Cal Poly Pomona

Institutional Assessment of Quantitative Literacy: A Presentation to AAC

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Learning Outcome

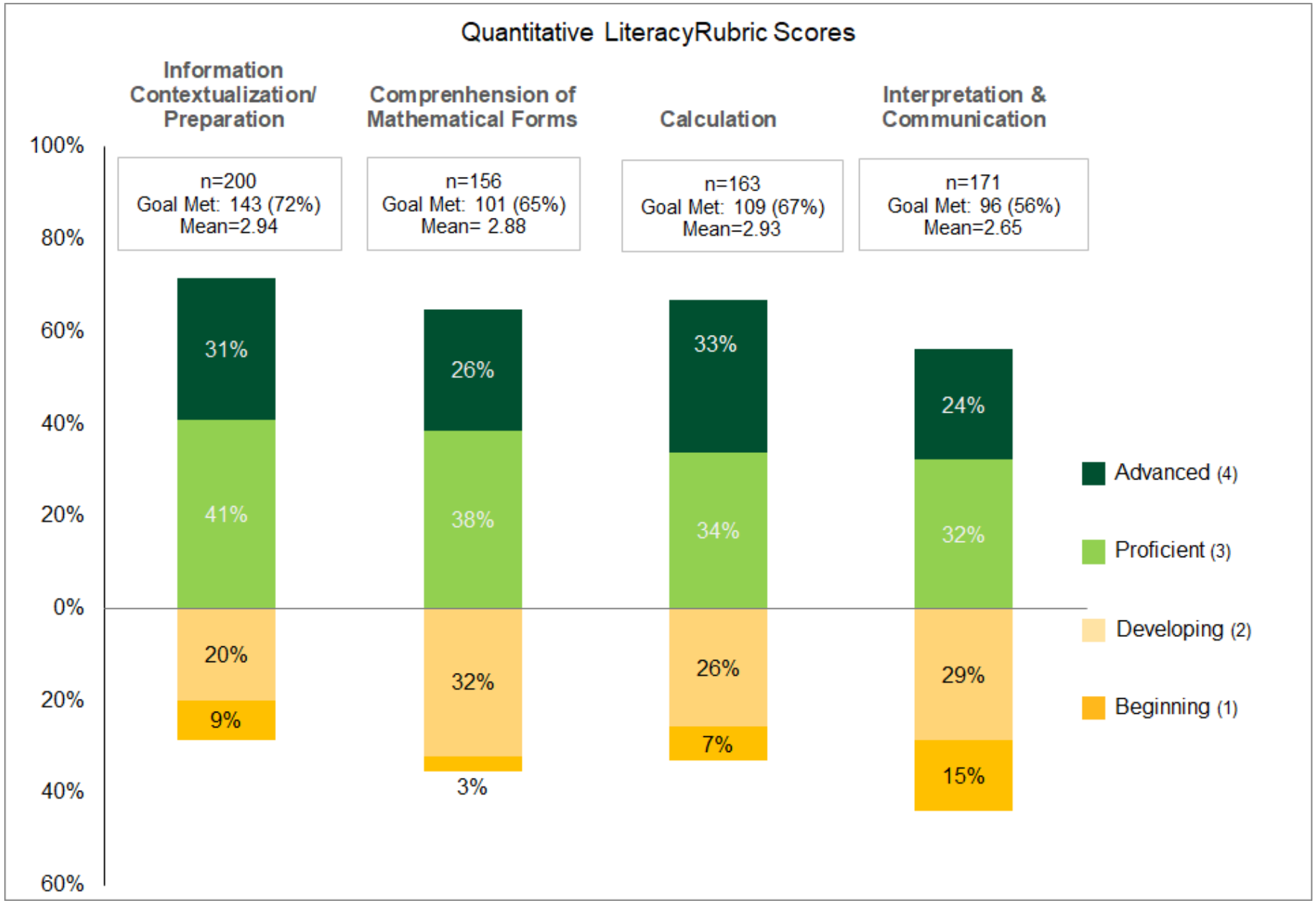
Quantitative Literacy: Students will use quantitative information to draw inferences and communicate informed arguments.

