FALL 2023 CORE COMPETENCY ASSESSMENT

OVERVIEW

At MiraCosta College, the concept of Core Competencies refers to overarching learning outcomes students are expected to acquire while completing coursework required for a degree, certificate, or transfer. Each semester the college conducts a classroom assessment of student skill acquisition from the faculty perspective, allowing faculty to examine whether students are achieving course learning outcomes tied to specific areas of *competence*. In Fall 2023, faculty assessed **Quantitative Literacy**, competency and comfort in working with numerical data, was assessed for the second time, while **Teamwork & Collaboration** was assessed for the third time. This report divides the analysis of each competence into separate sections and contains charts and tables that disaggregate core competency assessments by important student characteristics.

EVALUATION METHODOLOGY

Prior to the semester's start, faculty review and confirm an initial coding process that has mapped a particular core competency to one or more of their course learning outcomes. During the semester, faculty volunteers evaluated students' level of competency in a specific area, using specified criteria, and locally developed rubric. This competency measurement is subsequently merged with student records and analyzed by the Office of Research, Planning, and Institutional Effectiveness (RPIE).

QUANTITATIVE LITERACY

Table 1: Quantitative Literacy

Number of Course Sections	21
Number of Associate Faculty	7
Number of Full-Time Faculty	10
Students Rated (Duplicated)	380
Average Rating	2.38

Faculty assessed **Quantitative Literacy** from 0 to 4 on the following dimensions:

- **Interpretation** | The ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words)
- **Representation** | The ability to convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words)
- **Application/Analysis** |The ability to make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis
- **Communication** | Expressing quantitative evidence in support of the argument or purpose of the work (in terms of what evidence is used and how it is formatted, presented, and contextualized)

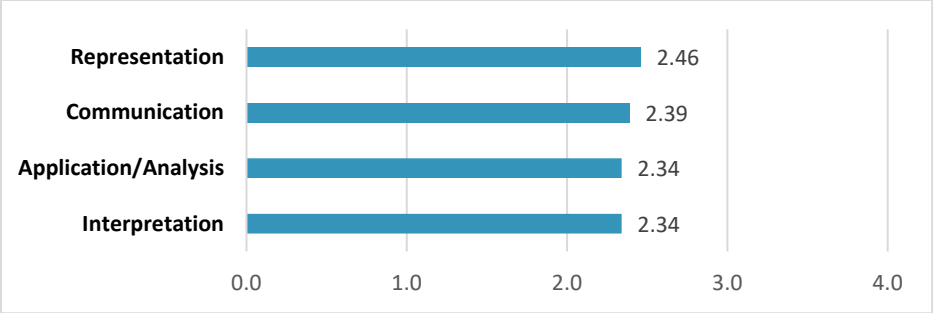
- Students who received a course grade of "W" or "EW" were excluded from the analysis.
- A total of 380 duplicated (369 unduplicated[1]) students were included in the evaluation process of this competency in Fall 2023
- Assessment took place in 21 course sections among 7 Full-time faculty and 10 Associate faculty instructors
- Students were rated from 0-4 on each Quantitative Literacy dimension according to the developed rubric, with 0 signifying the lowest level of competence.
- Most students received an average rating of "2"
- Over sixty percent of assessed students received an average rating of "2" or "3"

Figure 1: Number of Students by Quantitative Literacy Average Score

QUANTITATIVE LITERACY BY CRITERION

- Average scores on Quantitative Literacy dimensions ranged from 2.34 to 2.46
- **Representation** generated the highest average scores, while **Interpretation** and **Application & Analysis** generated the lowest average scores.

Figure 2: Average Score in each of the criteria of the Quantitative Literacy Rubric ~~Component~~



QUANTITATIVE LITERACY SCORE BY COURSE GRADE

- Rubric scores were compared to students' grades in the course where assessment occurred to examine a potential relationship between variables
- The table suggests that lower Quantitative Literacy scores may increase relatively linearly with progressively higher, grade attainment
- Small samples of "D" and "F" grades impede the ability to statistically evaluate the strength of a potential relationship between these variables.

Table 2: Average Quantitative Literacy score by Grade Received in Course

Grade Received	n	Average Score
A	128	3.08
B	118	2.33

[1] 'Duplicated students' refers to the number of overall assessments given and may include a uniquely identifiable student more than once. 'Unduplicated students' refers to the number of uniquely identifiable students included in the assessment.

C/P	92	1.88
D	24	1.70
F/NP	18	1.24

- The distribution of grades across Quantitative Literacy Score categories is additionally suggestive of a relationship between course grade and Quantitative Literacy scores
- Over eighty percent of students who earned the grade of "**A**," also earned an average score of "**3**" or "**4**"
- Over sixty percent of students who earned a grade of "**F**" received a Quantitative Literacy score of "**0**" or"**1**"; However, this sample is extremely small and subject to a high degree of variability
- More observations in lower grade categories are necessary to draw firm conclusions about a potential relationship between course grades and Quantitative Literacy scores (due to smaller sample size)

Table 3: Average Quantitative Literacy score ~~category~~ by Grade- Heat Map

	Average Quantitative Literacy Score Category				
Grade Received	**0**	**1**	**2**	**3**	**4**
A	0.0%	3.9%	14.8%	43.8%	37.5%
B	0.0%	11.9%	47.5%	31.4%	9.3%
C/P	2.2%	25.0%	46.7%	20.7%	5.4%
D	0.0%	41.7%	41.7%	8.3%	8.3%
F/NP	16.7%	55.6%	16.7%	5.6%	5.6%

