Fostering Transformative Outcomes in Art and Design Students Across a Year of Remote Learning in Sustainability Courses

Ashley Bales[a], Michael Sekor[a,b], Bryan Adinolfi[a], & Christopher XJ Jensen[a]

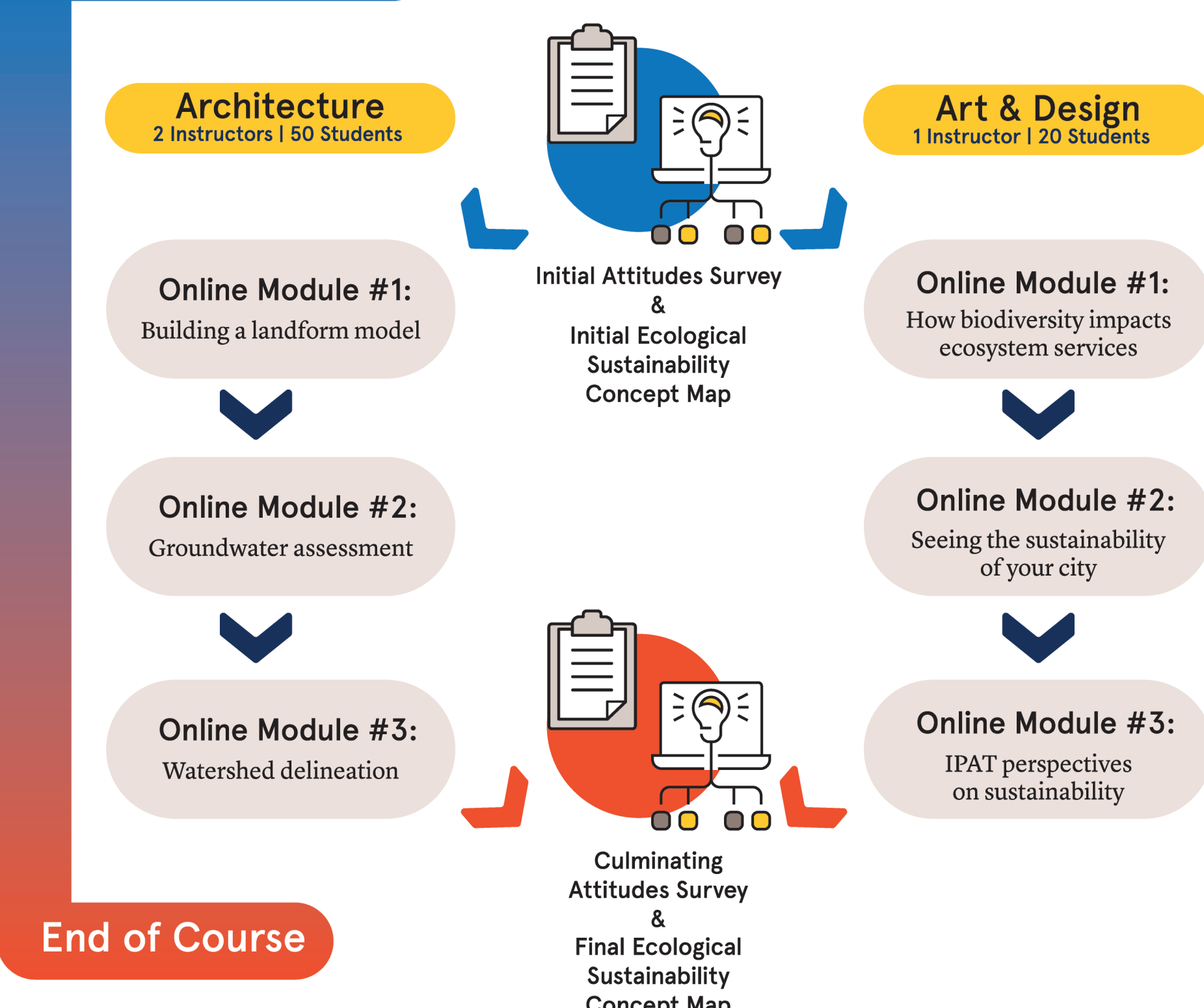## Introduction

The Problem:

In March 2020, classes moved online to remote instruction. **How could we maintain student engagement, support learning outcomes and foster transformative learning?**

What we did:

A group of environmental science faculty formed a teaching and learning community and designed a series of online learning modules.

