Southwest
Virginia Community College
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Quantitative Literacy
General Education
Competency Assessment

Fall 2024

Southwest Virginia Community College

Quantitative Literacy Assessment Team

Tabbi Smith, Chair

Southwest Virginia Community College

Primary contact: Tabbi Smith, Mathematics Faculty—tabbi.smith@sw.edu

Competency: Quantitative Literacy

Definition:

Quantitative literacy is correctly using numbers and symbols; studying measurements, properties, and relationships of quantities; or formally reasoning within abstract systems of thought to make decisions, judgments, and predictions.

Plan Summary:

Quantitative literacy will be assessed at Southwest Virginia Community College (SWCC) using a final assessment in MTH 154 – Quantitative Reasoning. Students will be assessed by a final student project given in the form of a spreadsheet assignment which combines a variety of learning objectives in the course.

Outcomes:

A student completing MTH 154 – Quantitative Reasoning at Southwest Virginia Community College (SWCC) shall be able to:

1. Use spreadsheet applications including the ability to create and use functions to solve mathematical problems
2. Interpret and draw inferences from mathematical models such as formulas, graphs, tables, and schematics.
3. Communicate mathematical information symbolically, visually, numerically, and verbally.
4. Use arithmetical, algebraic, and analytic methods to solve problems.
5. Estimate and check answers to mathematical problems to determine reasonableness.
6. Solve word problems using quantitative techniques and interpret the results.
7. Apply mathematical techniques and logical reasoning to produce predictions and make inferences based on a given set of data or quantitative information.
8. Determine the soundness and accuracy of conclusions derived from quantitative information.
9. Solve multi-step problems.
10. Demonstrate an understanding of the fundamental issues of statistical inference, including measurement and sampling.

Goals:

The quantitative literacy assessment goals for general education at SWCC are designed to measure the level of understanding students have of the mathematical content of MTH 154 and their ability to apply the content covered.

The following student project grade standards have been established for MTH 154 students and will be used to evaluate:

- 50% will score ≥90 out of 100 classified as understanding
- 35% will score between 70 and 89 classified as moderate understanding
- 15% will score ≤69 classified as low understanding

When comparing students taking the course online to those taking the course in-person would be that this value would be close (less than 10% difference) and that there are no major discrepancies between various modes of instruction

Methods:

*Direct Assessment***:**

The student project will be made available to students halfway into the semester (7-8 weeks in) and will not be required for submission until the last week of the course. Students will complete the project on a Microsoft Excel template which contains four sheets where they will complete their given tasks. The tasks (steps) students are asked to complete will be provided in a separate document. The topics addressed in this student project include required learning objectives in the MTH 154 course.

Scoring: The student project will be scored as each step worth one point. The total points earned per sheet are then scaled to a value of 50. With each sheet being worth 50 points, the total possible points for the project is 200.

Analysis: Results will be analyzed by the final score of all four sheets expressed as a percentage of 200 total points. Additionally, results will be analyzed further to address any issue in curriculum understanding and areas that need more concentration.

Information will be broken down by course section (including averages and medians) and by whether the courses were instructed in-person or online. For the evaluation of the scoring described in the "Goals" section, the number of students as well as percentage of students will be determined.

Schedule:

The assessment will be developed and deployed on Canvas, so students have access to the assignment. Students will be asked to submit their completed excel spreadsheet via a submission link also given on Canvas. Due to the required method development to solving problems via excel tied into the assessment, students will be required to submit the complete excel file on Canvas and there will not be an option to complete the assignment on paper.

Fall 2020 – Spring 2023: data collection and analysis

Fall 2023: Report findings to SCHEV

Oversight and Communication of Findings:

A faculty committee will provide oversight for assessment implementation, reporting, and dissemination. The Office of Institutional Research will manage implementation. Detailed reports, with analysis and findings, will be authored by the Office of Institutional Research and shared first with the faculty oversight committee for review, comment, and approval. Findings will then be shared with stakeholders as needed and with others as appropriate. Personal student data will be protected at each level of data gathering, analysis, reporting, and dissemination.

