

Between Conservatism and Messianism: Is Technology Really Changing Student Expectations in Higher Education?

Francesc Pedró

Senior Policy Analyst,
OECD Centre for Educational Research
and Innovation (CERI), Paris

<http://www.uoc.edu/inaugural10/>

Contents

Presentation

Imma Tubella, President of the UOC

3

Programme of the ceremony

5

Between Conservatism and Messianism:
Is Technology Really Changing Student
Expectations in Higher Education?

*Francesc Pedró, Senior Policy Analyst,
OECD Centre for Educational Research
and Innovation (CERI), Paris*

7

Presentation

We are about to start a new academic year that is marked by the upward trend in the number of students enrolling at Catalan universities. The number of new enrolments at the Universitat Oberta de Catalunya (Open University of Catalonia, UOC) has also gone up, which shows, firstly, an increased awareness in society for the need to include lifelong learning as one of the pillars for individual and collective progress; and secondly, in the case of students who have chosen to increase their higher learning at the UOC, it also reflects a determined desire for professional development and personal growth through the intensive use of ICTs as a vital and essential tool for access to knowledge.

Many people have stressed that the human condition, in all its senses, comes from training. Today, we have the honour of being able to listen to one of the leading figures in education and ICTs as he gives the inaugural lecture for the UOC's academic year 2010-2011. In particular, I would like to highlight that Dr Francesc Pedró, beyond a brilliant and extensive CV, has played an important role at the UOC since its beginning, as one of the ideologues and promoters of our teaching model, and also through his commitment to our university community as Vice President for Educational Innovation and Research. Currently, his main professional activity is his role as Senior Policy Analyst in educational policy at the OECD's Centre for Educational Research and Innovation (CERI) in Paris.

The initial success of the UOC's teaching model is based, in good part, on the clairvoyant vision that Dr Pedró had fifteen years ago and, thus, who better than him to encourage us to continue working everyday in terms of excellence and quality to make the UOC a worldwide point of reference in the field of networked and web-based higher learning?

Have a great academic year 2010-2011.

Imma Tubella i Casadevall
UOC President

Barcelona, September 2010

Programme of the ceremony

- Welcome from Imma Tubella, President of the Universitat Oberta de Catalunya (Open University of Catalonia, UOC).
- Presentation of the annual report for the academic year 2009-2010 by Dr Llorenç Valverde, General Secretary of the UOC.
- Inaugural lecture, “Between Conservatism and Messianism: Is Technology Really Changing Student Expectations in Higher Education?”, by Dr Francesc Pedró, Senior Policy Analyst at the Organisation for Economic Cooperation and Development (OECD) Centre for Educational Research and Innovation (CERI).
- Closing of the ceremony by Dr Joan Majó, the Catalan government’s Commissioner for Universities and Research.

Inaugural lecture of the academic year 2010-2011

Between Conservatism and Messianism: Is Technology Really Changing Student Expectations in Higher Education?

Francesc Pedró

Senior Policy Analyst, OECD Centre for Educational Research
and Innovation (CERI), Paris

By now it is quite obvious that technology¹ has changed the way in which higher education institutions run their activities, particularly in the domains of research, management and administration, information, and provision of critical services for the university community such as libraries. Teaching and learning practices are not an exception, and a wide range of different approaches to the adoption and integration of technology has already emerged and contributed to a changing landscape.

Less obvious and documented is the issue of how technology is affecting higher education students' expectations regarding teaching and learning. Some authors claim, in a sort of good pedagogical and messianic faith, that the attachment to the Internet and digital media that students show nowadays is deemed to have an impact on how they value traditional teaching and learning practices in higher education. As a response to these new emerging claims, institutions are expected to radically change their practices, drawing on and learning from how students manage communication and knowledge in their daily lives.

It is against this context that this lecture addresses three basic questions. First, what is the actual level of technology uptake by students in higher education? Secondly, are students' expectations changing because of this, in particular in relation to the ways

1. Throughout this lecture, unless indicated otherwise, any reference to technology should be understood as a wide term encompassing a wide range of digital information and communication devices and applications, ranging from mobile phones, music and video players and game consoles to computers and the Internet, just to name a few.

in which technology could change teaching and learning practices? Some indications seem to suggest that they are far more conservative in this respect than many university teachers would like them to be. Finally, to what extent are teachers in higher education responding to this challenge?

