Here, Marya's account highlights the lasting power of her meta-affective learning, which she explicitly elevated in relation to her content learning. Though we did not follow her into the lab to see how it was enacted in situ, she has clearly carried around the perception of her own learning "outcome" as a change in feelings and orientation toward confusion.

IV. CONCLUSIONS

In this paper, we illustrated Marya's meta-affective learning evident both in her own account as well as in an instance of her sense-making. From our perspective as physics educators and from Marya's own perspective, her meta-affective learning was a fundamental part of her physics learning more generally. Marya's case is only one example of meta-affective learning, but it provides proof that such learning is possible. It also illustrates the lasting impact meta-affective learning can have on an individual's academic growth and professional choices.

It is important to note that we do not wish to separate meta-affective learning from the other dimensions of learning physics (conceptual, epistemological, social, etc.). On the contrary, in the forthcoming paper featuring this work [5] we look at the ways that Marya's meta-affective and epistemological development dynamically co-constructed one another. This paper highlights meta-affective learning as an important part of the larger picture—one that has until now been under-represented if not completely un-acknowledged in PER. Recognizing meta-affective learning as part of learning physics means that we must continue to shift our focus past content goals and outcomes in both research and instruction. While making practical recommendations for instruction is beyond the scope of this paper, we hope that this work will continue to expand the boundaries for how the PER community conceptualizes learning in physics and will motivate others to find and study more cases of students' meta-affective learning.

ACKNOWLEDGMENTS

Special thanks to Marya for continuing to inspire our research and our own disciplinary journeys. We also thank Anna Phillips for her feedback on a draft of this paper. This work is funded by the Gordon and Betty Moore Foundation, Grant GBMF3475. The views expressed here are those of the authors alone.

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