Criteria	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
Information Contextualization/ Preparation: *Identify and format appropriate quantitative information needed to address a question or problem. (e.g. data source, equations, functions, graphs, or theoretical constructs, etc.)*	Identifies and evaluates the most relevant quantitative information and thoroughly explains the connection to the question or problem. Expertly selects and organizes appropriate variables, parameters, or elements for use within the analytical or theoretical framework.	Identifies relevant quantitative information and explains its connection to the question or problem. Selects generally appropriate variables, parameters, or elements and organizes them adequately for use within the analytical or theoretical framework.	Recognizes limited understanding of relevant quantitative information and partially explains its connection to the question or problem. Selects some appropriate variables, parameters, or elements but organizes them with errors or inconsistencies, impacting their effectiveness.	Fails to identify relevant quantitative information and fails to explain its connection to the question or problem. Chooses inappropriate or irrelevant variables, parameters, or elements and does not organize them adequately.
Comprehension of Mathematical Forms: *Explain information presented in mathematical forms (e.g., graphs, equations, tables, words, diagrams, etc.)*	Accurately interprets and explains mathematical forms. Provides detailed elaboration revealing relevant facts or ideas.	Explains the meaning of mathematical forms clearly and appropriately.	Partially explains or interprets mathematical forms with limited accuracy or detail.	Provides an incorrect interpretation or explanation of mathematical forms.
Calculation: *Perform appropriate quantitative operations to solve the problem or address the task.*	Applies and executes appropriate quantitative operations accurately and thoroughly to solve the problem or question.	Applies generally appropriate quantitative operations with minor errors in execution.	Uses some quantitative operations that are partially aligned with the problem or question resulting in minor calculation errors.	Fails to apply appropriate quantitative operations or executes them inaccurately, resulting in significant errors or omissions.
Interpretation and Communication: *Make inferences and communicate appropriate conclusions based on quantitative analysis, theoretical results, or information provided (e.g. graphs, equations, etc.)*	Draws, justifies, and explains comprehensive conclusions based on quantitative analysis. Clearly evaluates the significance of results and articulates data or methodologic limitations.	Draws and explains appropriate conclusions based on quantitative information, recognizing some limitations in data, methods, and/or theoretical assumptions.	Draws limited or partially relevant conclusions with minimal explanation or evaluation of quantitative significance of the information. Identifies few limitations.	Fails to draw, explain, or evaluate conclusions based on quantitative information, showing no recognition of limitations.
Disciplinary Conventions *(Methodology) When applicable, select and apply methods and models that align with discipline-specific standards, demonstrating adherence to established conventions in the field.*	Applies discipline-specific methods with detailed attention and accurate execution aligned to established conventions.	Applies discipline-specific methods correctly with minor errors.	Attempts to apply discipline-specific methods but with major errors or inconsistencies.	Does not apply discipline-specific conventions or methods appropriately.

Developed by CPP Summer Assessment Institute faculty 8.13.2024; Approved and adopted by Academic Assessment Committee, 2.7.2025; Modified, approved and adopted by AAC 12.1.2025.

