

# *The Silent Information Revolution*

by Steve Mowry

A revolution is defined as a drastic and far-reaching change in ways of thinking and behaving. The following is a discussion of revolutionary developments in the concept of freedom of informant and the way we learn and share knowledge resources and tools. I will breakdown what I see as the significant elements of this seldom-discussed present day phenomenon into two categories, open university and open software.

## **OPEN UNIVERSITY**

Traditionally, the great universities throughout the world were beyond the reach of most people. The prestigious academic institutions seemed to simply be facilities that supplied societies with the highly skilled professionals or the “elite”. An education at Harvard, MIT or Stanford almost guarantees success. Admission is difficult even for affluent candidates with average or even above average academic achievement. This then leads to the educational element of the information revolution, the OpenCourseWare consortium, [www.ocwconsortium.org](http://www.ocwconsortium.org).

The OCW consortium is a remarkable story of institutions rallying around an ideal of freedom of information and then delivering on the promise of that ideal. It is an ideal that flows from the passionate belief in a mission, based on the conviction that the free dissemination of knowledge and information can open new doors to the powerful benefits of education for humanity around the world. The individual can take control of his destiny.

Already, OCW is a large-scale, web-based publication of the educational materials from University courses throughout the world. This unique initiative enables the open sharing of teaching materials with educators, enrolled students, and self-learners around the world. OCW provides users with open access to the syllabi, lecture notes, course calendars, problem sets and solutions, exams, reading lists and a selection of video lectures. There are no fees and there is no enrollment requirement. The course materials can be downloaded from various university websites.

The driving force behind the OCW movement is the grad daddy of all technical universities and none other than Massachusetts Institute of Technology, MIT. I have previously referred to MIT as “the chambers of horror” when I resided in Massachusetts and attended a couple of seminars there. A university with academic standards at such the highest level is a demanding experience for students. Compared to the national average in the USA for 17 to 22 year-olds, MIT's suicide rate is almost three times the average at 20.6 per 100,000 since 1990. The national suicide average during that period at all colleges was estimated at 7 per 100,000. The OCW movement could help reduce suicides at all universities and especially the pressure cookers like MIT by giving students open access to course materials.

OCW helps advance knowledge by providing resources for educators, who may draw on them for curriculum development and teaching purposes, and students and self-learners, who may use the materials for their personal knowledge development. These resources may be particularly helpful for people in developing regions of the world. OCW stimulates innovation, generates alumni and community pride, enhances faculty and student recruitment, accelerates adoption of digital materials in teaching, and fosters collaboration among faculty. OCW provides a new vehicle for contributing to faculty members' discipline, affords greater visibility for themselves and their work, provides a valuable service to faculty for enhancing the presentation of course materials, provides an information resource, and values. OCW also helps students to plan their courses of study and provides supplementary study materials.

The underlying premise and purpose of OCW is to make course materials used in the host institutions' courses freely and openly available to others for non-commercial educational purposes. Through OCW, the publisher grants the right to anyone to use the materials, either "as is," or in a modified form. There are no restrictions on how a user can modify the materials for the user's purpose. Materials may be edited, translated, combined with someone else's materials, reformatted, or changed in any other way.

At first I considered this type of learning format was a great idea but would lack the "university experience". Although this may be the case, now a self-motivated learner can pick and choose what skills and knowledge are required for their occupation and what is the "best" OCW course available. This seems to be a very powerful tool with the option to self-manage the learning and skill enhancement process. This does appear to be best suited to someone whom has attained a Bachelors or an Associates Degree from an institution of reasonable standards but the OCW courses have no prerequisites. This puts the student in complete control and only limited by what wares are available. Having said this, an argument can be made that the openness and freedom of OCW allows a new University experience that is not limited by rules and traditions. This is truly revolutionary both in thought and behavior with regards to how we educate ourselves.

## **OPEN SOFTWARE**

The second element of the information revolution that I will discuss is Open Source Code software development, [www.opensource.org](http://www.opensource.org). Open source is a development method for software that harnesses the power of distributed peer review and transparency of process. The promise of open source is better quality, higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in along with any planned obsolescence.

The open source software license does not restrict any party from selling or giving away the OSC software as a component of a distribution containing programs from several different sources. The license shall not require a royalty or other fee for such a sale. The objective is obvious, free or low cost software that is readily available with the typical method of distribution being download. Most of the Open Source Code applications can be downloaded from [sourceforge.net](http://sourceforge.net).

