

Consistency of Inquiry Strategies Across Subsequent Activities in Different Domains

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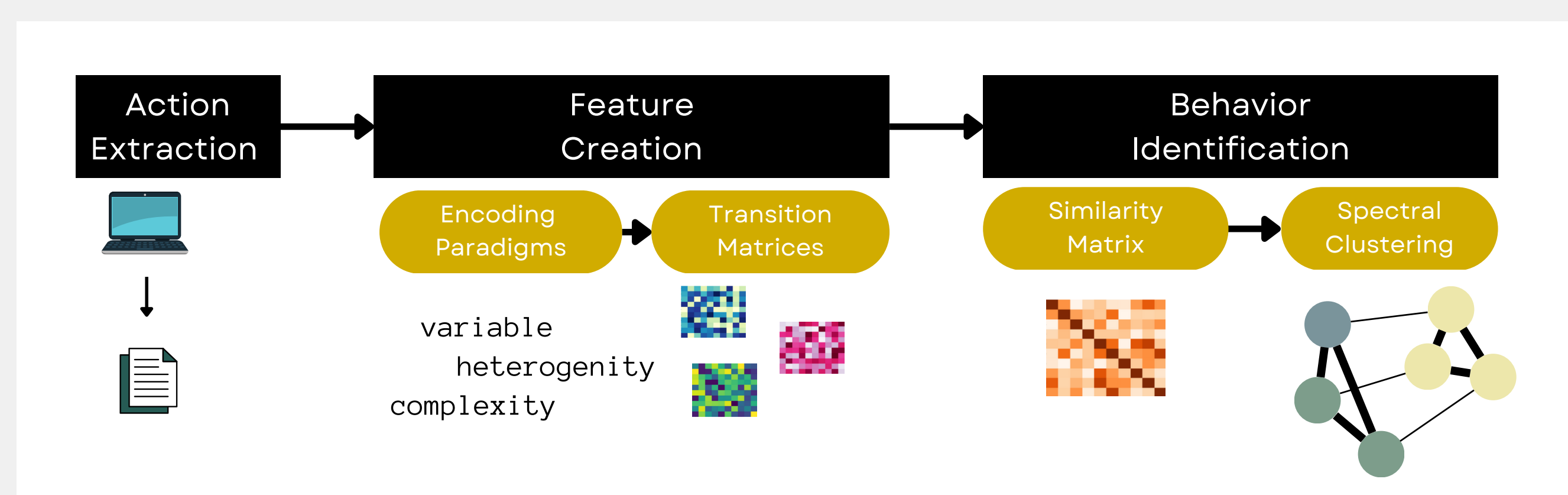
1 INTRODUCTION AND RESEARCH QUESTION

Inquiry learning with interactive simulations is challenging. Indeed, navigating those environments is often difficult for learners [1]. Analysing OELE interaction logs can help to identify the students who struggle [2], as well as suggest explanations for the sources of their difficulty [3]. However, given their open-ended nature, identifying productive behaviours in an OELE is challenging. To tackle a part of this problem, we investigated the following two research questions:

1. What patterns do students adopt across inquiry labs, and how consistent are those strategies across topics?
2. How consistent is students' use of these patterns across simulations?

