Collaborative Curriculum Design as a Framework for Designing Teacher Professional Development that Produces the Content Knowledge for Teaching the Life Sciences

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ABSTRACT: Effective science teaching critically requires content-focused professional development (PD), particularly in life sciences where content evolves rapidly. How subject matter knowledge related to teaching (SCK) is most effectively incorporated into PD has not been investigated. We studied how a professional learning community of high school teachers and scientists co-designing a bioscience curriculum produced the accompanying SCK-focused PD. SCK was level specific but teachers could not generate it alone. Co-designing SCK with scientists was valuable to teachers, as evidenced by significant increases in their cognitive and attitudinal attributes toward the PD, in turn promoting change in practice and student learning gains, both within and outside the initial partnership. Surprisingly, social network analysis of how the collaborators interacted revealed that though the network was cognitively and effectively robust, it was behaviorally much sparser than anticipated for such a high functioning partnership, counter to commonly accepted PD best practices. We suggest that the scientist/educator facilitators who intentionally promoted collaboration in the context of distributed leadership were able to eliminate extraneous interactions, optimizing the process. The results are further evidence that developing content-focused PD relevant to 21st century life sciences requires dismantling the institutionalized segregation between practitioners of science and teaching,