Student Experiences in a Computational Physics Lab through the Lens of Physics Computational Literacy

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RQs:

What insights about student learning in upper division computational physics courses can we gain from looking at student experiences through the lens of Physics Computational Literacy (PCL)?

And what insights does that give us about applying PCL as an analytical framework?

Background

Computational physics is a key part of the landscape of twenty-first century physics [1, 2].

There is still room for the development and application of theory in the context of computational physics education [3].

There is a gap to be filled in upper-division research in-particular [4].

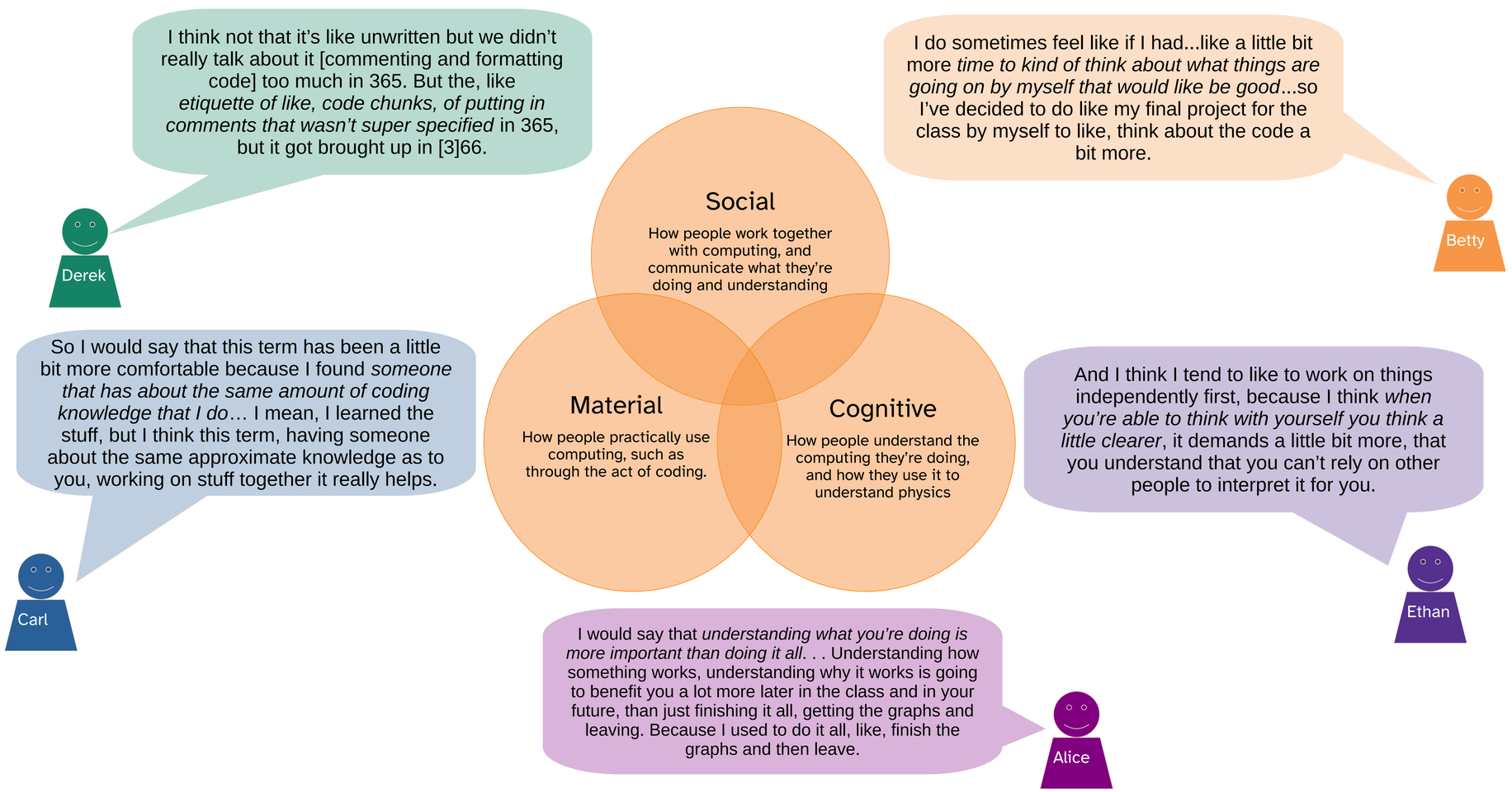
Adopting the PCL framework [5] provided us a way to systematize our analysis at a useful depth.

Methods

We conducted open ended interviews of 5 students in a 1-credit upper division computational physics lab course at the end of their second term in a 3-term sequence.

Interviews allow us to gain insight into individual experiences and perspectives.

Key Takeaway: Students are aware of tensions between developing different aspects of computational literacy, social computational literacy is a mediating factor.



References

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Conclusions & Discussion

We Found:

- PCL allows us to identify tensions and trade-offs between the different aspects of computational literacy.
- Students are conscious of the trade-offs they may be making between the development of different aspects of computational literacy.
- Social computational literacy development and practices can be bound up in unspoken assumptions.

Future Work:

- Implement lessons learned from this research and the literature into the new version of our computational physics curriculum.
- Use social network analysis to focus on the social component of PCL?
- Pre and post surveys?
- Longitudinal interviews?

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