Additional Institutional Contacts:

SWCC's Quantitative Literacy Workgroup:

Tabbi Smith, Chair	tabbi.smith@sw.edu
Crystal Dye	crystal.dye@sw.edu
Julia Dotson	julia.dotson@sw.edu
Brian Hale	brian.hale@sw.edu
Mike Henry	mike.henry@sw.edu
Melissa Ray	melissa.ray@sw.edu

Institutional Research Officer:

Cathy Smith-Cox	cathy.smith-cox@sw.edu

Vice President of Academic and Student Services:

Dr. Robert Brandon	robert.brandon@sw.edu

Interim Dean of Health Technologies, Mathematics and Natural Science:

Dr. Brian Wright	brian.wright@sw.edu

Quantitative Literacy Assessment **Fall 2023**

The Quantitative Literacy Assessment was completed by 177 students. Students were enrolled in MTH 154. The student project (the assessment used) was conducted in an excel spreadsheet, and the tasks required students to apply various learning objectives taught in MTH 154.

From the student project, information was gathered based on student scores and broken down further based on various categories.

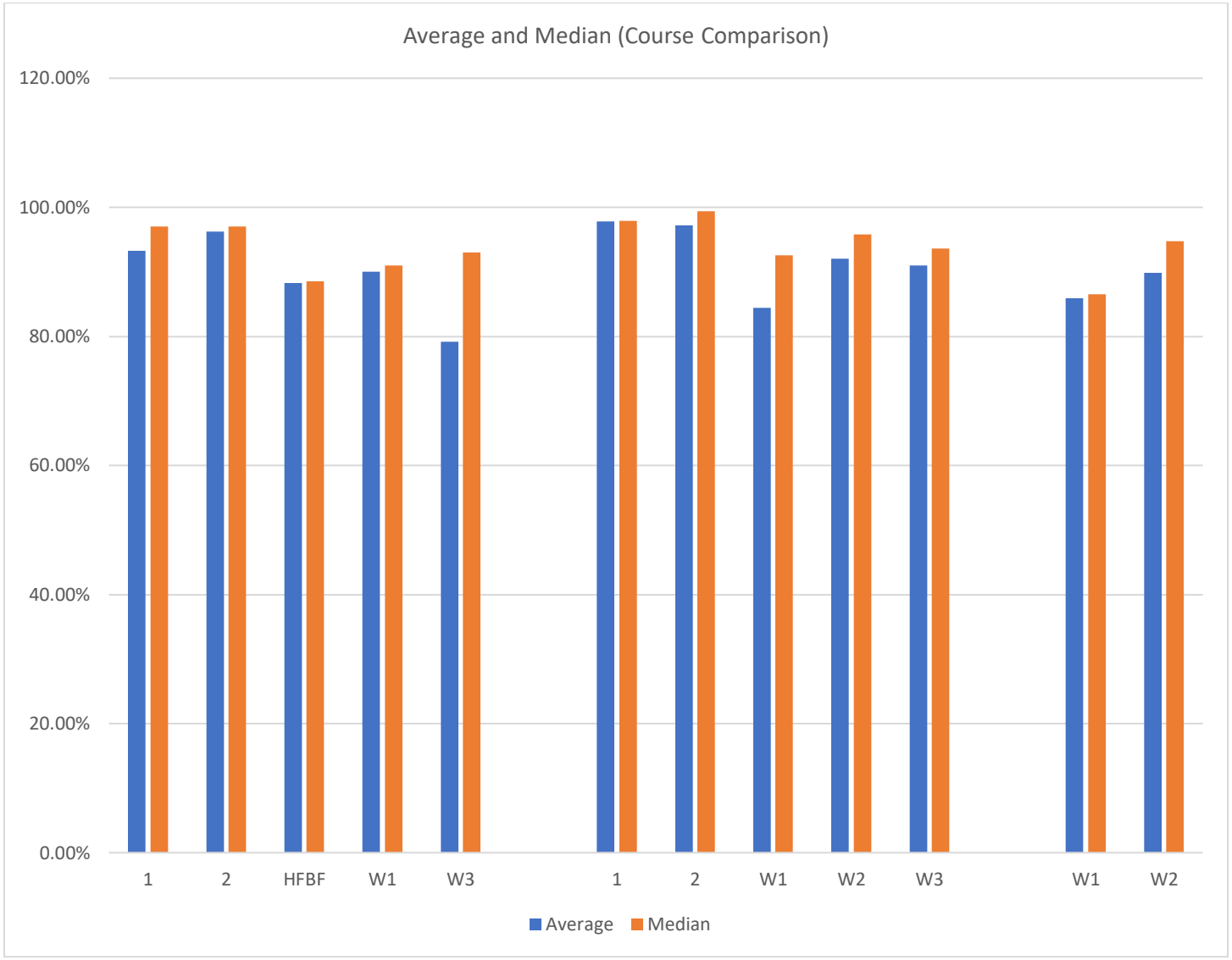
**1 and 2 indicate in-person courses. HFBF was primarily an online course. W1, W2, and W3 indicate online courses.
**Students who did not turn in the assignment were not included in the calculations.