Yet, two considerations must be taken into account. On the one hand, this lecture is focused on traditional higher education institutions or, in other words, those which teach mostly on a face-to-face basis. The situation in distance teaching institutions might be significantly different in this respect for a number of reasons –namely the different composition of the student population and the fact that most teaching and learning occurs in an asynchronous way. On the other hand, this lecture emphasises that the higher education landscape is characterised by diversity. Such diversity emerges as a natural result of the combination of a high degree of institutional autonomy, which often results in diversity across institutional policies and practices, and very diverse disciplinary traditions, which give rise to diversity across faculties and schools.

Technology uptake: a few snapshots

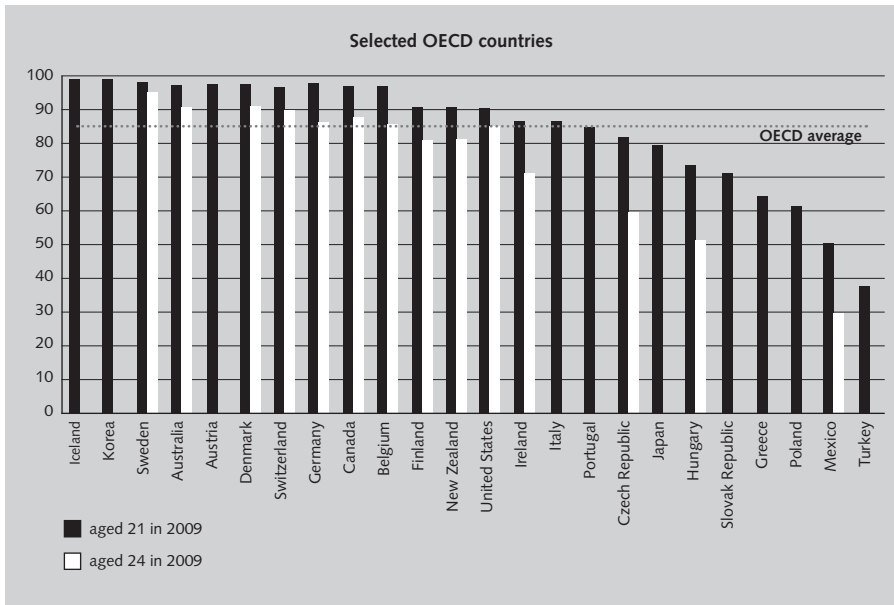
There is no doubt that the level of technology uptake by university students is impressive. Technology has become part of their daily lives, supporting their activities in areas such as social communication, information management, and cultural practices particularly in terms of media consumption. In this respect they are clearly much more attached to, if not dependent on, technology than were past generations.

Some snapshots and comparative data of the actual level of technology uptake can be taken as indications that confirm that across OECD countries students are heavy users of technology. In fact there is a clear correlation between the level of education and the intensity of technology adoption –although this correlation may be seen as a different facet of the digital gap. Some evidence regarding the important issue of for what purposes students use technology is also brought into consideration. Finally, it would be misleading, however, to conclude that all students are acting exactly the same way as there is clear evidence of different alternative profiles of students when it comes to technology adoption and use.

In the absence of international comparative surveys addressing the issue of how far higher education students are attached to technology, Figure 1, based on PISA data, provides a good indication by estimating the percentage of the age cohort now in higher education who declares to have a home computer. Actually the Figure presents the percentage of people aged either 21 or 24 in 2009 who declared to have access to a home computer when they were aged 15 –so six or nine years ago, respectively.

On average 85% of today's 21 year-olds had a home computer already in 2003. Interestingly, the number of OECD countries surpassing this figure is higher than the

Figure 1. Estimated percentage of young people aged 21 and 24 in 2009 having a home computer



Source: PISA database (2003 and 2000). Values refer only to OECD countries that took the PISA ICT familiarity questionnaire these two years.

corresponding countries lagging behind. Moreover, in thirteen out of the twenty-four OECD countries that participated in PISA 2003, this value was at least 90%. Although data are available only for some countries, the differences in percentages between 21 and 24 year-olds suggest a pace of growth that could easily lead the majority of OECD countries to the universalisation of home computers in less than five years – or even before – with a matching development also in broadband access (OECD, 2008).