2 METHODOLOGY

Model Architecture

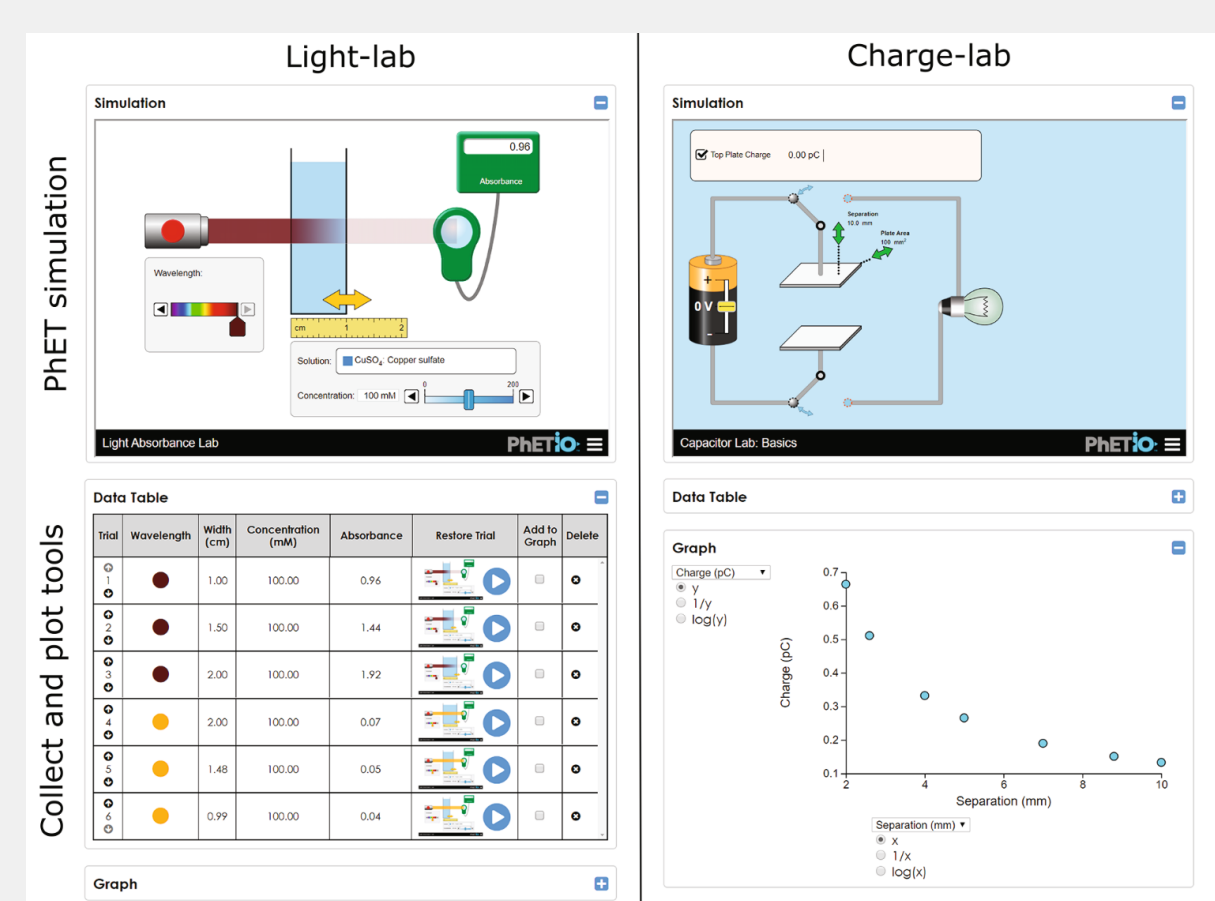


Dataset

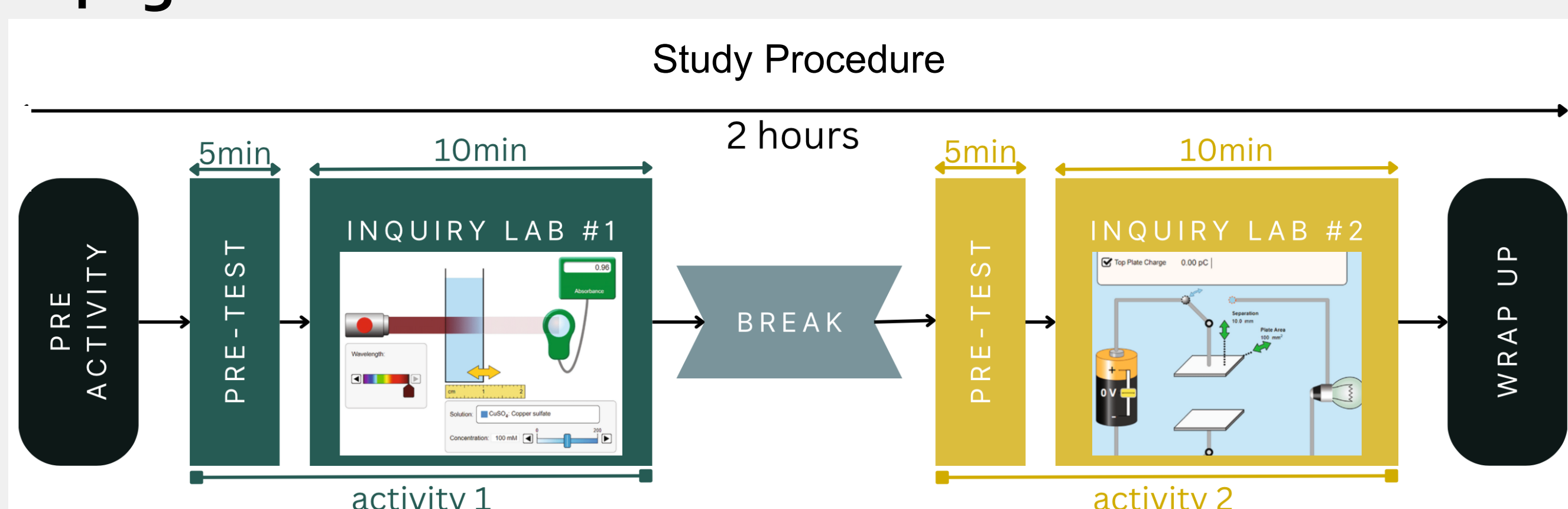
2 simulations

- Capacitor Lab: <https://phet.colorado.edu/en/simulations/capacitor-lab-basics>
- Beer's Law Lab: <https://phet.colorado.edu/en/simulations/beers-law-lab>

Embedded into an inquiry lab, with a graphing tool and a table tool.