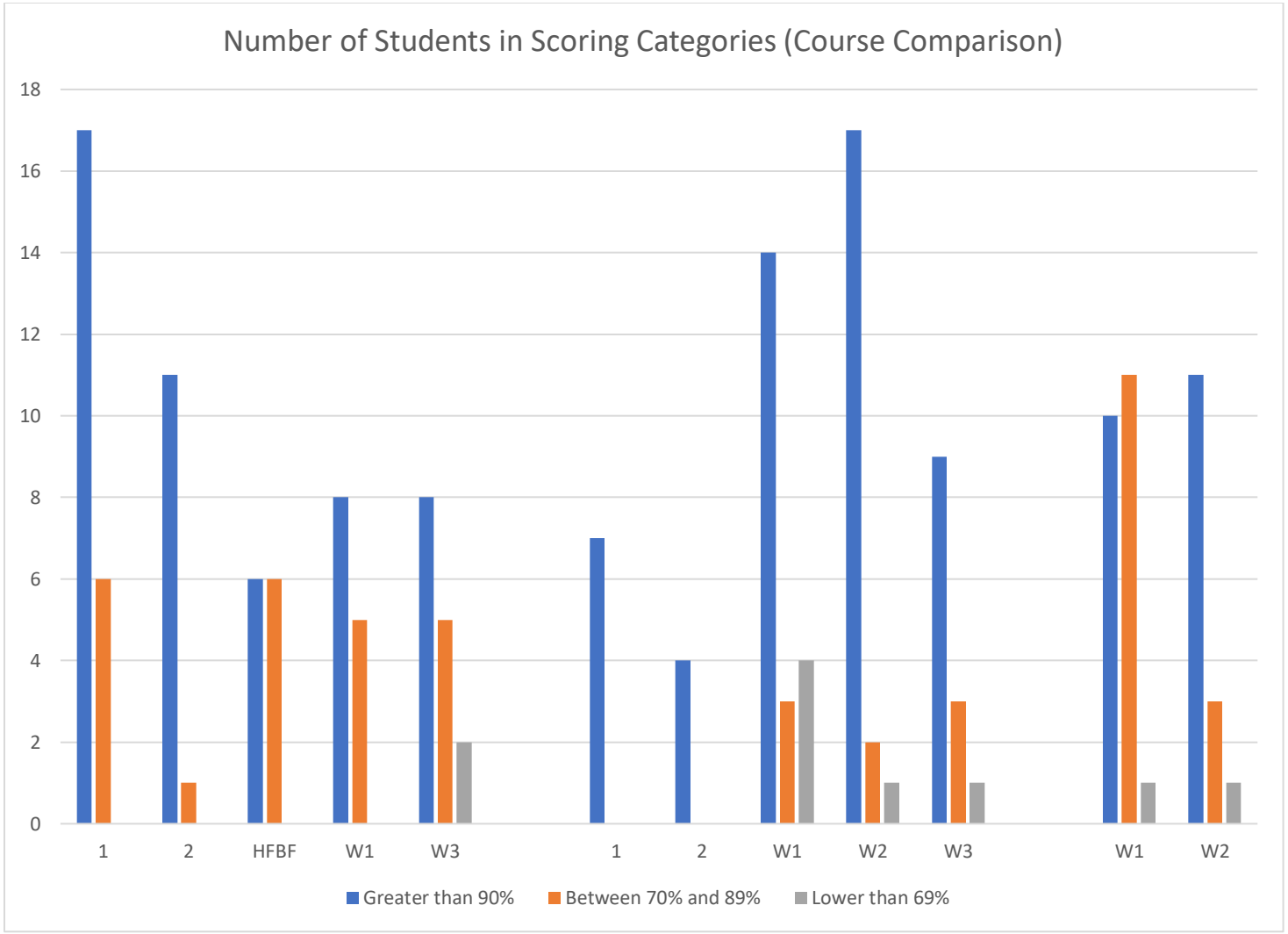
	Fall 22					Spring 23					Summer 23		Total
	1	2	HFBF	W1	W3	1	2	W1	W2	W3	W1	W2	
Number of Students	23	12	12	13	15	7	4	21	20	13	22	15	177
Average Score	93.30%	96.25%	88.25%	90.00%	79.20%	97.81%	97.23%	84.41%	92.04%	90.98%	85.90%	89.85%	89%
Median Score	97.00%	97.00%	88.50%	91.00%	93.00%	97.92%	99.37%	92.56%	95.84%	93.65%	86.53%	94.79%	95.00%
Maximum	100.00%	100.00%	99.00%	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Minimum	73.00%	89.00%	71.00%	75.00%	6.00%	95.52%	90.18%	14.98%	30.38%	68.06%	43.38%	23.23%	6.00%

