Crowdsourcing Curriculum Development in Mathematical Biology Education

Crowdsourcing has been deployed to address a number of difficult problems. By stating open problems in a well-posed, succinct way and inviting the submission of pragmatic solutions to their solution, participation of individuals and groups that are not usually included is invited. By its very nature, mathematical biology education requires the participation of individuals that have frequently been isolated in academic disciplinary silos. Recent successes in open, interdisciplinary, research-rich undergraduate science education (see special issues of *CBE Life Science* Education (<http://lifescied.org/content/9/3.toc>) and *Mathematical Modelling of Natural* Phenomena (http://www.mmnp-journal.org/action/displayIssue?jid=MNP&volumeId=6&seriesId=0&issueId=06>) have demonstrated the profit of collaborative interdisciplinary teams. Yet most curriculum development is by individual educators for their own classrooms and is not built upon adopting, adapting, and implementing vetted alternatives from colleagues and published literature. How do we prepare our students for the challenges of 21st century science, productive careers, and responsible citizenship? In an era of terabytes to petabytes of data amassed per day, of a globally interconnected communication network, electronically accessible open access journals, massively parallel computational power, personal real-time data acquisition devices, national collaboratories that make high-end instrumentation more accessible to wider communities, potential for personal fabrication, community sensor networks, and new modes of intellectual property such as Creative Commons, copyleft, wikis, blogs, re-mixes, and mash-ups, how are traditional expectations of students inappropriate? If we adopt a Citizen Science approach that would include students, teaching assistants, lab technicians who prepare lab course materials, novice and experienced faculty from biology, mathematics, and associated disciplines such as biological engineering and environmental studies, science and mathematics education researchers, quantitative and qualitative ethnographic evaluators, historians-philosophers-sociologists-anthropologists of science and mathematics, and industrial employees who hire our students to do mathematical biology, I believe that we have the potential to not only address some serious challenges to our current practices, but also to serve as a pragmatic successful model for others to emulate. (309 words)