

# Key Features of a Successful Introductory Physics for Life Sciences Course Ecosystem

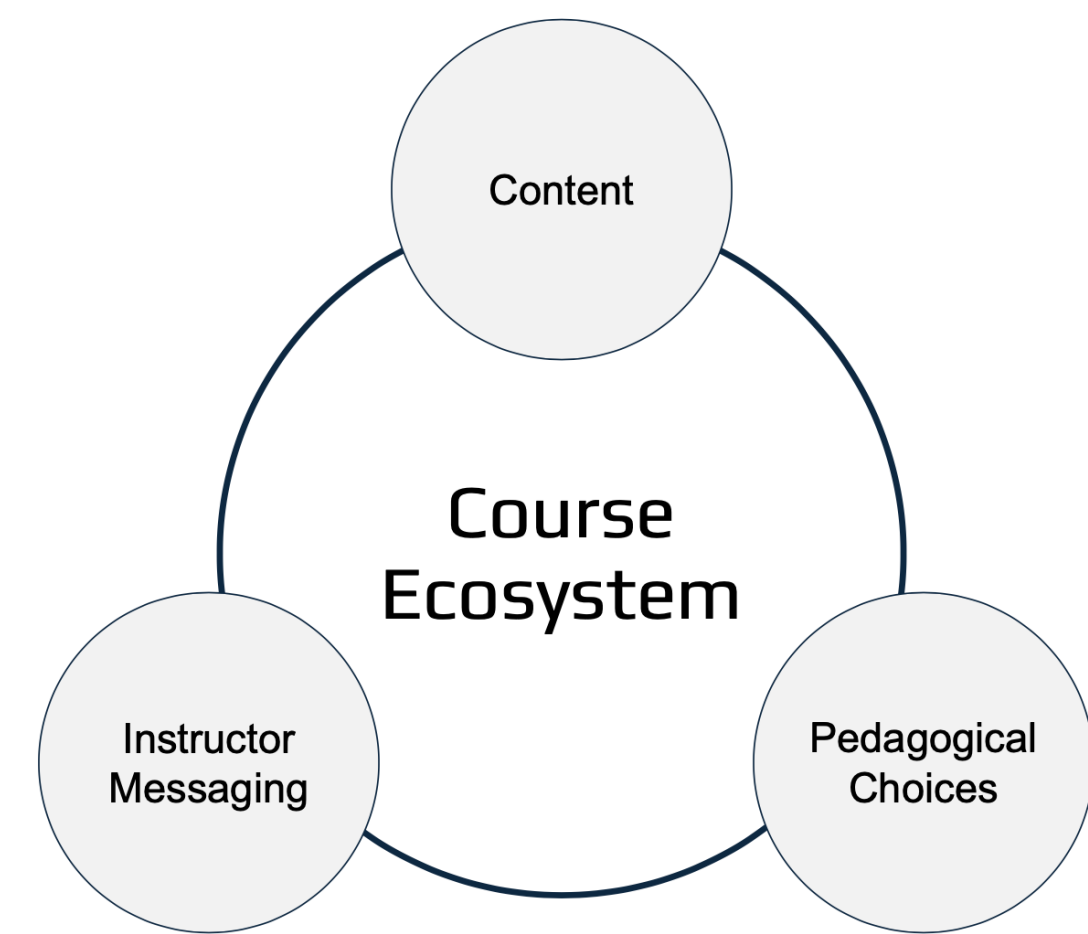
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## Research Question

How do the features of a successful IPLS course ecosystem contribute to building student interest and confidence?