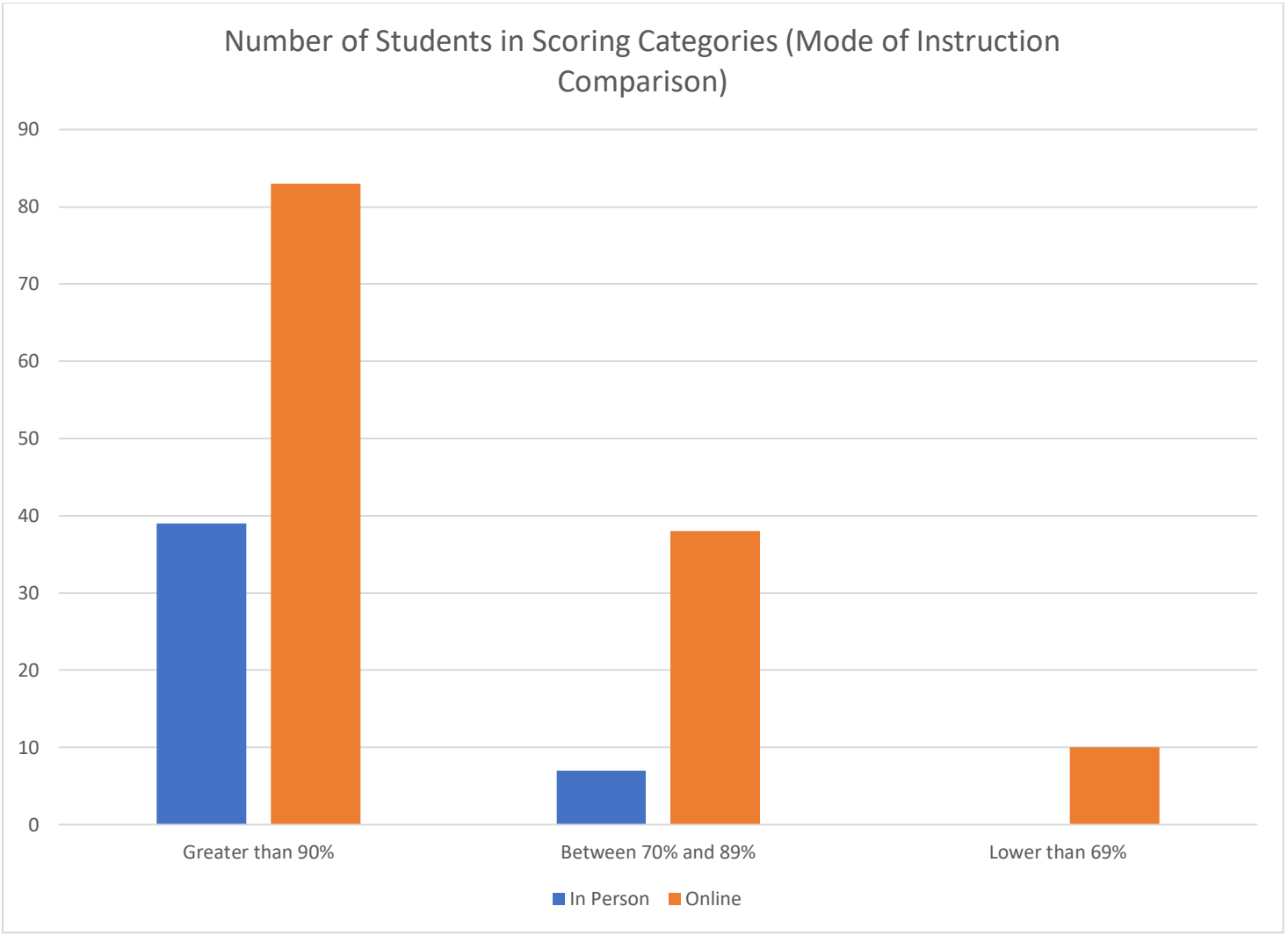
	Fall 22					Spring 23					Spring 23		Total	Percentge of Total
	1	2	HFBF	W1	W3	1	2	W1	W2	W3	W1	W2		
Greater than 90%	17	11	6	8	8	7	4	14	17	9	10	11	101	72.14%
Between 70% and 89%	6	1	6	5	5	0	0	3	2	3	11	3	31	22.14%
Lower than 69%	0	0	0	0	2	0	0	4	1	1	1	1	8	5.71%

