Massachusetts Department of Higher Education

Critical Thinking Analysis
2017 & 2019
## Participating Massachusetts Institutions

<table>
<thead>
<tr>
<th>2017</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bristol Community College</td>
<td>Cape Cod Community College</td>
</tr>
<tr>
<td>Fitchburg State University</td>
<td>Fitchburg State University</td>
</tr>
<tr>
<td>Massasoit Community College</td>
<td>North Shore Community College</td>
</tr>
<tr>
<td>Mount Wachusett Community College</td>
<td>Northern Essex Community College</td>
</tr>
<tr>
<td>North Shore Community College</td>
<td>Salem State University</td>
</tr>
<tr>
<td>Northern Essex Community College</td>
<td>University of Massachusetts Amherst</td>
</tr>
<tr>
<td>Salem State University</td>
<td>University of Massachusetts Boston</td>
</tr>
<tr>
<td>University of Massachusetts Amherst</td>
<td>Westfield State University</td>
</tr>
<tr>
<td>University of Massachusetts Lowell</td>
<td>Worcester State University</td>
</tr>
<tr>
<td>Westfield State University</td>
<td></td>
</tr>
<tr>
<td>Worcester State University</td>
<td></td>
</tr>
</tbody>
</table>

Highlighted institutions participated in both 2017 and 2019 and were used to create Matched Set comparisons.
### Massachusetts Sample Sizes

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2019</th>
<th>Net Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Year Institutions</td>
<td>312</td>
<td>222</td>
<td>90 (-29%)</td>
</tr>
<tr>
<td>4-Year Institutions</td>
<td>484</td>
<td>466</td>
<td>18 (-4%)</td>
</tr>
<tr>
<td>Total</td>
<td>796</td>
<td>688</td>
<td>108 (-14%)</td>
</tr>
</tbody>
</table>

Sample sizes reflect work submitted by students at Associates institutions with at least 45 semester credits and students at Bachelors institutions with at least 90 semester credits. “Early” student work was excluded.
Scores & Methodology

• These are average scores of student work as scored by faculty using the AAC&U VALUE rubric.

• Scores are out of a possible 4 points, ranging from 0 to 4. Chart axes in the following slides refer to this scale.

• T-tests were run to determine statistical significance in averages between 2017 and 2019 for key data cuts, using the standard alpha level of 0.05.

• Effect sizes were measured using Cohen’s D.
OVERALL RESULTS
Critical Thinking Distribution – All Participating MA Institutions

2017

Explanation of Issues
- 0: 4%
- 1: 13%
- 2: 35%
- 3: 36%
- 4: 11%

Evidence
- 0: 8%
- 1: 13%
- 2: 42%
- 3: 31%
- 4: 6%

Influence of Context and Assumptions
- 0: 6%
- 1: 25%
- 2: 39%
- 3: 23%
- 4: 7%

Student's Position
- 0: 7%
- 1: 26%
- 2: 34%
- 3: 29%
- 4: 5%

Conclusion and Related Outcomes
- 0: 7%
- 1: 19%
- 2: 46%
- 3: 21%
- 4: 7%

2019

Explanation of Issues
- 0: 4%
- 1: 5%
- 2: 33%
- 3: 45%
- 4: 14%

Evidence
- 0: 7%
- 1: 8%
- 2: 43%
- 3: 36%
- 4: 5%

Influence of Context and Assumptions
- 0: 5%
- 1: 11%
- 2: 44%
- 3: 35%
- 4: 5%

Student's Position
- 0: 6%
- 1: 12%
- 2: 42%
- 3: 35%
- 4: 5%

Conclusion and Related Outcomes
- 0: 6%
- 1: 11%
- 2: 52%
- 3: 28%
- 4: 3%
Overall Average Critical Thinking Scores

**All Participating MA Institutions**

- 2017: 2.11
- 2019: 2.29

**Matched Set MA Institutions**

- 2017: 2.17
- 2019: 2.35
Average Scores: 2-Year and 4-Year Institutions

All Participating MA Institutions

Matched Set MA Institutions
Differences in Average 2017 to 2019: 2-Year and 4-Year Institutions