Goals:

Develop learning modules designed for remote teaching to support:

- Student comfort with collaboration in remote learning and comfort with digital remote learning tools
- Student breadth and complexity of understanding of ecological sustainability
- Transformative outcomes in students
- Support faculty in the implementation of these learning modules through monthly roundtables
- Assess achievement of these goals for the 2020-2021 academic year

Study Methods

Beginning of Course

Architecture — 2 instructors | 50 Students

- **Online Module #1:** Building a landform model
- **Online Module #2:** Groundwater assessment
- **Online Module #3:** Watershed delineation

Initial Attitudes Survey & Initial Ecological Sustainability Concept Map

Art & Design — 1 Instructor | 20 Students

- **Online Module #1:** How biodiversity impacts ecosystem services
- **Online Module #2:** Seeing the sustainability of your city
- **Online Module #3:** IPAT perspectives on sustainability

Culminating Attitudes Survey & Final Ecological Sustainability Concept Map

End of Course

Teaching Approaches

Transformative Learning

Active learning · Agency · Applicability · Interdependence · Action · Feedback · Community focus

Students active from outset of online meeting

Students empowered to choose the direction of their inquiry

Students complete learning experiences in small groups

Assignments structured so that students each contribute unique elements

Students asked to provide specifics in their planned actions

Students asked to directly apply what they have learned to a realistic scenario

Activities foster interaction between different student groups

Activities foster interaction between students and instructor

Defining Transformative Action

Outcomes

- Students adopt more sustainable practices in their lives
- Students adopt more sustainable practices in their art and design work
- Students recognize the social and cultural implications of sustainable actions
- Students get involved in sustainability advocacy/activism

inclusion of "individual action" concepts / inclusion of "design thinking" concepts / inclusion of "social impact" concepts — Elements found in Student Concept Maps

self-reported behaviors on — Culminating Survey Responses

Assessments

Student Comfort with Online Learning

Did exposure to our modules increase student comfort with online learning?

Initial Attitudes > Culminating Attitudes Survey

Significant increase (based on paired tests):

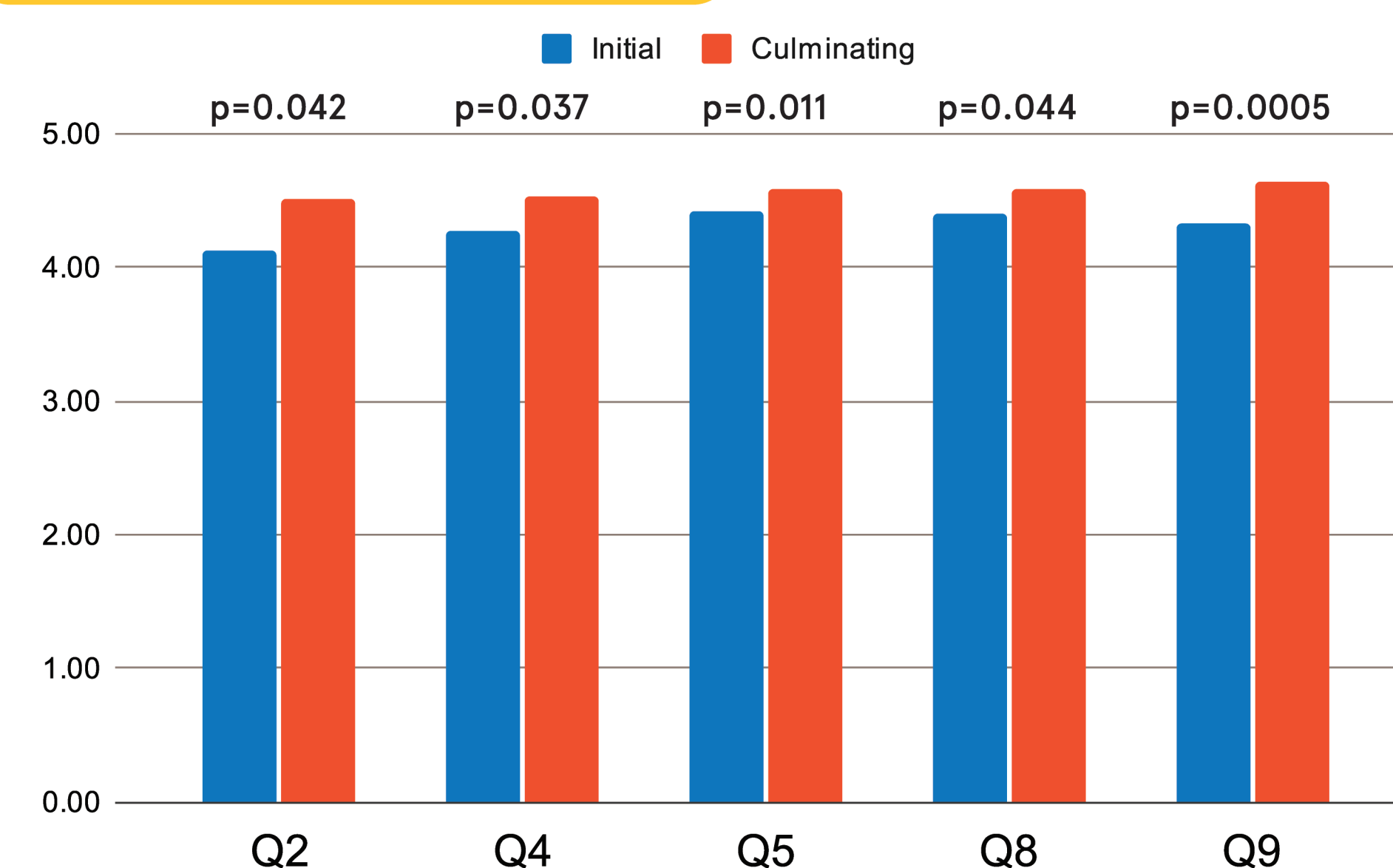Q2 = Effectively use computer to communicate