QUANTITATIVE LITERACY DEMOGRAPHIC TABLES & GRAPHS

UNITS ATTAINED AT MIRACOSTA COLLEGE

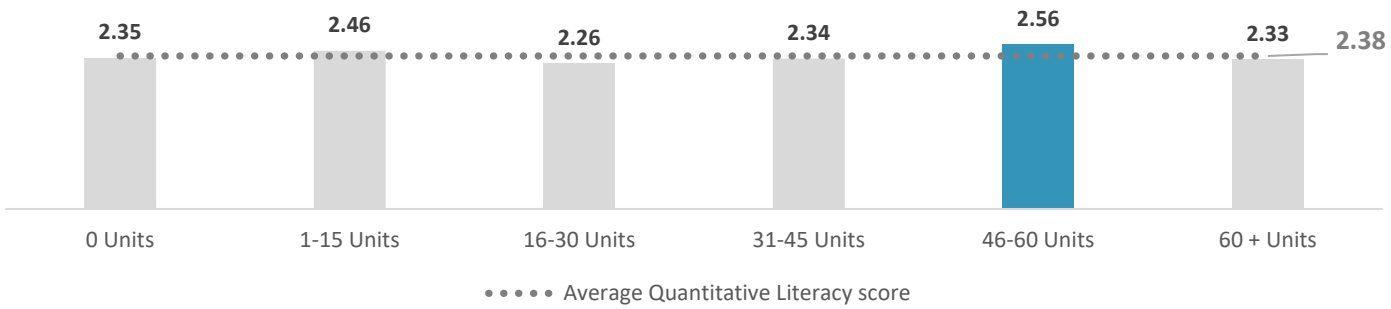
- Quantitative Literacy scores were highest among students who attained **46-60 units** prior to Fall 2023 and lowest among those who accumulated **16-30 units** prior to assessment
- This observed trend may speak to the incremental development of this competency across a student's educational journey but may also reflect random, sample variation as this trend doesn't occur in a linear fashion across unit groupings

- It's essential to interpret these findings cautiously and consider other factors that may influence Quantitative Literacy scores, such as course difficulty or level of student engagement.

Table 4: Average Quantitative Literacy Score by Number of Units Completed Prior to Fall 2023

	n	Average Score
0 Units	82	2.35
1-15 Units	81	2.46
16-30 Units	43	2.26
31-45 Units	80	2.34
46-60 Units	41	2.56
60 + Units	53	2.33

Figure 3: Average Quantitative Literacy score by Units Completed Prior to Fall 2023



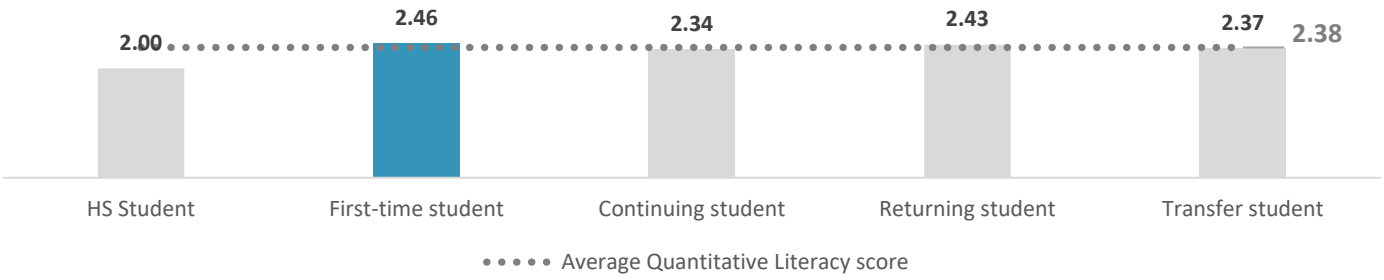
ADMISSION STATUS

- Contrary to expectation, average Quantitative Literacy scores were higher among **First-time students** when compared to other admit type groups
- **Continuing students** tended to generate the *slightly lower* Quantitative Literacy scores than other groups
- This unusual trend may be explained by the difference in courses taken by these groups or by a host of other individual and motivational variables, perhaps even the level of student engagement
- This observed trend may also perhaps be driven by the difference in the size of the groups, as there were nearly twice as many Continuing students included in this sample in comparison to First-time students.

Table 5: Average Quantitative Literacy Score by Admission Status

	n	Average Score
High School Student	3	2.00
First Time Student	98	2.46
Continuing Student	205	2.34
Returning Student	47	2.43
Transfer Student	27	2.37

