of 0	7 (8%)	6 (5%)	1 (1%)	5 (4%)
Score + 0	5 (5%)	13 (12%)	22 (20%)	20 (18%)
Total	93	112	112	112

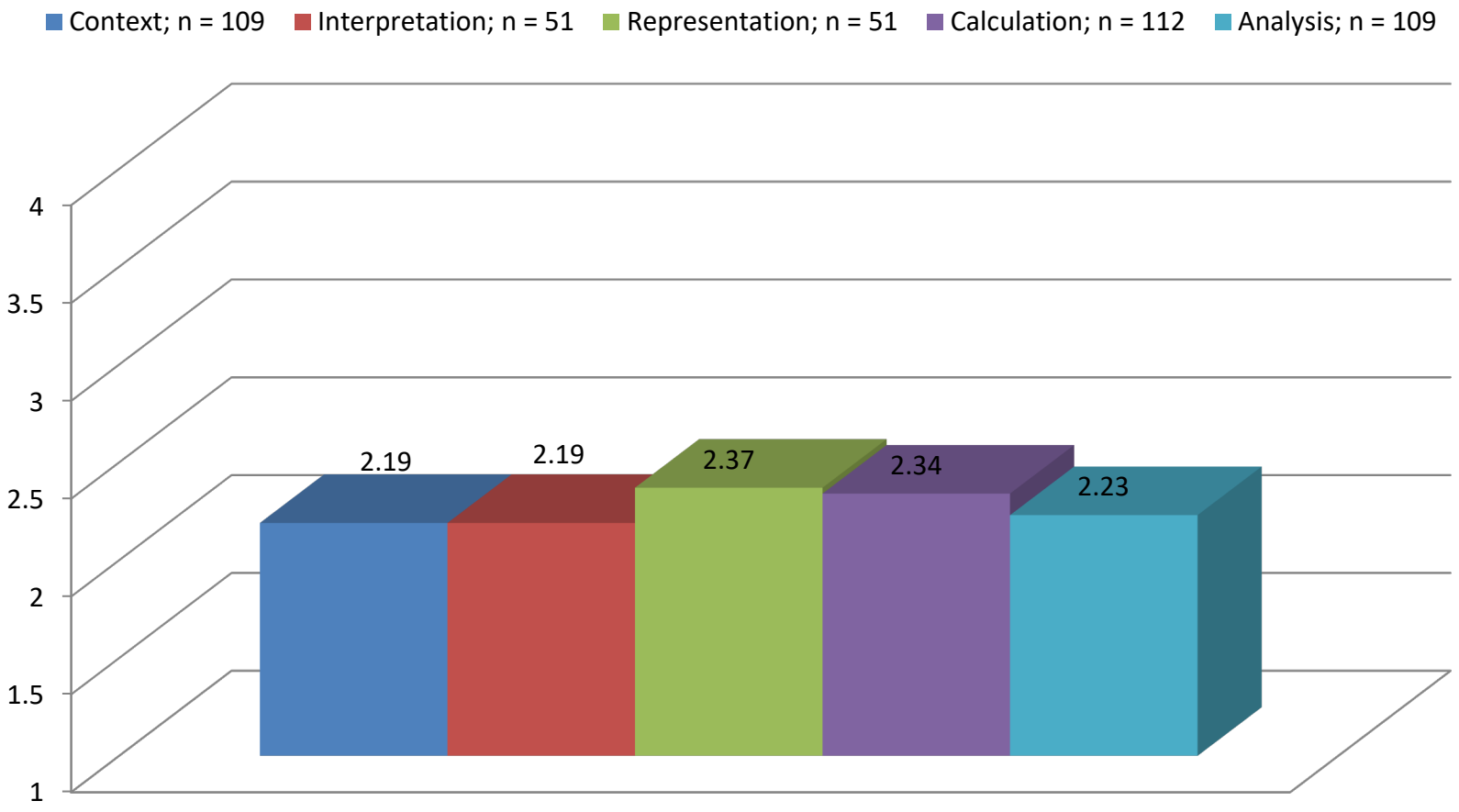
Quantitative Thinking

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score

(Although there were 112 artifacts in the analysis, not all artifacts aligned to every trait and, in some cases, there was no evidence the student addressed a particular trait; Additionally, all artifacts were from 100 and 200-level courses)

A series of paired samples *t* tests showed a significance for two traits – students scored significantly higher on calculation than on context. They also scored significantly higher on calculation than on interpretation.