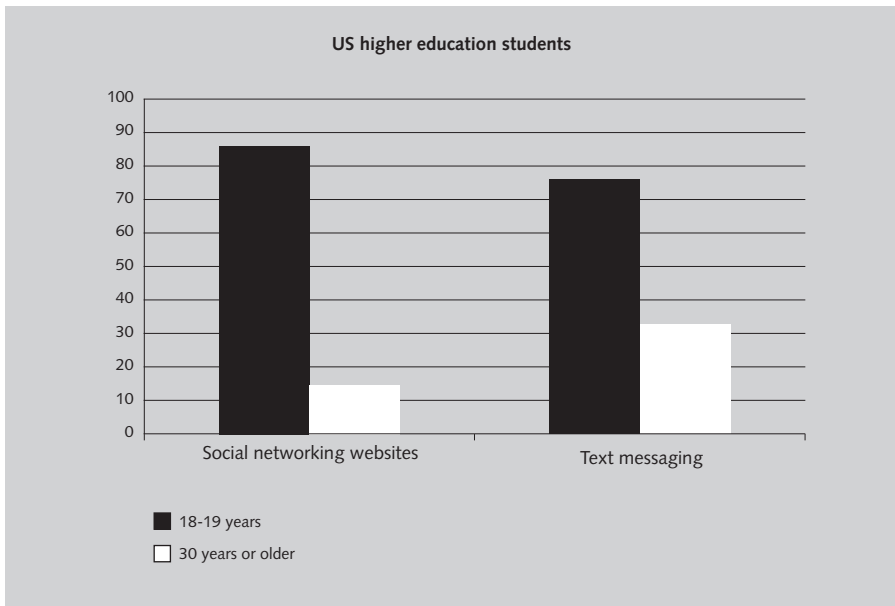
For a number of reasons the percentages presented in Figure 1 are likely to be underestimating the real values. A number of national surveys already point to higher levels of technology adoption, up to the extent that it can be reasonably expected that any new entrant to a higher education institution has access not only to a home computer or increasingly to a laptop, but also to an Internet connection. For instance the most recent survey of undergraduate students in the United States (Salaway, Caruso & Nelson, 2008)² reveals that more than 80% of them own laptops compared to only

2. This study involved some 27,317 students from community colleges, colleges and universities in the United States. The 2008 edition, as well as the previous ones, can be downloaded from www.educause.edu/ecar.

66% in 2006. Additionally, 54% own desktops and approximately one-third have both. Obviously, a computer connected to the Internet seems to be an integral part of the necessary equipment of a higher education student nowadays. Although the situation in the United States might not be necessarily representative of the OECD average for obvious reasons, including the residential nature of most campuses which reinforces the need for better opportunities for communication with friends and family, it is clearly a good indication of the speed at which higher education students are equipping themselves with computers: of those entering higher education in 2008, 71% have a laptop which is less than one year old.

There are also striking differences in the levels of use among university students according to age, which points to the fact that younger students are far more technology savvy than older ones or, to say it differently, undergraduates rely more on technology than postgraduate students. As an indication of this, Figure 2 compares the use of a couple of significant applications (social applications and text messaging) by two different age groups of students in higher education institutions in the United States: new entrants and the oldest students, mostly postgraduates. The use of text messaging is doubled by

Figure 2. Use of particular applications weekly or more often



Source: ECAR, 2008.

younger students, whereas social networking applications are hardly accessed by older students while being widespread among new entrants.

Whether undergraduate students are more attached to digital technologies than their graduate peers in the same institutions is hard to say. A European comparison of the rates of PC ownership by new entrant students and graduate students in a number of European universities³ showed mixed results. In the end it turned to be that the use of technology increased significantly during the university years in comparison with the past experience in secondary education in some universities while in others there appears to be a slight decrease, at least measured by the ownership of a PC. The reasons for such a disparity across countries would need further investigation (and unfortunately they are not discussed by the authors), but the least that can be said is that this disparity is surely related to the different technology requirements posed by the courses dictated in each of the participating universities which, in turn, are likely to depend on the prevalent teaching methods.