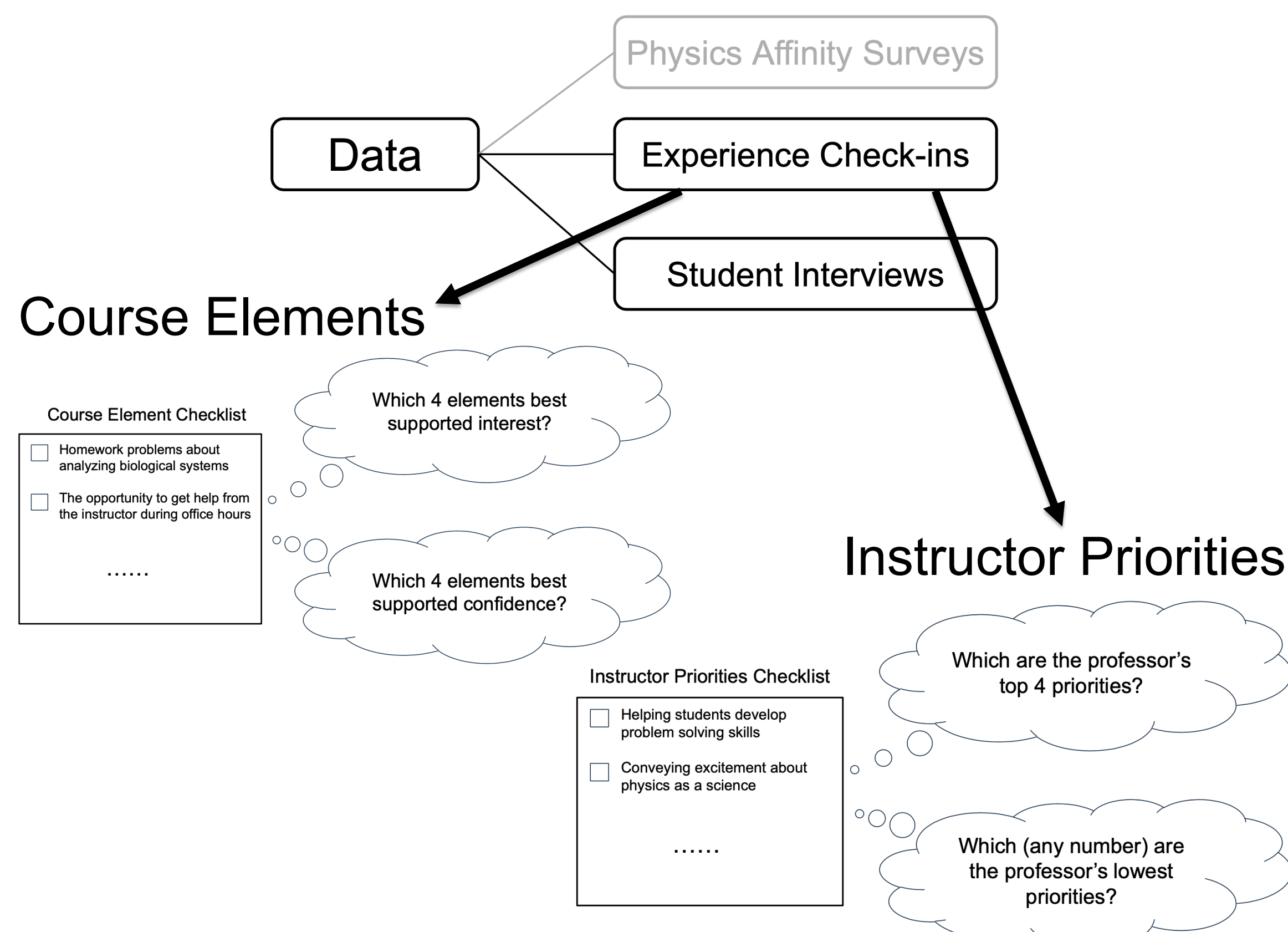


## IPLS at Swarthmore

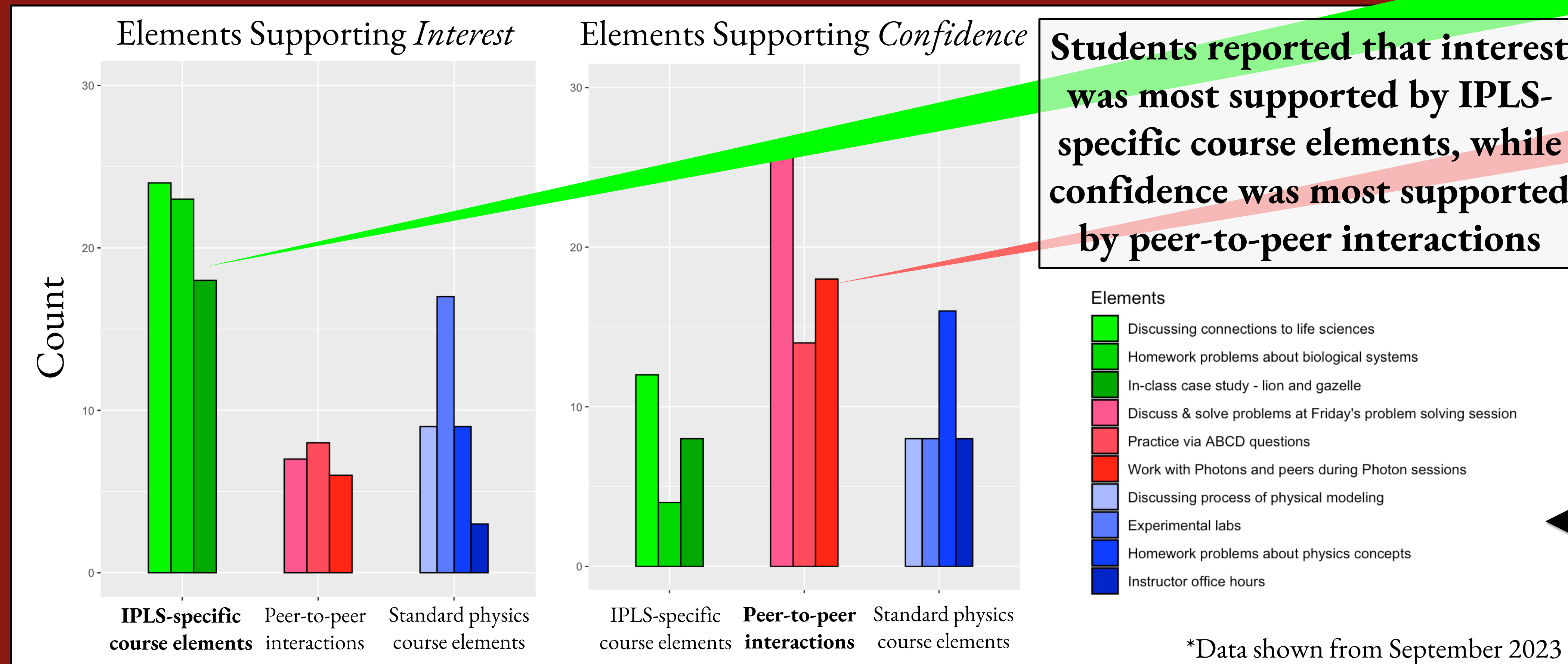
Swarthmore's Introductory Physics for the Life Sciences (IPLS) courses aim to make physics durably relevant and meaningfully engaging to life science students. Prior work at Swarthmore has shown that this happens. [1] Our current project explores the sources of these gains.

## Data Streams

**"Experience check-ins":** We surveyed all enrolled students 3 times each semester on their perceptions of (a) how course elements supported their interest and confidence and (b) the instructor's priorities in the course. **Case study interviews:** We interviewed 9 case study students (selected from volunteers) twice per semester.