148 graduate students

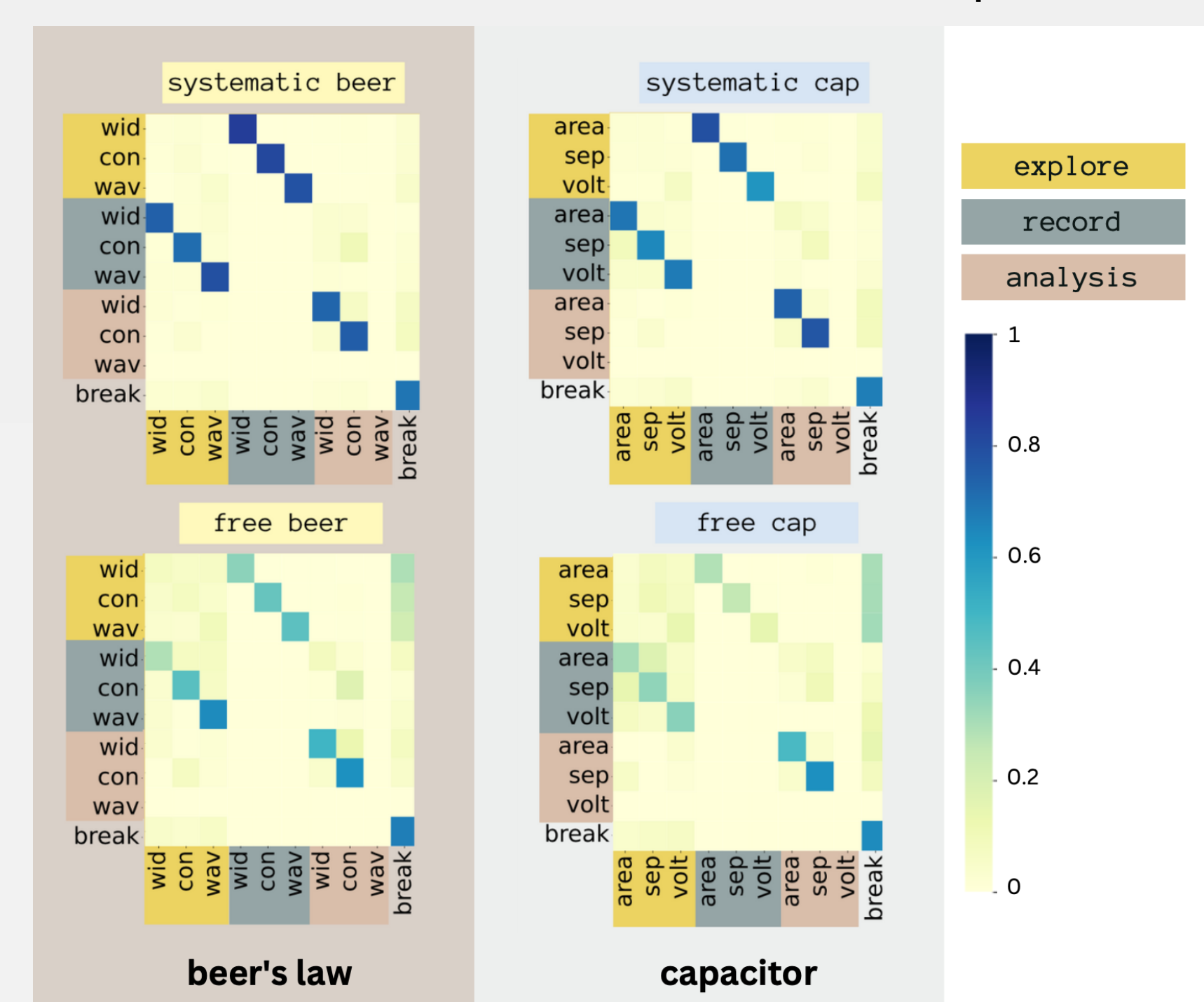


3 RESULTS

RQ 1: Strategies Adopted

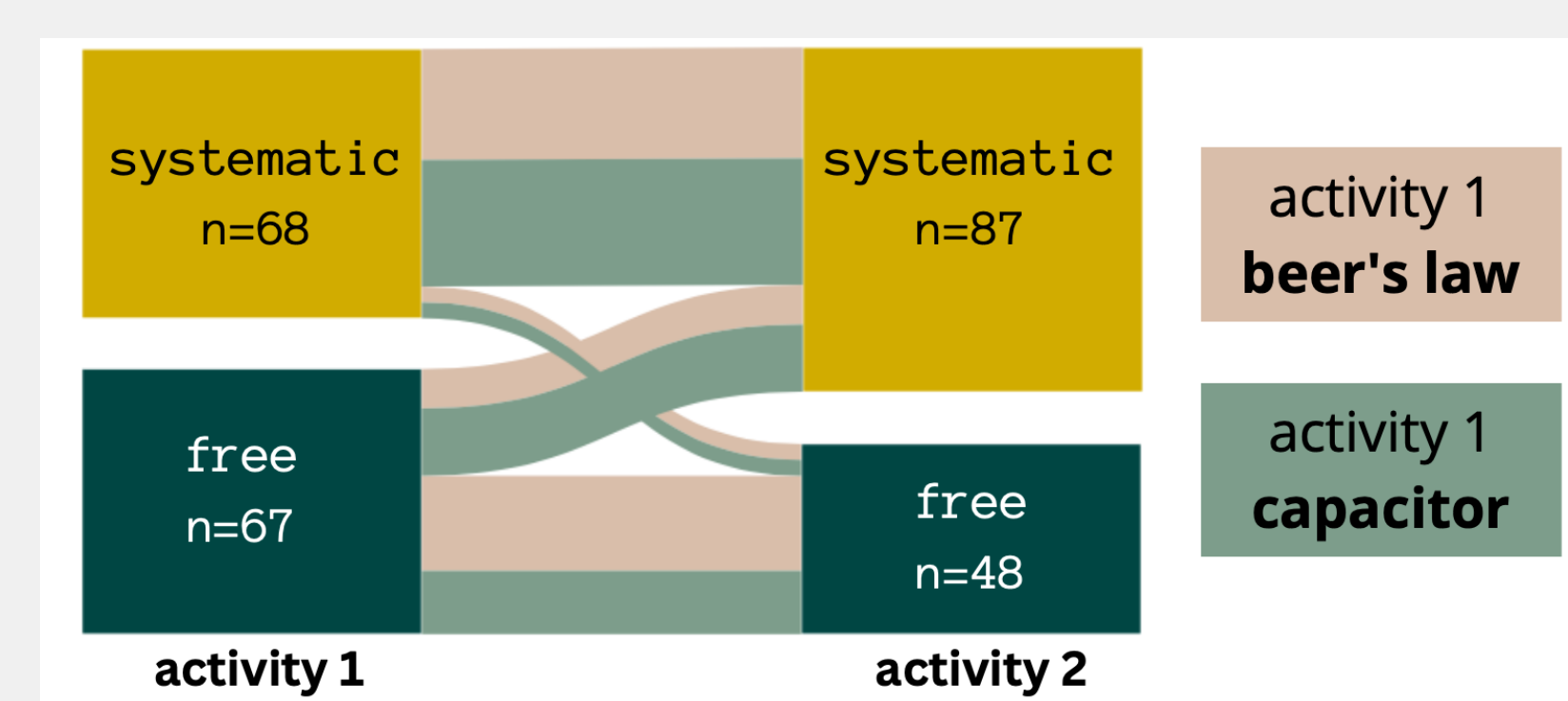
We find 2 types of strategies:

- **Systematic** students systematically iterate through explore → record → analyse systematically over all variables
- **Free** students are less structured in their exploration



RQ 2: Consistency of Strategies

Students were usually consistent with the adopted strategies. When they were not, it was most likely to switch to a **systematic** strategy.



4 CONCLUSION

We used three dimensions to encode interaction data on two subsequent activities based on two different inquiry labs.

We find that students either use a **systematic** strategy or a **free** one, and that those strategies are consistent across environments.

This opens the door for topic-general representations of student actions.

REFERENCES

- [1] Alfieri, L., Brooks, P.J., Aldrich, N.J., Tenenbaum, H.R.: Does discovery-based instruction enhance learning? Journal of educational psychology 103(1), 1 (2011)
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- [3] Tschirgi, J.E.: Sensible reasoning: A hypothesis about hypotheses. Child development pp. 1–10 (1980)