All of this shows that what is most important are the purposes for which technology is being used. There are two universal activities since 2007 among US higher education students: emailing and word-processing.⁴ Although there is not much information about the uses of email facilities in European universities, the *Europaeum* survey (Flather & Huggins, 2004) revealed that university students appear ready to use email for communication with staff and fellow students they study with (77%), friends (83%), and university administrative staff (59%). Although it is no surprise that the main recipients of students' emails are friends and fellow students, there is certainly something new in the fact that emailing with university administrative staff ranks so highly, which indicates that there is a point in introducing technologies to facilitate administrative efficiency at universities.

Other than these, it is interesting to see in Table 1 below the mixture of technology-enabled activities ranking with high levels of student engagement since they include both those which can mostly, if not only, be related to academic work with others which can possibly be linked to entertainment almost exclusively. Among the former it is really impressive to see the high levels of access to the library website, mostly on a weekly basis, as a natural development of the growing availability of academic

3. The SEUSSIS project, funded by the European Commission under the Socrates Programme collected information about Information and Communication Technology (technology) experience, skills, confidence and attitudes of students and academic staff at seven European universities in Finland, Norway, France, Spain, Italy, Belgium, and the Netherlands. The questionnaires were not administered in all universities to a representative sample of the corresponding population and accordingly are reproduced here only as mere indications. The total number of questionnaires received from students was 12,716. **Information may be downloaded from www.intermedia.uib.no/seusiss.**

4. In view of this it was decided not to ask anymore about these two activities in future surveys. This is why the 2008 survey does not contain information about any of these two activities, under the assumption that all students carry them out.

Table 1. Most frequent student computer and Internet activities

In US higher education institutions			
	Students engaged in 2007 (%)	Students engaged in 2008 (%)	Median frequency of use
Create, read, send emails	99.9	-	Daily
Word processing for coursework	98.6	-	Several times a week
Use the institution's library website	94.7	93.4	Weekly
Presentation software	91.7	91.9	Monthly
Spreadsheet	87.9	85.9	Monthly
Social networking sites	81.6	85.2	Daily
Text messaging	84.1	83.6	Daily
Course management system	83.0	82.3	Several times a week
Download web-based music or videos	77.8	77.3	Weekly
Graphics software	72.3	73.9	Monthly
Instant messaging	-	73.8	Several times a week

Source: Own calculation on the basis of ECAR, 2007, 2008. Only those activities in which more than 50% of students are engaged are presented here. (-) data not available for that year.

resources in digital formats only, and the even higher use of course management systems – which are increasingly becoming a mandatory campus commodity. The same applies to British first-year students (Ipsos Mori, 2008), among whom 79% access course-specific materials at least once a week and 97% of these find it useful. Among the latter, the only noticeable increase in one year corresponds to the use of social networking sites such as Facebook.

Such a pre-eminence of social applications can be also seen in British first-year university students, even to a higher extent with 91% of them declaring frequent use (Ipsos Mori, 2008). Again, a similar picture can be seen in Australia, with quite an impressive percentage of students frequently using the university learning management system to access course-related materials (81%) (Gregor Kennedy, Krause, Judd, Churchward & Gray, 2006). European students, however, do appear to spend more time using the Internet for personal or entertainment activities than for formal academic work (Flather

& Huggins, 2004). Some 42% use the network for such purposes for four hours or more a week. This compares with 91% of students who use it for less than one hour a day to retrieve course or lecture materials.

The conviction that Web 2.0 applications would transform Internet users increasingly into content producers (OECD, 2007) is also confirmed on the basis of this data. More than one-fifth of US higher education students are actively contributing content to blogs, wikis, photo or video websites such as YouTube, and 18% contribute regularly to at least three of these – although almost 39% declare not to contribute to any of these. While the pattern of Australian and British students seems to be equivalent to the one in the United States (Gregor Kennedy, *et al.*, 2006), Italian university students appear to be even more attached to blogs, with up to 42% of them contributing regularly to their own and 78% often reading others' blogs (Ferri, *et al.*, 2008). Two additional areas where the differences between Italian and US students seem to be non-existent are text messaging and instant messaging. Accordingly, it may well be that the differences in the digital diet of higher education students are not so high among the OECD countries.