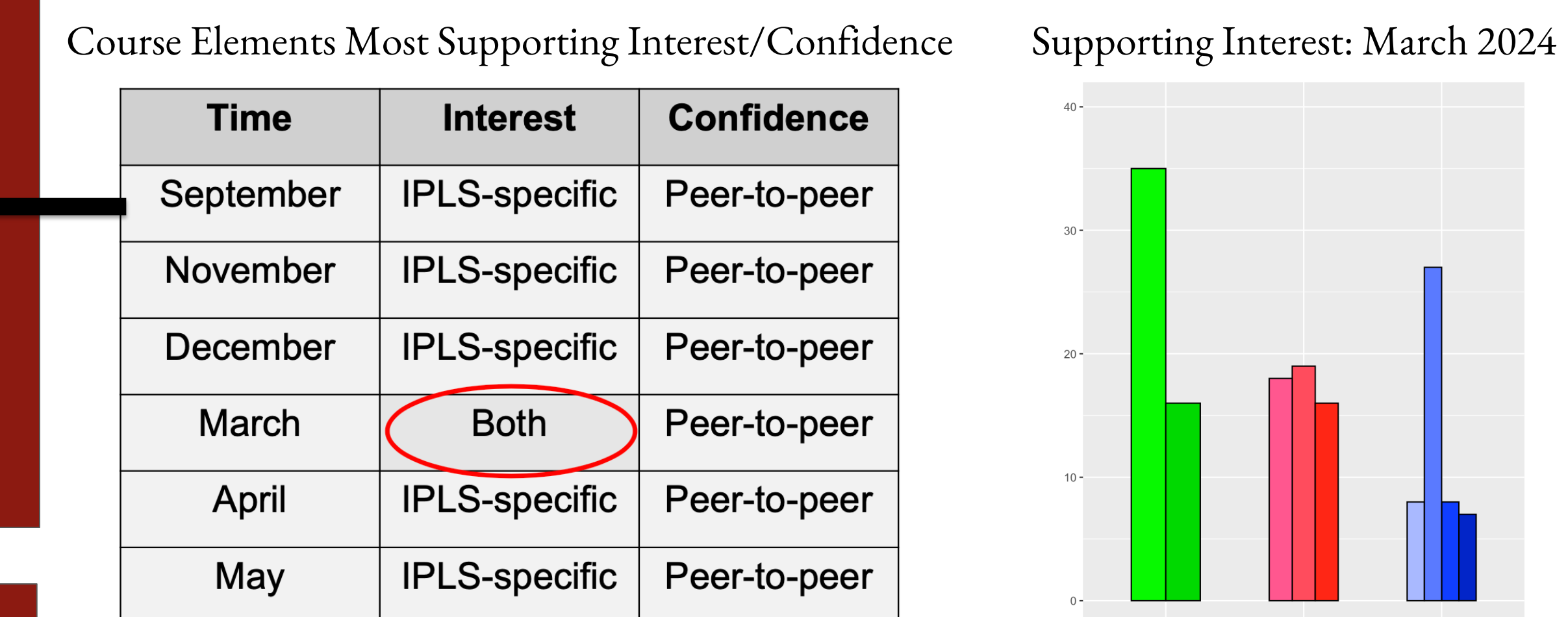
## Students perceived *interest* and *confidence* to be most supported by different course elements



"It is sometimes hard to motivate yourself to do homework about things that are not interesting. And having homework that relates to biological problems is a lot more helpful than just having straight physics problems. ... it is easy to have textbook problems and answers ... but getting answers about biological systems or textbook problems about them helps in maintaining my focus and interest." –Gertrude

"I like working on problems with other people and having other people available for help. And I think group work just helps me develop confidence with the material." –Carolina

## Do these trends persist throughout the school year?



Course elements supporting interest/confidence are stable throughout 2023-24, except for March. We hypothesize that the abstract and conceptually challenging nature of electrostatics led students to rely more on peer-to-peer interactions than at other times.

## Summary

- Students reported:
- Interest was most supported by IPLS-specific course elements, while confidence was most supported by peer-to-peer interactions.
  - Learning environment was especially comfortable
    - Comfort perceived as highest priority for instructor
    - Achieved through interplay of messaging, course policies, and content
    - Especially notable compared to other introductory STEM courses