Figure 4: Average Quantitative Literacy Score ~~Category~~ by Admission Status



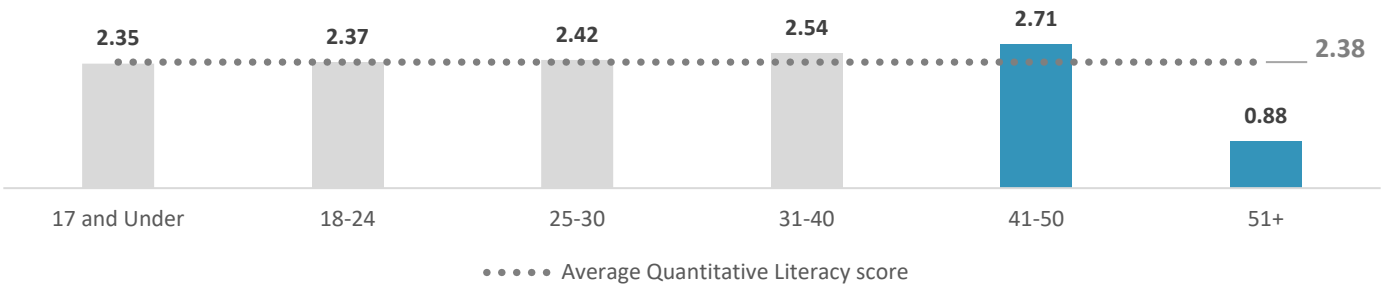
AGE

- A small group of students, **ages 41-50** generated the highest average Quantitative Literacy scores, followed by students **ages 31-40**
- Average Quantitative Literacy scores were *lowest* among students **ages 51+** and students **ages 17 and under**
- Quantitative Literacy scores increased up to ages 41-50, where the average score peaks and sharply declines for the **51+** age group
- Small samples of our older and younger students may not accurately represent the broader population from which they are drawn and have limited generalizability.
- While the data provide insights into the relationship between age and core competency scores, it's essential to interpret these findings cautiously as there may alternative explanations or these patterns and the sample sizes of the represented groups vary widely

Table 6: Average Quantitative Literacy Score by Age

	n	Average Score
17 and under	20	2.35
18-24	274	2.37
25-30	50	2.42
31-40	27	2.54
41-50	7	2.71
51+	2	.88

Figure 5: Quantitative Literacy Score by Age



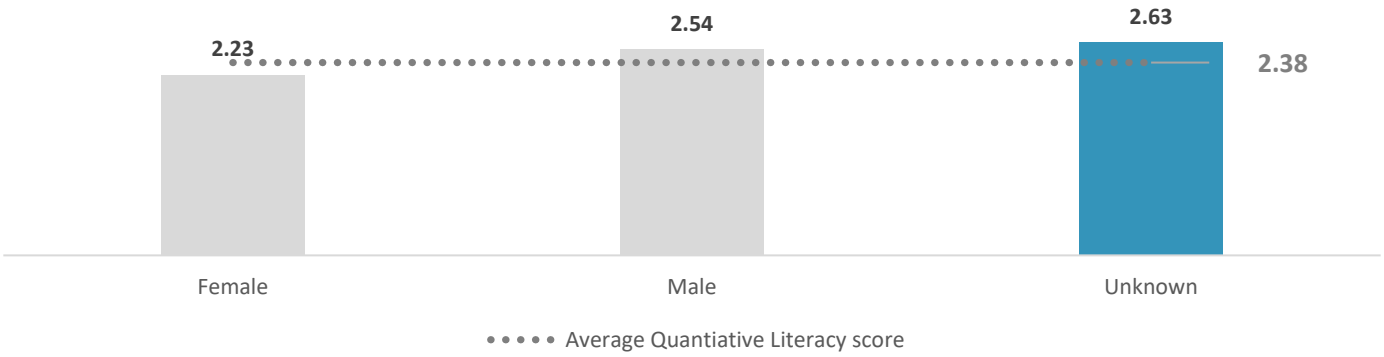
GENDER

- On average, **Male** students generated higher Quantitative Literacy scores followed by the **Other/Unknown** gender students
- **Female** students generated the lowest Quantitative Literacy scores
- While this is preliminary evidence of gender differences in Quantitative Literacy, it's essential to interpret these findings cautiously and consider potential confounding factors that may influence the relationship between gender and core competency scores

Table 7: Average Quantitative Literacy Score by Gender

	n	Average Score
Female	191	2.23
Male	185	2.54
Other/Unknown	4	2.63

Figure 6: Average Quantitative Literacy Score by Gender



ETHNICITY

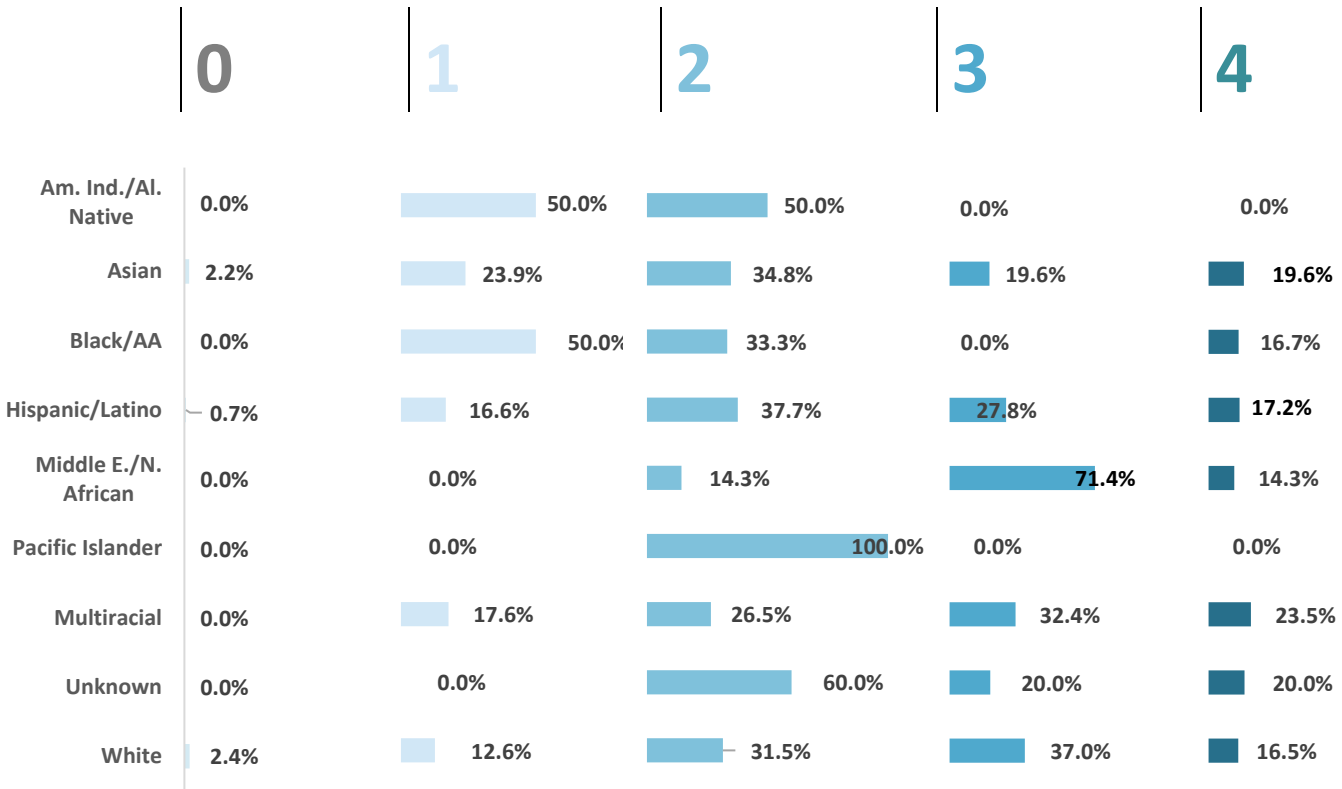
- A small group of **Middle Eastern/North African** students generated the highest average Quantitative Literacy score followed by **Multiracial** students