Finally, it would be misleading to take for granted that average values represent the overall majority of higher education students. To begin with, at least in a number of OECD countries, an important part of the student body is constituted largely by people older than assumed. This accounts for as much as 40% of any student cohort, who might be older than 25 and certainly not responding to the stereotype of a digital native (Prensky, 2001) or a new millennium learner (Pedró, 2007), as this percentage certainly includes people with full or part-time jobs and sometimes family obligations.

It is true that when the observations are restricted to young new entrants, aged around 20, contrarily to what might be expected, differences in the amount of use according to gender or age are not significant, but they become relevant when the majors are considered. Not surprisingly, in the United States engineering majors are the ones using the Internet most often (mean of 25 hours per week) and those in education show the least use (mean of 17.6 hours per week) – which points again to significant differences in course requirements and teaching methods in different disciplines. Exactly the same is true of Australian university students, again with those majoring in education at the lowest level of the scale of use (Gregor Kennedy, *et al.*, 2006).⁵

Other than this, it is easily arguable that different profiles of students *vis à vis* technology coexist. A study at the University of Melbourne (Gregor Kennedy, *et al.*, 2006) noted that there is little empirical support for the stereotypical depiction of the digital native –wired and wireless 24/7. When one moves beyond entrenched technologies and tools (e.g. computers, mobile phones, email) the patterns of access and use of a range

5. CERl is currently developing a study on the use of technology in initial teacher training, whose origins are partly connected to the evidence of the reduced use of technology in schools of education.

of other technologies show considerable variation. Another important exception to this overall emphasis on the homogeneity of students is the Numediabios study (Ferri, *et al.*, 2008), which concludes that there is enough evidence to support the existence of a number of diverse higher education student profiles in relation to technology use.

Students' views and expectations regarding technology integration in teaching and learning

Students and teachers have different expectations regarding the added value of technology in teaching and learning. The resulting differences may emerge at least partly from different experiences with technology in their daily lives. Just to give an indication of the growing competences of university students in relation to potentially relevant educational uses, a recent study from Pew Internet and American Life found that in the United States more than half of the 12 million teens online create original material for the web, whether through a blog or a home page, with original artwork, photos or video (Lenhart, Madden, Rankin Macgill & Smith, 2007) and, as has been shown above, this translates into a relevant proportion of higher education students contributing to blogs, photo or video sites, thus becoming content producers. This in turn may have an effect on their expectations – for instance, most prospective British university students (79%) would expect to have to take their own computer to university with them and be able to use it logging on to the university network (81%) (Ipsos Mori, 2007).

On the whole, however, there is little empirical evidence regarding the so often assumed shift in students' demands and expectations caused by their attachment to technology. Although student surveys have been in place for a long time in a number of OECD countries, including Australia, France, the United Kingdom, and the United States, the issues related to expectations regarding technology in teaching have not been taken into account except in surveys where the main topic is precisely technology adoption.⁶ International comparative evidence is even scarcer, and sometimes the nature of the methodology used does not allow room for generalisations. However, there are a few studies, with very limited and unrepresentative samples, which might be taken as indicative of what may be going on.

What emerges from available data is that students appear far more reluctant to technology adoption in teaching and learning than their levels of digital media exposure would suggest. In general they welcome uses and applications that are intended to provide more convenience (for example, access to course guidelines, notes or background documents) or improve their productivity in academic tasks (for example, online databases

6. For a comparative analysis of some of these surveys see Higher Education Academy (2007).

or virtual libraries). Other than this, they advocate for a use of technology in teaching which supplements rather than changes the traditional models, and they certainly show a clear preference for a face-to-face teacher or tutor relationship over computer-mediated communications.

