The Effectiveness of Supplemental Instruction Closing the Gap between URM & Non-URM Students in STEM Courses

CAIR 2011 Conference Presentation
November 10, 2011

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Two Gateway Courses

BIOL 171 (Evolution/Biodiversity)

- Biology
- Kinesiology (part of pathway to 300 level Human Anatomy course)
- Biochemistry (part of pathway to Cellular Basis of Life)
- Geology (option)

MATH 150A (Calculus 1)

- Engineering and Computer Science majors
- Chemistry/Bio-Chemistry
- Mathematics
- Physics
- Biology (option)
- Geology (option)

Two Gateway Courses

BIOL 171 (Evolution/Biodiversity)

- Fall 2006 (before SI)
  - 224 attempts (10 sections)
    - 1.94 mean course GPA
      - 1.37 low section GPA
      - 2.35 high section GPA
- Fall 2010
  - 239 attempts (10 sections)
    - 2.68 mean course GPA
      - 2.29 low section GPA
      - 3.18 high section GPA

MATH 150A (Calculus 1)

- Fall 2007 (before SI)
  - 261 attempts (9 sections)
    - 1.68 mean course GPA
      - 0.93 low section GPA
      - 2.38 high section GPA
- Fall 2010
  - 333 attempts (11 sections)
    - 1.83 mean course GPA
      - 1.35 low section GPA
      - 2.46 high section GPA

First-time Freshman First-Semester Probation Rates

Natural Sciences and Mathematics

- Fall 2006 – 36%
- Fall 2007 – 34%
- Fall 2010 – 17%

Engineering and Computer Science

- Fall 2006 – 34%
- Fall 2007 – 39%
- Fall 2010 – 34%

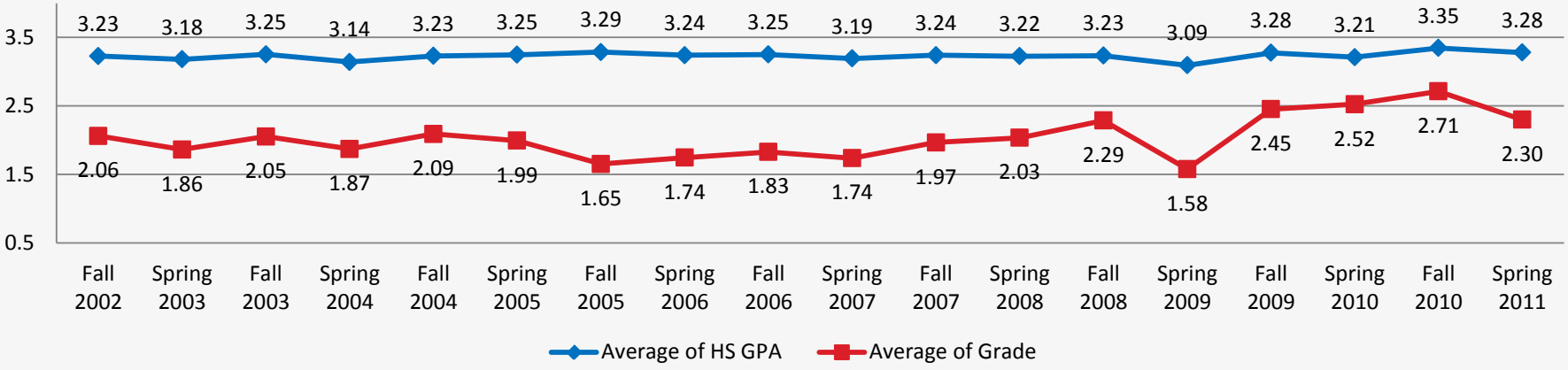
Theoretical Background of Supplemental Instruction

- Academic Integration / Social Integration
  - Tinto's Theory
  - Cognitive & Affective Learning Outcomes
- Culturally-Sensitive Strategy
  - Collaborative Settings
  - Closing the achievement gap between URM & Non-URM
- Vygotsky's Zone of Proximal Development
- Meta-Cognition
  - Self-monitoring/Self-regulating strategy
- Cost-effective strategy to improve retention

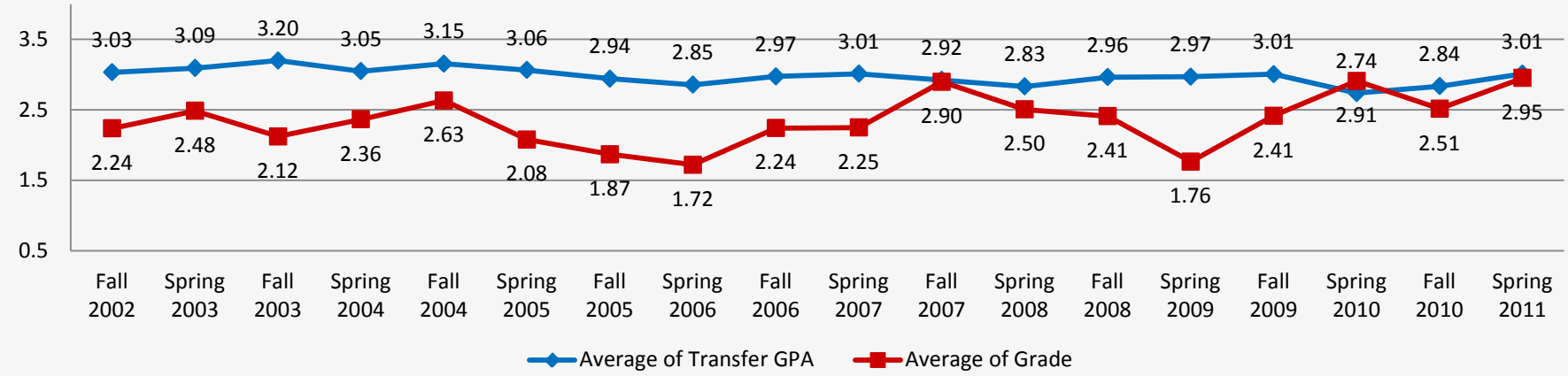
Historical Trends of Two STEM Gateway Courses:

BIOL171 (Evolution & Biodiversity)
MATH150A (Calculus I)

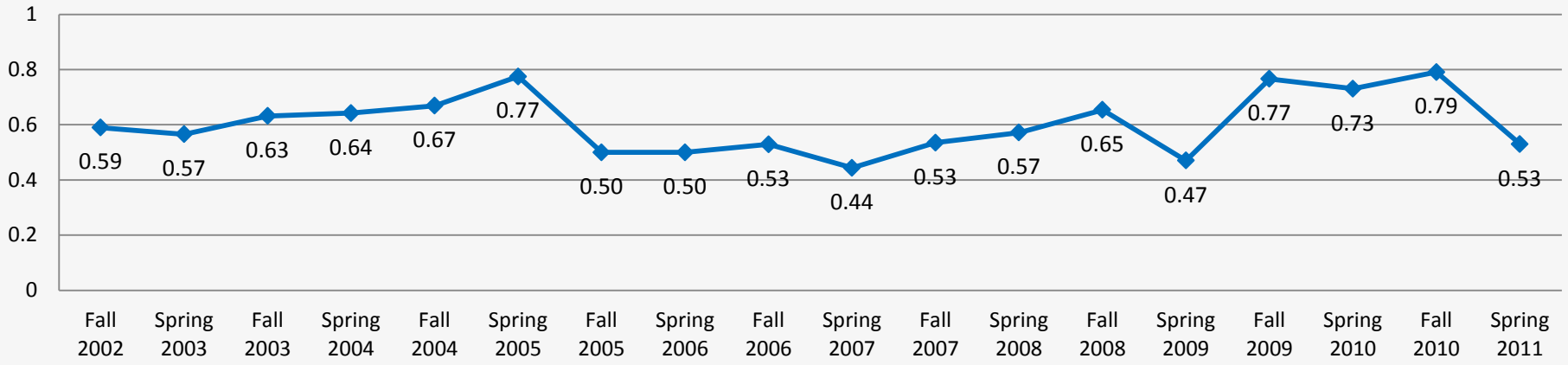
BIOL171 Course Grade (CSUF Natives)



