



Purpose of the study	Hypothesis	Participants	Instruments and Data Analysis	Design and Procedures	Findings
<p>The study compares the use of two discovery learning environments in the physics domain of collisions. In one environment, implicit heuristics were used to provide the learner with guidance. In the other learning environment explicit heuristics were used.</p>	<p>Students in the explicit condition are expected to be able to transfer heuristics and to keep on using them, whereas only part of the students in the implicit condition is expected to be able to do so. The aim of the study was to examine whether offering heuristics for discovery learning can engage learners in discovery learning processes in which they learn about the domain and about the processes of discovery learning.</p>	<p>30 students in their fifth year of pre-scientific education (16-17 year olds). The participants were assigned randomly over the two conditions.</p>	<p>The authors used three different tests: a definitional domain knowledge test, an intuitive domain knowledge test to measure domain knowledge and a scientific reasoning test to see whether heuristics transfer to general scientific reasoning and experiment design.</p>	<p>The authors designed two learning environments, one with implicit heuristics and the second one with explicit heuristics. The two learning environments were implemented together with a simulation tool. The session lasted approximately 3 hours and included: introduction and pretest (40 min), interaction with the simulation tool (1:40 min), and post-test (40 min).</p>	<p>Results confirm that students in both conditions gained on the definitional and intuitive knowledge with no significant difference between the two conditions. When examined the relations between pre-test and post-test, the authors identified that in the implicit condition students responded to the treatment by improving their performance. However, in the explicit condition the scores were not related. Their results show a considerable gain with large effect sizes on the definitional and intuitive knowledge from pre to post for the students in both conditions.</p>