FALL 2021 CORE COMPETENCY ASSESSMENT

OVERVIEW

At MiraCosta College, the concept of Core Competencies refers to over-arching 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 that are tied to specific areas of achievement or competence. In the Fall 2021 semester, faculty assessed **Critical Thinking** and **Problem-Solving** for the first time. This report divides the analysis of each competence into separate sections.

EVALUATION METHODOLOGY

Prior to the start of the semester, faculty are asked to 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 then evaluate students' level of competency in a specific area, using specified criteria and locally developed rubric. This competency measurement is then merged with student records and analyzed by the Office of Research, Planning, and Institutional Effectiveness (RPIE).

CRITICAL THINKING

Table 1: Critical Thinking Summary

Number of Course Sections	26
Students Rated (Duplicated)	486
Average Rating	2.82

Critical Thinking was assessed from 0 to 4 on the following dimensions:

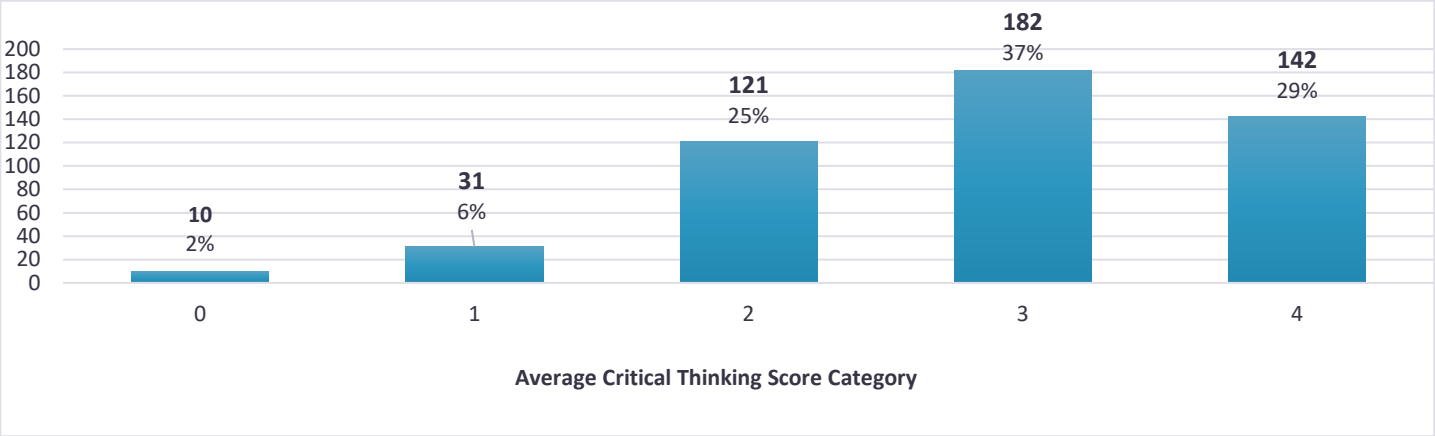
- **Explanation of issues**
- **Evidence**
- **Influence of Context & Assumptions**
- **Student's Position** (perspective, thesis/hypothesis)
- **Conclusions & related outcomes** (implications and consequences)

- Students receiving a grade of "W" or "EW" were excluded from the analysis.
- A total of 486 duplicated (410 unduplicated[1]) students were included in the evaluation process of this competency in Fall 2021

[1]'Unduplicated students' refers to the number of uniquely identifiable students included in the assessment. In this figure each student counts only once. 'Duplicated students' refers to the number of overall assessments given and may include a uniquely identifiable student more than once. It is unknown if Critical Thinking scores that were provided without Student IDs are duplicated in any manner.

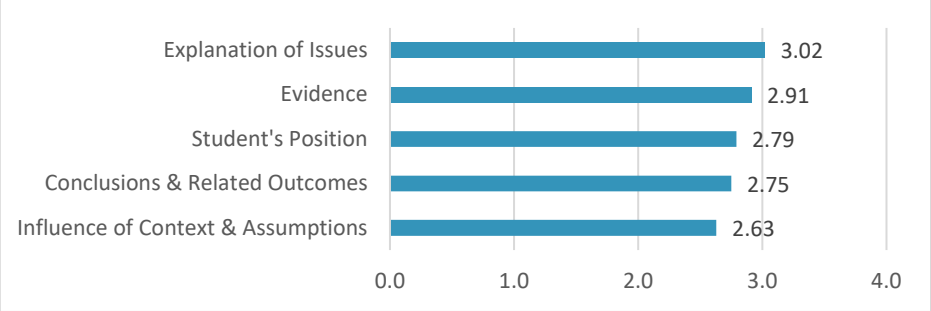
- 70 students with no student ID were included in the evaluation, but they are excluded from demographic and grade summaries
- Assessment took place in 26 course sections among 19 faculty/instructors
- Students were rated from 0-4 on each dimension according to the developed rubric, with 0 signifying the lowest level of competence
- Over 65% of students assessed received an average rating of "3" or "4"

Figure 1: Number of Students by Critical Thinking Average Score Category



CRITICAL THINKING BY DIMENSION

Figure 2: Average Score of each Critical Thinking Rubric Component



- Average scores on Critical Thinking categories ranged from 2.63 to 3.02
- **Explanation of Issues** and **Evidence** generated the highest average scores, while the **Influence of Context & Assumptions** dimension generated the lowest average scores.