Q4 = Confident doing internet research

Q5 = Comfortable receiving feedback from peers

Q8 = Believe receiving feedback from peers will help me improve

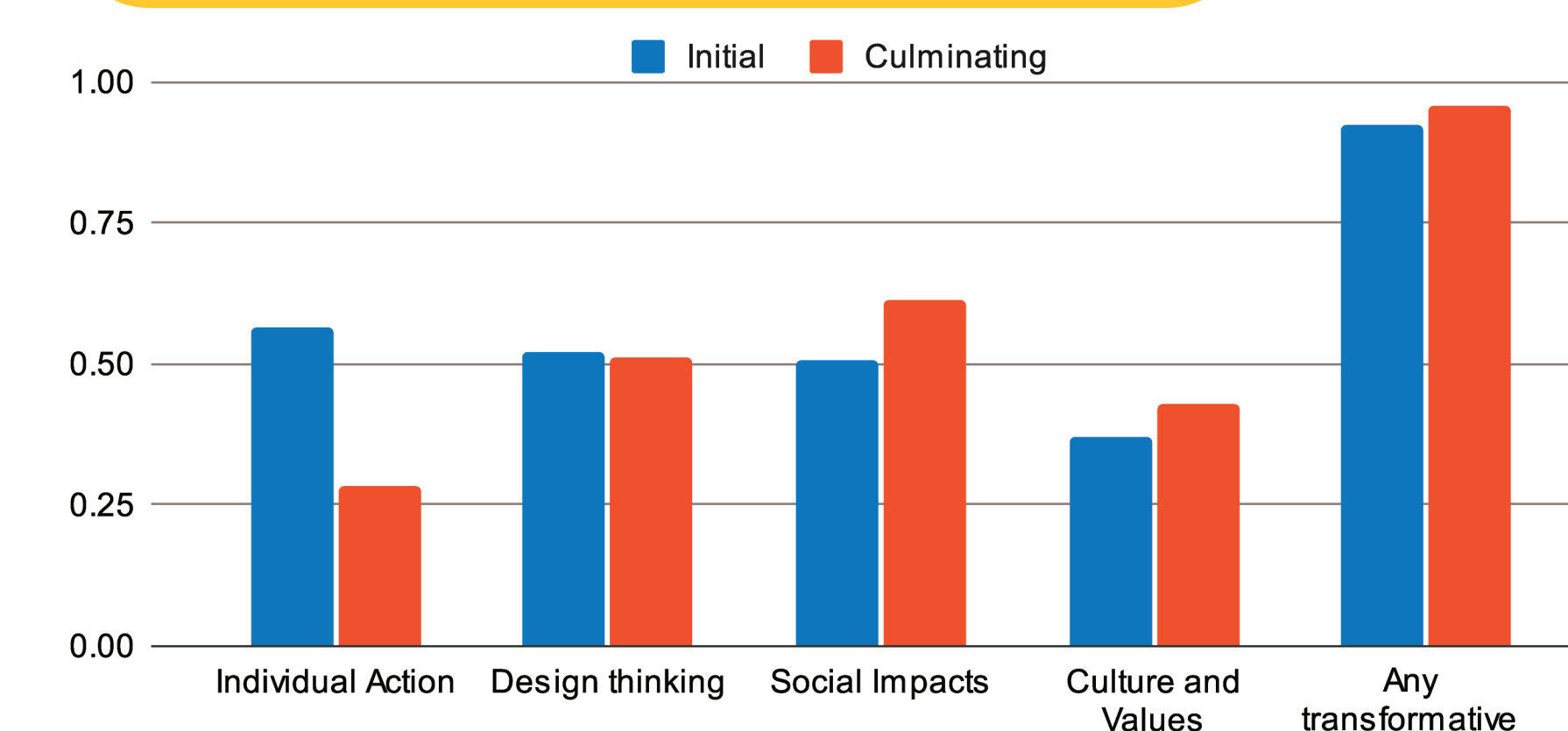Q9 = Can effectively navigate technology and platforms
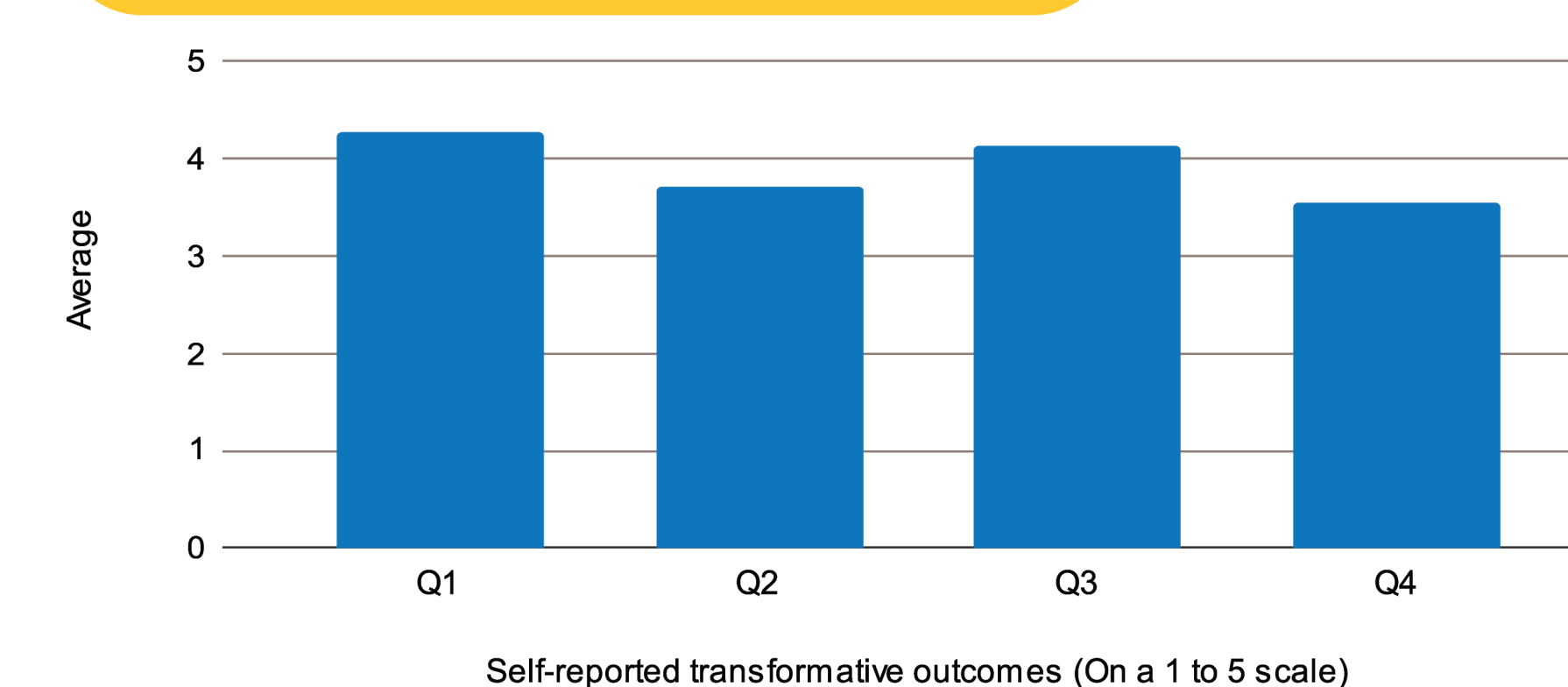
Student comfort with online learning

