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Getting to impact at scale: A dynamic analysis to guide propagation of educational innovations in climate change

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In order to successfully address climate change, society needs education that scales rapidly, transmits scientific information about its causes and effects, and motivates sustained commitment to the problem and science-based action to address it. For decades, government agencies in the US and elsewhere have funded the development of innovative, evidence-based pedagogies and curricula to teach STEM fields, including climate change and sustainability. Research shows that many of these innovations deliver strong gains in learners' knowledge, sense of urgency, and desire to learn more about climate change and sustainability. To build capacity needed to meet the climate and related grand challenges, rapid scaling of educational innovations is needed in higher education. However, current practices of outreach and word-of-mouth propagation mostly fall short. We develop and analyze a simple computational model to understand why and, using the model and conducting sensitivity analyses, test other, more promising strategies. Our dynamic analysis reveals that outreach has limited impact and does little to accelerate word-of-mouth adoption under conditions typical in higher education. Instead, we find that community-based propagation can rapidly accelerate adoption, as is also shown by successful real-world scaling efforts.