BIOL171 Course Grade (Transfers)



BIOL171 Success Rates (CSUF Natives)



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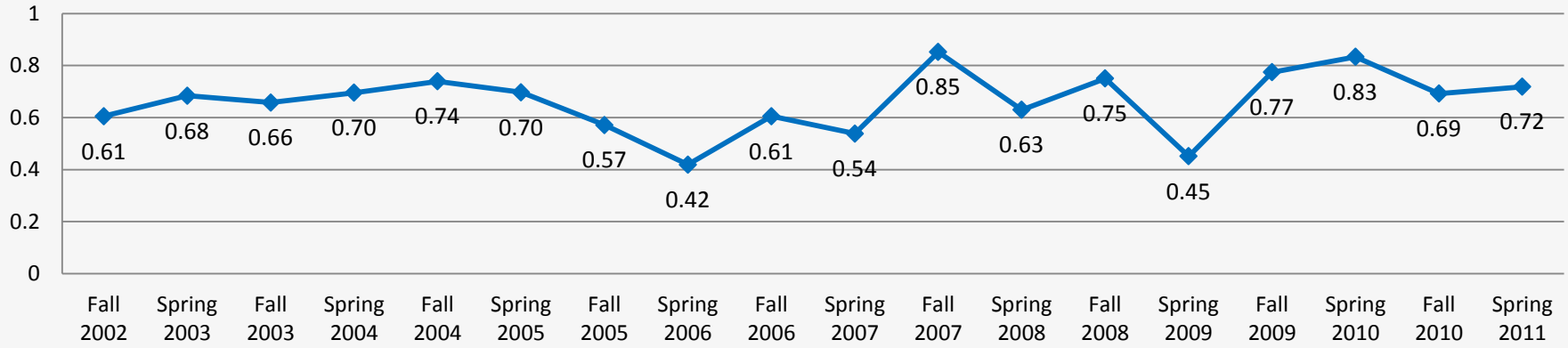
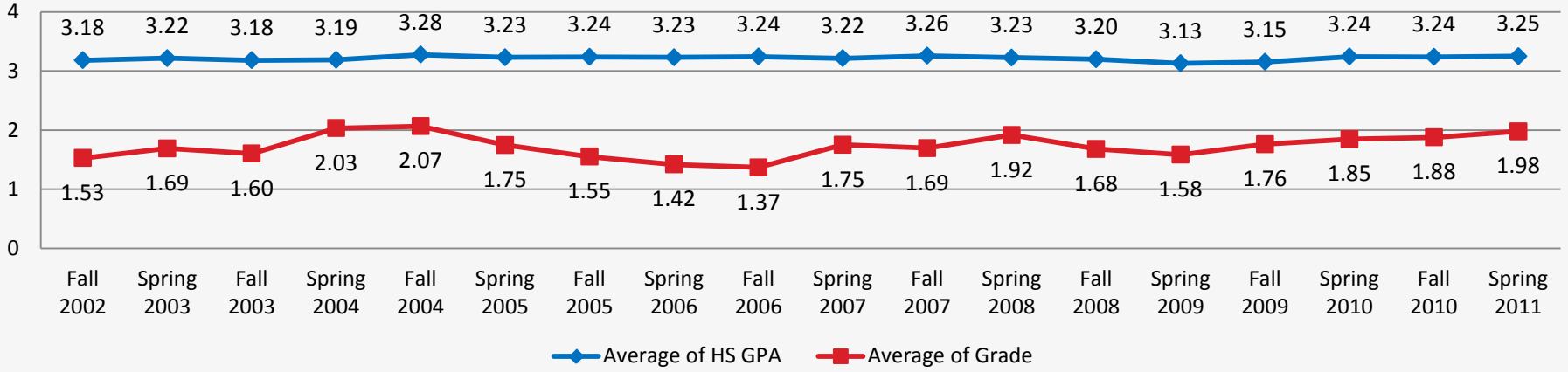


MATH150A Course Grade (CSUF Natives)



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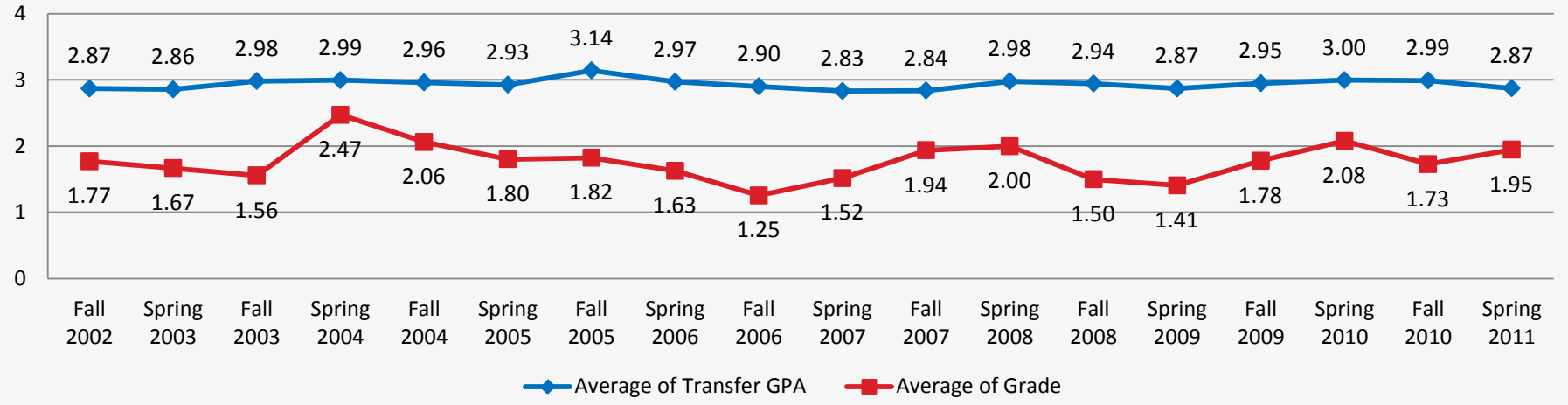