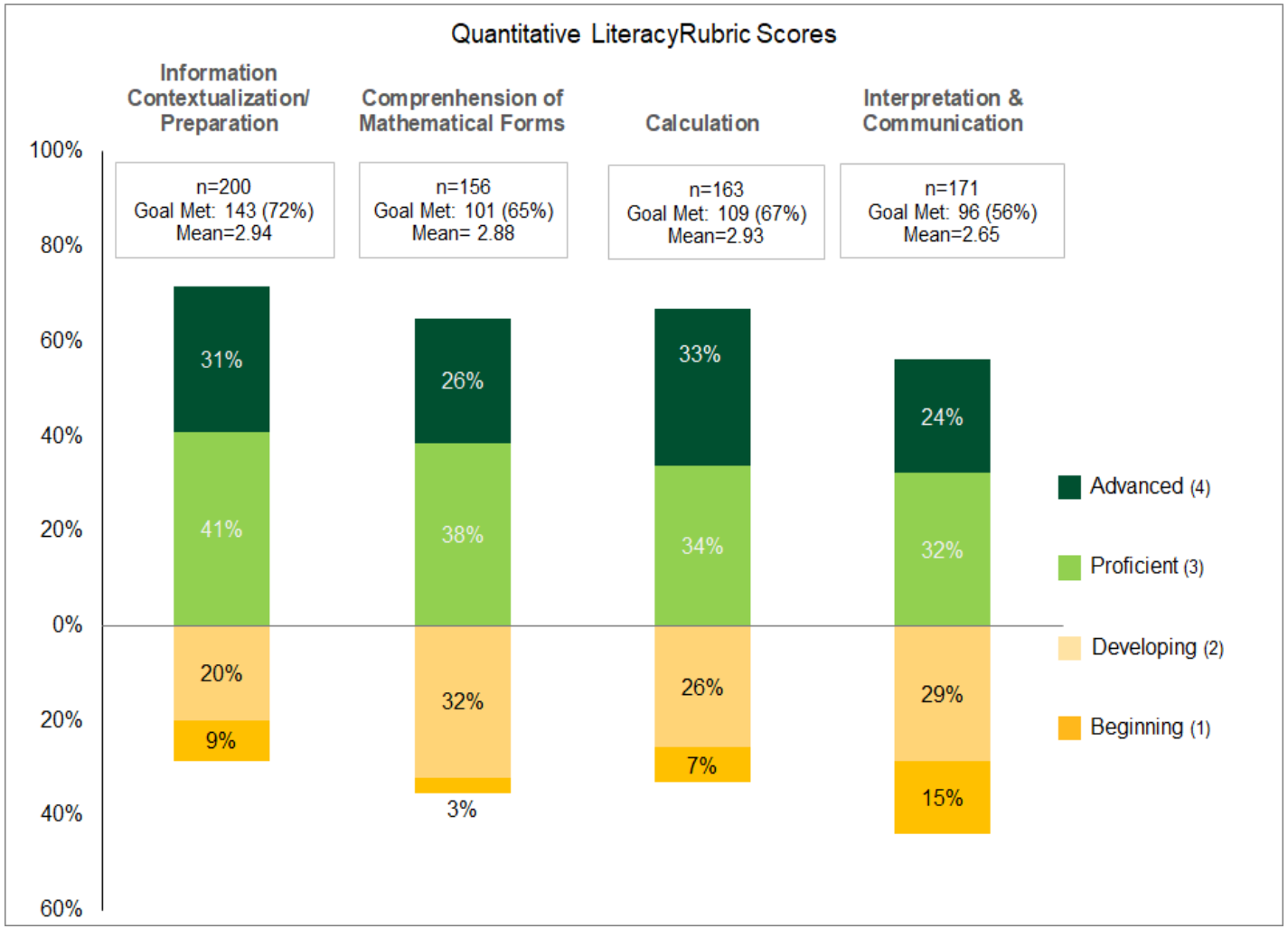
Background Information

- CPP's first assessment of Quantitative Literacy since the adoption of new GE-SLOs in 2023 (previous Quantitative Reasoning learning outcome assessed in Spring 2020)
- Artifacts
  - Seniors from 7colleges represented (N = 205)
  - 3000- and 4000-level courses in Fall 2025 and Spring 2026
  - Project reports, research papers, exams
- Scoring
  - 11 faculty across disciplines
  - Each artifact was scored by 2 faculty
  - Scoring discrepancies of 2 points or more were scored by a third scorer
  - Scoring discrepancies involving N/A (when the criterion was beyond the scope of the prompt) were resolved by a third score



CPP Goal Met “Advanced (4)” & “Proficient (3)”

