Student Perceptions of Instructor Priorities in an IPLS Classroom

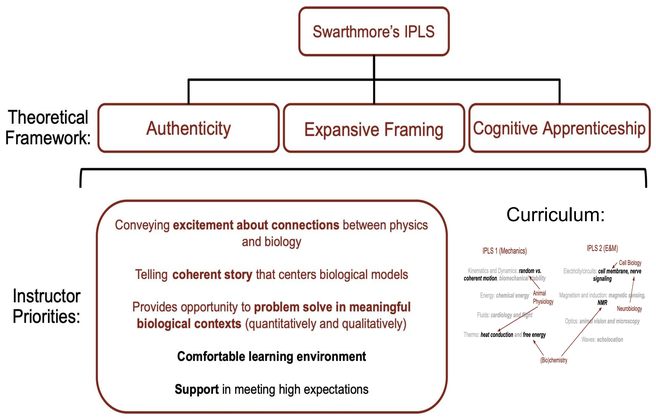
Drake Roth '25, Angelina Tjia '26, Catherine H. Crouch, Stephen Hackler, and Benjamin D. Geller

NSF 2142074

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 source of these gains.**

IPLS Framework [2]



Motivation for this Study

A step in the process of students buying into the course is the ability to **identify the instructor priorities.**

Research Question

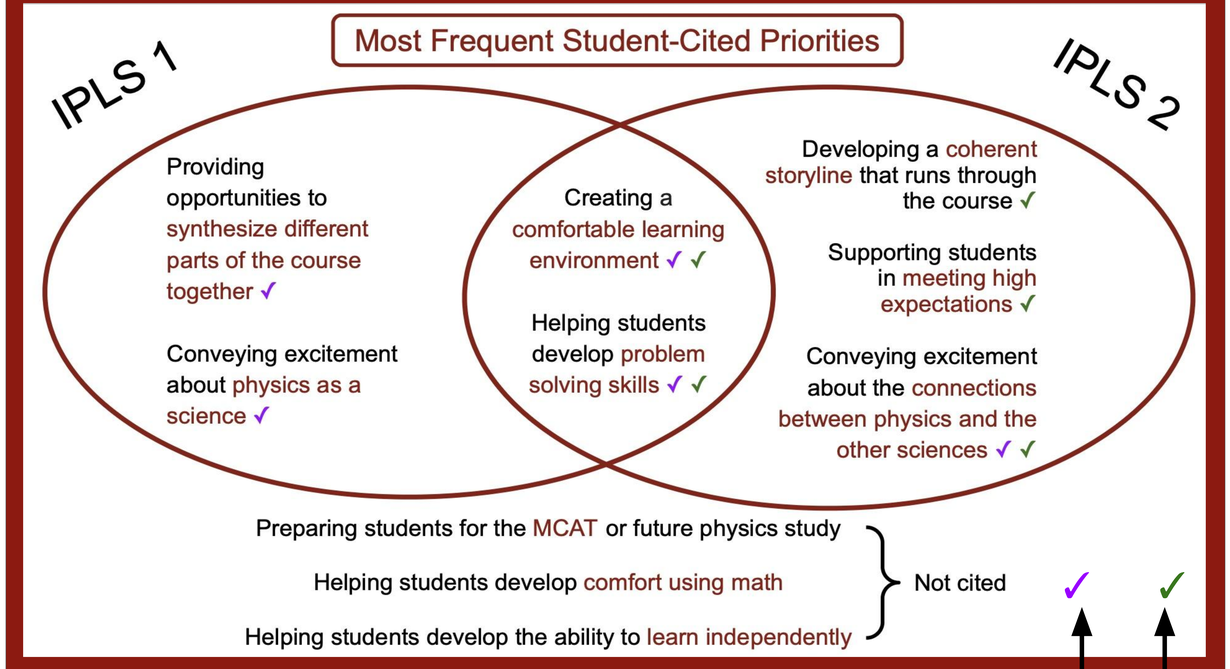
Do students' perceptions of instructor priorities reflect instructors' actual priorities in an IPLS classroom?

Methodology

All students invited → Seven students interviewed → Semi-structured interview → **Multiple readers counted frequency of different responses + reasoning**

Asked students at the end of an IPLS year to **identify the instructors' top three priorities from a provided list.**

Students' perceptions of instructor priorities **reflect** their **actual priorities** in Swarthmore's IPLS classroom

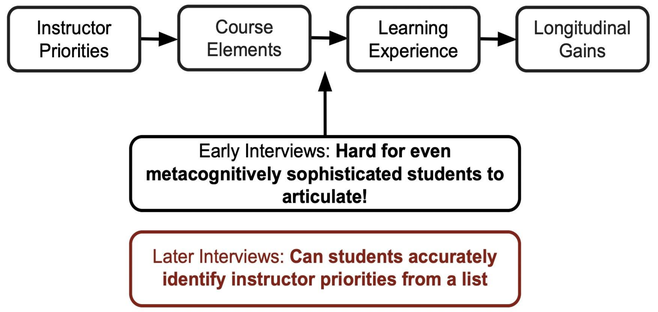


Q: Which of these do you think were the **professor's top three**? Which if any do you think were **not at all important** to them? Which do you think were **important but not in their top three**?

A: "I think without a doubt would be 'creating a **comfortable learning environment**,' 'conveying **excitement** about the **connections** between physics and other sciences,' and '**supporting students** in meeting high expectations for learning.' I would say that…those three would be…the most important ones. [And] I think **he never…explicitly conveyed** [the] importance [of] 'preparing students for the **MCAT** or future physics study.' 'Helping students **master core physics ideas**' [was] like a **byproduct**, maybe, not necessarily a priority."

Possible Instructor Priorities	IPLS 1 Instructor Priorities	IPLS 2 Instructor Priorities
Helping students master core physics ideas		✓
Helping students develop problem solving skills	✓	✓
Helping students develop comfort with using math		
Helping students develop the ability to learn independently		
Preparing students for the MCAT or future physics study		
Developing a coherent story line that runs through the course		✓
Providing opportunities to synthesize different parts of the course together	✓	
Creating a comfortable learning environment	✓	✓
Setting high expectations for learning	✓	
Supporting students in meeting high expectations		✓
Conveying excitement about physics as a science	✓	
Conveying excitement about the connections between physics and other sciences	✓	✓

How Do Instructor Priorities Lead to Student Outcomes?



Results

There is a clear mapping between these student-perceived priorities and the actual instructor priorities.

What Does this Mean and Why Do We Care?

In ways that have yet to be fully understood, IPLS course elements support students in accurately identifying (and internalizing) instructors' actual priorities.

This is likely a necessary (though insufficient) step in the process of **students buying into** and **engaging with** the IPLS course, and consequently **making meaningful and long-lasting attitudinal gains.**

Acknowledgements:

Thank you to Andrew Boudreaux (WWU), Eric Brewe (Drexel), Tim Nokes-Malach (Pitt), and Laura Ríos (Cal Poly) for serving on our advisory board. It was a privilege to work under the kind, careful, and attentive guidance of Professors Geller (PI), Crouch (co-PI), Renninger (education department and senior consultant), and Hackler (faculty contributor). As well, thank you to my assiduous undergraduate colleague Angelina Tjia '26. This research was funded by NSF DUE 2142074 and Swarthmore College.

References:

[1] Geller & Tipton et al., *PR-PER* (2022), Geller & Rubien et al., *PR-PER* (2022), Rak et al., AAPT Talk (2019).
[2] Watkins et al., *PR-PER* (2011), Engle et al., *Instruc. Sci.* (2011), Crouch & Heller, *AJP* (2014).