- **American-Indian/Alaska Native** and **Black/African-American** students generated the lowest average scores, but these groups were very minimally observed.
- As additional Quantitative Literacy data is gathered from students and ethnic groups with small samples are more robustly represented, we will better be able to discern whether a relationship exists between ethnicity and Quantitative Literacy.

Table 8: Average Quantitative Literacy score by Ethnicity

	n	Average Score
American-Indian/Alaska Native	2	1.63
Asian	46	2.23
Black/African American	6	1.71
Hispanic/Latino	151	2.35
Middle Eastern/North African	7	2.82
Pacific Islander	2	2.25
Multiracial	34	2.54
Unknown	5	2.60
White	127	2.45

Figure 7: Proportion of average Quantitative Literacy score ~~category~~ by Ethnicity



The sample of **Quantitative Literacy** core competency assessments was large, however the disaggregation of the data resulted in minimal observations for some subgroups (i.e., older and younger students, Middle-Eastern and American-Indian/Alaska Native students, Transfer students) resulting in a reduced ability to make broad-based inferences about the student body across demographic variables of interest. The strength of the inferences will increase as the college collects more data for this competency in future terms and the captured data is compiled and analyzed together.

The sample for **Teamwork & Collaboration** was relatively smaller in Fall 2023, rendering the analysis of this competency less robust and reliable and the disaggregated statistics less generalizable and representative. The statistics generated by this sample may less closely approximate the overall population of MiraCosta College students, decreasing the generalizability of the analysis.

TEAMWORK & COLLABORATION

Table 9: Teamwork & Collaboration

Number of Course Sections	7
Number of Associate Faculty	3
Number of Full-Time Faculty	4
Students Rated (Duplicated)	93
Average Rating	3.11

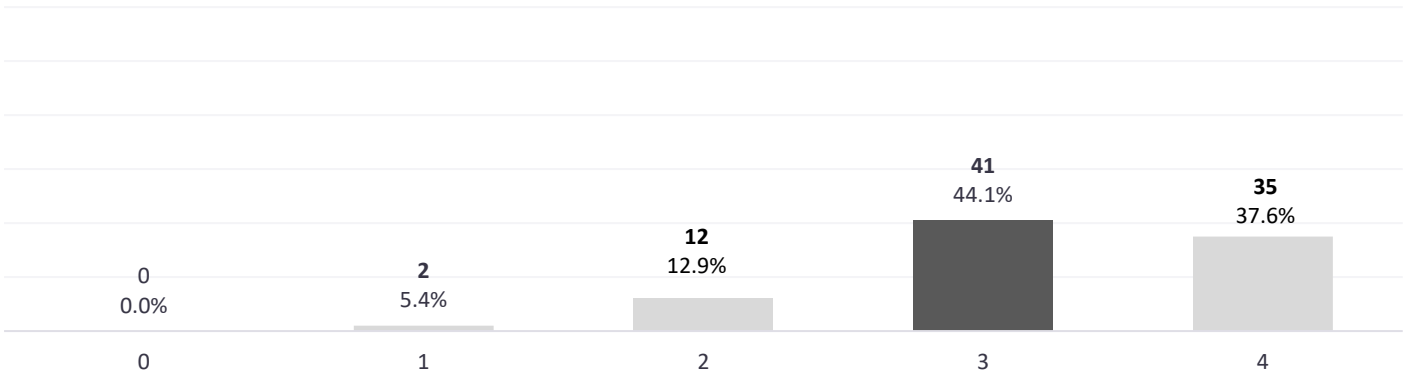
Faculty assessed students' **Teamwork & Collaboration** from 0 to 4 along the following dimensions:

- **Contributes to Team Meetings**: Helping the meeting move forward by articulating the merits of alternative ideas or proposals
- **Facilitates Contributions of Team Members**: Engaging team members in ways that facilitate their contributions to meetings
- **Individual Contributions outside of Team Meetings**: Completing all assigned tasks by deadline; accomplished work is thorough and comprehensive
- **Fosters Constructive Team Climate:** Supports team climate
- **Responds to Conflict**: Addresses conflict directly and constructively, helping to manage/resolve it in a way that strengthens overall team cohesiveness

- Four full-time faculty and three associate faculty in 7 different sections participated in the assessment of this core competency
- Students receiving a grade of "W" or "EW" or who dropped the course prior to census were excluded from the analysis.
- Students were rated according to a locally developed rubric, from 0-4 on each dimension, with 0 signifying the lowest level of competence
- A total of 93 duplicated[2] (89 unduplicated) students were included in the evaluation process
- The most commonly awarded score was "3"

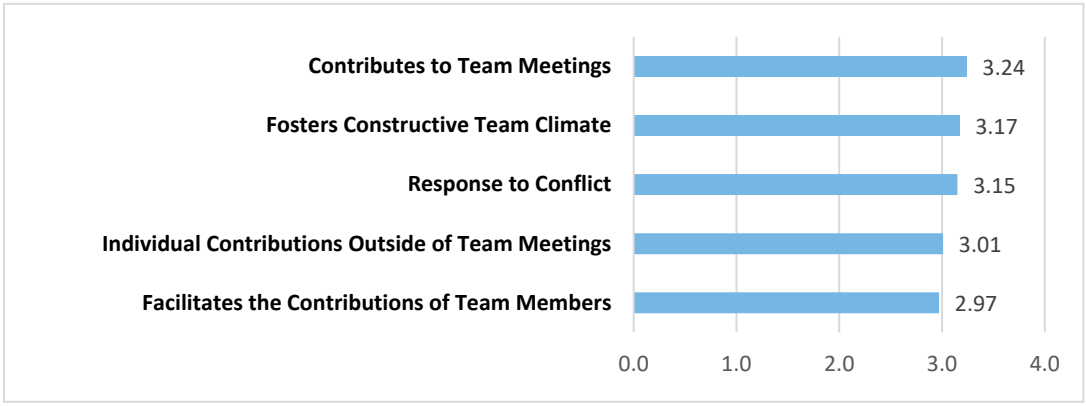
[2] 'Duplicated students' refers to the number of overall assessments given and may include a uniquely identifiable student more than once. 'Unduplicated students' refers to the number of uniquely identifiable students included in the assessment. In this figure each student counts only once.

Figure 8: Number of Students by Average Teamwork & Collaboration score



TEAMWORK & COLLABORATION BY CRITERION

Figure 9: Average Score ~~of each~~ in each of the criteria for Teamwork & Collaboration ~~Dimension~~



- Average scores on Teamwork & Collaboration dimensions ranged from 2.97 to 3.24
- Students generated the highest scores on **Contributing to Team Meetings** and generated the lowest scores on **Facilitating Contributions of Team Members**

TEAMWORK & COLLABORATION SCORE BY COURSE GRADE

Table 10: Average Teamwork & Collaboration Score by Grade Received

Grade Received	Number of Students	Average Score
A	56	3.48
B	23	2.57
C/P	10	2.78
D	1	2.60
F/NP	3	1.47

- Rubric scores were compared with earned course grade to examine a potential relationship between the variables

- The table suggests that as course grades increased, so too did average Teamwork & Collaboration competency ratings
- It is unknown to what extent this finding is representative of the student population at large, or generalizable, as several grade categories have a minimal number of observations and the potential to produce spurious findings.

Table 11: Average Teamwork & Collaboration score by Grade- Heat Map

	Average Teamwork & Collaboration Score Category				
Grade Received	0	1	2	3	4
A	0.0%	1.8%	1.8%	41.1%	55.4%
B	0.0%	8.7%	26.1%	56.5%	8.7%
C/P	0.0%	10.0%	30.0%	40.0%	20.0%
D	0.0%	0.0%	0.0%	100.0%	0.0%
F/NP	0.0%	33.3%	66.7%	0.0%	0.0%

- In examining the distributions of grades across average Teamwork & Collaboration score categories in the heat map below, there appears to be a relatively linear pattern between Teamwork & Collaboration scores and earned course grade
- Of the students who earned the grade of "**A**," over 90% earn an average score of "**3**" or "**4**"
- All students who earned a grade of "**F**" received a score of "**1**" or "**2**".
- Small numbers of observations in lower grade categories undermine our ability to evaluate the strength of this relationship with inferential statistics