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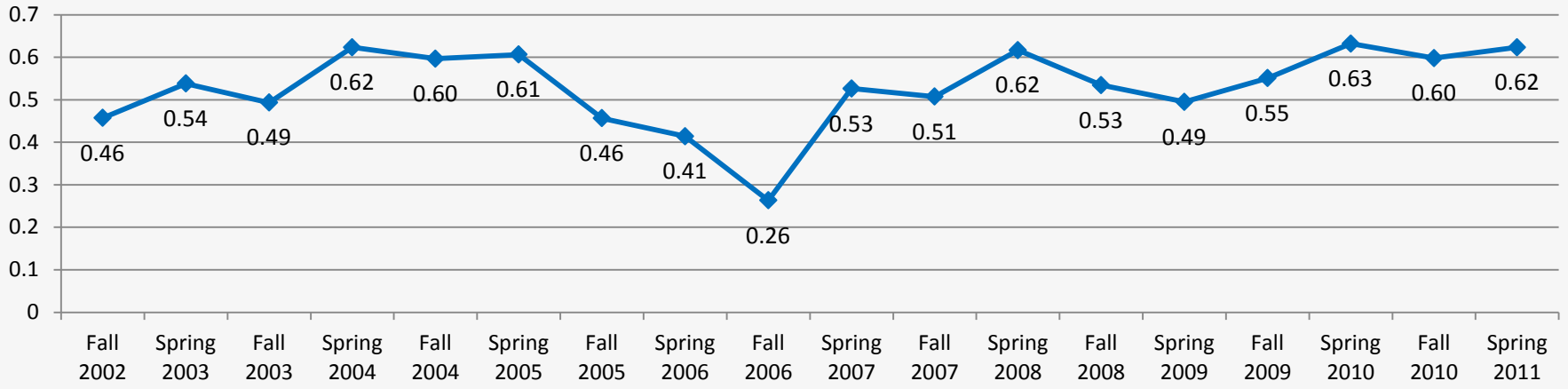

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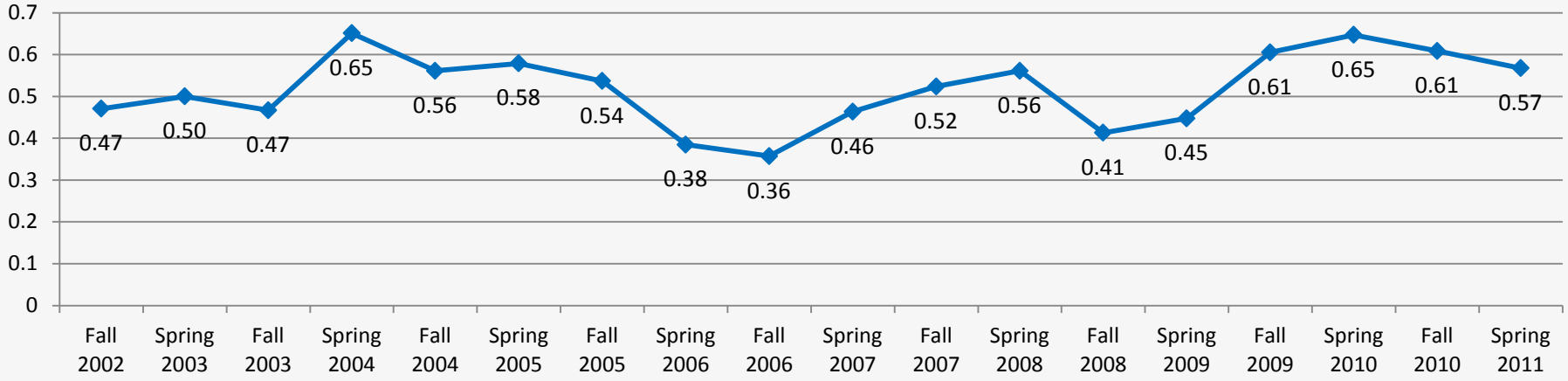
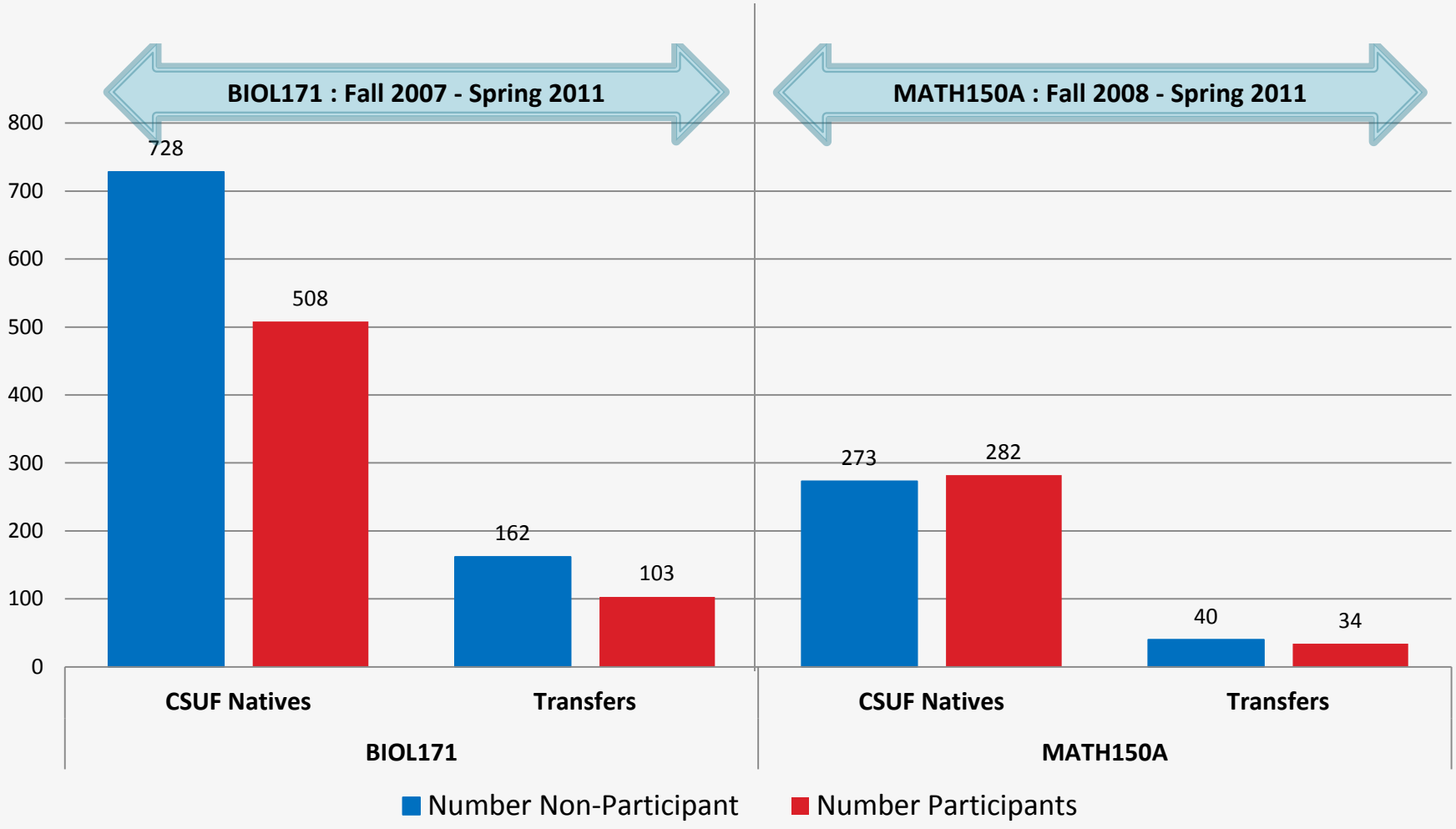