Overall Analysis



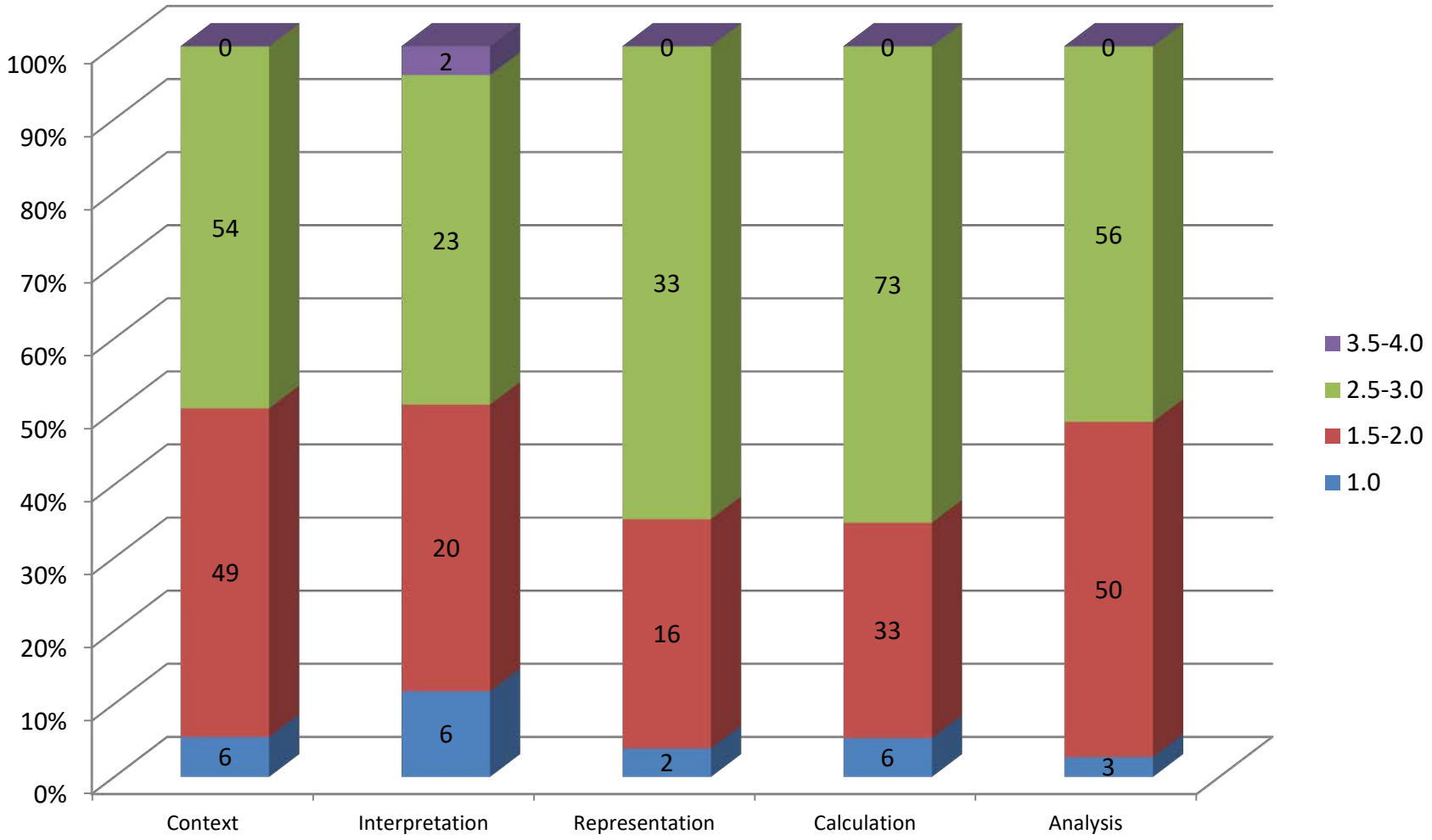
Quantitative Thinking

Number of artifacts (with usable scores) scoring at each performance level

Trait/ Performance Level	Context	Interpretation	Representation	Calculation	Analysis	Total
1.0	6 (6%)	6 (12%))	2 (4%)	6 (5%)	3 (3%)	**23 (5%)**
1.5 – 2.0	49 (45%)	20 (39%)	16 (31%)	33 (29%)	50 (46%)	**168 (39%)**
2.5 – 3.0	54 (50%)	23 (45%)	33 (65%)	73 (65%)	56 (51%)	**239 (55%)**
3.5 – 4.0	0	2 (4%)	0	0	0	**2 (0%)**
Totals	**109**	**51**	**51**	**112**	**109**	**432**

Quantitative Thinking

Frequency Analysis



Quantitative Thinking

Inter-Rater Agreement Results

Trait/ Performance Level	Context Kappa Liberal = .863	Interpretation Kappa Liberal = .881	Representation Kappa Liberal = .847	Calculation Kappa Liberal = .855	Analysis Kappa Liberal = .864
Agree on score	50 (45%)	24 (46%)	23 (44%)	50 (45%)	46 (41%)
Difference = 1 point	49 (44%)	22 (42%)	23 (44%)	50 (45%)	52 (46%)
Difference = 2 points	5 (4%)	5 (10%)	2 (4%)	10 (10%)	8 (7%)
Difference = 3 points	0	0	0	0	1 (1%)
Agree on Score of 0	1 (1%)	1 (2%)	0	0	2 (2%)
Score + 0	7 (6%)	0	4 (8%)	2 (2%)	3 (3%)
Total	**112**	**52**	**52**	**112**	**112**

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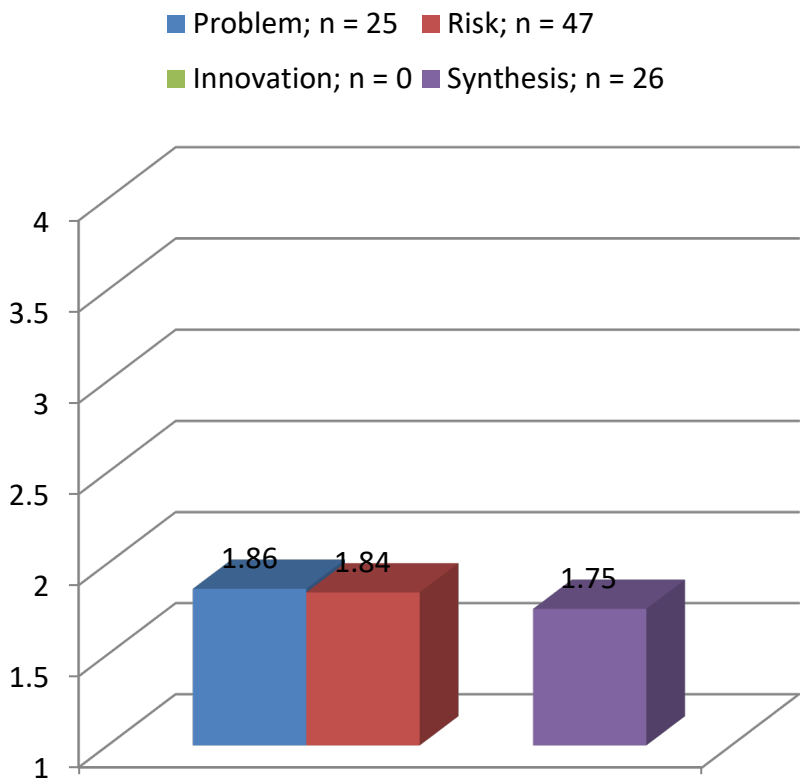
Course Type Analysis

Please note that many courses can fulfill several categories. For example, critical thinking (CT) courses might also be Core II, multicultural or international, be taught online, etc.