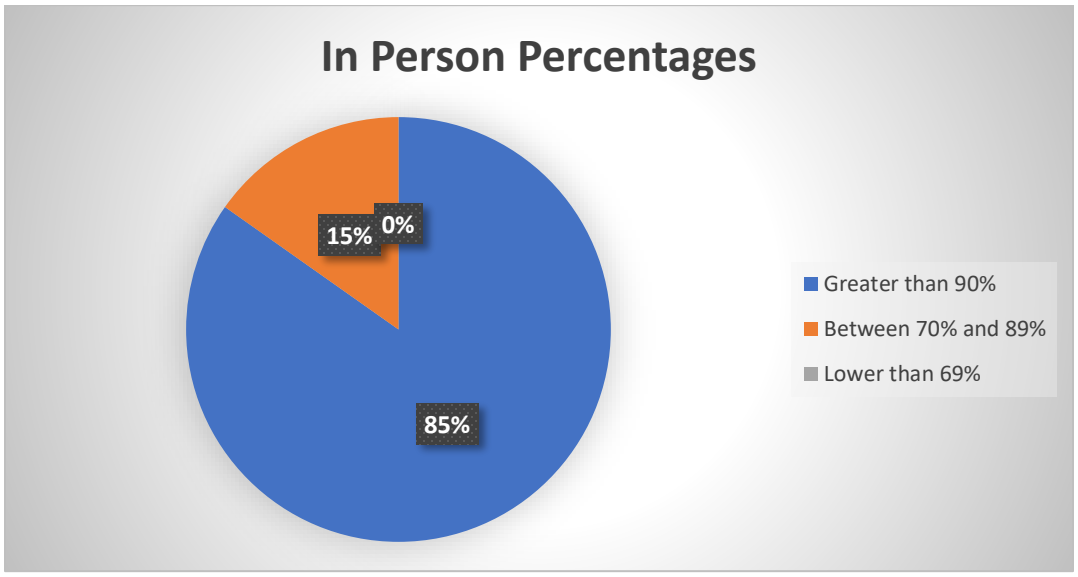
	Fall 22		Spring 23		Spring 23	
	In Person	Online	In Person	Online	In Person	Online
Greater than 90%	28	22	11	40	n/a	21
Between 70% and 89%	7	16	0	8	n/a	14
Lower than 69%	0	2	0	6	n/a	2

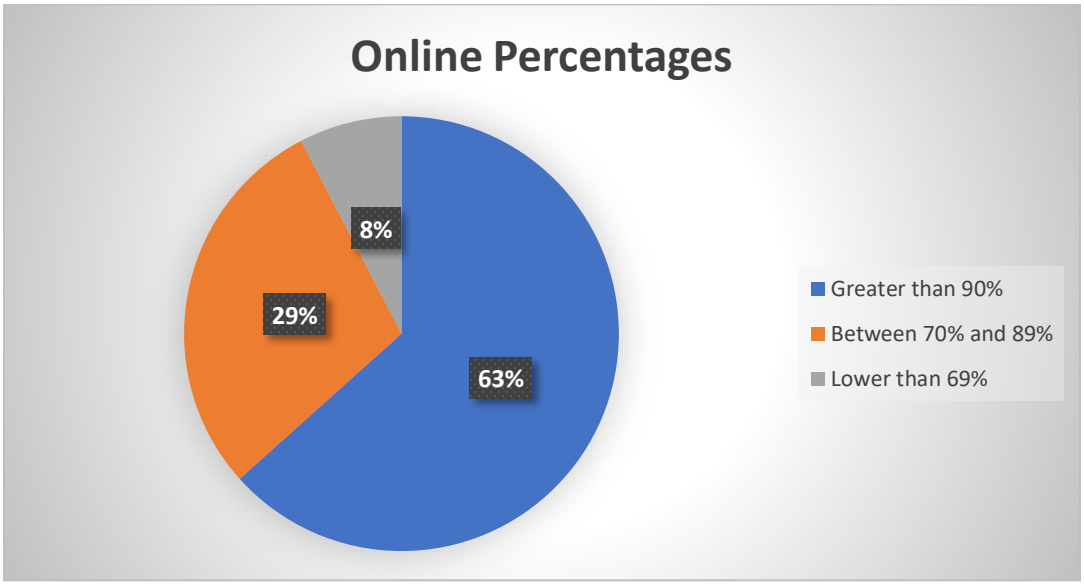
Total		Percentage of Total Per Category	
In Person	Online	In Person	Online
39	83	84.78%	63.36%
7	38	15.22%	29.01%
0	10	0.00%	7.63%