Direct Evidence

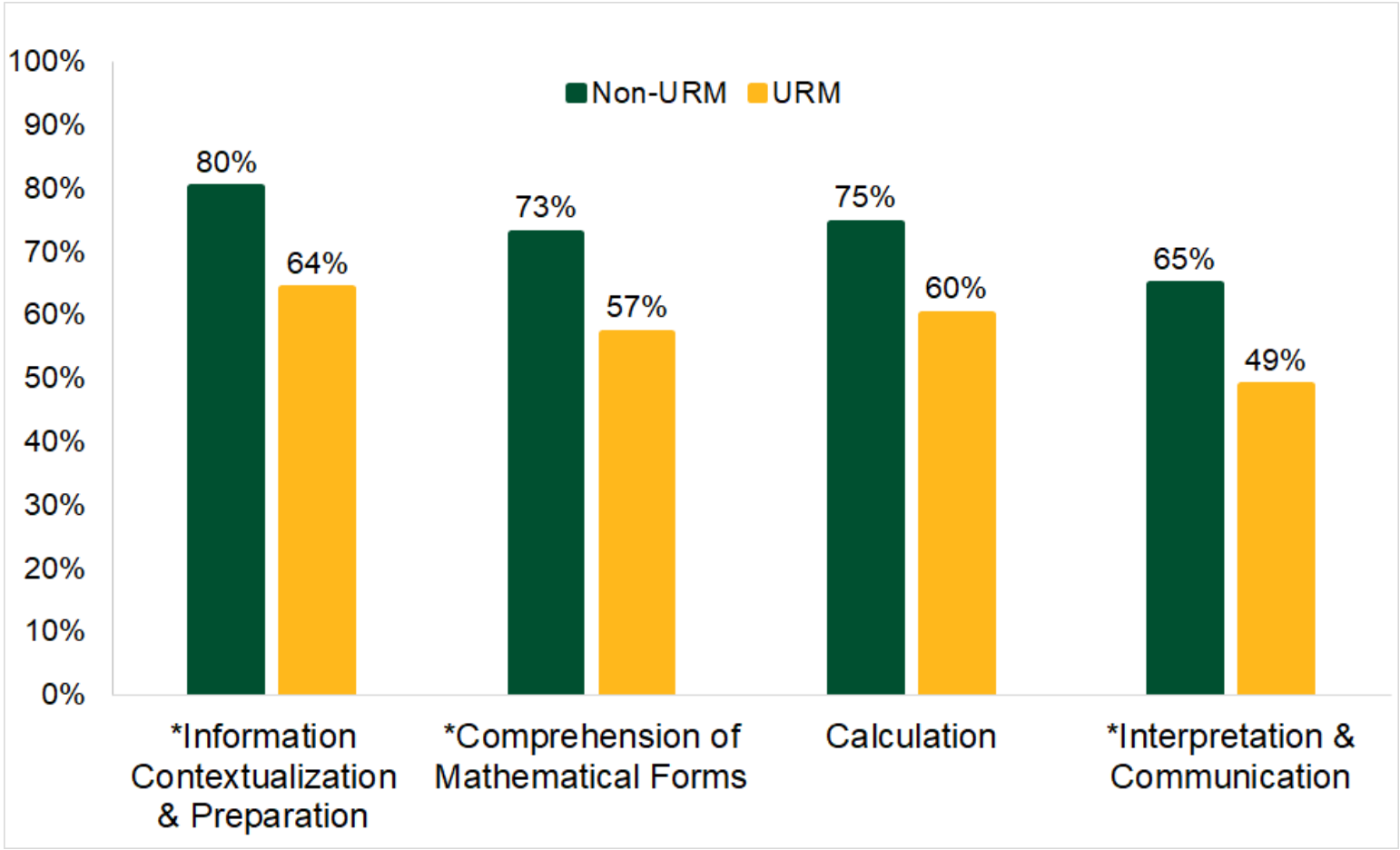


Seniors met CPP expectations across all criteria

- *Information Contextualization& Preparation* showed the strongest results.
- *Comprehension of Mathematical Forms and Calculation* presented some difficulty for students.
- *Interpretation & Communication* was particularly challenging, fewer students demonstrating proficient or advanced levels.

CPP Goal Met “Advanced (4)” & “Proficient (3)”

