the author is interested in receiving royalties). And of course the content is also available for free on the Connexions Web site, which will keep the commercial costs from rising above what the value added justifies.

Roadblocks on the Horizon?

While the OER movement is rapidly gaining speed, there are a number of potential roadblocks that must be carefully navigated for it to prosper.

Technology fragmentation. If the OER community does not adopt common or compatible content and repository standards, then it risks fragmenting the movement into a number of isolated islands of incompatible content. This will unfortunately discourage global collaboration, reduce the overall economy of scale of the enterprise, and thus devalue any financial sustaining opportunities. We must pay attention to the lessons learned by groups like the World Wide Web Consortium and its standardization and maintenance of the HTML and XML standards.

Intellectual property fragmentation. Just as with open source software, there are a number of copyright licenses that can be applied to OERs. These various licenses present a number of compatibility issues. For instance, there is currently a debate regarding whether open materials should or should not be commercially usable. Licensing that renders open materials only noncommercially useable promises to protect contributors from potentially unfair commercial exploitation. A noncommercial license, however, not only limits the spread of knowledge by complicating the production of paper books, e-books, CDs and DVDs, but also cuts off potential future revenues that might sustain non-profit OER enterprises in the future. Interestingly, such an anticommercial stance is contrary to that of the more established open source software world, which greatly benefits from commercial involvement. Where would Linux and Apache be without the value-adding contributions of for-profit companies like Red Hat and IBM, for instance?

Quality control. How can OERs produced in a grass-roots fashion, by people with varying skill levels and degrees, for widely varied reasons, be adequately vetted for quality? The anxieties frequently aired about projects like Wikipedia and other open-authorship projects suggest they are threatened by the proliferation of massive amounts of low-quality material that might swamp the information environment and prove impossible to navigate. Traditional publishers, as well as institution-based OER projects like MIT OpenCourseWare, employ a careful internal review process before their content is made publicly available. However, such a prepublication review cannot scale to keep up with the fast pace of community-based OER development, where materials may change daily or even hourly. Accept/reject decisions also create an exclusive rather than inclusive community culture. And finally, prereview does not support evaluation of modules and courses based on actual student learning outcomes. Some promising steps are being made in this direction. In one, Connexions recently rolled out a system of post-publication "lenses" that are open to an arbitrary number of third-party reviewers and editorial bodies. Several universities, companies, and professional societies are currently reviewing content for their lenses (see cnx.org/lenses).[5]

OERs have the potential to aid in the democratization of the world of knowledge.

Success models. While the advantages of remixing and reusing educational content are readily apparent (and while authors already consciously and unconsciously remix ideas from myriad different sources as they compose), we need more OER success models to build upon. We surmise that the lack of a large number of models is due in a large part to technological barriers (which are gradually being overcome) and in a lesser part to several hundred years of academic community dynamics (which are being addressed by community-organized OER projects like the IEEE's mentioned earlier).

Moving Forward

Our experience with OERs over the past eight years has convinced us that the movement has real potential to enable a revolutionary advancement of the world's standard of education at all levels. Moreover, as it grows and spreads, the movement will have a large impact on the academic world itself. It promises to disintermediate the scholarly publishing industry, in the process rendering some current business models unviable and inventing new viable ones. It will also change the way we conceive of and pursue authorship, teaching, peer review, promotion, and tenure. And by encouraging contributions from anyone, anywhere, OERs have the potential to aid in the democratization of the world of knowledge.

A concerted effort from the community of authors, instructors, students, and software developers (that is, by you) will enable the OER movement to surmount the challenges on the road to these goals. Fortunately, it's easy to get involved: become an author for an OER project on your favorite topic; contribute your out-of-print work so others can build on it and keep it alive; adopt or remix an open textbook for your next course; start or participate in an OER quality review program; or translate an OER into a new language. Together, we can change the way the world develops, disseminates, and uses knowledge. C

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