To begin with, the main reasons for which students may be keen for use of technology in their courses are not so related to their willingness to see teaching and learning radically transformed as to the added value of convenience. This was pointed out by Caruso and Kvavik (2006) who found that the most valuable reason for using technology in courses is precisely convenience (51% of students), followed by the ability to easily manage course activities (19%), and to a much lesser extent the opportunities to enhance learning (15%) and to communicate with peers and teachers (11%). Accordingly, from the student perspective, technology is useful because of the convenience and control it provides, rather than for its transformative power.

Not surprisingly, overall, European students clearly appear to want to see more use of technology in their courses, although a significant number, roughly one-fifth, remain unsure (Flather & Huggins, 2004). This may suggest two different things. First, concern that the benefits of improved communication may also lead to less direct contact with staff, with distance learning or e-learning replacing some traditional teaching methods; and second, that the way in which technology is being used by instructors is asking students to do even more, unexpected or not well understood activities whose added value is not evident to them – or not well explained by instructors.

In a similar vein, another European study (Spot+, 2002) found that although university students held a fairly positive view of the different advantages that ICT can bring to learning and education, they had also a similar positive attitude towards learning with traditional education methods and one which questioned the value of ICT in education. A closer inspection of the answers on the individual questions reveals that university students were especially interested in the use of ICT for purposes of information exchange, such as “to ask questions of experts and relevant people no matter where they are” and “to share information and ideas with people who have similar interests”. With respect to explicit learning purposes the students expressed a stronger preference for traditional education methods (defined as printed text and a classroom setting) than for ICT-based methods.

In many ways it may well be that student expectations regarding technology adoption in teaching are less supportive of innovations than it is commonly assumed. There are clear indications that their main assumption is that teaching is about conveying knowledge from the teacher to the learner, from a position of authority. If ICT is to be used in an educational context, students tend to express doubts about the quality of the human interaction when there is no face-to-face contact. Moreover, 21% of the respondents of a European survey of higher education students (Flather & Huggins, 2004) indicated that they did not know whether “small-group learning may become disorganised in online courses”, 14% did not know whether “learning with ICT is very time-consuming,” and

13% did not know whether “ICT can improve their learning.” A more recent survey of prospective students in the United Kingdom found that four fifths (80%) felt that the quality of teaching at the university, expressed in terms of actual contact with teachers, was more important than the IT provision (Ipsos Mori, 2007).

This is seen across the board – high or low ICT use does not necessarily correlate with the perceived importance of quality of teaching over ICT provision. ICT is seen as a supplement to teaching, not as a substitute for the personal interaction to which they are accustomed. This might indicate that, due to the lack of experience with ICT, students expressed themselves rather cautiously about its use in education, leading them to state a higher preference for traditional education methods, which are well known to all students. This means that students leaving secondary school and entering the university have a stronger preference for traditional education methods and a more negative attitude towards using ICT than students who are a few years older and have already spent some years at the university or in work as it is the case of postgraduate students.

It could be said that prospective students think of technology as improving their learning by giving them more access to data and research resources, rather than imagining totally new methods of teaching, learning, or interacting with peers and lecturers. This mirrors their understanding of how ICT works at school and home – and it also mirrors the experience they have had so far at school, a traditional teacher and pupil environment. They find it hard to imagine other kinds of interactions and engagements. So, when prospective British students were asked about being taught by lecturers, the traditional teacher/pupil environment was preferred. As the report concludes, “the face-to-face teaching quality was felt to be the most visible sign of the university’s value for money – it’s what they believe they are paying for” (Ipsos Mori, 2007, p. 25). In fact, it may well be concluded that prospective students in the United Kingdom are convinced of the benefits of technology adoption in universities, but provided that it is used to support established methods of teaching and administration, and not to change them dramatically; to act as an additional resource for research and communication; and to be a core part of social engagement and facilitate face-to-face friendships at university.

A companion study done also in the United Kingdom one year later with first-year students found that face-to-face interaction is still seen as the best form of teaching, fitting well with the prevalent student view about what teaching should be. They may feel uncomfortable when teachers try to relate to them in a flat, non-hierarchical structure (e.g. getting involved with personal Facebook accounts). However, the use of ICT in teaching is now perceived to be a good thing, but only as long as it is done well. Face-to-face interaction supported by inefficient or inept use of technology is worse than using none (Ipsos Mori, 2008).