Statistically Significant Differences

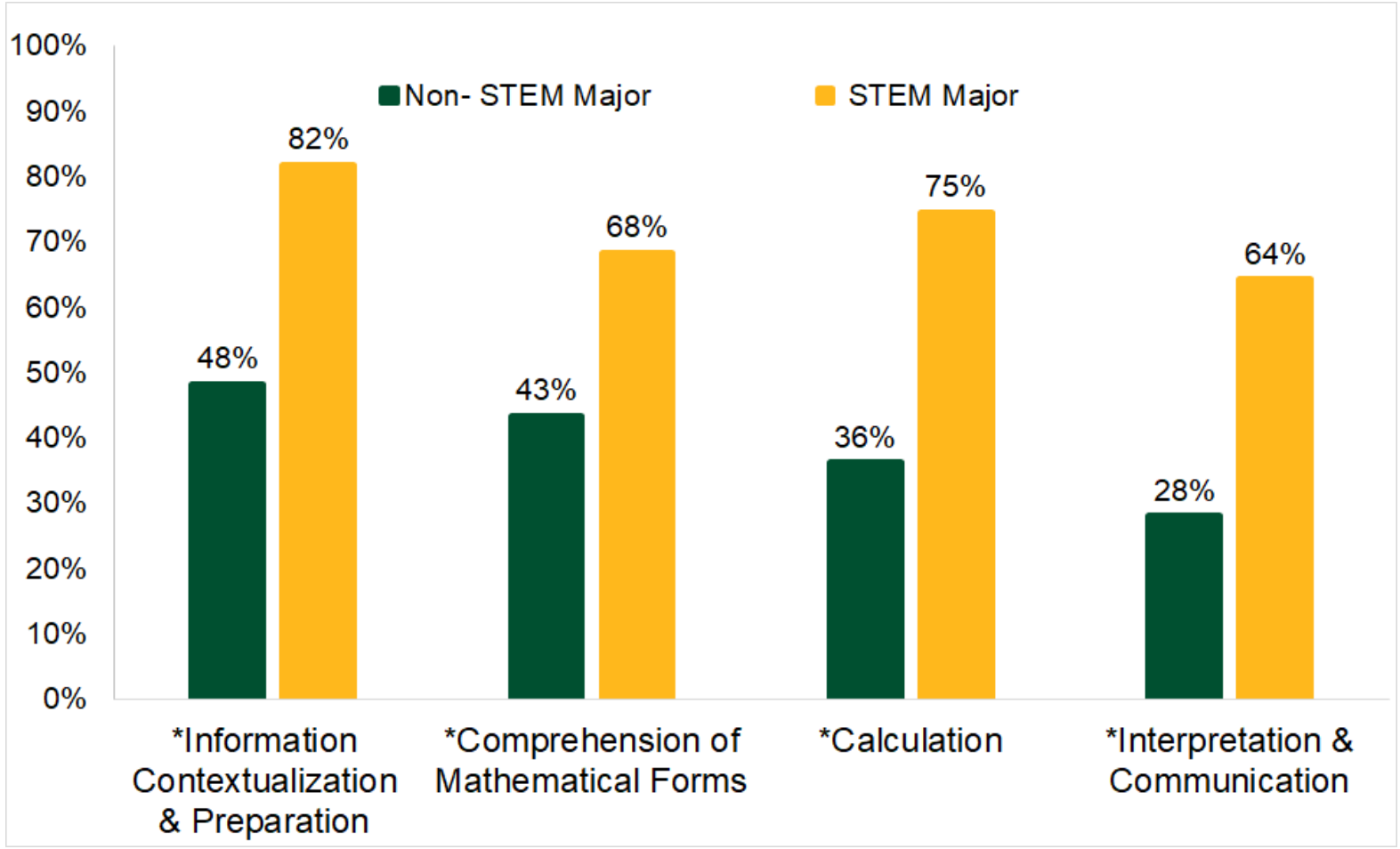


URM

- All criteria except *calculation*
- Non-URM students performed better than URM
- Difference was 16% in each criterion

CPP Goal Met “Advanced (4)” & “Proficient (3)”