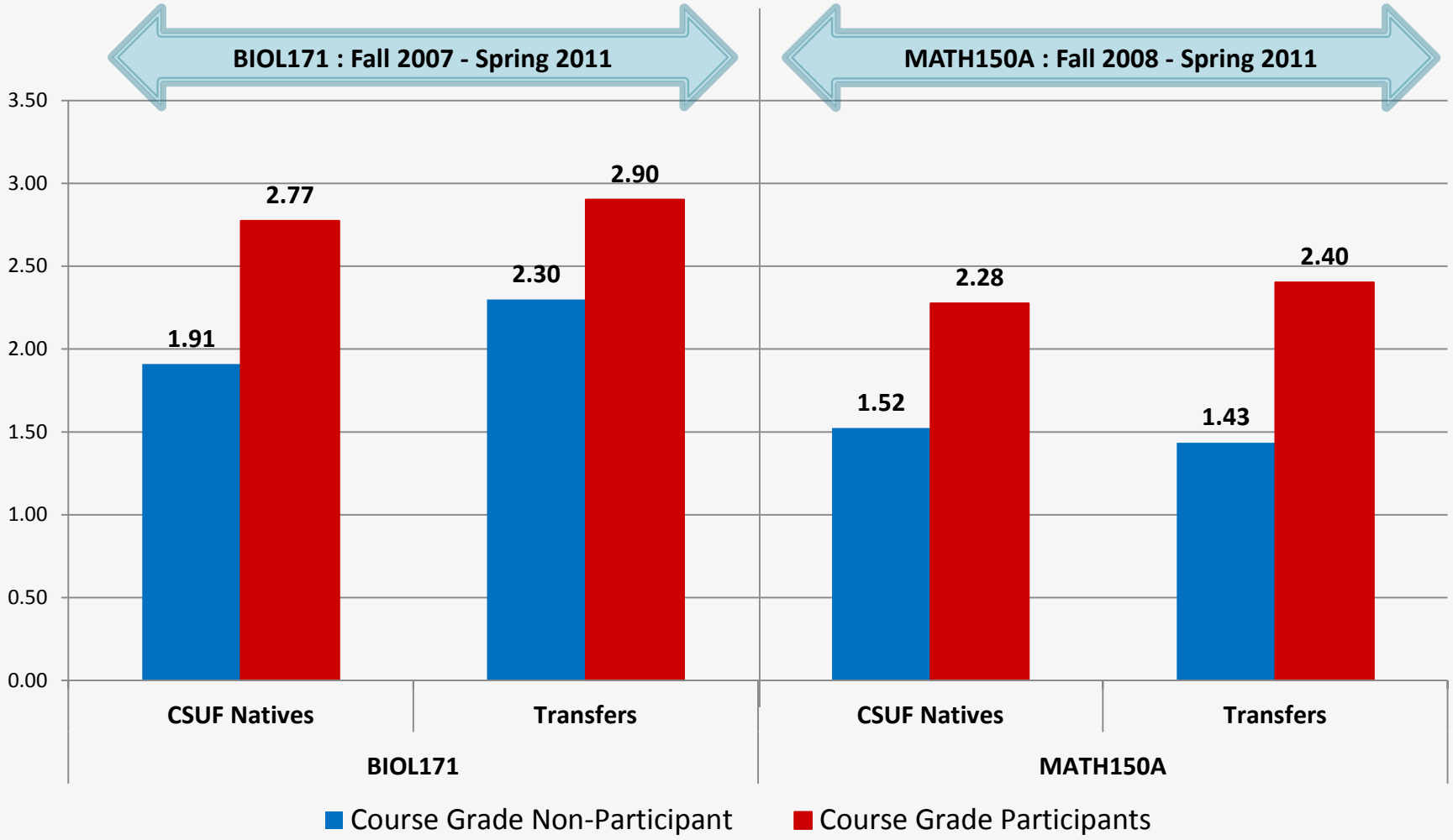
Effects of Supplemental Instruction on Two STEM Gateway Courses:

BIOL171 (Evolution & Biodiversity)
MATH150A (Calculus I)

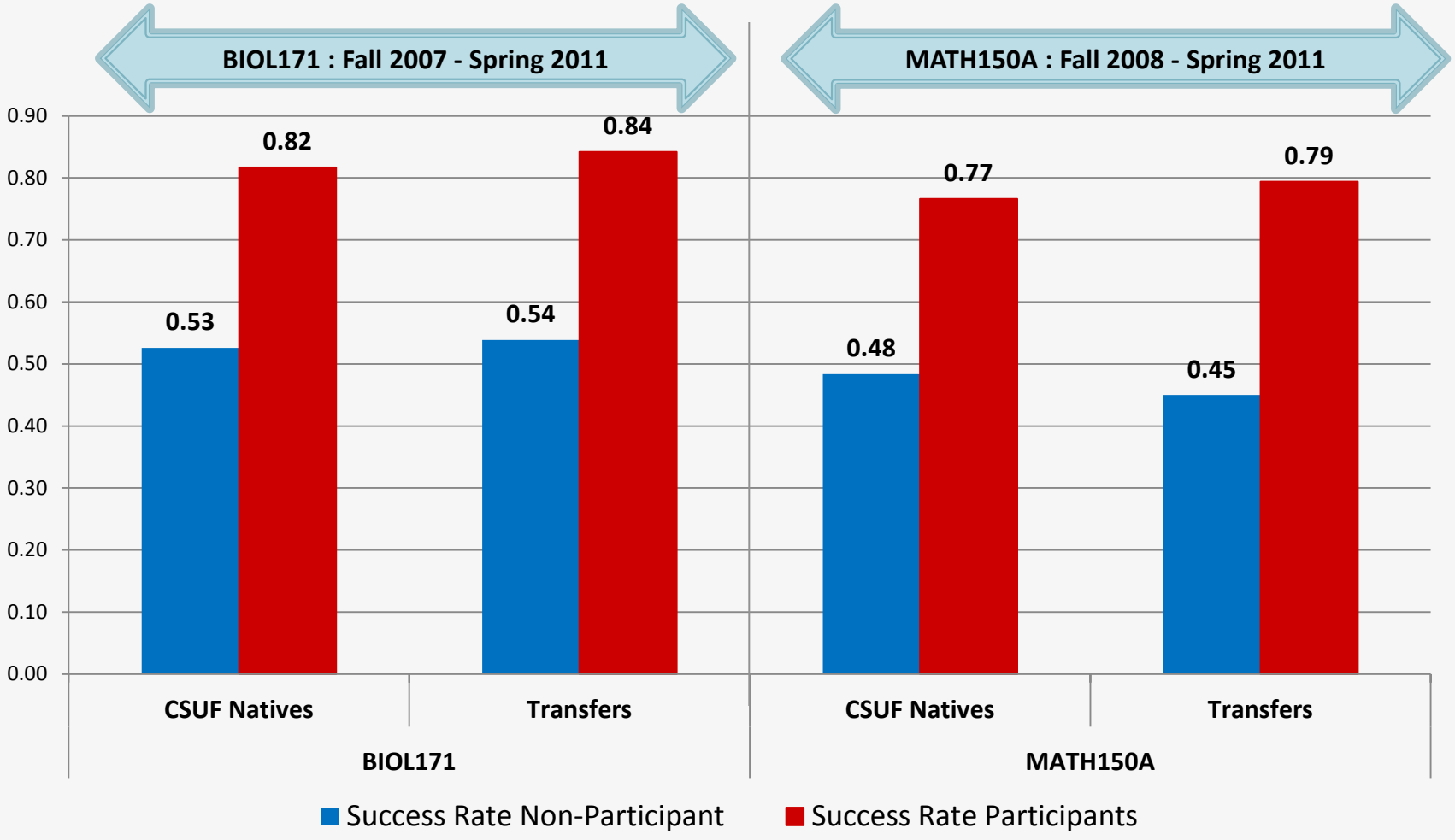
of SI Participants and Non-Participants in BIOL171 & MATH150A