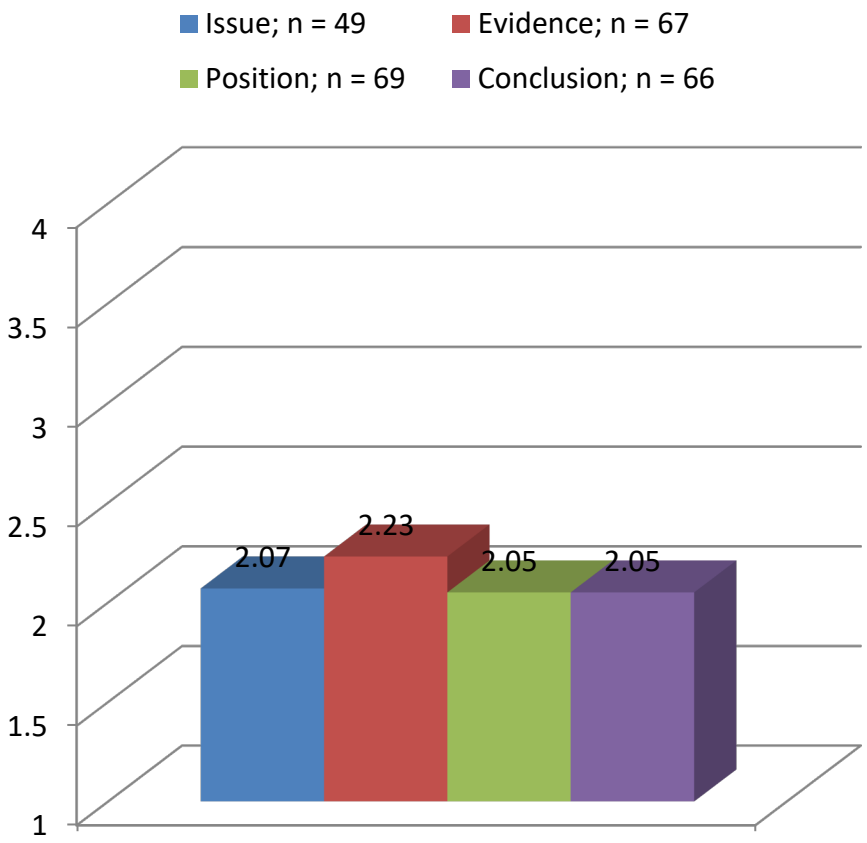
CT Courses

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score. All CT courses are 100/200 Level.

Creative Thinking



Inquiry-Based Thinking



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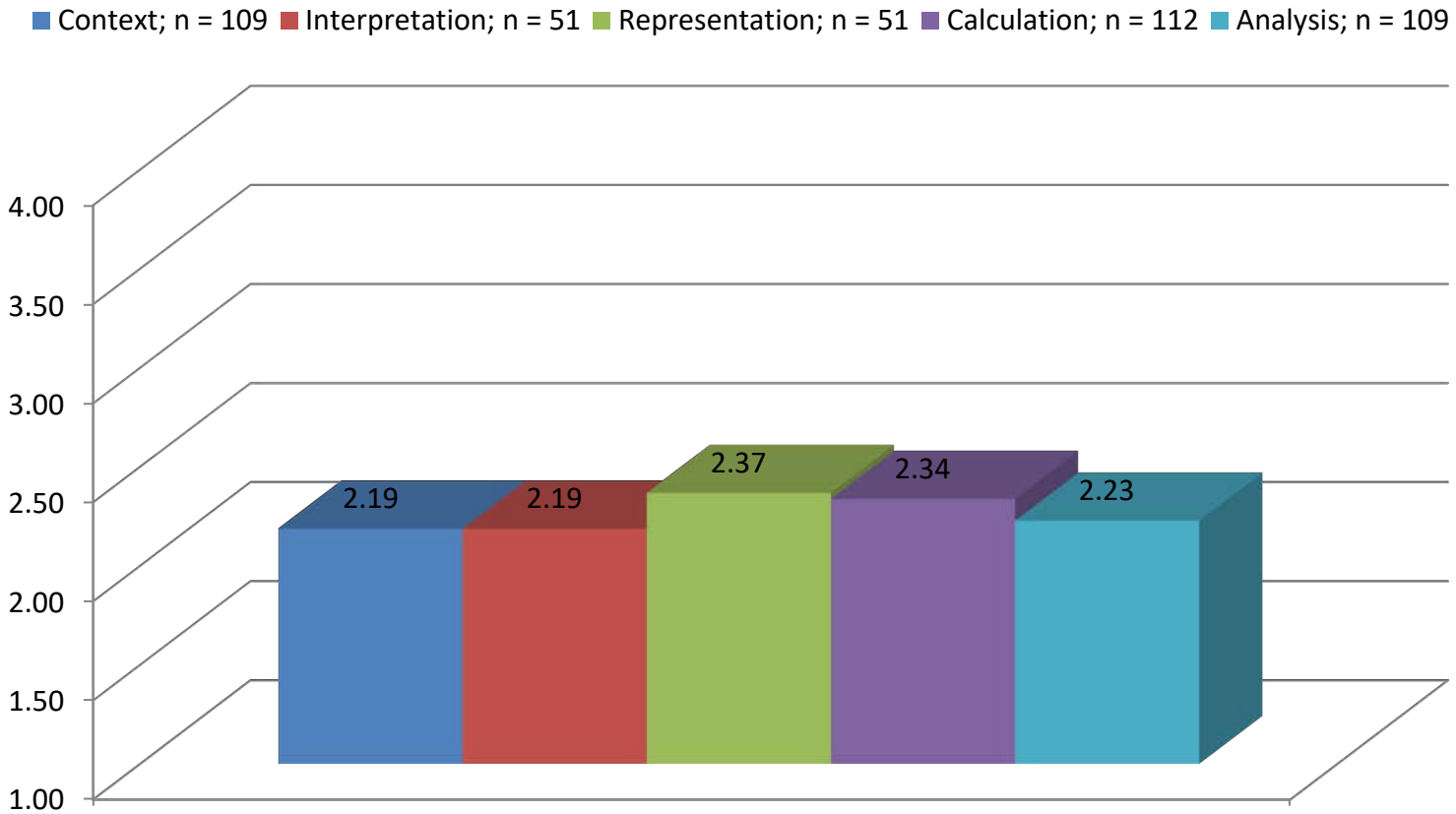
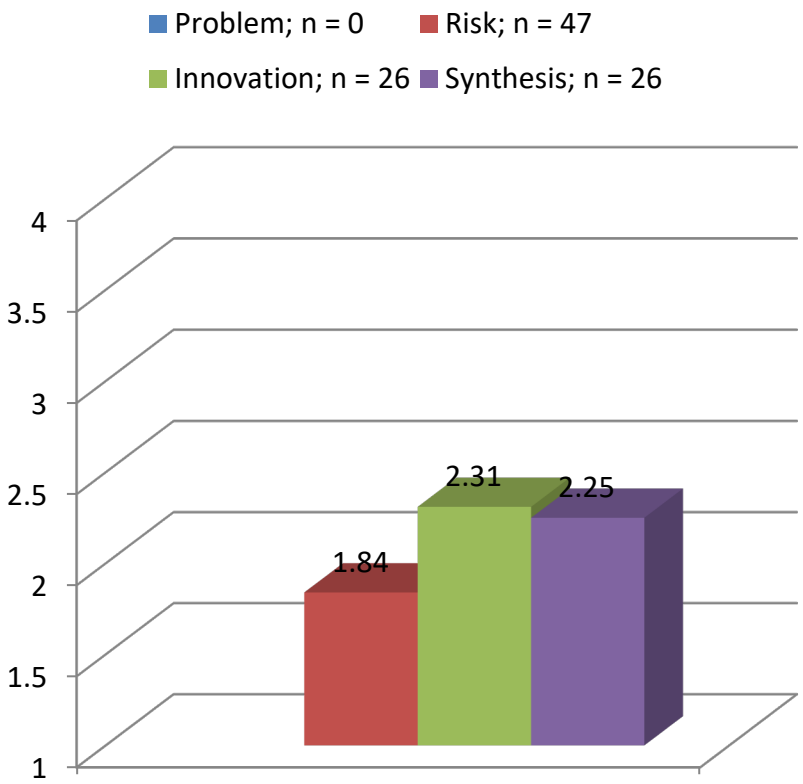


