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DC Circuits: Context dependency of students' responses

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Abstract content
   (Max 300 words)
Formatting &
Special chars

We probe the effect on student responses when fine grained contextual changes are made to questions in the area of simple DC circuits. The instrument developed for the study comprised a series of questions based on an open circuit showing a battery, a wire and a single resistive element. Variations in presentation included the following: (a) three circuit elements were interchanged with each other (resistor, light bulb and a heating element), (b) the orientation of the circuit was rotated between vertical and horizontal and (c) small changes were made to the words describing current. Each question was presented as a situation involving a discussion among a group of students who are posited to be discussing issues relating to the particular circuit in question. A number of different points of view are articulated by the students and offered as options for which (a) a particular choice has to be made and (b) the reason for the choice has to be provided in detail. We (a) summarise the results obtained (detailed in previous SAIP talks) showing the high level of sensitivity to the contextual changes and (b) focus on recent results obtained from follow-up interviews that show how features presented in the questions trigger ideas that make sense in the everyday world but can end up causing students to appear as if they have "misconceptions" relative to the canonical physics world. The negative implications of using light bulbs to introduce circuits or to probe student conceptions of DC circuits are discussed in the light of these findings.

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