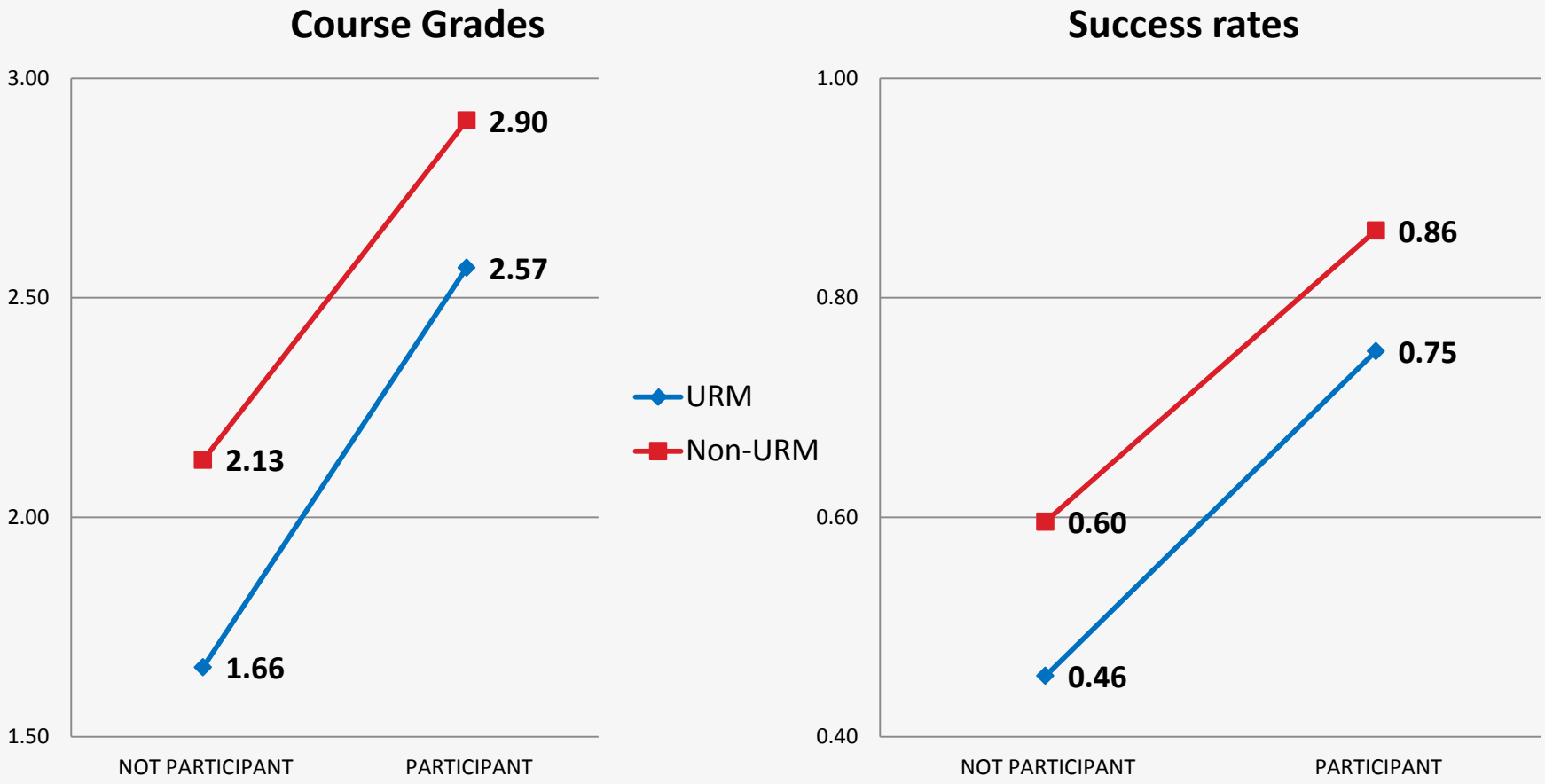
Course Grades of BIOL171 & MATH150A Between SI Participants and Non-Participants



Success Rates BIOL171 & MATH150A Between SI Participants and Non-Participants



URM vs. Non-URM : BIOL171 (CSUF Natives)



