the Amazon Kindle and handheld devices such as the iPhone (see page 568). The printed textbook will not vanish anytime soon — but a generation from now, it could be just a memory.

Yet at the same time, new technology is not limited to delivering the same type of content in new formats. E-textbooks are part of a much larger technological shift in the nature of teaching and learning. As is typical on the Internet, it is users who are driving some of the most popular innovations. Although the large publishing houses are understandably taking their time to consider how best to connect to new media, teachers and students, unconstrained by the need to protect jobs and revenues, are further ahead in experimenting with how to make the best use of virtual environments.

At the simplest level is the worldwide trend for both teachers and institutions to provide online access to course notes — often free of charge. Beyond that are collaborations between teachers to produce altogether new types of learning resource. At the University of Edinburgh, UK, for example, teachers have produced a set of free-to-download computer animations that illustrate concepts and phenomena in the physical sciences (see www.ph.ed.ac.uk/cgi-bin/interactive/applets).

And at a third level are virtual classrooms, in which teachers speak to global audiences through online classes and seminars, or via do-it-yourself online courses such as those offered by the US National Science Teachers Association in Arlington, Virginia. Indeed, more and more colleges and universities are taking courses almost completely online through 'virtual learning environments' such as the commercial Blackboard system, headquartered in Washington DC, or the open-source Dokeos platform from Europe. These environments not only allow students to access tests, homework, grades and lectures via the Internet, but they increasingly use wikis, blogs, messaging and even three-dimensional virtual environments such as Second Life to create online communities around each course. Such communities are particularly valuable for distance learning, to avoid students having to work in isolation.

"There is a ferment of creativity and innovation in education that deserves to be encouraged."

The result is a ferment of creativity and innovation in education that deserves to be encouraged. The funding agencies and private foundations are already doing so to some degree. The Edinburgh project, for example, was funded by Britain's Higher Education Academy, based in York. But they need to support such efforts more systematically — particularly by developing toolkits that make it easy for teachers to create instructional modules, and by encouraging the adoption of Sharable Content Object Reference Model and other such open standards for instructional software so that the modules can be used anywhere.

Textbook publishers would also do well to support such efforts, rather than ignoring or even resisting them, as the music industry tried to do with digital recordings. Textbooks were kings in a world where few other learning resources existed. University students, college libraries and school science departments had no option but to buy them. Now they have much more choice. ■

A bill against rights

Italy's Senate has approved a bill that ignores patients' wishes and the country's own constitution.

On 26 March, the Italian Senate approved a bill that would give physicians in the country the right to override the living wills of people who are in a persistent vegetative state, and to try to keep the patients alive through artificial nutrition.

The measure has caused intense controversy. Many countries have laws, or established codes of medical practice, that protect the expressed wishes of an individual to decline treatment if they become severely incapacitated and incapable of communicating. In most US states, for example, a doctor must negotiate with relatives via an ethics committee if he or she believes that a patient incapacitated in this way could benefit from additional treatment. The Italian bill, however, which is now being discussed in the lower house of parliament, the Chamber of Deputies, explicitly allows physicians to overrule such living wills. It also declares that artificial nutrition — which requires a feeding tube to be implanted into the stomach — is not a clinical intervention.

Curiously, the proposed law applies only to patients in the type of prolonged, deep coma known as a persistent vegetative state, and not to those with other, similarly incapacitating illnesses. This is because the bill has been prompted by the recent and much-publicized death of Eluana Englaro, who spent 17 years in a vegetative state after a car accident at the age of 21. Her father, arguing that his daughter had voiced a desire to be allowed to die if incapacitated, had pressed her reluctant doctors to cease artificial feeding. He eventually took legal action, winning in one court after the next in fighting off all the doctors' appeals. In February, he finally had her moved to a hospital that was prepared to remove the feeding tube. Prime Minister Silvio Berlusconi issued an emergency decree to block the process, but the Italian president refused to sign it. The constitutional crisis was averted when Englaro died on 9 February.

Surveys have indicated that a large majority of Italians do not support the idea that living wills could be ignored. But most relevant scientific societies have been quiet. The Federation of Italian Physicians published only a mild statement, after the Senate vote, suggesting that it should have been consulted.

As tragic as Englaro's situation was, media-fuelled emotion is not a good basis for lawmaking. The Italian constitution says that no one can be forced to undergo medical treatment without his or her approval. The Chamber of Deputies must now ensure that the bill is imbued with a suitable level of scientific and legal sophistication, and that it meets this constitutional provision. Discussion needs to embrace the requested wider consultation with the medical community and provisions should be made for care-givers' conscientious objection. But a physician whose conscience precludes his or her personally removing a feeding tube should not have the last say in the life or death of a patient whose wishes are clearly stated. ■