CRITICAL THINKING SCORE BY GRADE RECEIVED

Table 2: Average Score by Grade Received in Course

Grade Received	n	Average Score
A	215	3.25
B	112	2.70
C/P	61	2.56
D	13	2.45
F/NP	13	1.91
I	1	2.00

N/A*	70	2.18

**Please note*: One faculty member did not provide student ID numbers to preserve student anonymity. These students could not be tied back to student records (*n*= 70). One additional student did not receive a course grade for the semester.

- Rubric scores were compared with the grade students received in the course to cursorily examine the relationship between the two variables
- The table suggests that individuals who earned higher grades also tend to generate higher **Critical Thinking** scores, but small sample sizes in some grade categories make it difficult to assess the statistical strength of this relationship.

- The heat map below also suggests a relationship between grade received and Critical Thinking scores.
- Of the students who earned the grade of "A", over 80% earn an average score of "3" or "4"
- Roughly 70% of those earning a grade of "F" received a score of "1" or "2"

Table 3: Average Critical Thinking score category x Grade Heat Map

	Average Critical Thinking Score Category				
Grade Received	**0**	**1**	**2**	**3**	**4**
A	0.0%	3.3%	13.5%	34.4%	48.8%
B	6.3%	6.3%	17.9%	47.3%	22.3%
C/P	0.0%	9.8%	41.0%	37.7%	11.5%
D	0.0%	7.7%	61.5%	15.4%	15.4%
F/NP	7.7%	38.5%	23.1%	15.4%	15.4%
I	0.0%	0.0%	100.0%	0.0%	0.0%
N/A*	2.9%	7.1%	50.0%	38.6%	1.4%

**Please note*: One faculty member did not provide student ID numbers to preserve student anonymity. These students could not be tied back to student records (*n*= 70).

CRITICAL THINKING DEMOGRAPHIC TABLES & GRAPHS

UNITS ATTAINED

- Average Critical thinking scores looked to differ most between the first three groups of unit attainment
- Students with 0 units scored lower on Critical Thinking than more seasoned, 16–30-unit students, on average

Table 4: Average Critical Thinking Score by Number of Units Completed Prior to Fall 2021

	n	Average Score
0 Units	171	2.67
1-15 Units	74	2.88
16-30 Units	103	2.93
31-45 Units	73	2.87
45-60 Units	32	2.88
60 + Units	33	2.93
N/A*	70	2.18

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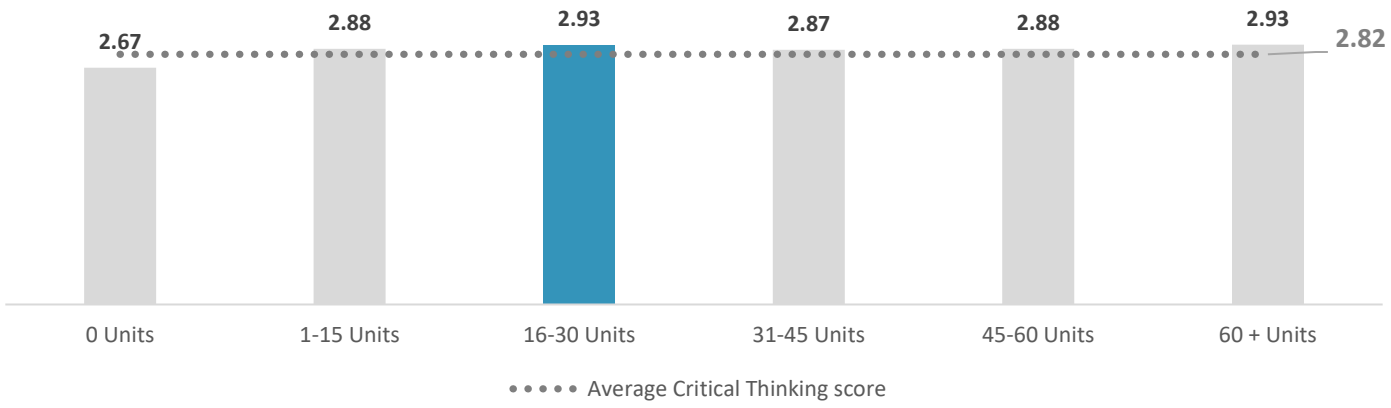
Figure 3: Average Critical Thinking score by Units Completed Prior to Fall 2021



ADMISSION STATUS

- Average Critical thinking scores were slightly higher in **First-time students** when compared to other types of students.
- Critical thinking scores were observed to be slightly higher in First-time students, but lower among those students with no prior unit attainment at MiraCosta College. While these findings seem to be in contention, a large number of Transfer students contributed to the 0 prior units attained group. Their contribution to the '0 units' attained group lowered the average score of the 'first time' student sample.