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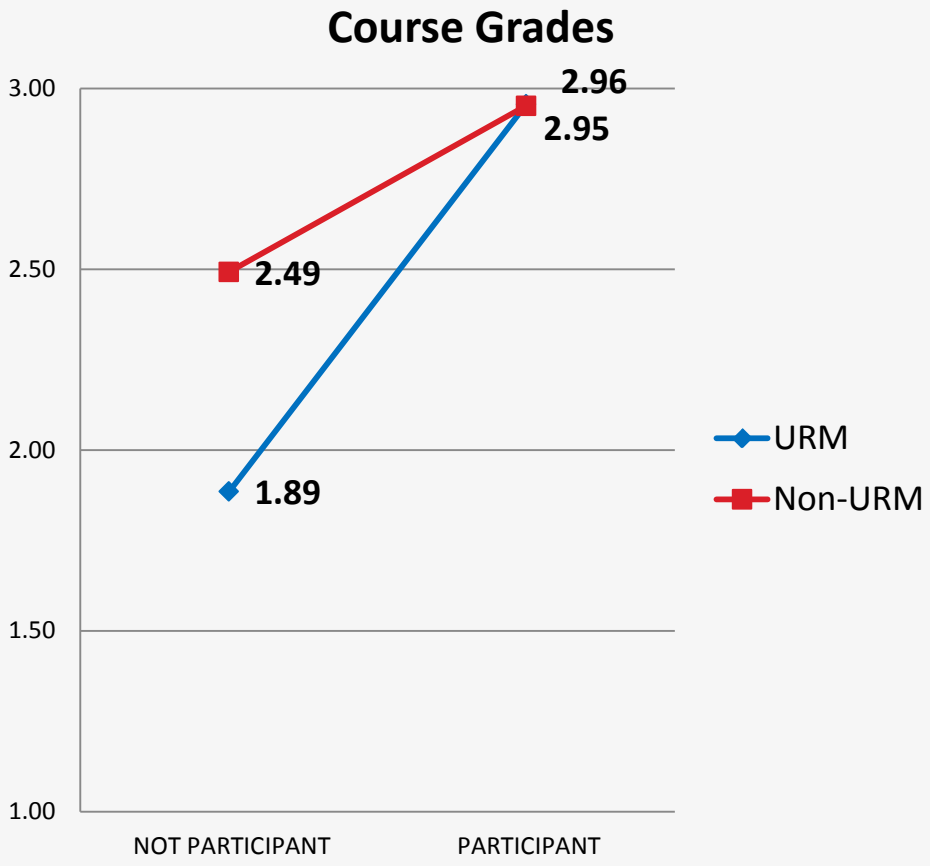
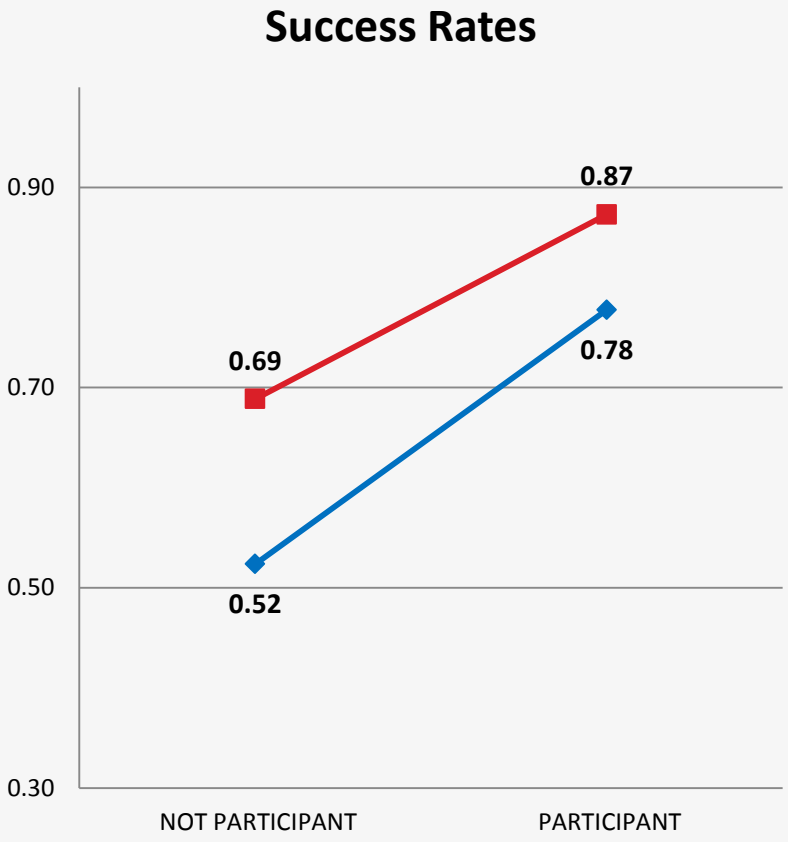
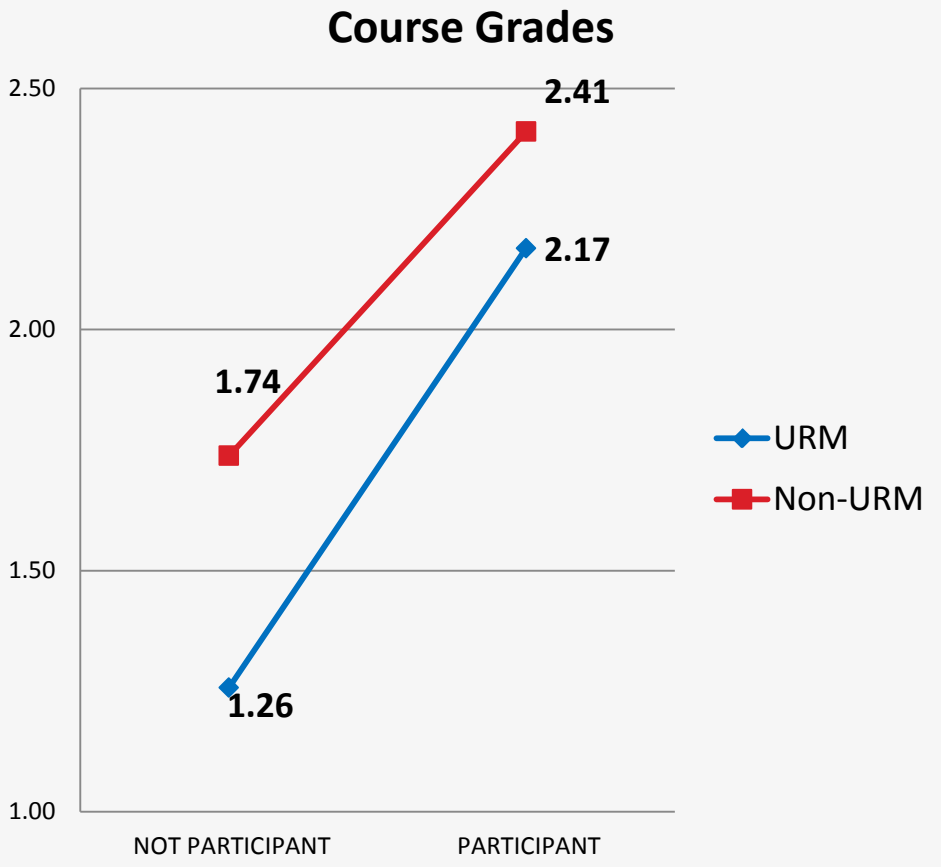
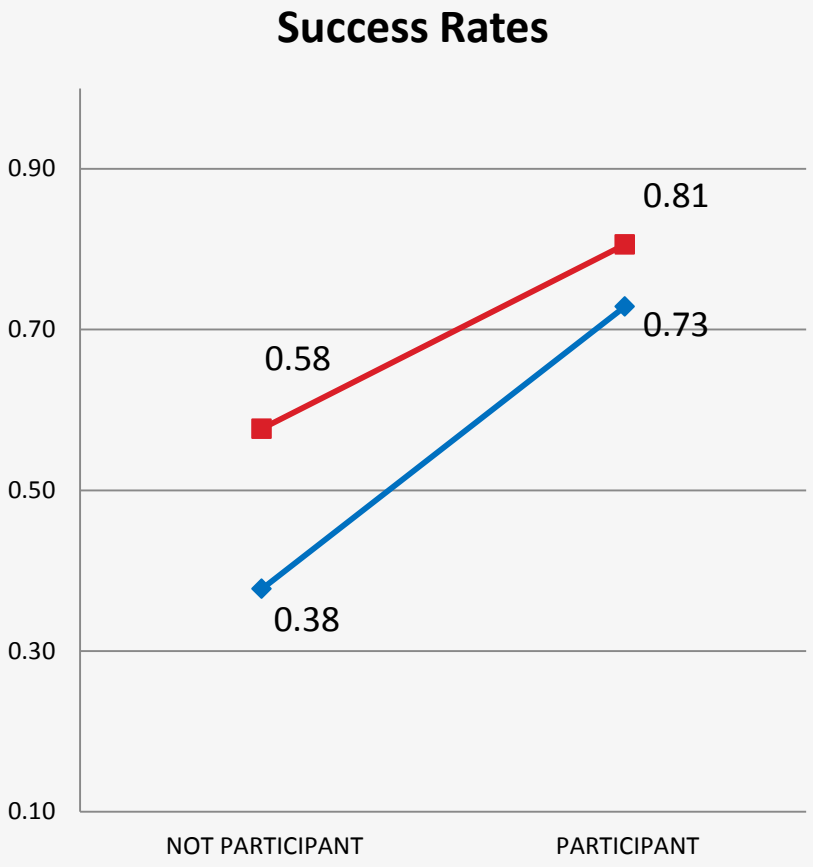




URM vs. Non-URM : MATH150A (CSUF Natives)





