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Mobilizing the Forgotten Army: Improving Undergraduate Math and Science Education through Professional Development of Graduate Teaching Assistants¹

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Evidence-based best practices for improving undergraduate STEM education abound. Unfortunately, these practices have not been widely adopted, in part because typical dissemination efforts are mediated in a top-down fashion and fail to obtain critical buy-in from key local stakeholders. Here, we present a novel framework to increase nationwide uptake of STEM-education best practices through grassroots propagation of Professional Development programs for Graduate Teaching Assistants (GTA-PD). Our model pays special attention to overcoming resistance to change by soliciting, from the very start, critical buy-in from departmental chairs, faculty, and GTAs who have direct control over and responsibility for instruction. A key component of our approach involves an annual National GTA Workshop where faculty-GTA leadership teams from many different Physics and Chemistry departments come together to develop best-practices-based GTA-PD improvement plans for their own departments while guided by a core group of nationally recognized expert practitioners in GTA-PD and STEM education. As a pre-condition for participation, each department chair must pledge to facilitate implementation of their leadership teams plan; additional and ongoing support is provided by the core group of experts, together with other teams from the workshop cohort. Our initial pilot efforts point to success via enthusiastic buy-in within each STEM department due to the potential for immediate positive impacts on both undergraduate instruction and the long term research productivity of GTAs. In the future, longitudinal data on the progress of the GTA-PD programs will be gathered and analyzed to provide guidance for improving the success of future GTA-PD programs.

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