Average and Median (Course Comparison)
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1
2
HFBF
W1
W3
1
2
W1
W2
W3
W1
W2
Average
Median


Number of Students in Scoring Categories (Course Comparison)
18
16
14
12
10
8
6
4
2
0
1
2
HFBF
W1
W3
1
2
W1
W2
W3
W1
W2
Greater than 90%
Between 70% and 89%
Lower than 69%


Number of Students in Scoring Categories (Mode of Instruction Comparison)
90
80
70
60
50
40
30
20
10
0
Greater than 90%
Between 70% and 89%
Lower than 69%
In Person
Online


In Person Percentages
15%
0%
85%
Greater than 90%
Between 70% and 89%
Lower than 69%


Online Percentages
8%
29%
63%
Greater than 90%
Between 70% and 89%
Lower than 69%

Findings: Specifically, from the pie charts presented, it is found that the scoring of students falls in the desired percentage ranges presented in "Goals" section. More students reached a status of understanding than originally predicted, which caused the amount of moderate and low understanding to decrease compared to the original goals set. There seems to consistently be a higher number of students in the above 90% category and labeled as understanding than any of the other categories which was the desired outcome.

From the data and graphical representations provided above, there is a difference between the scores achieved by the students when comparing in-person instruction versus online instruction. Although there is less than a 10% difference between those who take the course online compared to those who take it in-person, there is a higher percentage of students who fail this project in online courses. There is also a higher rate of students who fall into the moderate understanding category in online courses (a difference of approximately 14% compared to those who take in-person classes). An area of focus needed for the future would be to close more of this gap in percentages between what is scored in online courses.

Possible Plans of Action: Although the percentages for each category in the online and in-person sections were within the initial goals set, it should always be that we work to improve these. The ultimate goal in mind would be for no students to fall into the category of low understanding. With some of the following ideas, we could work to decrease the number of students deemed low understanding as well as close the gap between online and in-person learners.

One of the first thoughts about improving the knowledge of our online learning community is to have students check and test their understanding more often than what is currently being provided. Currently, students have four tests in the course and a student project. Providing a lower stakes option for testing student knowledge may be beneficial through methods such as a weekly quiz or discussion board. Not only does this allow for students to check and test their knowledge at a lower risk of affecting the overall grade, but it also permits them to receive weekly feedback from the instructor as to where they need to improve. Not only would this be an idea to implement into online courses but should be added to in-person classes as well. Doing more regular assessments and checks of student knowledge would help correct them more effectively and prepare them sooner for the student project.

The next action that would be implemented is regular Zoom office hours for online courses. The course is currently set up where students must reach out to the instructor to set up a Zoom meeting during virtual hours or attend in-person. Doing this opens the door for more conversation between the instructor and the student, and it allows learners to have more of an opportunity to receive assistance. This would also decrease the anxiety in students associated with reaching out to the instructor for help. This would help them be more prepared for their student project.

From that data pulled from course analytics, it is seen that most students are not utilizing the resources provided in the course modules which is how they are supposed to learn the content. This may be a reason there is a gap between online and in-person learners because one is seen as optional material while the other is more forced. Holding students more accountable in some way may be an option for ways to improve student project scores as they will have the content knowledge to know how to

complete it. Previously, grades were taken for the percent completion status of individual videos for each student from them to have this accountability. However, due to the complaints of students, this was removed as a requirement. Therefore, additional methods would need to be explored.

Another viable option is shifting the focus of the course to that in which teaching content revolves around improving algebraic habits and problem solving which requires critical thinking. This would allow students to focus on application more than what they feel most comfortable with: procedural learning. This would be a transition that would need to be made over time rather than all at once as this is not a common teaching practice which students from our area experience.