Reform will require concerted action by faculty, administrators, professional societies and other educational organizations, foundations, industry, and government. The process begins with faculty and administrators. [We urge] each academic institution to critically review how it educates its future biologists. Departmental retreats are a good setting for an initial examination of current educational objectives, practices, and outcomes. The circle should eventually be broadened by inviting faculty from different departments to come together with administrators and discuss aspirations and goals for the coming decade. The resources needed to effect these changes must be clearly defined and a realistic path must be charted to complete the planning stage. University administrators will need to actively support faculty development and remove barriers to interdisciplinary teaching, a key aspect of enhancing undergraduate education. Departments and colleges must find new ways to help individual faculty and academic departments innovate and reward their efforts in creating, assessing, and sustaining new educational programs. For example, faculty interested in adapting teaching approaches for their own use or in creating new teaching materials should have lighter than normal requirements for teaching, research, or service while actively engaged in such projects.

– National Research Council.

From Bio 2010: Transforming Undergraduate Education for Future Research Biologists.

A challenge for supporting informed participation is in providing a mechanism allowing various participants to integrate their perspectives in a meaningful way. To do so, it is important to support the process of reflection-in-action. As participants act upon a problem, breakdowns occur due to incomplete understanding of the underlying problem, conflicts among perspectives, or the absence of shared understanding. By supporting the process of reflection within this shared context, opportunities arise for building upon these breakdowns in ways that integrate the various perspectives and expertise, while enhancing shared understanding. Supporting informed participation requires processes that integrate the individual and the group knowledge through collaborative constructions. Information spaces need to be constructed collaboratively and integrated into the work and social practices of the community. These collaborative constructions result in work products that are enriched by the multiple perspectives emerging through community discourse.

Requirements for systems supporting informed participation and empowerment

Effectively supporting informed participation and empowerment is a socio-technical problem in which the social support and the technical infrastructure for [solving] open-ended problems go hand in hand.

By providing the opportunity for people to change systems, we encourage users to become owners of problems. Of course, not all users want to be intimately involved in all phases of a problem-solving activity. Fostering communities where individuals can spontaneously find appropriate roles and responsibilities is extremely important. However, people are not going to accept responsibility without an understanding of what costs, benefits, and other motivating factors they will encounter. People are motivated to participate if a problem affects them and if they see a benefit to participating. Supporting authentic problems in which people have a personal stake is an essential part of motivating a community. There must also be a reward for investing time and effort to becoming knowledgeable enough to act as designers. The nature of these rewards may range from a feeling of control over the problems, to being able to solve or contribute to the solution, a passion to master tools in greater depth, an ego-satisfying contribution to a group, or a sense of good citizenship in a community.

– Ernesto Arias, Hal Eden, Gerhard Fischer, Andrew Gorman and Eric Scharff, University of Colorado, Boulder.

From Beyond Access: Informed Participation and Empowerment.