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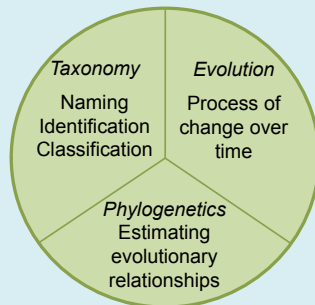
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Motivation

Undergraduates who have taken evolution courses still harbor evolution misconceptions and misinterpret phylogenetic trees.¹²³⁴

Assessing student learning of evolution concepts allows informed adjustments in future iterations of the course.

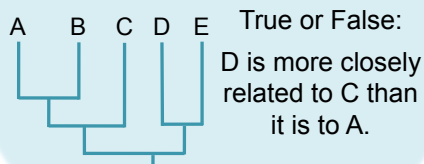
What is Systematics?



What is Tree Thinking?

The ability to understand evolutionary relationships by interpreting phylogenetic trees

How good is *your* tree thinking?



Project Questions

Do lectures on evolution & phylogenetics

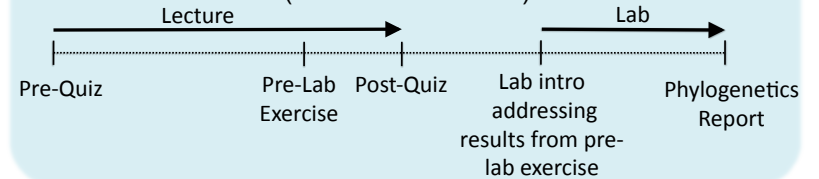
- teach students how to read trees?
- address student misconceptions?

Do in-class practice & feedback

- improve tree thinking skills?
- reduce evolution misconceptions?

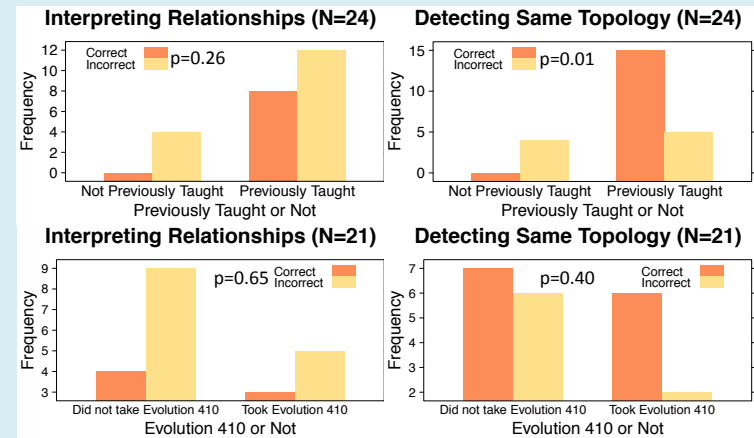
Study Design

Evolution Module Timeline (2nd half of semester)



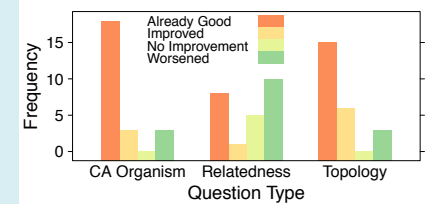
Results

Student Base-Line?

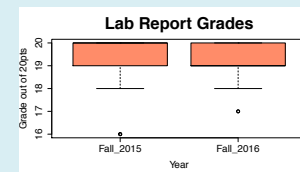


Did Students Learn From Lecture?

Pre/Post Quiz Comparison



Did Students Improve from Pre-Lab Exercise?



Year	Class average	Class range
2016	19/20	17 - 20
2015	19/20	16 - 20

Discussion

- Small N might explain lack of significant correlations
- Varying branch lengths might confuse students
- Rotated trees might confuse students
- Lab report grades may have limited power to reflect effectiveness of pre-lab exercise

Lessons for instruction

- Teach tree thinking & misconceptions earlier on
- Provide regular assessment and feedback

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References: Baum et al. 2005. *Science*, 310(575):979-980; Meir et al. 2007. *ABT*, 69(7):e71-e76; Morabito et al. 2010. *JBE*, 44(4):166-174; Halverson et al. 2011. *Science Education*, 95(5):794-823.