Statistically Significant Differences

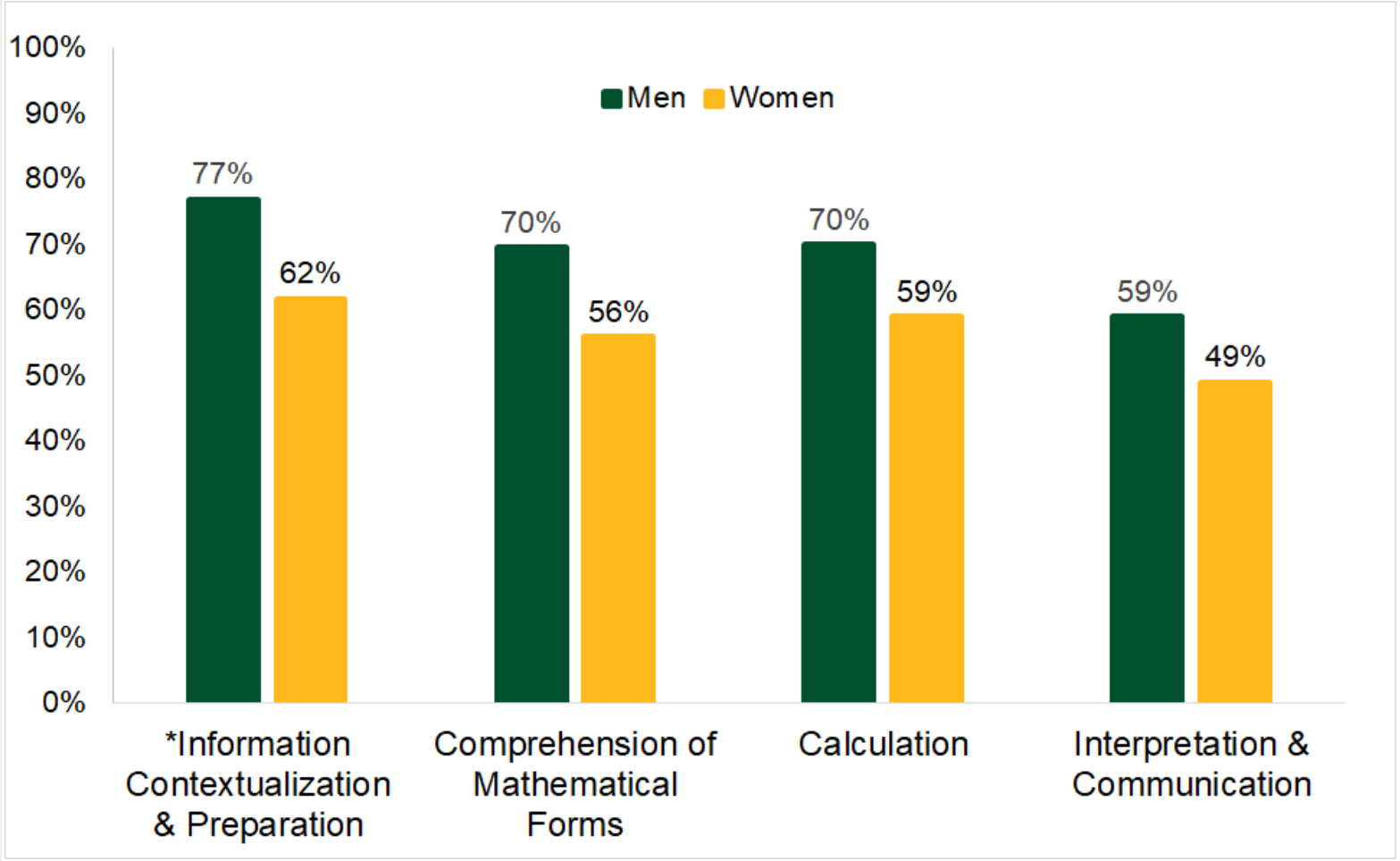


STEM Status

- All criteria
- STEM majors performed better than non-STEM major
- Difference range from 25% to 39%

CPP Goal Met “Advanced (4)” & “Proficient (3)”

Statistically Significant Differences



GENDER

- *Information Contextualization & Preparation*
- Men performed better than Women
- Difference was 15%

CPP Goal Met “Advanced (4)” & “Proficient (3)”

Indirect Evidence: What Seniors Say

CPP Graduating Senior Survey (GSS) – GE Learning Outcomes

80% Credited CPP for preparing them to use numerical information to discuss different viewpoints *quite a bit* or *very much*

National Survey of Student Engagement (NSSE)

73% Gained experience analyzing numerical and statistical information
(68% at other CSUs)

59% Reached conclusions based on their own analysis or numerical information
(57% at other CSUs)

48% Used numerical information to examine world problems and evaluate conclusions
(49% at other CSUs)

So what?

How can faculty advance this learning outcome?

Lessons Learned and Closing the Loop

Lessons Learned

- CPP seniors demonstrated solid quantitative literacy overall
  - Both direct and indirect evidence reflect positive students' perceptions of quantitative preparedness.
- Data indicate a statistical tile towards STEM majors and males in Quantitative Literacy.
- Advancing quantitative literacy requires a coordinated institutional effort.

Closing the Loop

- Non-STEM fields should explore ways to incorporate Quantitative Literacy in the curriculum.
- Integrate the rubric into instruction by sharing assessment criteria with students and providing rubric-based feedback to clarify expectations and deepen learning.
- Explore the use of AI as a tool for teaching and assessing quantitative literacy (Walker et al., 2025)
- Share and discuss findings with college leadership, assessment committees, and campus leadership bodies to inform decisions related to quantitative literacy.

Questions?

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