TEAMWORK & COLLABORATION DEMOGRAPHIC TABLES & GRAPHS

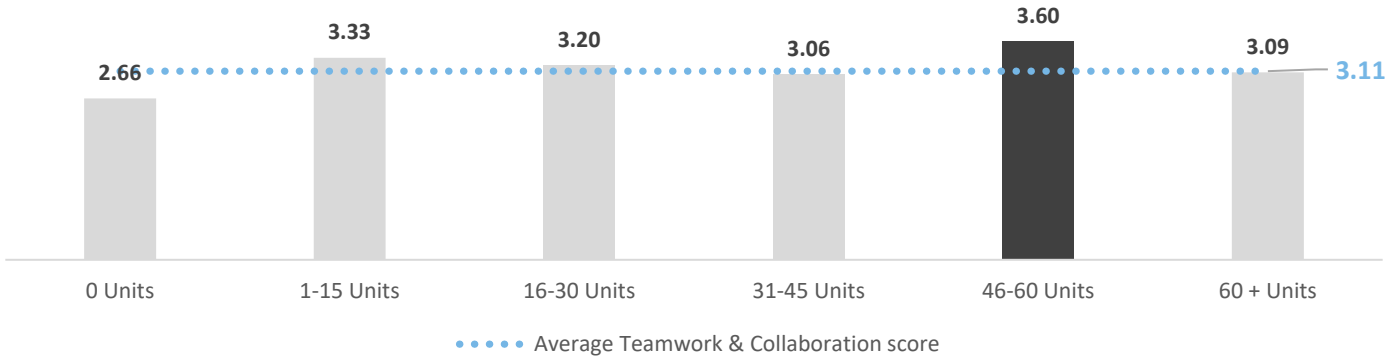
UNITS ATTAINED

- The highest Teamwork & Collaboration scores were generated by students with **46-60 completed units** prior to Fall 2023
- The lowest Teamwork & Collaboration scores were found among students with **0 completed prior units**
- There appears to be a trend where students with more completed academic units tend to have higher average scores, up to a certain point.
- Increased collaborative skills scores among students with more units may point to the development of this competency across a student's educational journey
- However, it's important to interpret these findings cautiously and consider potential confounding that may influence the relationship between the number of academic units completed and Teamwork & Collaboration competency scores.

Table 12: Average Teamwork & Collaboration score by Units Completed

	n	Average Score
0 Units	19	2.66
1-15 Units	24	3.33
16-30 Units	10	3.20
31-45 Units	10	3.06
46-60 Units	6	3.60
More than 60 Units	24	3.09

Figure 10: Average Teamwork & Collaboration score by Units Completed



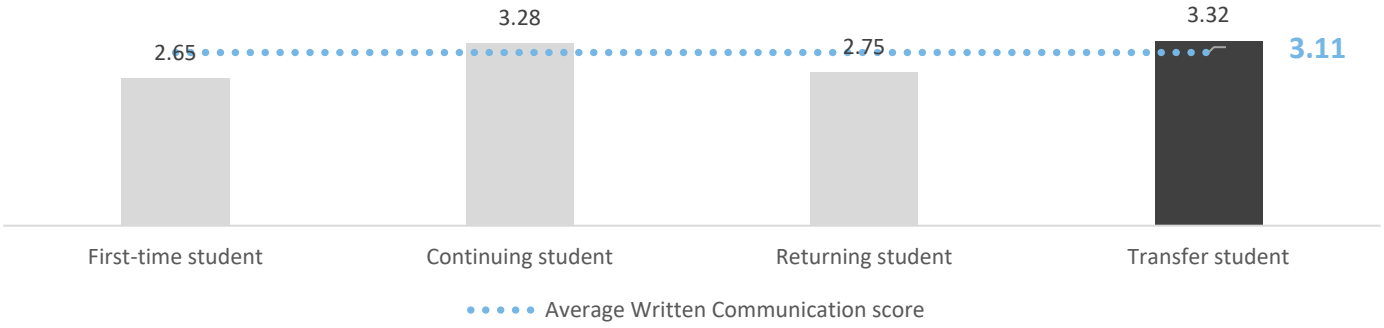
ADMISSION STATUS

- **Transfer students** and **Continuing students** exhibited the highest Teamwork & Collaboration scores
- Teamwork & Collaboration scores were lowest on average among **Returning students**, though observations of this group were minimal
- While sample sizes vary widely among these groups, the data suggests that there may be differences in teamwork and collaboration skills among students based on their admission status or that this skill could develop across students' educational trajectories
- Further investigation, such as examining specific components of teamwork and collaboration or controlling for additional variables, may provide deeper insights into the observed differences among student groups.

Table 13: Average Teamwork & Collaboration score by Admission Status

	n	Average Score
First Time Student	19	2.65
Continuing Student	61	3.28
Returning Student	8	2.75
Transfer Student	5	3.32

Figure 11: Average Teamwork & Collaboration score by Admission Status



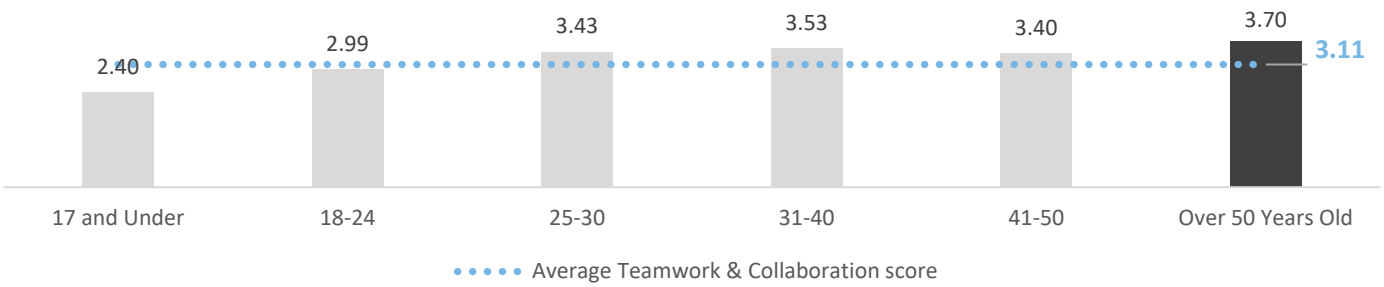
AGE

- Individuals **ages 50+** tend to generate higher Teamwork & Collaboration competency scores, followed by those in the **31-40** and **25-30** age groups.
- Conversely, individuals aged **17 and under** and those in the **18-24** age group generated lower average Teamwork & Collaboration scores.
- It is essential to interpret these findings cautiously and consider other factors with the potential to influence teamwork and collaboration skills, like maturity
- Furthermore, minimal sampling of non-traditional age college students makes it difficult to establish the existence of a relationship between Teamwork & Collaboration scores and age.