Legend: Initial (blue), Culminating (red)

p=0.042 (Q2), p=0.037 (Q4), p=0.011 (Q5), p=0.044 (Q8), p=0.0005 (Q9)

Student Breadth of Ecological Knowledge

Did exposure to our modules increase the breadth and complexity of student's ecological knowledge?

Coding concept maps to evaluate:

- Breadth of categories included
- Number of distinct concepts included
- Complexity- a measure of number of nodes and linkages between nodes

Initial Ecological Sustainability Concept > Final Ecological Sustainability Concept > Analysis of Concept Maps

Concept Maps: Breadth

Proportion of students including each sustainability category

Legend: Initial (blue), Culminating (red)

Categories: Environment, Resource scarcity, Social impacts, Culture and values, Future generations, Equity and unbalance, Technology and industry, Economics, Education, Actors and stakeholders

Concept Maps: Complexity

Complexity of student concept maps

Legend: Initial (blue), Culminating (red)

Categories: Category Breadth, Number of Concepts, Complexity

Student Transformative Action

Did exposure to our modules foster transformative action in students?

Proportion of students including transformative indicators in concept maps

Legend: Initial (blue), Culminating (red)

Categories: Individual Action, Design thinking, Social Impacts, Culture and Values, Any transformative

Average Self-reported transformative outcomes (On a 1 to 5 scale)

