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“Seeing is believing”: Visual perceptions and the learning of kinematics

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<p>The proverb “seeing is believing” is generally applied in science education today. Many of the contemporary teaching strategies engage the learners in activities that guide them in making their own observations. Still, problems regarding the learning of physics, especially the prevalence of alternative conceptions, remain a head-ache in physics education research.

A variety of causes are ascribed to the occurrence of alternative conceptions, e.g. that textbooks contain them, teachers themselves have them or do not attend to learners’ intuitive ideas or that learners focus to contextual features of an event and do not observe what we intend them to. Even with seemingly sufficient experimental proof, some alternative conceptions remain persistent. The study reported here investigated learners’ visual perceptions as possible cause for the existence, persistence and transfer of the intuitive conception in kinematics that DiSessa called changes-take-time. An example of this conception is the assertion that a cannon ball keeps on accelerating after the shell has been launched. A questionnaire, group discussions and individual questioning contributed to the investigation. Grade 9 and 10 physical science learners as well as student teachers participated in the study.

The results revealed that although the learners’ intuitive conceptions are context-dependent, the majority of them feel confident about their responses. Limitations and inaccuracies in visual perceptions (such as differences in real and perceived velocities and changes in velocities) seem to contribute to their intuitive conceptions. A teaching sequence that attends to learners’ visual perceptions is developed. The sequence further intends the conceptual refinement of learners’ productive experiential knowledge in the learning of kinematics. Consistent application of physics concepts and principles in a variety of everyday and classroom experiences is emphasized for the formation of a meaningful explanatory model.

Level (Hons, MSc,
   PhD, other)?

Other

Consider for a student
   award (Yes / No)?

No

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

Yes

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