Table 5: Average Critical Thinking Score by Admission Status

	n	Average Score
High School Student	4	3.25
First Time Student	68	3.17
Continuing Student	251	2.87

Returning Student	54	2.93
Transfer Student	39	2.83
N/A*	70	2.18

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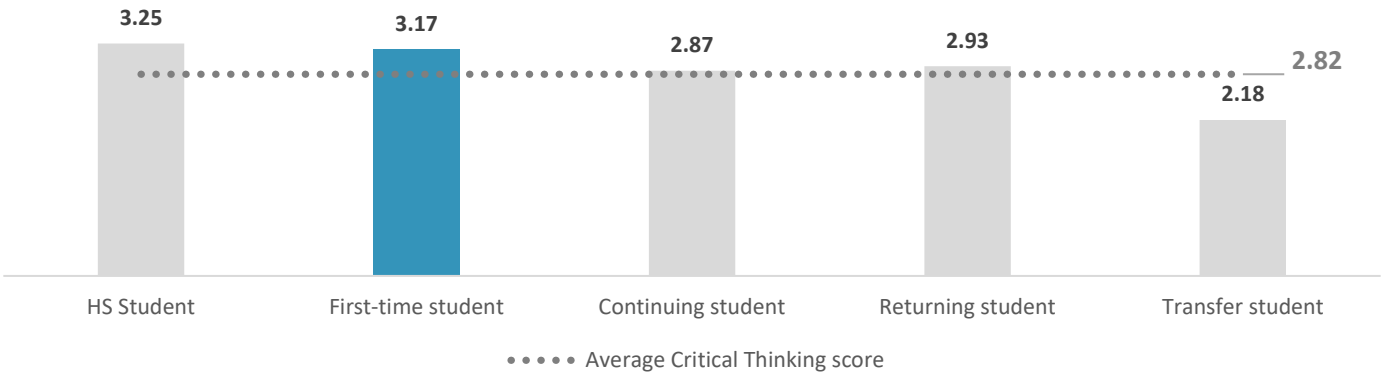
Figure 4: Average Critical Thinking Score Category by Admission Status



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AGE

- Critical thinking scores were highest among 31–40-year-old students and 18- to 24-year-old students, and lowest among students over 50
- Small samples, particularly of older students, make it difficult to measure the strength of the relationship between age and Critical Thinking scores

Table 6: Average Critical Thinking Score by Age Category

	n	Average Score
17 and Under	6	3.47
18-24	273	2.94
25-30	69	2.82
31-40	42	3.01
41-50	16	2.90
Over 50 Years Old	10	2.64
N/A	70	2.18

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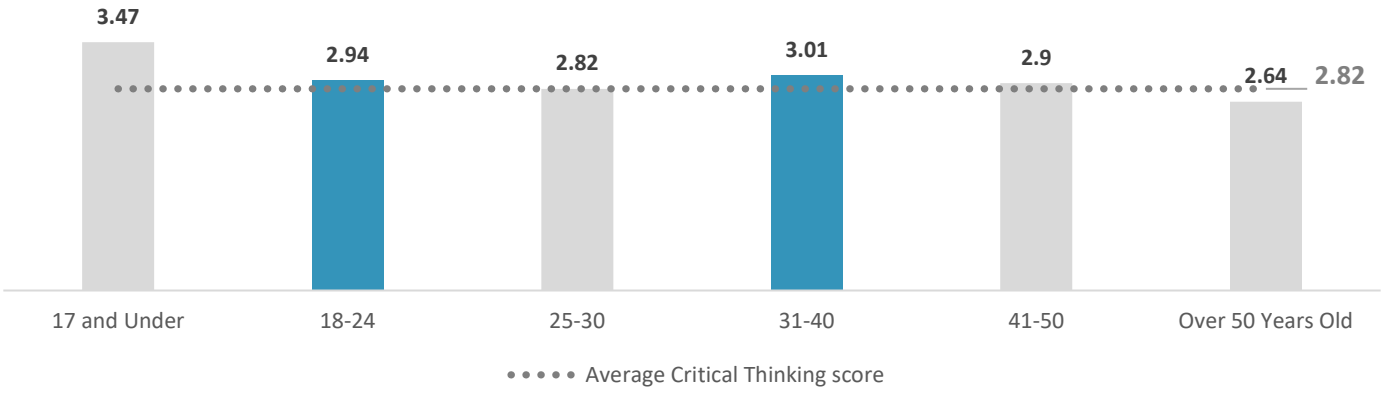
Figure 5: Critical Thinking Score by Age



GENDER

- Critical Thinking scores were higher on average among male students.