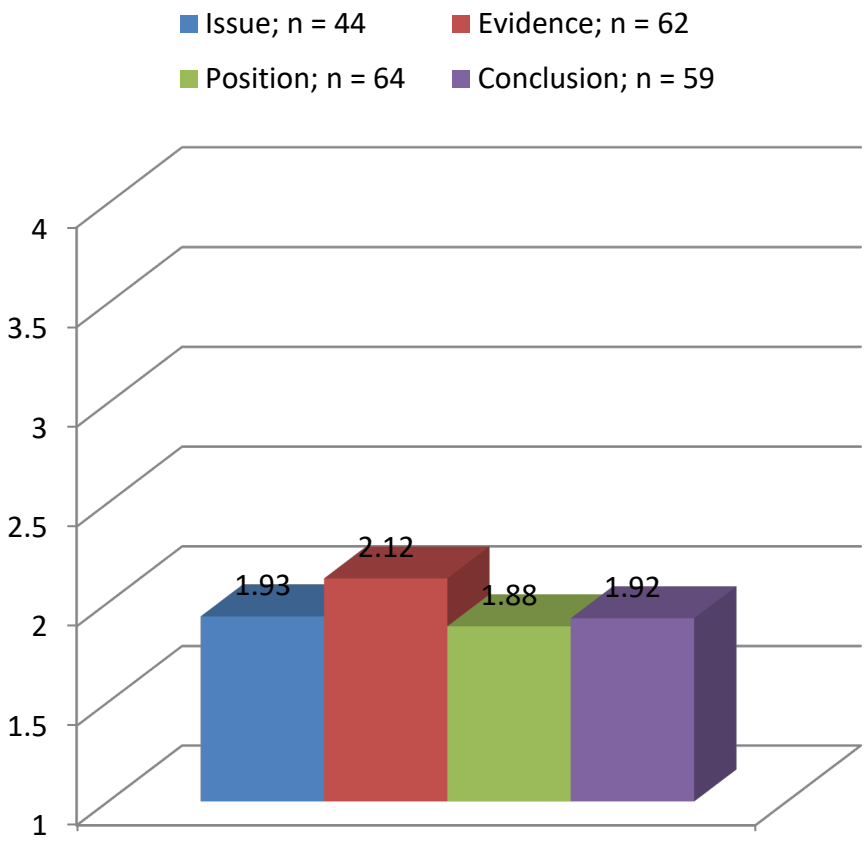
Core II Courses

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score. All Core II courses are 100/200 Level.

Creative Thinking



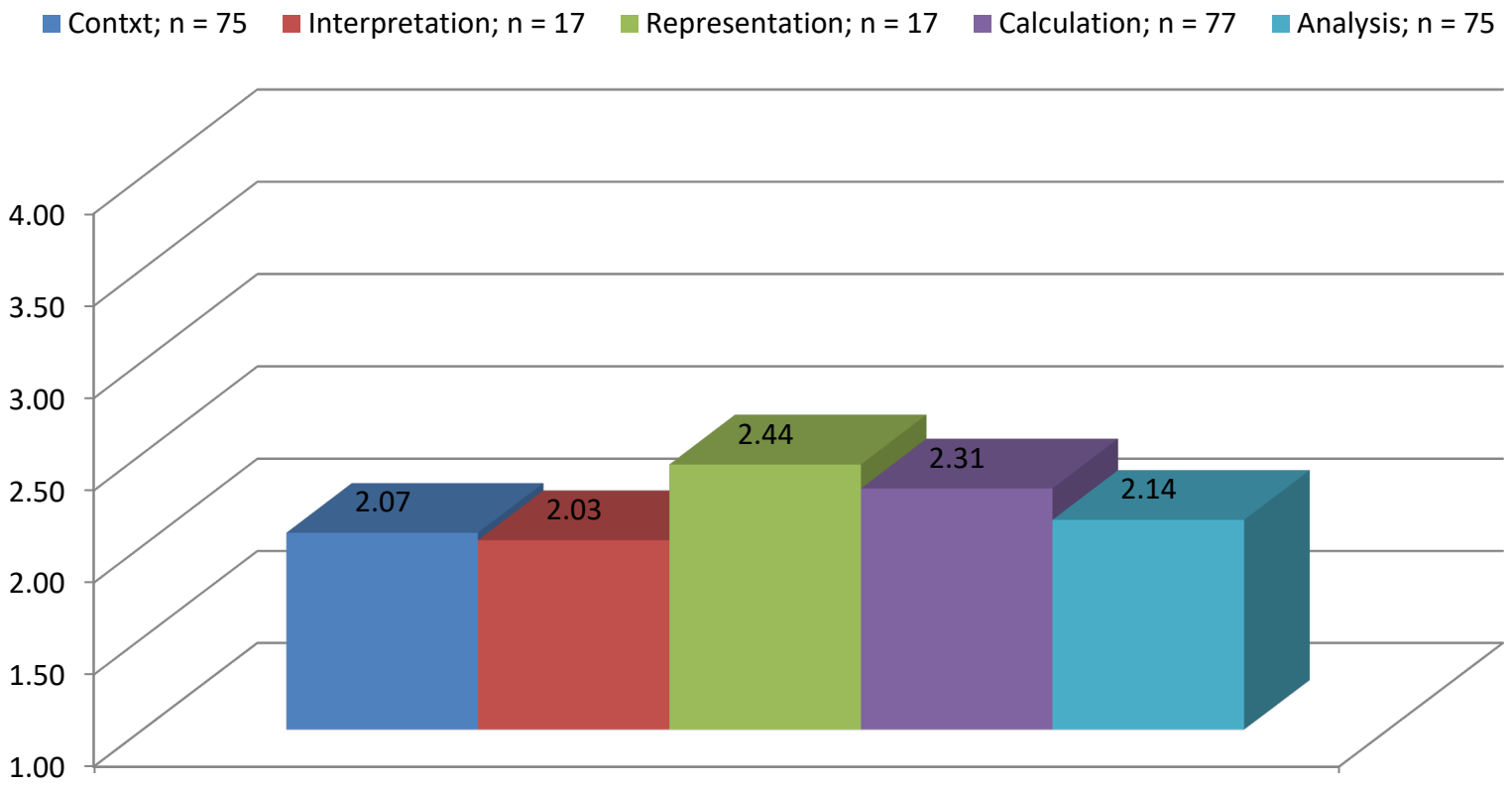
Inquiry-Based Thinking



Core II Courses

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score. All Core II courses are 100/200 Level.

