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Obtaining laws through quantifying experiments: justifications of pre-service physics teachers in the case of electric current, voltage and resistance.

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Summary: The language of physics is mathematics, and physics ideas, laws and models describing phenomena are usually represented in mathematical form. Therefore, an understanding of how to navigate between phenomena and the models representing them in mathematical form is important for a physics teacher so that the teacher can make physics understandable to students. Here, the focus is on the “experimental mathematization,” how laws are established through quantifying experiments. A sequence from qualitative experiments to mathematical formulations through quantifying experiments on electric current, voltage and resistance in pre-service physics teachers’ laboratory reports is examined. The way students reason and justify the mathematical formulation of the measurement results and how they combine the treatment and presentation of empirical data to their justifications is analyzed. The results show that pre-service physics teachers understand the basic idea of how quantifying experiments establish the quantities and laws but are not able to argue it in a justified manner.

Classification: M59 D39

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