Table 7: Average Critical Thinking Score by Gender

	n	Average Score
Female	253	2.87
Male	155	3.01
Unknown	4	3.50
N/A*	70	2.18

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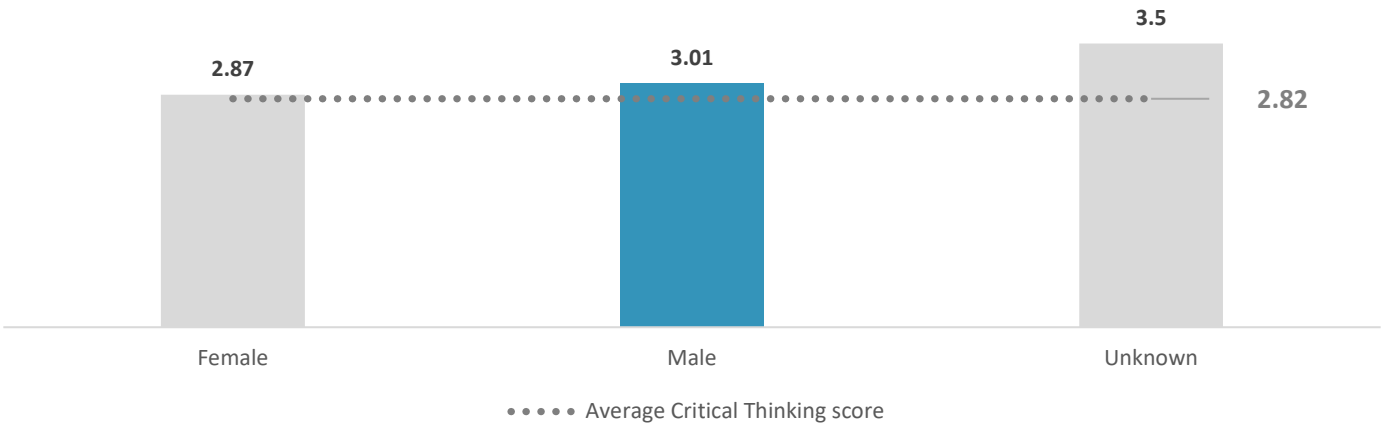
Figure 6: Average Critical Thinking Score by Gender



**Please note*: One faculty member did not provide student ID numbers to preserve student anonymity. These students could not be tied back to student records (*n*= 70).

ETHNICITY

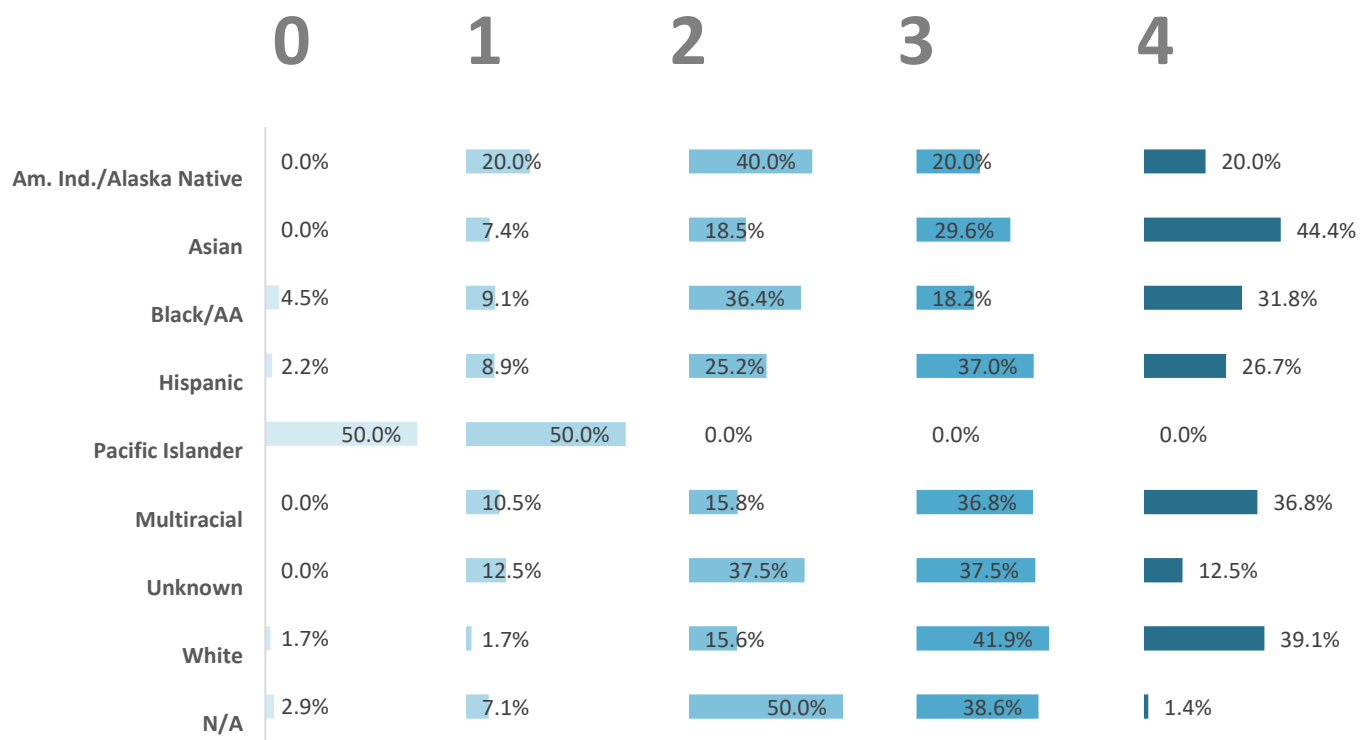
- White students generated the *highest* Critical thinking scores on average, while Black and Hispanic students generated the *lowest* scores.
- Small sample sizes for non-White ethnic groups make it difficult to ascertain if this trend would be represented in the larger population of students.