**All Participating MA Institutions**

- **2-Year Institutions**: Improvement from 2017 to 2019 = 0.29
- **4-Year Institutions**: Decline from 2017 to 2019 = 0.07

**Matched Set MA Institutions**

- **2-Year Institutions**: Large effect size = 0.78
- **4-Year Institutions**: Difference not statistically significant = 0.03

Legend:
- Green: Improvement from 2017 to 2019
- Red: Decline from 2017 to 2019

**Effect Size Interpretation**

- **medium effect size**: 0.29
- **large effect size**: 0.78
- **very small effect size**: 0.07
- **difference not statistically significant**: 0.03
RESULTS

BY GENDER
Overall Average Scores by Gender

### All Participating MA Institutions

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2.07</td>
<td>2.07</td>
</tr>
<tr>
<td>2019</td>
<td>2.20</td>
<td>2.12</td>
</tr>
</tbody>
</table>

### Matched Set MA Institutions

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2.09</td>
<td>2.09</td>
</tr>
<tr>
<td>2019</td>
<td>2.11</td>
<td>2.18</td>
</tr>
</tbody>
</table>
Differences in Average: 2017 to 2019 by Gender

All Participating MA Institutions

- Male: Improvement from 2017 to 2019 (0.04)
- Female: Difference not statistically significant

Matched Set MA Institutions

- Male: Decline from 2017 to 2019 (0.18)
- Female: Difference not statistically significant
Average Scores by Gender: 2-Year Institutions

**All Participating MA 2-Year Institutions**

- **2017**: Male 1.74, Female 1.79
- **2019**: Male 1.98, Female 1.89

**Matched Set MA 2-Year Institutions**

- **2017**: Male 1.39, Female 1.58
- **2019**: Male 1.98, Female 2.08
Differences in Average 2017 to 2019: 2-Year Institutions by Gender

<table>
<thead>
<tr>
<th></th>
<th>All Participating MA 2-Year Institutions</th>
<th>Matched Set MA 2-Year Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.23 (small effect size)</td>
<td>0.40 (medium effect size)</td>
</tr>
<tr>
<td>Female</td>
<td>0.10 (very small effect size)</td>
<td>0.69 (large effect size)</td>
</tr>
</tbody>
</table>

Improvement from 2017 to 2019
Average Scores by Gender: 4-Year Institutions

**All Participating MA 4-Year Institutions**

- Year: 2019
  - Male: 2.30
  - Female: 2.23

- Year: 2017
  - Male: 2.36
  - Female: 2.29

**Matched Set MA 4-Year Institutions**

- Year: 2019
  - Male: 2.15
  - Female: 2.22

- Year: 2017
  - Male: 2.36
  - Female: 2.51
Differences in Average 2017 to 2019: 4-Year Institutions by Gender

All Participating MA 4-Year Institutions

<table>
<thead>
<tr>
<th>Gender</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.05</td>
<td>difference not statistically significant</td>
</tr>
<tr>
<td>Female</td>
<td>0.06</td>
<td>difference not statistically significant</td>
</tr>
</tbody>
</table>

Matched Set MA 4-Year Institutions

<table>
<thead>
<tr>
<th>Gender</th>
<th>Difference</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.36</td>
<td>medium effect size</td>
</tr>
<tr>
<td>Female</td>
<td>0.14</td>
<td>small effect size</td>
</tr>
</tbody>
</table>

Decline from 2017 to 2019
RESULTS
BY PELL ELIGIBILITY
Overall Average Scores by Pell Eligibility

All Participating MA Institutions

Matched Set MA Institutions
Differences in Average 2017 to 2019 by Pell Eligibility

All Participating MA Institutions

- Pell Eligible: 0.19 (small effect size)
- Non-Pell Eligible: 0.16 (small effect size)

Matched Set MA Institutions

- Pell Eligible: 0.24 (small effect size)
- Non-Pell Eligible: 0.13 (very small effect size)

Improvement from 2017 to 2019
### Average Scores by Pell Eligibility: 2-Year Institutions