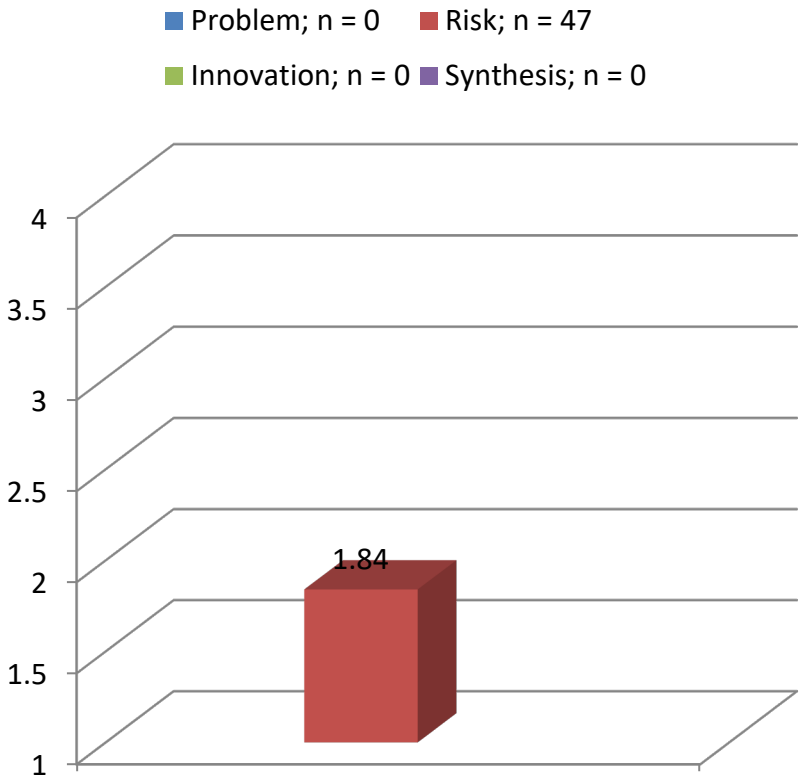
Quantitative Thinking



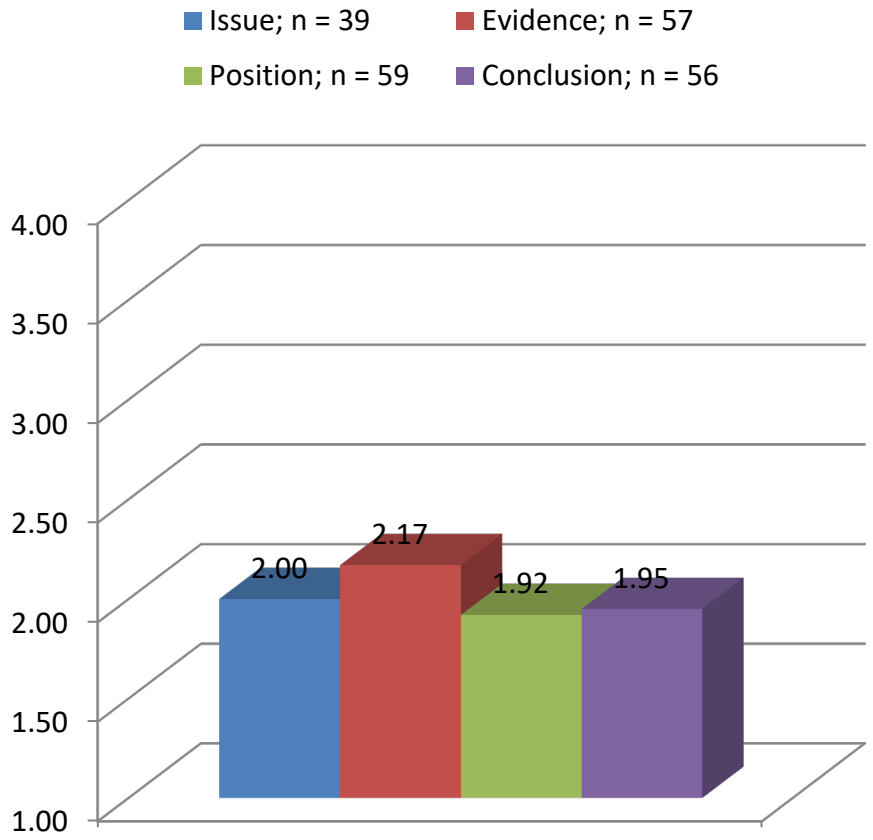
Multicultural Courses

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score.
Note: There were no MC course artifacts aligned to Quantitative Thinking in this sample.
Note: Although MC courses may be 100, 200, 300, or 400 levels, only MC courses at the 100 or 200 levels were submitted for this assessment.