Table 8: Average Critical Thinking Score by Ethnicity

	n	Average Score
American Indian/Alaska Native	5	2.48
Asian	27	3.13
Black/African American	22	2.54
Hispanic	135	2.74
Pacific Islander	2	0.70
Multiracial	38	3.03
Unknown	78	2.70
White	179	3.11
N/A*	70	2.18

**Please note*: One faculty member did not provide student ID numbers to preserve student anonymity. These students could not be tied back to student records (*n*= 70).

Figure 7: Proportion of average Critical Thinking score category by Ethnicity



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PROBLEM SOLVING

Large samples of core competency assessments allow us to approximate the existence of assessed competencies in the larger student population with greater confidence. The large sample of **Critical Thinking** assessments made it possible to disaggregate the data with greater confidence and examine the assessment patterns of Critical Thinking among important subgroups. Larger group and subgroup samples are less influenced by individual outliers and therefore more closely align to the populations they represent rather than being representative of a few individuals. This allows us to generalize the **Critical Thinking** competency results to students, and student subtypes, with greater confidence.

By comparison, sample sizes for **Problem-Solving** were relatively small, resulting in a reduced ability to make broad-based inferences about the student body as a whole. The strength of the inferences will increase over time as more data is collected for this competency in future semesters.

Table 9: Problem Solving Summary

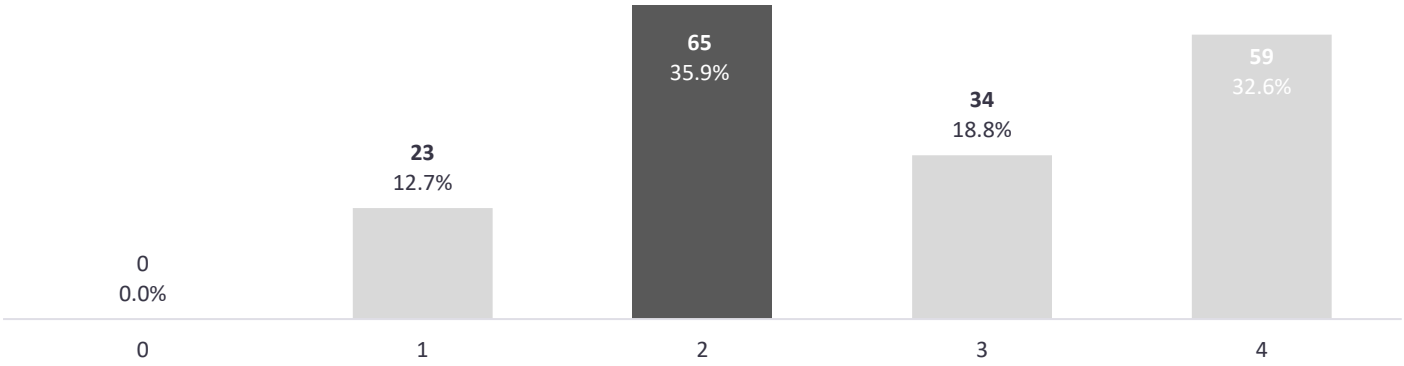
Number of Course Sections	13
Students Rated (Duplicated)	181
Average Rating	2.71

Students' Problem Solving abilities were assessed along the following dimensions:

- **Defining the problem**
- **Identifying strategies**
- **Proposing solutions (Hypothesis)**
- **Evaluating solutions**
- **Applying results**

- Eleven faculty in 13 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 181 duplicated (178 unduplicated) students were included in the evaluation process
- The most commonly awarded score was "2"

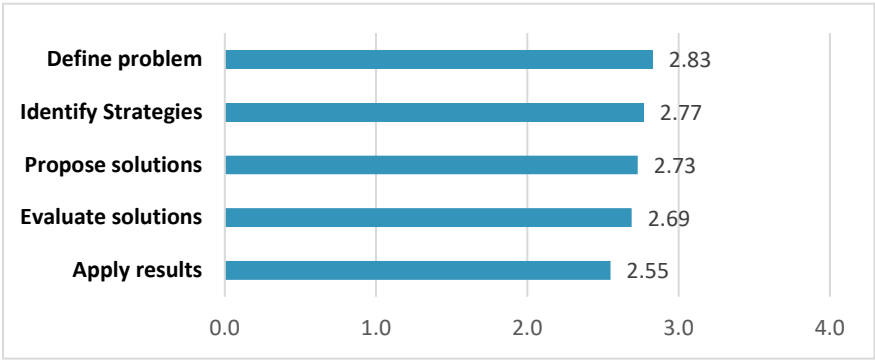
Figure 8: Number of Students by Average Problem Solving rating



PROBLEM SOLVING DIMENSIONS

- Average scores on Problem Solving dimensions ranged from 2.55 to 2.83
- Students scored highest on **Defining the Problem** scored lowest on **Applying results.**

