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New pathways to physics instruction: Blending a MOOC and in-person discussion to train physics graduate students and postdocs in evidence-based teaching[1]

BENNETT GOLDBERG, Northwestern University

A challenge facing physics education is how to encourage and support the adoption of evidence-based instructional practices that decades of physics education research has shown to be effective. Like many STEM departments, physics departments struggle to overcome the barriers of faculty knowledge, motivation and time; institutional cultures and reward systems; and disciplinary traditions. Research has demonstrated successful transformation of department-level approaches to instruction through local learning communities, in-house expertise, and department administrative support. In this talk, I will discuss how physics and other STEM departments can use a MOOC on evidence-based instruction together with in-person seminar discussions to create a learning community of graduate students and postdocs, and how such communities can affect departmental change in teaching and learning. Four university members of the 21-university network working to prepare future faculty to be both excellent researchers and excellent teachers collaborated on an NSF WIDER project to develop and deliver two massive open online courses (MOOCs) in evidence-based STEM instruction. A key innovation is a new blended mode of delivery where groups of participants engaged with the online content and then meet weekly in local learning communities to discuss content, communicate current experiences, and delve deeper into particular techniques of local interest. The MOOC team supported these so-called MOOC-Centered Learning Communities, or MCLCs, with detailed facilitator guides complete with synopses of online content, learning goals and suggested activities for in-person meetings, as well as virtual MCLC communities for sharing and feedback. In the initial run of the first MOOC, 40 MCLCs were created; in the second run this past fall, more than 80 MCLCs formed. Further, target audiences of STEM graduate students and postdocs completed at a 40-50% rate, indicating the value they place in building their knowledge in evidence-based instruction. We will present data on the impact of being in an MCLC on completion and learning outcomes, as well as data on departmental change in physics supported by MCLCs.

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