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Creating the thirst

From its inception, scientists have grasped the potential of the Internet. Academicians initially developed software for idea and data sharing and created tools to ease the difficulties of long-distance collaboration. Most early development solved problems that were common across disciplines. The solutions, whether they were protocols for standardizing access to university and institute sites or programs for comparing DNA sequences, were freely shared. This heritage of sharing is combined with another characteristic that has manifested itself time and again throughout the Internet's development: an altruistic belief that the Internet can be a force for positive change. In April 2001, in line with this early sentiment, the Massachusetts Institute of Technology (MIT) announced their decision to make course materials for their entire institute freely available on the Internet. They have started a pilot program, MIT OpenCourseWare, through which they hope to have the core materials for at least 500 courses online in two years. This was the surprising outcome of MIT's quest to determine how they should use technology to advance education beyond the campus classroom. A free website could easily coexist with the "distance education" fee-based initiatives that are already in place at many institutions: paying to earn credit toward a degree is not incompatible with free provision of materials for course development or students elsewhere.

Free course material is a great departure from the trend of recent years toward a more profit-oriented Web. Vast archives of information have been translated into digital form and are now available for browsing, downloading, purchase or study. All this development has led to an Internet that is both useful and convenient. Yet increased use of the Internet hasn't translated into an increased curiosity about science or technology among the general public, except, perhaps, for a fleeting fascination with technology stocks. This lack of proficiency has left us ill equipped to deal with the intersection of science and society.

As the world becomes increasingly entangled with technology and dependent upon advances in molecular biology, it has been confronted with issues that never surfaced before. All countries need more scientifically and technologically literate citizens to deal with these new concerns. In recent years, numerous political choices have been made (for example, denying that HIV causes AIDS and prolonging the public's exposure to BSE-contaminated beef) concerning topics upon which science has great bearing, and yet, the science is often ignored or misinterpreted to suit political ends. The debate on using US federal funds to support research with embryonic stem cell lines would be more valid if the public were better equipped to evaluate the scientific issues. In other cases the press promotes public paranoia without providing an analysis of the scientific facts. Irradiation of food would not be feared if the confusion over radioactive materials and radiation were clarified. Thus, although the public has constant exposure to complex technologies and is bombarded with news of scientific findings, the facts are often misinterpreted, resulting in legislation based upon misconceptions. The "developed" world has had little success in educating its average citizen (or politician) about basic scientific knowledge and methods, which doesn't bode well for poorer countries.

What the general population needs is more educated science enthusiasts, and one way to increase the supply is to provide the inspiration. Despite the explosion of technological advances, the percentage of US college graduates that chose a science or engineering major has not increased since the early 1980s. Providing future primary and secondary school teachers worldwide with better science educations could be where MIT's seed yields the most fruit. If other highly regarded institutions follow MIT's lead, the beginnings of a valuable shared resource for educators, no matter where they reside, would be available. We cannot automatically expect the rational inclusion of science in public decision-making in the immediate future; it may not be until the next generation that we see results. Improved worldwide undergraduate education will produce more scientists and engineers. But more importantly, by training better those who train our children, the degree of familiarity and comfort most people have with real scientific thought and practice should increase. By reaching not just undergraduates but also primary and secondary school children, the necessary seeds will be sown.

The accessibility of the Internet makes it more realistic to envision these improvements taking place in the developing world. Many of the newer issues with which we are confronted, such as the use of genetically modified crops, have international implications and need worldwide participation in the debate. By making freely available the experience of scholar-teachers at the best educational institutes, universities in less developed countries will benefit by dramatically reducing the years it takes to create good science offerings. MIT's OpenCourseWare could open up new possibilities for making the world more scientifically literate, if long-term complementary efforts are also made to reach the youngest among us.