Figure 9: Average Score of each Problem Solving Category



PROBLEM SOLVING SCORE BY GRADE RECEIVED

Table 10: Average Problem-Solving Score by Grade Received

Grade Received	Number of Students	Average Score
A	87	3.02
B	55	2.62
C/P	26	2.20
D	6	1.80
F/NP	6	2.10
I	1	3.80

- Rubric scores were compared with the grade students received in the course to see if there was a relationship between the two variables
- The table suggests that as course grades increased (*from D to A*) so too did Problem Solving competency ratings

- It is unknown to what extent this finding is accurate and can be generalized, as many faculty-assigned grade categories have a minimal number of observations and the potential to produce spurious findings.
- The heat map below also suggests a relationship between grade received and Problem Solving scores, particularly of lower scores being associated to lower grades
- Of the students who earned the grade of "A", nearly 70% earn an average score of "3" or "4"
- Over 80% of those earning a grade of "D" or "F" received a score of "1" or "2"

Table 11: Average Problem Solving score x Grade Heat Map

	Average Problem Solving Score Category				
Grade Received	0	1	2	3	4
A	0.0%	3.4%	28.7%	27.6%	40.2%
B	0.0%	12.7%	43.6%	12.7%	30.9%
C/P	0.0%	34.6%	38.5%	7.7%	19.2%
D	0.0%	50.0%	33.3%	16.7%	0.0%
F/NP	0.0%	16.7%	66.7%	0.0%	16.7%
I	0.0%	0.0%	0.0%	0.0%	100.0%

PROBLEM SOLVING DEMOGRAPHIC TABLES & GRAPHS

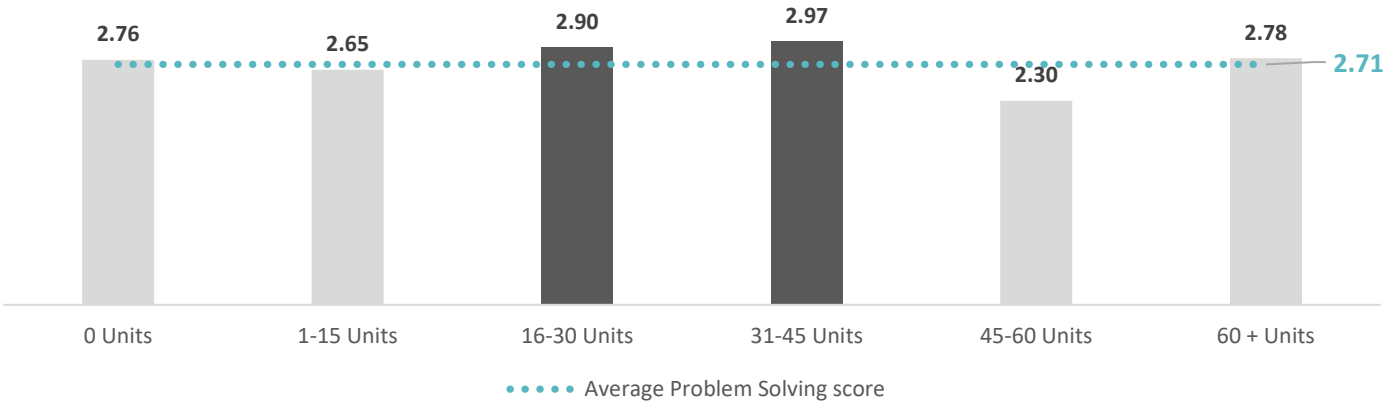
UNITS ATTAINED

- The highest Problem Solving scores were generated by students who attained 45-60 units, and those who had attained 16-30 units, prior to Fall 2021

Table 12: Average Problem-Solving score by Units Completed

	n	Average Score
0 Units	40	2.76
1-15 Units	32	2.65
16-30 Units	37	2.90
31-45 Units	19	2.97
46-60 Units	31	2.30
More than 60 Units	22	2.78

Figure 10: Average Problem Solving score by Units Completed



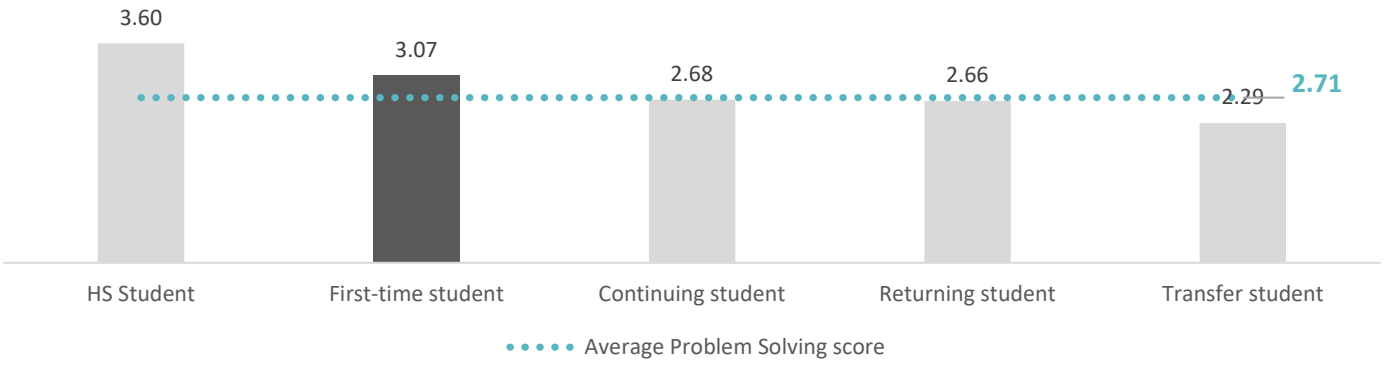
ADMISSION STATUS

- Problem Solving scores were lowest on average among Transfer and Returning students, while First-time students generated the highest scores
- However, small samples of all three groups make it difficult to know whether this trend would generalize to MiraCosta College Students as a whole
- As additional data is collected potential trends will have greater definition