#### All Participating MA 2-Year Institutions

<table>
<thead>
<tr>
<th>Year</th>
<th>Pell Eligible</th>
<th>Non-Pell Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>1.77</td>
<td>1.79</td>
</tr>
<tr>
<td>2019</td>
<td>1.91</td>
<td>1.95</td>
</tr>
</tbody>
</table>

#### Matched Set MA 2-Year Institutions

<table>
<thead>
<tr>
<th>Year</th>
<th>Pell Eligible</th>
<th>Non-Pell Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>1.43</td>
<td>1.49</td>
</tr>
<tr>
<td>2019</td>
<td>2.09</td>
<td>2.09</td>
</tr>
</tbody>
</table>
Differences in Average 2017 to 2019: 2-Year Institutions by Pell Eligibility

All Participating MA 2-Year Institutions

<table>
<thead>
<tr>
<th>Pell Eligible</th>
<th>Non-Pell Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15</td>
<td>0.15</td>
</tr>
</tbody>
</table>

small effect size

Matched Set MA 2-Year Institutions

<table>
<thead>
<tr>
<th>Pell Eligible</th>
<th>Non-Pell Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.66</td>
<td>0.50</td>
</tr>
</tbody>
</table>

large effect size

medium effect size

Improvement from 2017 to 2019
Average Scores by Pell Eligibility: 4-Year Institutions

All Participating MA 4-Year Institutions

<table>
<thead>
<tr>
<th>Year</th>
<th>Pell Eligible</th>
<th>Non-Pell Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2.29</td>
<td>2.34</td>
</tr>
<tr>
<td>2019</td>
<td>2.44</td>
<td>2.49</td>
</tr>
</tbody>
</table>

Matched Set MA 4-Year Institutions

<table>
<thead>
<tr>
<th>Year</th>
<th>Pell Eligible</th>
<th>Non-Pell Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2.41</td>
<td>2.42</td>
</tr>
<tr>
<td>2019</td>
<td>2.43</td>
<td>2.49</td>
</tr>
</tbody>
</table>
Differences in Average 2017 to 2019: 4-Year Institutions by Pell Eligibility

All Participating MA 4-Year Institutions

- Pell Eligible: 0.14 (small effect size)
- Non-Pell Eligible: 0.15 (small effect size)

Matched Set MA 4-Year Institutions

- Pell Eligible: Improvement not statistically significant
- Non-Pell Eligible: Improvement not statistically significant
RESULTS BY RACE/ETHNICITY
Overall Average Scores by Race/Ethnicity

All Participating MA Institutions

Matched Set MA Institutions
Differences in Average 2017 to 2019 by Race/Ethnicity

**All Participating MA Institutions**
- **Students of Color**: 0.26 (small effect size)
- **White Students**: 0.13 (very small effect size)

**Matched Set MA Institutions**
- **Students of Color**: 0.33 (medium effect size)
- **White Students**: 0.10 (very small effect size)

*Improvement from 2017 to 2019*
Average Scores by Race/Ethnicity: 2-Year Institutions

All Participating MA 2-Year Institutions

Matched Set MA 2-Year Institutions
Differences in Average 2017 to 2019: 2-Year Institutions by Race/Ethnicity

All Participating MA 2-Year Institutions

- Students of Color: 0.21 (small effect size)
- White Students: 0.12 (very small effect size)

Matched Set MA 2-Year Institutions

- Students of Color: 0.54 (medium effect size)
- White Students: 0.60 (medium effect size)

"Improvement from 2017 to 2019"
Average Scores by Race/Ethnicity: 4-Year Institutions

All Participating MA 4-Year Institutions

Matched Set MA 4-Year Institutions
Differences in Average 2017 to 2019: 4-Year Institutions by Race/Ethnicity

All Participating MA 4-Year Institutions

- **Students of Color**
  - Small effect size
- **White Students**
  - Difference not statistically significant

Matched Set MA 4-Year Institutions

- **Students of Color**
  - Difference not statistically significant
- **White Students**
  - Difference not statistically significant

Legend:
- Improvement from 2017 to 2019
- Decline from 2017 to 2019
Massachusetts Department of Higher Education