Facilitating Change in Undergraduate STEM Instruction: Synthesis of Change Strategies across Disciplines

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For decades, scholars in three primary fields have engaged in efforts to promote the use of instructional strategies in STEM subjects that are consistent with current educational research. STEM Education Researchers (SER) have appointments in a STEM department or as a STEM education specialist in a College of Education. Faculty Development Researchers (FDR) are connected with a center for teaching and learning. Higher Education Researchers (HER) have appointments in a College of Education or are university administrators. Efforts in all areas, despite significant funding and study, have met with only modest success. Further, although the fields share an overarching goal, the research generated by each rarely “crosses over” to inform the others.

This goal of this project is to critically review, integrate, and align the research literatures and perspectives of the SER, FDR, and HER communities and identify promising areas for future work.

Key Findings

- Four core categories of change strategies.
- Change agents in each field primarily operate within only one or two of the four core categories.
- Little communication between or within fields.
- Few change agents appear to treat the improvement of change strategies and theories as a scientific problem to be solved.
- Most articles do not reference any change literature.
- Most articles do not document the success or failure of change efforts.

A review of the literature on change strategies used in the improvement of undergraduate STEM instructional practices identified over 300 journal articles published in 176 distinct journals.

Preliminary results based on:
- 136 articles (randomly selected) to develop four categories of change strategies
- 43 articles (subset of the 136) to characterize i) connections to change literature and ii) strength of data presented
- 267 articles (full complete records) to develop citation maps

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