APR11-2011-000682

Abstract for an Invited Paper
for the APR11 Meeting of
the American Physical Society

What causes the patterns in students' incorrect answers to physics questions?

ANDREW HECKLER, Ohio State University

Science education researchers agree on one thing: the empirical finding that students often answer questions about simple physical phenomena in ways that are not only specific and contrary to the scientific view, but also remarkably similar to answers of other students. What causes these answering patterns? Most efforts focus on students' explicit reasoning, yet it still remains an open question to what extent implicit, automatic learning processes play a role. We provide evidence that such automatic cognitive mechanisms likely play an important role in student responses to science questions. For example, we find that students often choose to base their answer on the dimensions of a problem that are processed the fastest (even if the dimension is incorrect), and forcing a few-second delay can improve their performance. This suggests that respondents are capable of answering correctly, but instead they tend to answer quickly. We also provide evidence suggesting that repetitive training can shift attention to more relevant dimensions in a problem and increase performance, possibly because processing time is decreased.