Table 14: Average Teamwork & Collaboration score by Age Group

	n	Average Score
17 and under	4	2.40
18-24	61	2.99
25-30	16	3.43
31-40	8	3.53
41-50	2	3.40
50+ Years Old	2	3.70

Figure 12: Average Teamwork & Collaboration score by Age Group



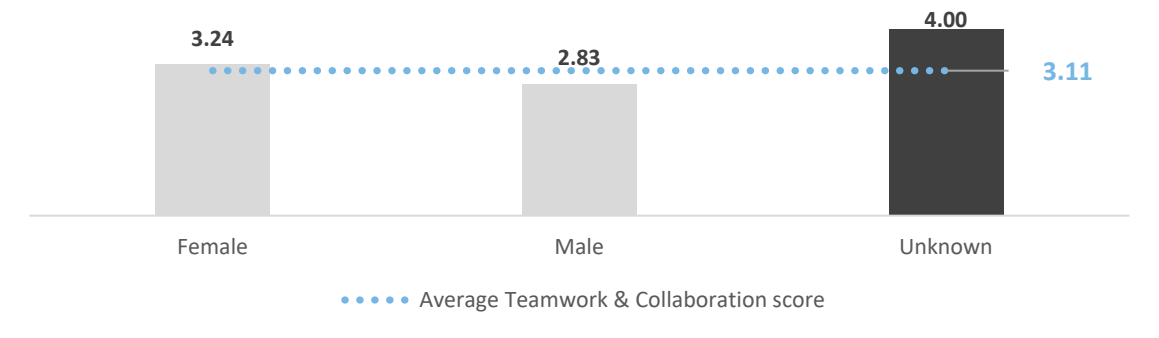
GENDER

- Teamwork & Collaboration scores were higher on average among **female** students
- However, these findings must be interpreted cautiously and other factors that may influence teamwork and collaboration skills must be considered, like differential course taking patterns between these groups
- For example, male students tended to be assessed for this competency in BUS and COMM courses while assessments for females tended to emanate from DNCE and SOC courses.

Table 15: Average Teamwork & Collaboration score by Gender

	n	Average Score
Female	57	3.24
Male	34	2.83
Other/Unknown	2	4.00

Figure 13: Average Teamwork & Collaboration score by Gender



ETHNICITY

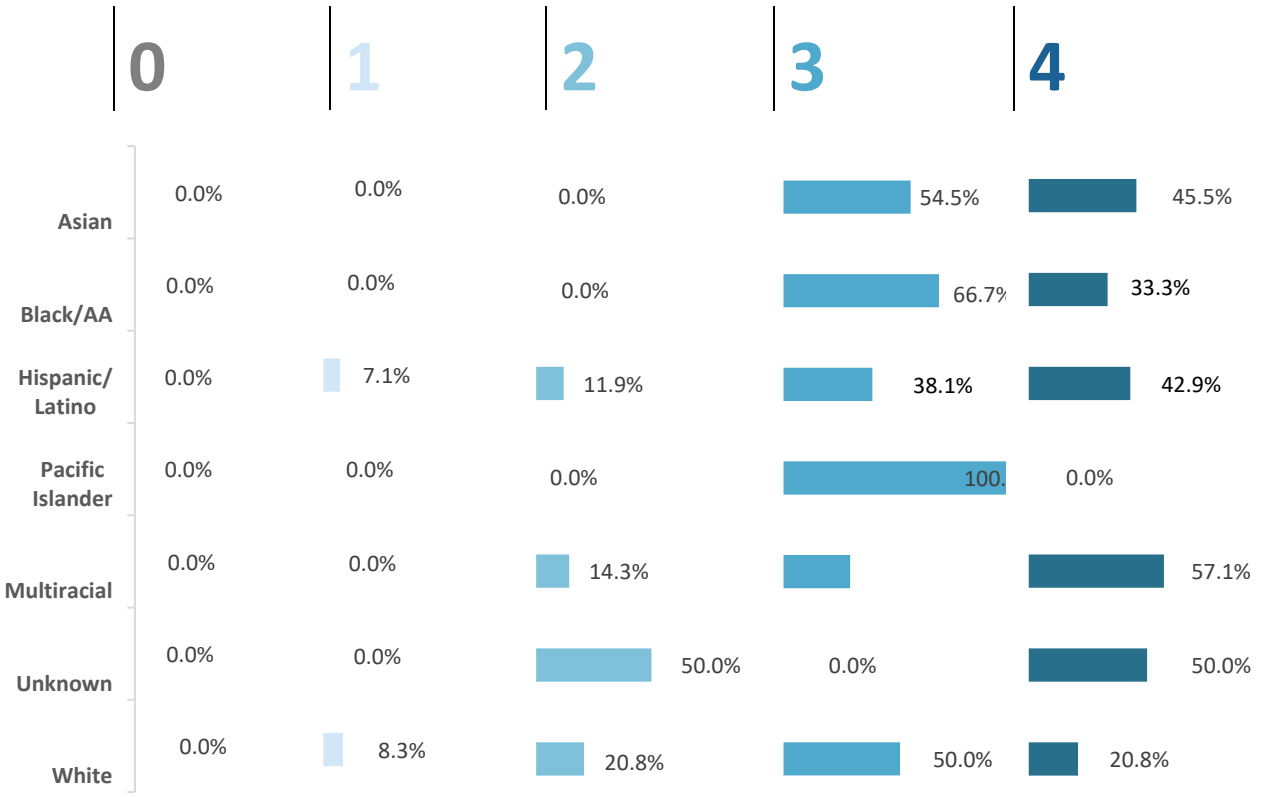
- Among more robustly represented ethnic groups, **Latinx** students generated higher Teamwork & Collaboration scores than **White** students
- **Asian** students generated the highest Teamwork & Collaboration scores but had a relatively small sample
- Small sample sizes for most ethnic categories make it difficult to discern meaningful trends for the remaining ethnic groups

