

Implications of half a century of research on alternative conceptions/misconceptions for physics education

While the teacher attempts to guide their students to 'correct' ideas, the students bring to bear prior knowledge, their intuition, everyday experiences and conversations/readings when constructing their understandings. The learner goes through 'wrong' dead ends, meanders along different alleys; slowly changing and every now and then producing what the teacher delights in hearing. The process of guiding students to scientifically congruent ideas is convoluted and documented in research as alternative conceptions or misconceptions. What is reassuring for researchers and educators is that there are identifiable, consistent and enduring patterns of alternative conceptions or misconceptions across different countries. The solution is to find ways through which these can be addressed. Over half a century, a range of tools have been identified as well as validated ways through which the educator can measure and ascertain if their teaching and/or curriculum materials are effecting change in student learning. A key finding which is often not reported is how students develop over their years of physics study; what are their trajectories of changing conceptions. If they don't 'overcome' misconceptions in first year, can they 'overcome' them later on if not explicitly taught? In this talk I will summarise the field, the contributions of my research team from Australia and Thailand, from multimedia, Veritasium YouTube Channel to conceptual surveys.

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