Table 13: Average Problem Solving score by Admission Status

	n	Average Score
High School Student	2	3.60
First Time Student	28	3.07
Continuing Student	118	2.68
Returning Student	18	2.66
Transfer Student	15	2.29

Figure 11: Average Problem Solving score by Admission Status



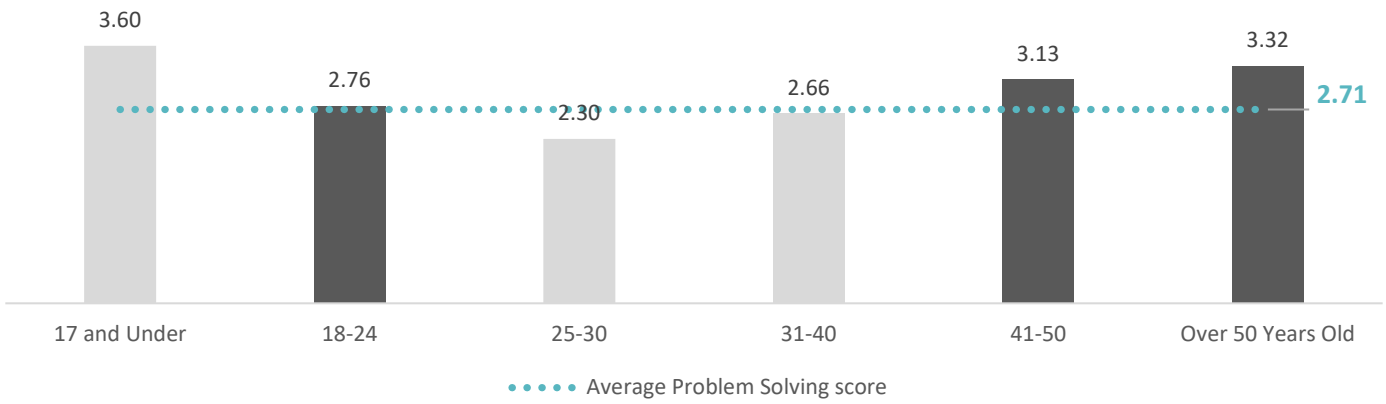
AGE

- The highest Problem Solving scores were seen in older student groups (41-50, & 50+) and students 18-24.
- Small samples, particularly of older students, make it difficult to measure the strength of the relationship between age and Problem Solving scores

Table 14: Average Problem Solving score by Age Group

	n	Average Score
17 and Under	2	3.60
18-24	120	2.76
25-30	30	2.30
31-40	16	2.66
41-50	8	3.13
Over 50 Years Old	5	3.32

Figure 12: Average Problem Solving score by Age Group



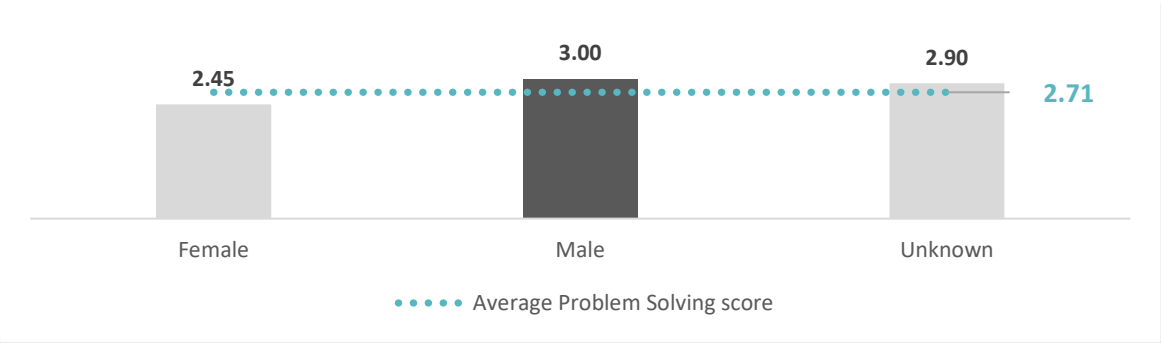
GENDER

- Male students tended to generate higher Problem Solving scores than Female students, on average