The Open Source Initiative (OSI) is a non-profit corporation formed to educate about and advocate for the benefits of open source and to build bridges among different constituencies in the open-source community. One of the most important activities is as a standards body, maintaining the Open Source Definition for the good of the community. The OSI, Open Source Software certification mark and program creates trust around which developers, users, corporations and governments can organize open source cooperation.

I will use the analogy of chemistry as a replacement for alchemy to software development. The main difference between chemistry and alchemy was that alchemists kept their knowledge secret. If someone wanted to make a titrate of mercury, they had to find an alchemist who claimed to know how to make a titrate of mercury, and pay him for that knowledge. Knowledge was power; knowledge was wealth; so knowledge was held privately and sold dearly. Knowledge was proprietary.

To a computer, code is knowledge. Code is the essence of "How do I do this?" If someone wants a specific operation, then they have to buy code from somebody who already knows how to do it, or else re-invent it themselves. Or, if they are working in open source, they can simply find the code and copy it. Shared code, like shared knowledge, has a group power that proprietary organizations can never appreciate.

In the long run chemistry outran alchemy. It outran it because information, which is shared, compounds itself. For the same reason, in the long run open source code will swamp proprietary code. Code, which is shared, compounds itself. Proprietary software companies are trying to block each other with patents and copyrights; open source software companies are trying to help each other.

Open software finally addresses the issue of software piracy head on. Free distribution of OSC is fundamentally encouraged. Although some companies do offer low cost (~\$100.00) or even free limited "student versions" of their FE/BE software applications and a few companies may offer one to twelve month free trial licenses of their applications and there are even a few freeware technical software applications available, the vast majority are priced far above what the typical self-learner could afford. FEM and BEM multi-physics, mathematics and other engineering and scientific software applications retail for as much as \$100,000.00 for a perpetual license and are rarely less than several thousand US dollars. Open software could someday significantly change this.

The presently available PC hardware has advanced to the point where most PCs are as powerful as Engineering Workstations were just a few years ago. Another words, the Finite Element / Boundary Element software applications can now be run effectively on most new low to moderate cost PCs that are on most desktops. The desktop computers also tend to be easily upgraded by simply purchasing memory chips and/or new video and /or audio cards.

## **IMPACT ON THE AUDIO/VIDEO INDUSTRY**

If these sources of information discussed, OpenCourseWare and Open Software are coupled and utilized together by the self-learner, the results would be fascinating to say the least. In futuristic setting, I see a person sitting at his computer, studying and acquiring powerful knowledge and skills that at least in theory can result in super technical people operating with little or no funding. However, the value of these degreeless but self-motivated professionals could still be very high with regards to what society needs and thus a resultant potential high demand for these highly skilled human resources. This then implies higher salaries and improved standards of living for future generations, especially in developing countries. Forget educational standards for a moment and focus on the reality of “knowledge is power” from the perspective of the powerless.

Individuals can now target specific A/V technical jobs based on the required skills. Companies can encourage by incentives, very low cost self-training programs for employees utilizing OCW resources. The employees can take advantage of the flexibility of such programs and the companies' risk is mostly limited to someone changing jobs. There is an increased incentive to train employees and technical staff. Merit salary increases could be made contingent on outside self-study learning and training. Practicing independent engineers and technical staff can keep their skills up to date. The open approach seems to offer reasonable hope of acquiring the fundamental and advanced theories and technical information required for loudspeaker or audio electronics engineering. Specialized A/V software tools and systems can be developed quickly and at lost lost in house by utilizing free open source code.

The idea of being able to audit university level courses and to obtain powerful software applications in parallel all from a PC workstation anywhere in the world with no fees is a powerful concept that appears only to be limited by the diligence of the self-learner. The only requirements are a reasonably new PC and Internet connection. The shocking realization that this revolution although silent gives mankind the best hope of a solution to world peace, is this the answer we have all been looking for? If everyone is busy learning and/or solving the physical problems and challenges that the world faces while developing new products and processes, then war and atrocity are assumedly less likely. Well, at least peace in the office hopefully.

Whatever the outlook and impact, it is highly unlikely that these drastic changes will subside. Rather there is evidence to the contrary. These trends in freedom of information should continue to intensify with the advance of IT. Education of the elite seems to actually be counter to world peace in the context of this argument.

There are critical unanswered questions. Who will pay for the universities? Who will pay for the software development? I will leave these “open” for the reader to consider. However, each element of the Silent Revolution has economic market forces associated with it. If the traditional barriers from Institutions, Governments and Regulatory Agencies are taken down, a free information market will result. Something tells me that this could then open up opportunities for innovation that have not yet been considered based on the convincing arguments presented for OCW and OSC.