Creative Thinking



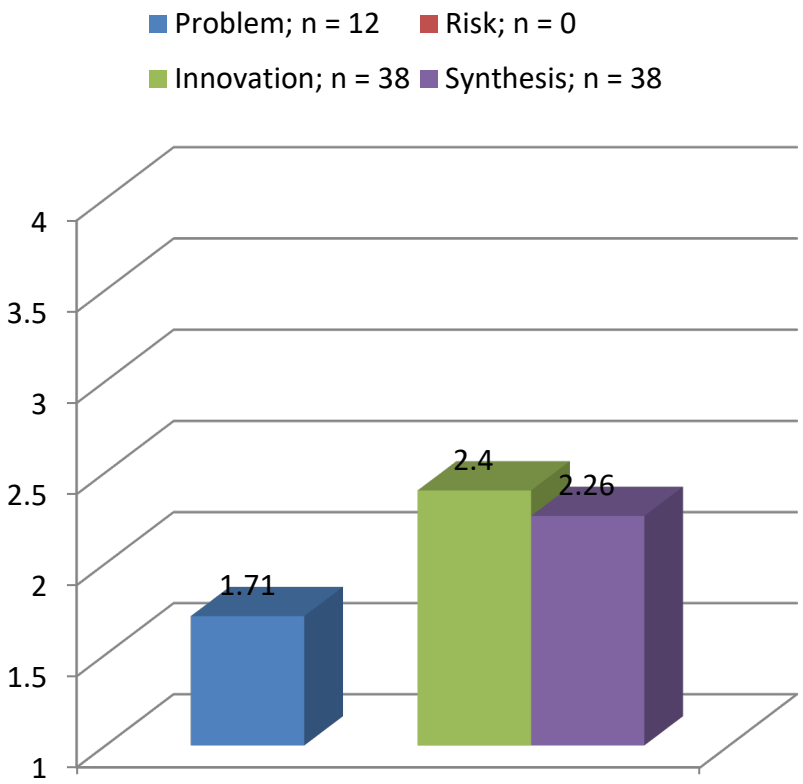
Inquiry-Based Thinking



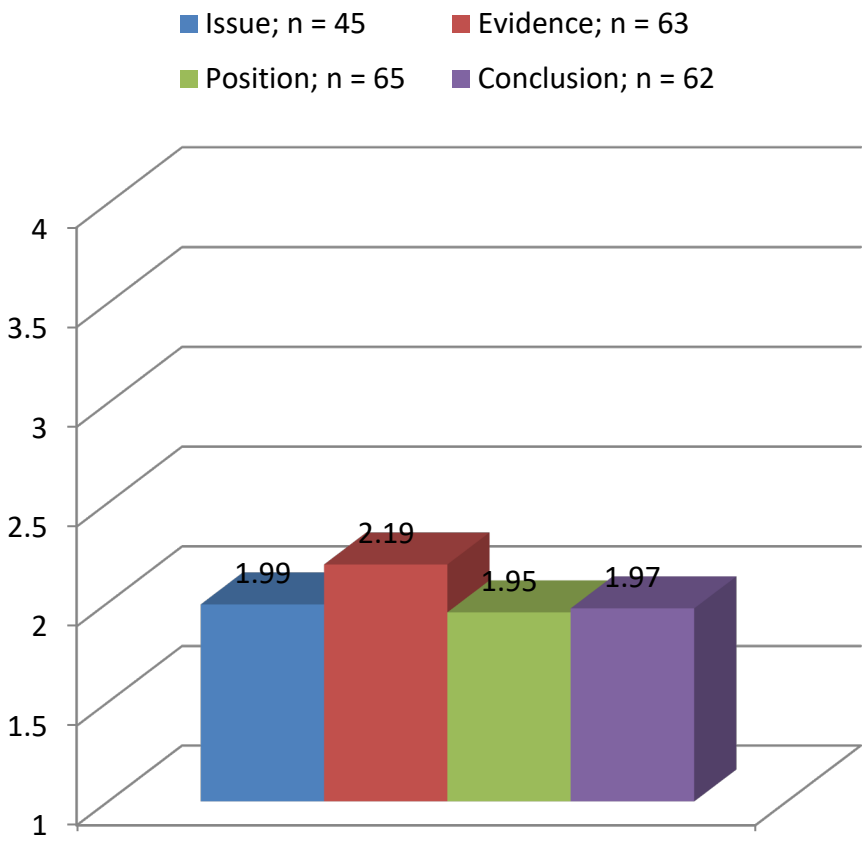
Writing Intensive Courses

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score. Some artifacts aligned to Creative and IB Thinking were from courses that, in addition to being WI, also were CT, Core II, and/or honors.
Only two artifacts aligned to some of the traits of Quantitative Thinking came from WI courses.

Creative Thinking



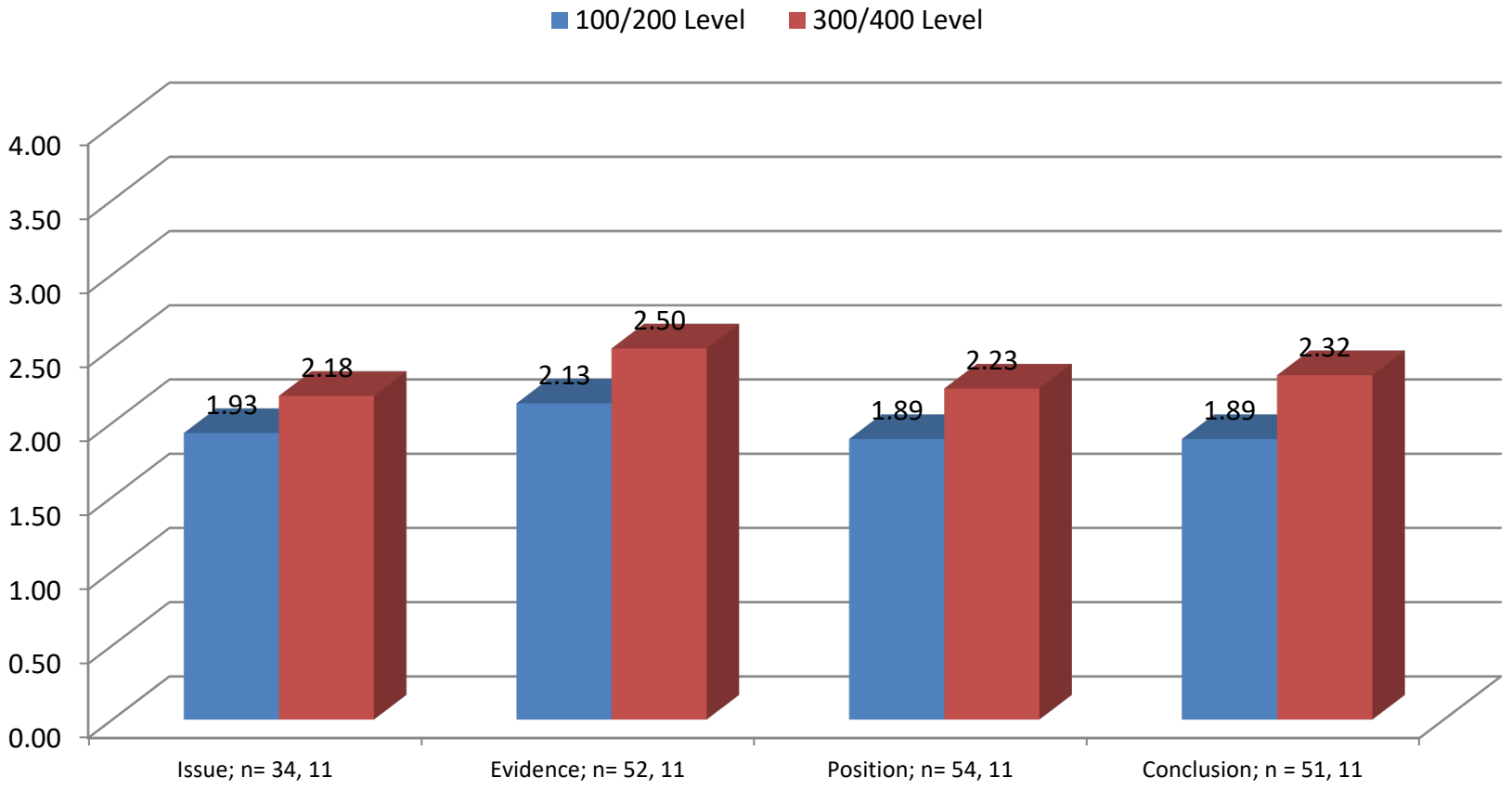
Inquiry-Based Thinking



Writing Intensive Courses: Course Level Comparisons

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score.