Table 15: Average Problem Solving score by Gender

	n	Average Score
Female	94	2.45
Male	85	3.00
Unknown	2	2.90

Figure 13: Average Problem Solving score by Gender



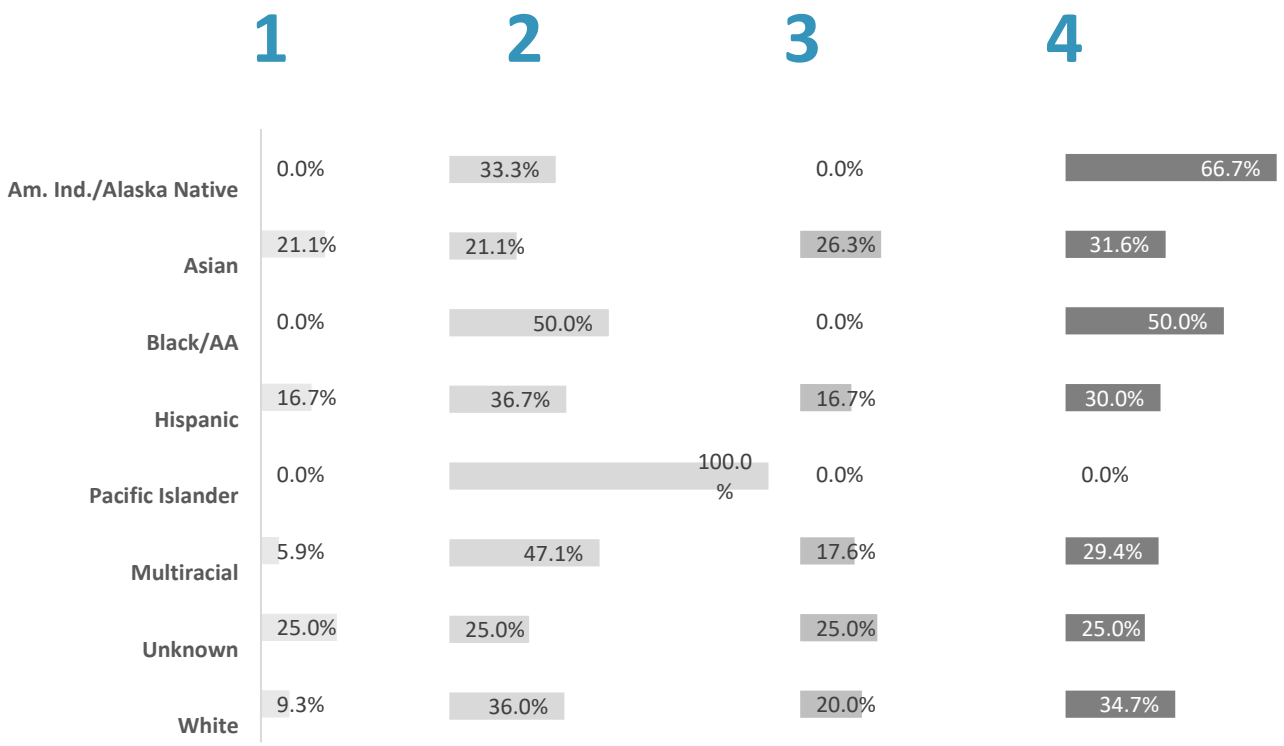
ETHNICITY

- Small sample sizes for most ethnic categories make it difficult to discern meaningful trends from the Problem Solving scores generated by these groups
- However, among the more represented groups (n >10), White and Multiracial students tended to generate higher scores on average, than Hispanic students

Table 16: Average Problem Solving score by Ethnicity

	n	Average Score
American Indian/Alaska Native	3	3.40
Asian	19	2.74
Black/African American	2	3.10
Hispanic	60	2.55
Pacific Islander	1	2.00
Multiracial	17	2.79
Unknown	4	2.60
White	75	2.80

Figure 14: Average Problem Solving score category by Ethnicity



SUMMARY

Students included in the core competency evaluation in Fall 2021, generated higher **Critical Thinking** scores (Mode score = 3), while observed **Problem Solving** scores tended to be lower on average (Mode score= 2).

In examining the relation of course success to level of competence, there appears to be a relatively linear relationship between course grade and both **Problem Solving** and **Critical Thinking** competency scores. In both cases, competency scores were observed to increase incrementally with gains in academic success. The small number of observations in some grade categories, however, require that more data is collected before statistical testing can be used to verify this relationship.

White students tended to generate higher **Critical thinking** and **Problem-Solving** scores than Latinx students. Other ethnic groups contained too few individuals to compare, rendering the collection of more data necessary before establishing trends in data disaggregated by ethnicity.

Critical Thinking scores were observed to be slightly higher in First-time students and those 18-24 years of age, but lower among those students with no prior unit attainment at MiraCosta College. While these findings seem at odds with one another, a large number of Transfer students contributed to the 0 prior units attained group. Their contribution to the no units attained group appears to lower the average score from what is seen in the new student population.

Problem Solving scores of first-time students and students ages 18-24 were also higher on average when compared to other groups. Furthermore, more seasoned students (with 16-45 units attained), tended to generate higher Problem Solving scores. However, small sample sizes for these subgroups make it difficult to discern meaningful trends.

Finally, there appear to be gender differences in both sets of data, with male students generating much higher **Critical Thinking** and **Problem Solving** scores on average, when compared to female students.