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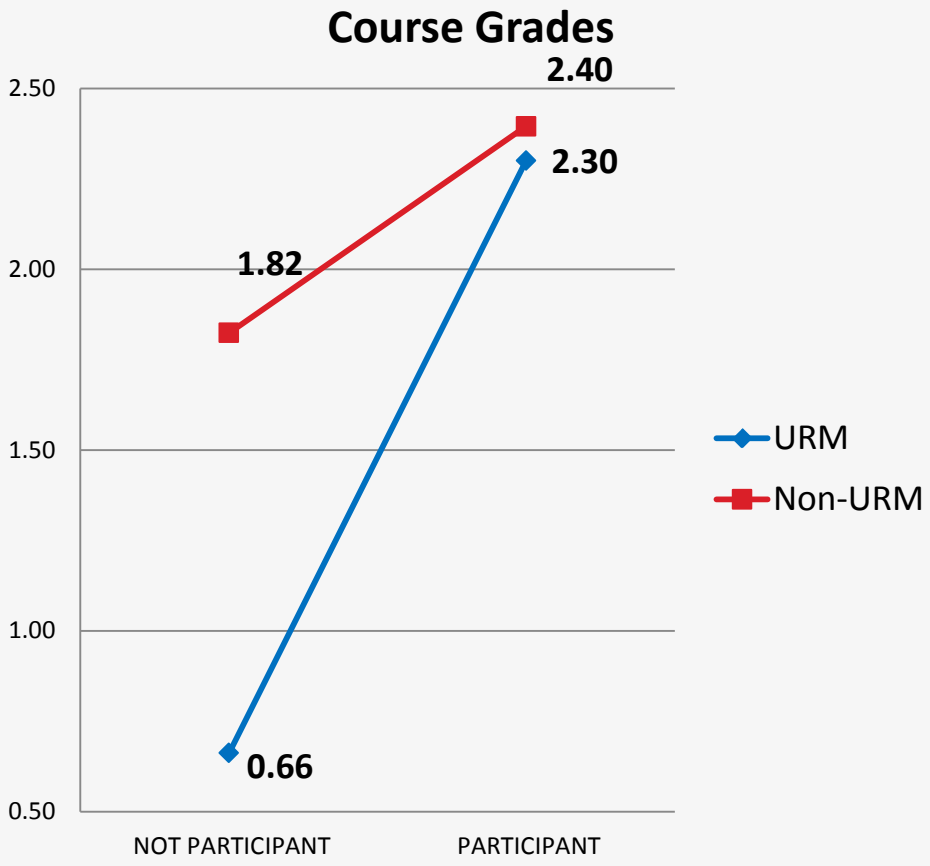
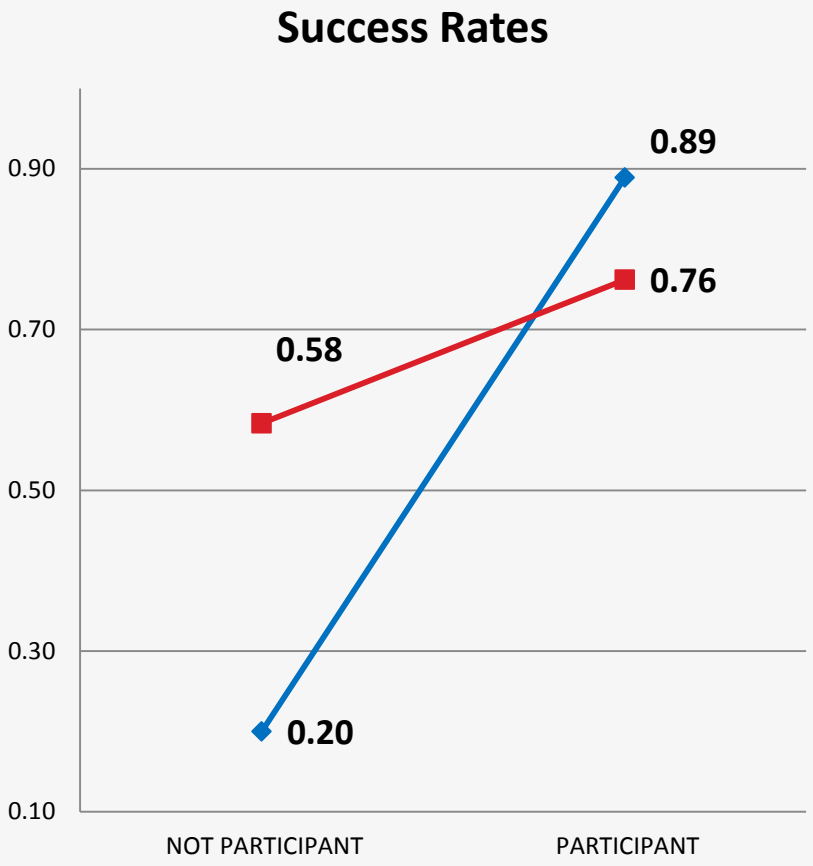
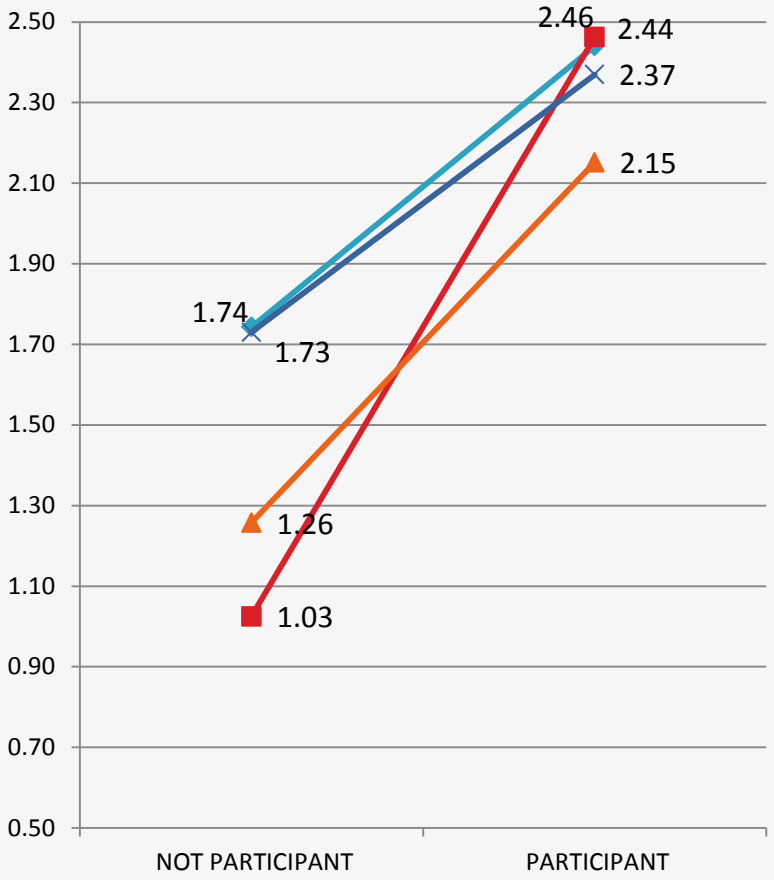
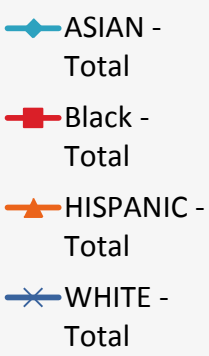