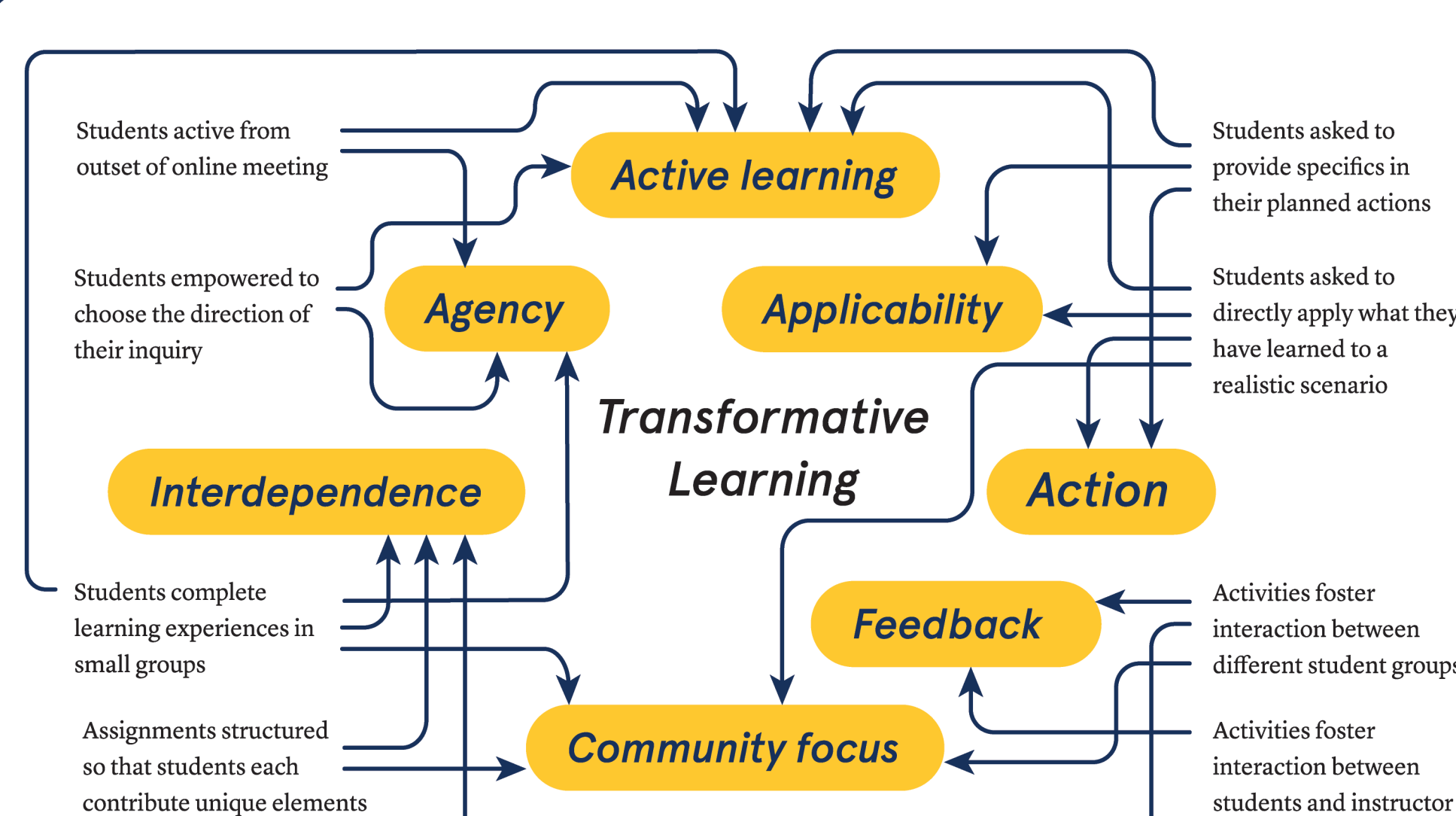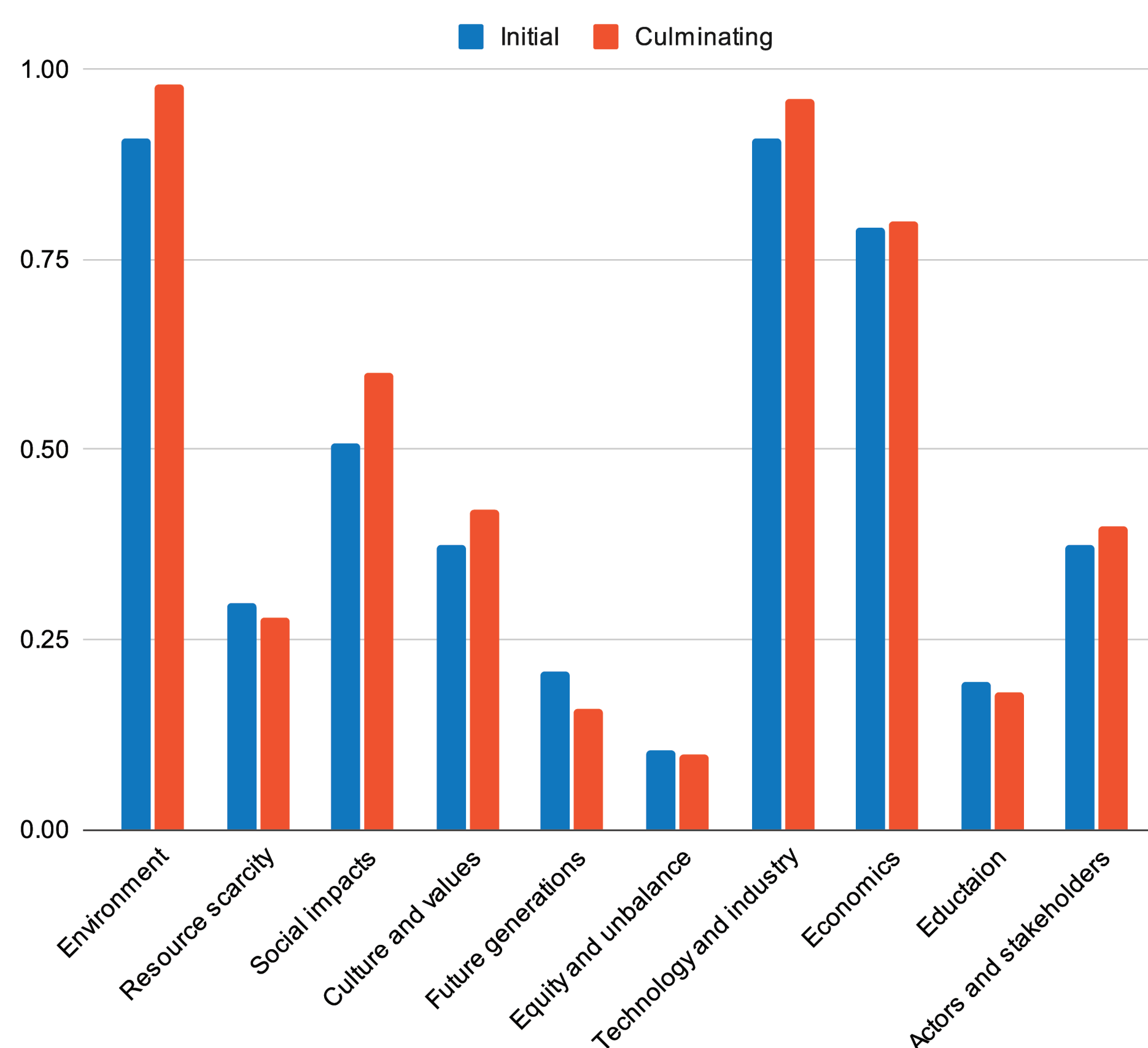