Table 16: Average Teamwork & Collaboration score by Ethnicity

	n	Average Score
Asian	11	3.47
Black/African American	6	3.33
Latinx	42	3.09
Pacific Islander	1	3.00
Multiracial	7	3.31
Unknown	2	2.90

White	24	2.88

Figure 14: Average Teamwork & Collaboration score category by Ethnicity



SUMMARY

The Outcomes Assessment Committee (OAC) at MiraCosta College set a standard score of '2' out of 4 to signify meeting or achieving a core competency. The original VALUE rubrics that served as the basis for MiraCosta College's calibrated rubrics, were primarily designed for use at four-year institutions. Since the Core Competencies were designed to primarily apply to students who are completing courses for transfer or an associate degree, the committee concluded that a score of '2' was appropriate to the level that would be expected from degree and transfer-seeking students. In Fall 2023, students sampled for core competency evaluation generated **Quantitative Literacy** scores (Mode score = 2) that tended to be at the expected skill level of community college students. Students assessed for **Teamwork & Collaboration** (Mode score = 3) exhibited collaborative skills that exceeded expectation, relative to the minimum criterion score of 2.

For both competencies there was a relatively linear relationship between course grade and the generated competency scores, to the extent that students with greater levels of course success (A relative to B; B relative to C) also tended to generate higher Quantitative Reasoning and Teamwork & Collaboration scores. In other words, Quantitative Literacy and Teamwork & Collaboration competency scores increased incrementally (on average) with gains in academic success. However, a limited number of observations for **Teamwork & Collaboration**, particularly in D/F grade categories, render

it difficult to speculate about the accuracy of these conclusions. As the college gathers more data on Teamwork & Collaboration skills our understanding of the potential relationship between academic achievement and Teamwork and Collaborative skills will become more refined.

First-Time students generated the highest scores for Quantitative Literacy, as did those with **1-15 units completed** at the time of assessment. While this is contrary to expectation, there are a number of factors that could be driving this finding. The college may be enrolling students from specific high schools that have strong quantitative high school programs, for instance, or it may be that first-time students included in this assessment tended to emanate from specific lower-level math courses, where demonstrating competency may be less difficult. There does look to be a differential pattern of course taking among First-time and Transfer or Continuing students. Quantitative Literacy assessments for First-time students tended to come from courses like MATH 126S, ECON 101 and CHEM 140 while assessments for Continuing students tended to come from BIO 102/202, CHEM 150/151, MATH 260 and PHYS 111. Alternatively, Teamwork & Collaborative skills were highest among **Transfer** and **Continuing students** and students who had completed **45-60 units** at the time of assessment. This data may speak to a relationship between educational progression and the development of Teamwork & Collaborative skills, but it could also be the result of maturity, as Quantitative Literacy and Teamwork and Collaboration skills both looked to increase on average as age increased.

For Quantitative Literacy there was a nearly linear incremental increase in generated scores across age categories up to the **50+ age** group where scores drastically declined. For Teamwork & Collaboration, scores increased almost linearly across the age categories. However, a minimal number of observations for students **ages 41+** for both competencies, renders it difficult to know if these captured trends are generalizable to the larger MiraCosta student population.

White students very slightly outperformed **Hispanic/Latino** students in Quantitative Literacy (2.53 vs 2.44; $M_{Diff} = 0.09$) on average, and these groups both outperformed Asian students in Quantitative Literacy (M = 2.30). For Teamwork & Collaborative skills **Hispanic/Latino** students performed better than **White** students with (3.09 vs 2.88; $M_{Diff} = 0.21$), while the remaining ethnic groups contained too few individuals to make adequate comparisons to larger, normally distributed groups.

Finally, there were gender differences in the data with **male** students outperforming **female** students in the Quantitative Literacy core competency assessment (2.54 vs 2.23; $M_{Diff} = 0.31$), and **female** students outperforming **male** students in the Teamwork & Collaboration core competency assessment (3.24 vs 2.83; $M_{Diff} = 0.41$). However, some of observed gender differences in these competency assessments may be explained by differential patterns of course taking. For instance, nearly twice as many female students were assessed for Quantitative Literacy in CHEM 140, and five times as many assessed in BIO 202, compared to male students. Nearly twice as many males were assessed for Quantitative Literacy in ANTH 101, ECON 101 and MATH 260 compared to female students. A pattern of differential course taking was also evident among male and female students being assessed for Teamwork & Collaborative skills. Female students tended to be assessed for this competency in DNCE and SOC courses, while male student assessments tended to emanate from BUS and COMM courses. As additional sampling is conducted, and assessments are continued across a wider swath of courses these differences will become more normalized and evenly distributed between groups rendering their comparison more equitable.