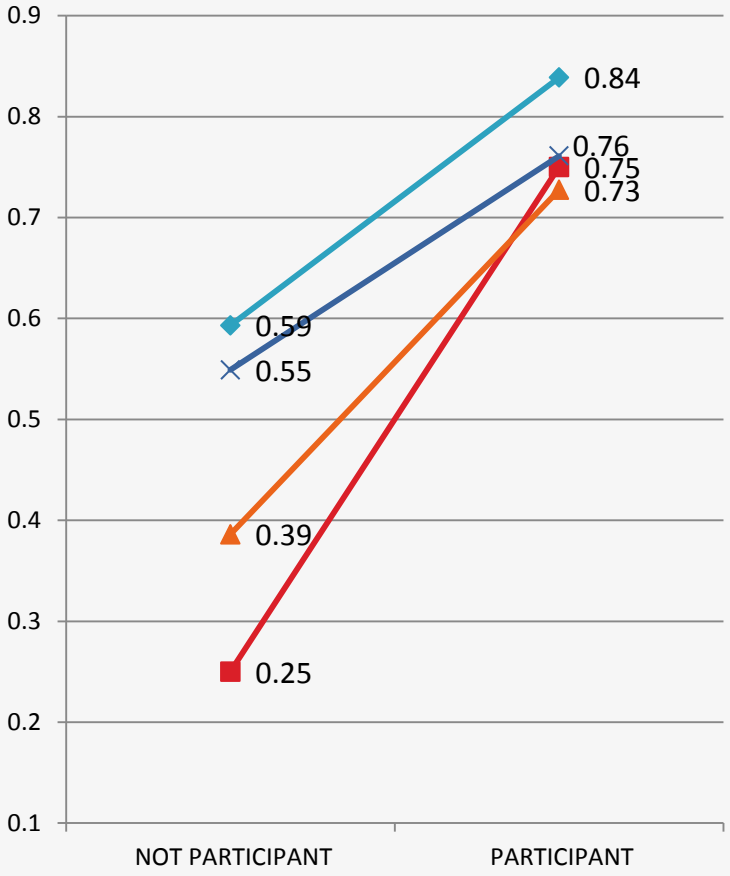
MATH150A Course Grade / Success Rates of SI vs. Non-SI by Ethnicity (CSUF Natives)

Course Grades



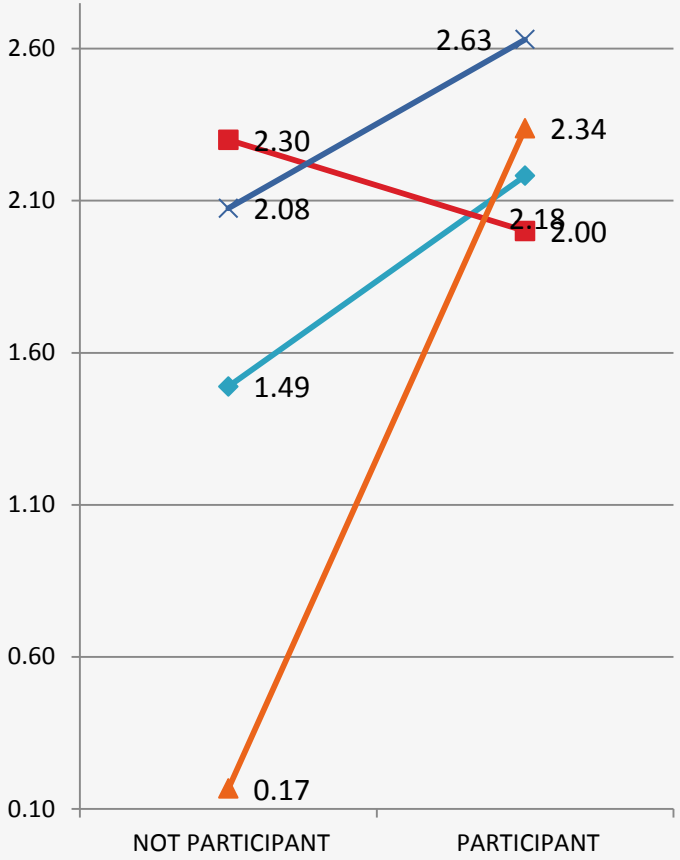


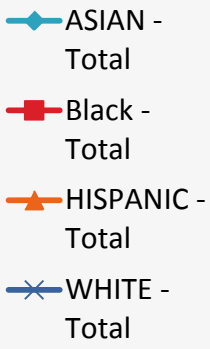
Success Rates



MATH150A Course Grade / Success Rates of SI vs. Non-SI by Ethnicity (Transfers)

Course Grades





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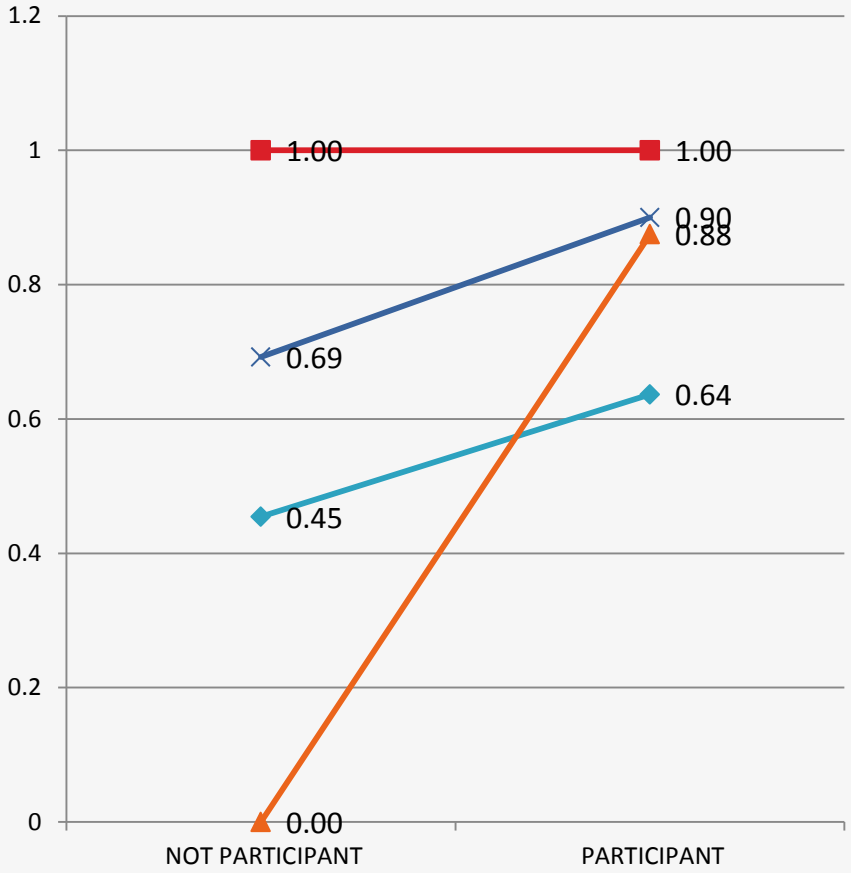

Next Steps

- Institutionalize Supplementary Instruction
  - SI efforts in Biology and Mathematics are currently supported by grant resources
  - Campus is looking at funding models for the instruction
    - Non-degree course section eligible for funding based on FTES generated (Math model)
    - Voluntary meeting (no course section) funded through defined revenue stream for student support (Biology Model)

Next Steps

- Clarify Roles and Responsibilities for SI program
- Potentially expand the scope of SI
  - Inclusion of other lower division gateway science courses
  - Inclusion of upper division gateway business courses

Questions?

- Presentation available on our website at:
  www.fullerton.edu/analyticalstudies/planning/avp/cair2011_SI.pdf