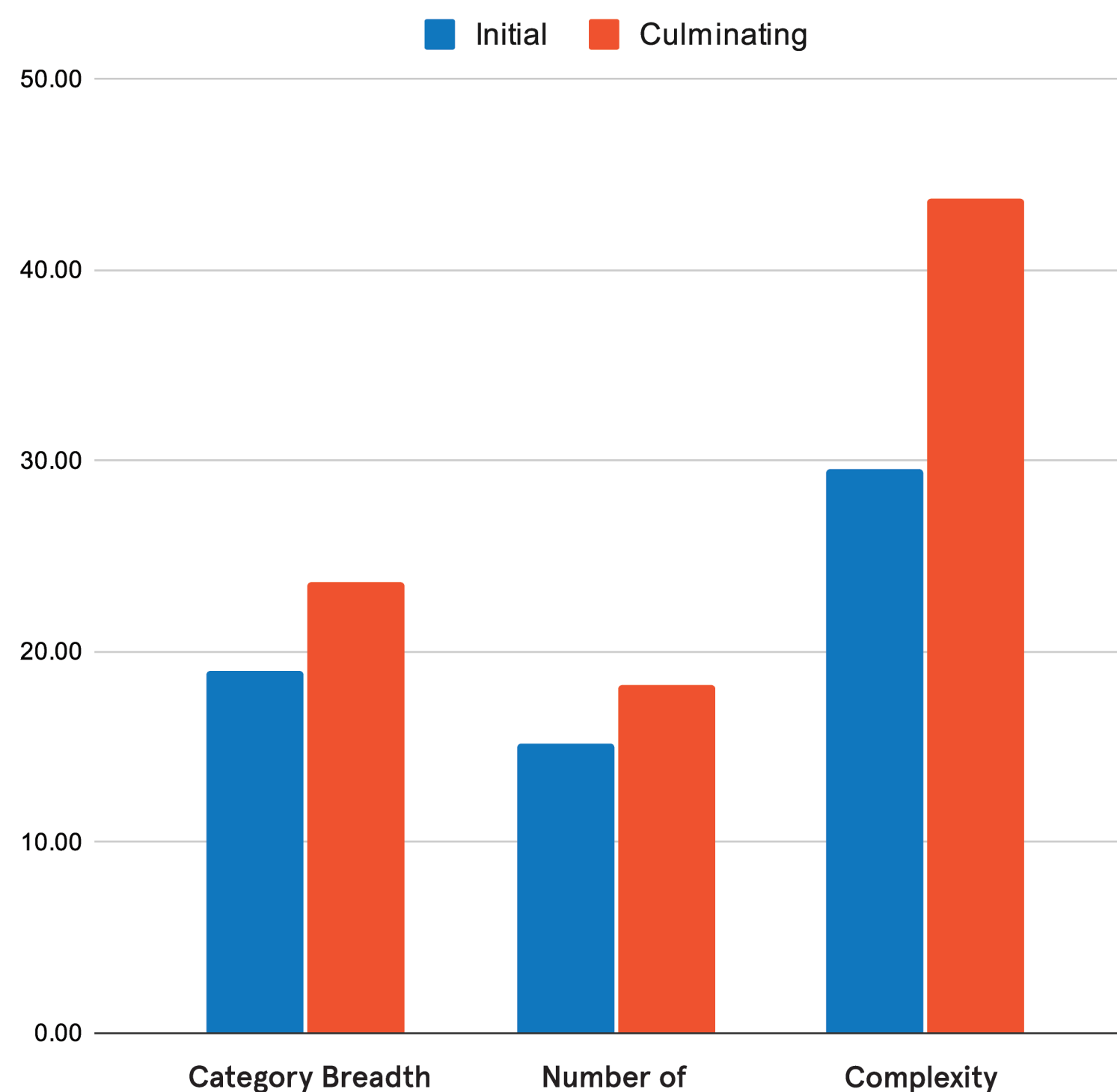Self-reported transformative outcomes (On a 1 to 5 scale): Q1, Q2, Q3, Q4

