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Abstract for an Invited Paper
for the MAS20 Meeting of
the American Physical Society

Facilitating Thinking and Learning in and Beyond the Physics Classrooms

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I will discuss, using my research in physics education, how research can be used as a guide to develop curricula and pedagogies to reduce student difficulties. My research has focused on improving student understanding of introductory and advanced concepts, for example, in learning quantum mechanics. We are developing research-based learning tools such as tutorials and peer instruction tools that actively engage students in the learning process. I will discuss how we evaluate their effectiveness using a variety of methodologies. I will also discuss our research studies that provide guidelines for how to enhance physics by making it inclusive. We thank the National Science Foundation for support.