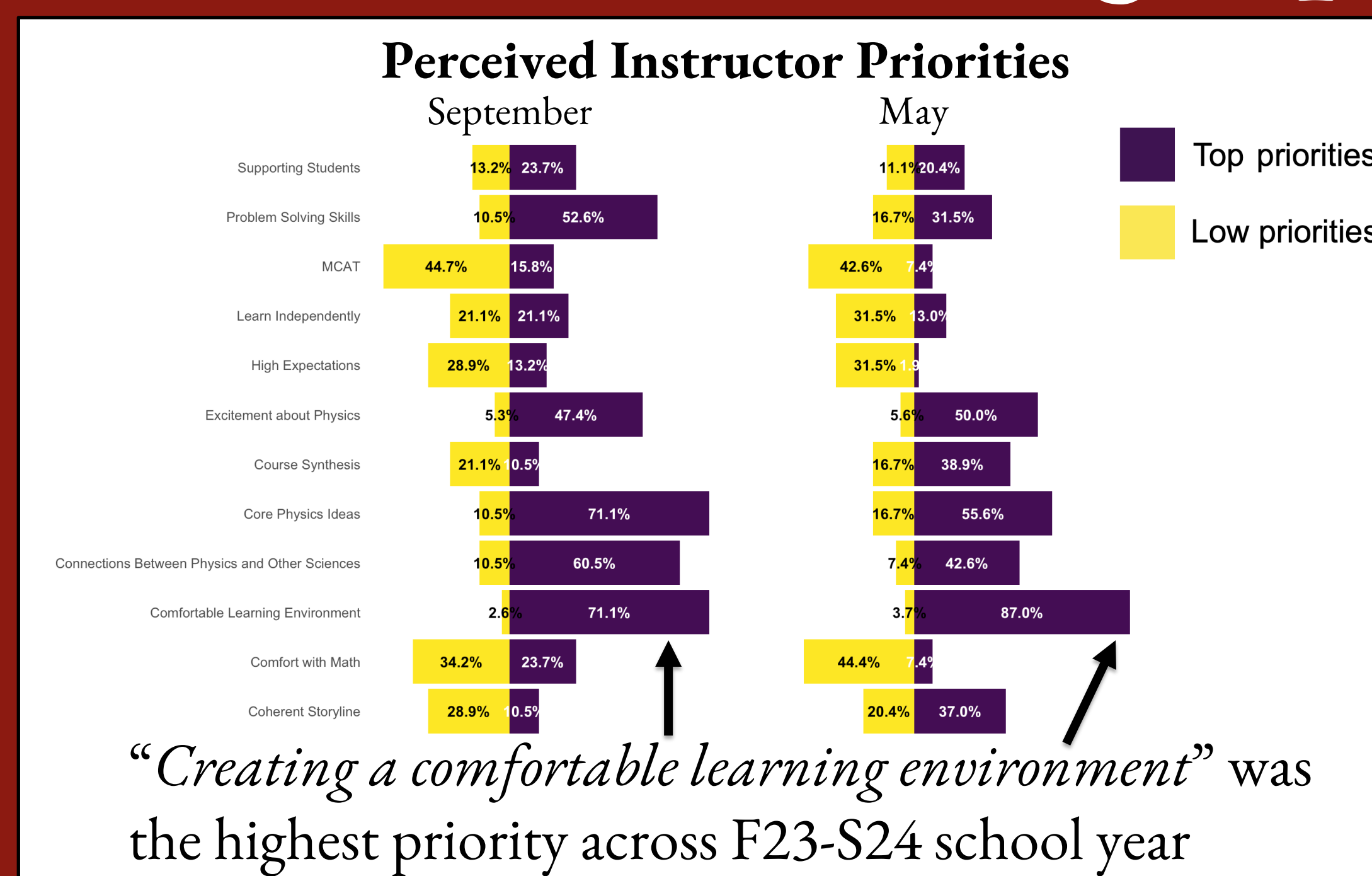
## Acknowledgements:

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## References:

[1] Geller & Tipton et al., *PR-PER* (2022), Geller & Rubien et al., *PR-PER* (2022), Rak et al., *AAPT Talk* (2019).

## Interactions within the course ecosystem led to students feeling especially comfortable



"[my professor] has literally been so direct about the messaging and has demonstrated that they just want you to succeed and they're here to support you." –Beatrice

"Physics has different policies that just seem friendlier to the students. So that's all the way from soft due dates for the homework to exam corrections to all the reassuring stuff that [my professor] says in class." –Isaac

"I think it would be the most comfortable I've been in a STEM class." –Hannah

Students perceived the professor to highly prioritize creating a comfortable learning environment, and reported experiencing greater comfort than in other introductory STEM courses.

They reported feeling they learned roughly the same amount as in those other STEM courses.