Q1 = What I learned in this course will affect choices I make moving forward.

Q2 = This course has motivated me to become more involved in environmental advocacy and/or activism.

Q3 = This course has inspired me to engage issues of environmental sustainability as I continue the creative work required by my major.

Q4 = This course has inspired me to make changes in my lifestyle and/or daily habits.

Conclusions

How well did we support transformative outcomes in students?

Transformative outcomes decreased slightly across the semester, suggesting students may be intuitively driven to apply ecological sustainability to their lives.

Did achievements of greater breath/complexity of understanding of sustainability concepts suggest increased achievement of transformative outcomes?

- Neither measure was correlated with transformative outcomes
- Content and comprehension modes of instruction were not effective in supporting transformative outcomes

Did achievements of students comfort and collaboration goals support increased achievement of transformative outcomes?

- No measures of improved comfort and collaboration correlated with transformative outcomes
- Students who overall found value in peer feedback were more likely to self-report transformative outcomes.

New questions:

- How to successfully measure transformative outcomes in future studies of art, design, and architecture students?
- How might we create learning modules that better support individual action and behavior change?
- Would a greater focus on production (student creative work) be more successful at supporting transformative outcomes?
- Should our look at transformative learning consider a longer span of student development?

Next steps:

- Focus on production by documenting students' featured creative work beyond the sustainability classroom, including culminating thesis work
- Continue to follow up with students on their engagement with sustainability following our courses
- Broader assessment of Pratt students' engagement with sustainability and achievement of transformative outcomes, leading towards curricular design changes for both remote and in-person courses that better support transformative outcomes

Corresponding author

Ashley Bales, abales69@pratt.edu

For additional information (including detailed methods and results), please navigate to our "Fostering Transformative Outcomes — AAC&U 2022 supplementary materials" Google Drive folder using this QR code:
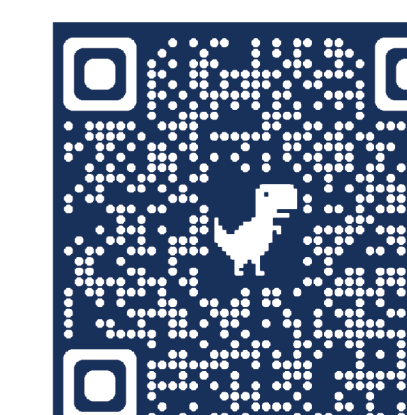
a = Pratt Institute, Department of Mathematics and Science, 200 Willoughby Avenue, Brooklyn, NY 11205

b = Vassar College, Department of Biology, 124 Raymond Avenue, Poughkeepsie, New York 12604