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Big Data Meets Physics Education Research: From MOOCs to University-Led High School Programs

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The Massive Open Online Course (MOOC) movement has catalyzed discussions of digital learning on campuses around the world and highlighted the increasingly large, complex datasets related to learning. Physics Education Research can and should play a key role in measuring outcomes of this most recent wave of digital education. In this talk, I will discuss big data and learning analytics through multiple modes of teaching and learning enabled by the open-source edX platform: open-online, flipped, and blended. *Open-Online* learning will be described through analysis of MOOC offerings from Harvard and MIT, where 2.5 million unique users have led to 9 million enrollments across nearly 300 courses. *Flipped* instruction will be discussed through an Advanced Placement program at Davidson College that empowers high school teachers to use AP aligned, MOOC content directly in their classrooms with only their students. Analysis of this program will be highlighted, including results from a pilot study showing a positive correlation between content usage and externally validated AP exam scores. Lastly, blended learning will be discussed through specific residential use cases at Davidson College and MIT, highlighting unique course models that blend open-online and residential experiences. My hope for this talk is that listeners will better understand the current wave of digital education and the opportunities it provides for data-driven teaching and learning.