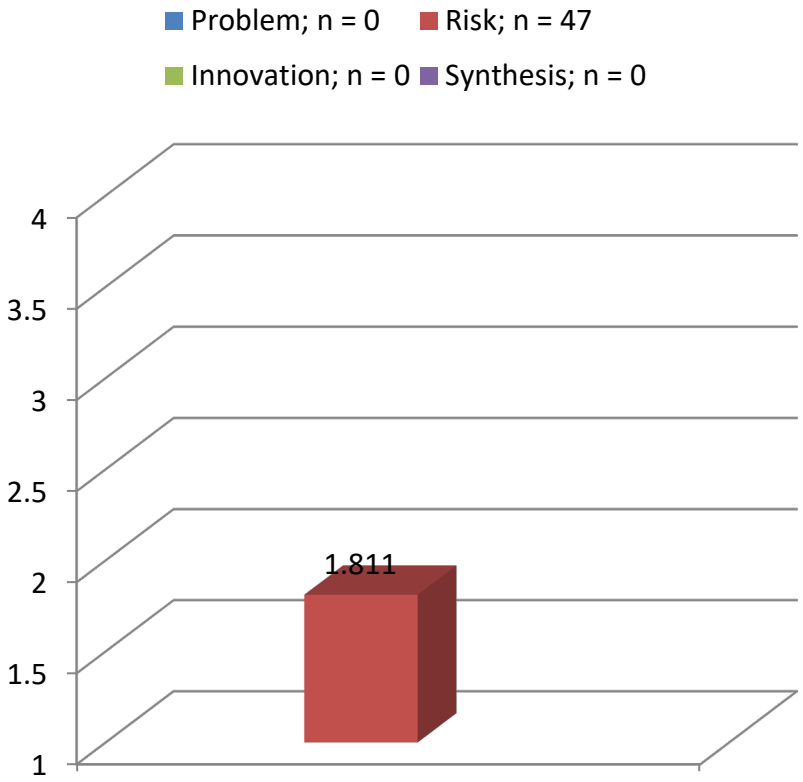
Inquiry-Based Thinking



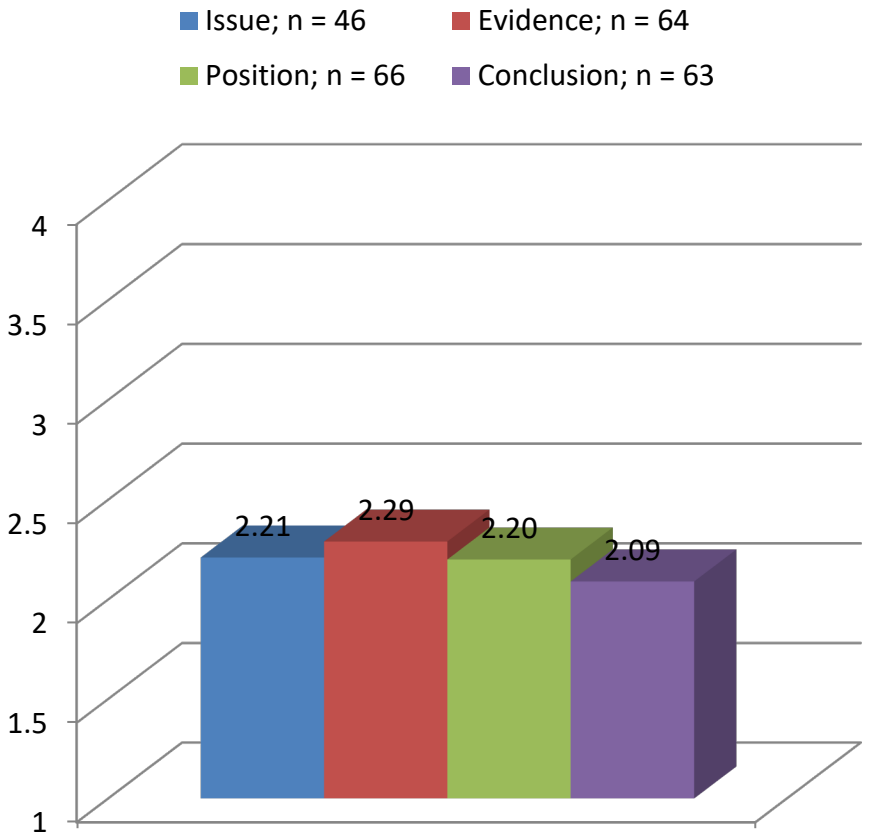
Online Courses

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score. All CT courses are 100/200 Level. Some artifacts aligned to Creative and IB Thinking were from courses that, in addition to being CT, also were Core II, Writing Intensive, MC, INT, and/or Honors.

Creative Thinking



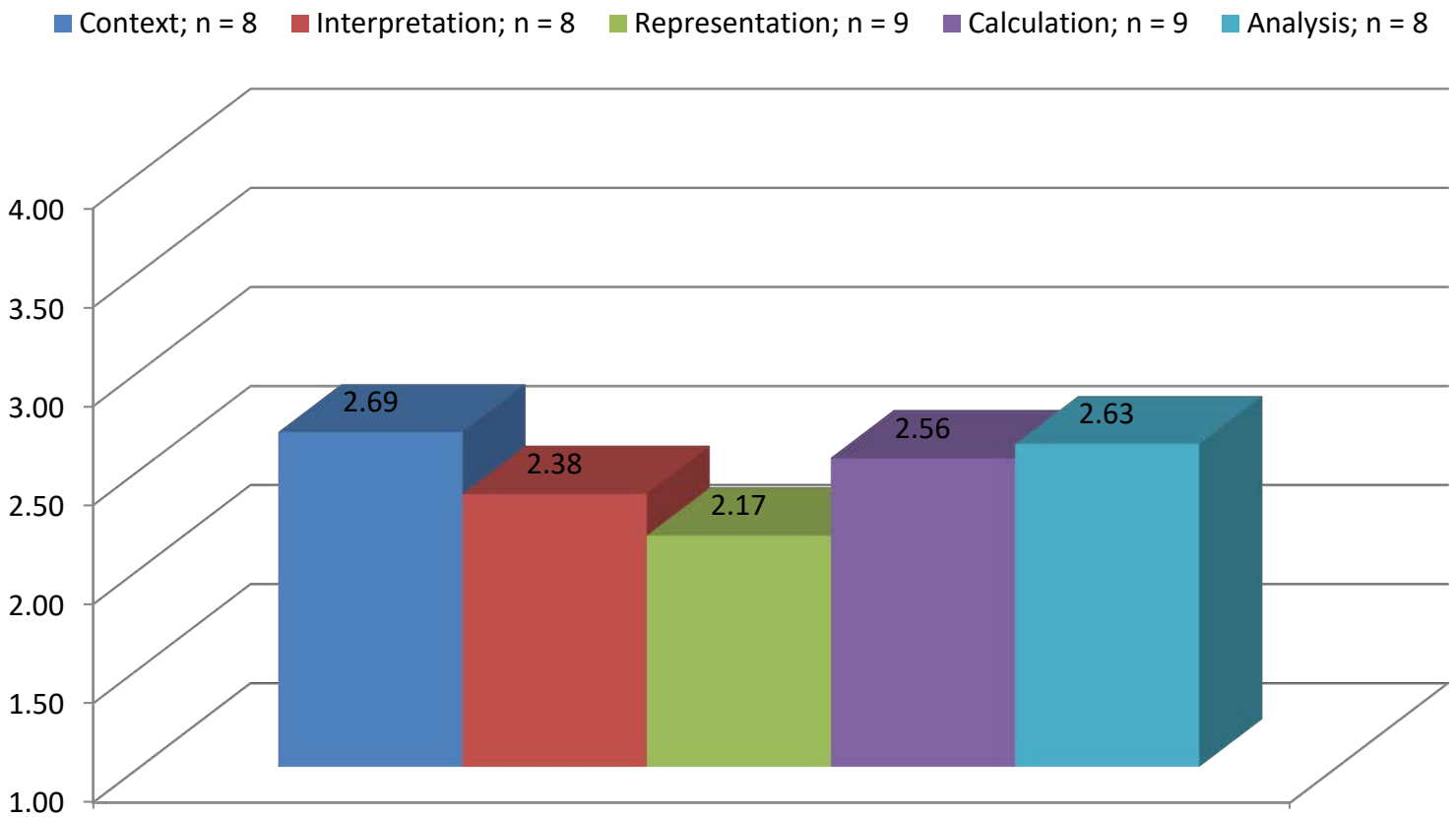
Inquiry-Based Thinking



Online Courses

Mean Scores on a scale of 1 – 4, with 4 being the highest possible score. Mean Scores on a scale of 1 – 4, with 4 being the highest possible score. All CT courses are 100/200 Level. Some artifacts were from courses that, in addition to being CT, also were Core II courses.

Quantitative Thinking



Online Courses: Course Level Comparisons

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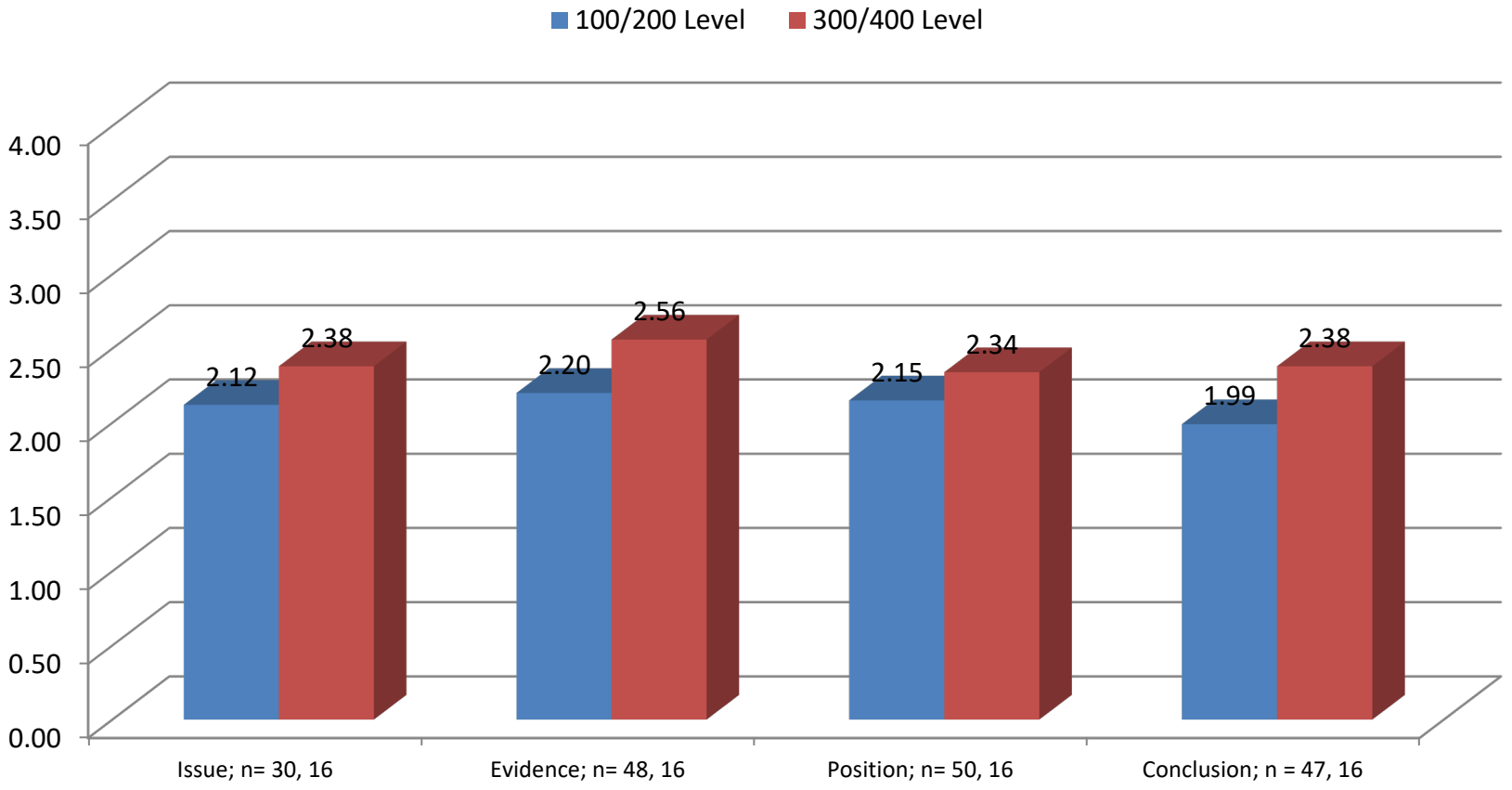
Inquiry-Based Thinking



Reference

Association of American Colleges and Universities (AAC&U). (2009). *Creative Thinking VALUE rubric.* Retrieved from https://www.aacu.org/value/rubrics/creative-thinking

Association of American Colleges and Universities (AAC&U). (2009). *Critical Thinking VALUE rubric.* Retrieved from https://www.aacu.org/value/rubrics/critical-thinking

Association of American Colleges and Universities (AAC&U). (2009). *Quantitative Literacy VALUE rubric.* Retrieved from https://www.aacu.org/value/rubrics/quantitative-literacy

Stellmack, M.A., Kohneim-Kalkstein, Y. L, Manor, J. E., Massey, A. R., & Schmitz, J. A. P. (2009). An assessment of reliability and validity of a rubric for grading APA-style introductions. *Teaching of Psychology*, *36*, 102-107.