All of this is fully in line with observations made, for instance, by Oblinger and Hawkins (2005) who argued that “the assumption that students want more technology may not be valid: especially younger students are less satisfied with complete online

learning than older students. The reason appears to tie to their expectation of being in a face-to-face, social environment." In a similar light, Zemsky and Massy (2004) also stated that "students do want to connect but principally to one another; they want to be entertained, principally by games, music and movies; and they want to present themselves and their work. E-learning at its best is seen as a convenience and at its worst as a distraction –what one student called *the fairy tale of e-learning*." As a recent British report has signalled, "students do not fully understand how ICT and learning can work together. They imagine and like the idea of the traditional, Socratic, or chalk and talk methods with face-to-face learning" (Ipsos Mori, 2007, p. 31). As a result, the inherent assumption that students are so attached to technology in their everyday lives that it warrants their full endorsement of its inclusion in teaching and learning, has to be contested. At the least it is unclear that students want their everyday technologies to be adopted in full as learning technologies.

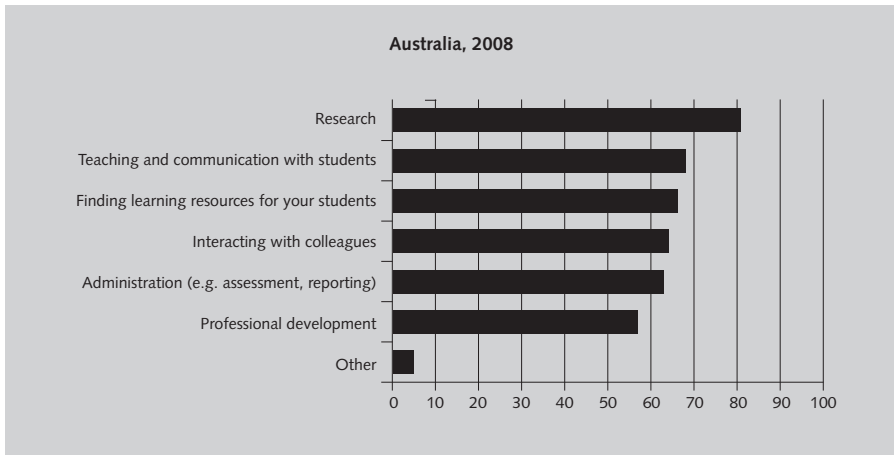
It is not surprising that European students also appear divided on the level of contribution that increased usage of technology may make to the critical and intellectual abilities of students. Less than one out of ten (8%) respondents strongly agreed that ICT encouraged independent learning, whilst 9% also disagree with this statement. Moreover, as Kennedy *et al.* (2008, p. 4) have pointed out, "it is not clear that emerging technologies and students' everyday skills with them will easily translate into beneficial technology-based learning". In other words, the fact that they are digitally literate does not imply necessarily that they are capable of employing technology strategically to optimise learning experiences and outcomes. As can be read in the preface by Katz to the ECAR 2005 study (Caruso & Kvavik, 2005, p. 7), "freshman students arrive at our institutions with a set of electronic core skills. Such skills include communications (telephone, email, text-messaging, and IM), Web surfing (not to be confused with research skills), word processing and video gaming... These young people can make technology work but cannot place these technologies in the service of (academic) work." In fact, higher education teachers may be expected to help students to employ technology more strategically, but is this what students want?

How are teachers responding?

It may be true that when it comes to the adoption of technology in teaching in many OECD countries the progress made at university level clearly outperforms the realisations made in the lower levels of the education system.⁷ Not only are university students

7. Although this appears to be a bold statement, it is important to note that the level of granularity of data regarding technology adoption and use in teaching in higher education is, at least in a number of OECD countries, extremely high in comparison to the equivalent in the schools sector, for which such a level of detail does not exist at all. The different level of data availability is thus a clear indication of the degree of interest in the issue.

Figure 3. Percentage of higher education teachers who use the Internet for specific tasks

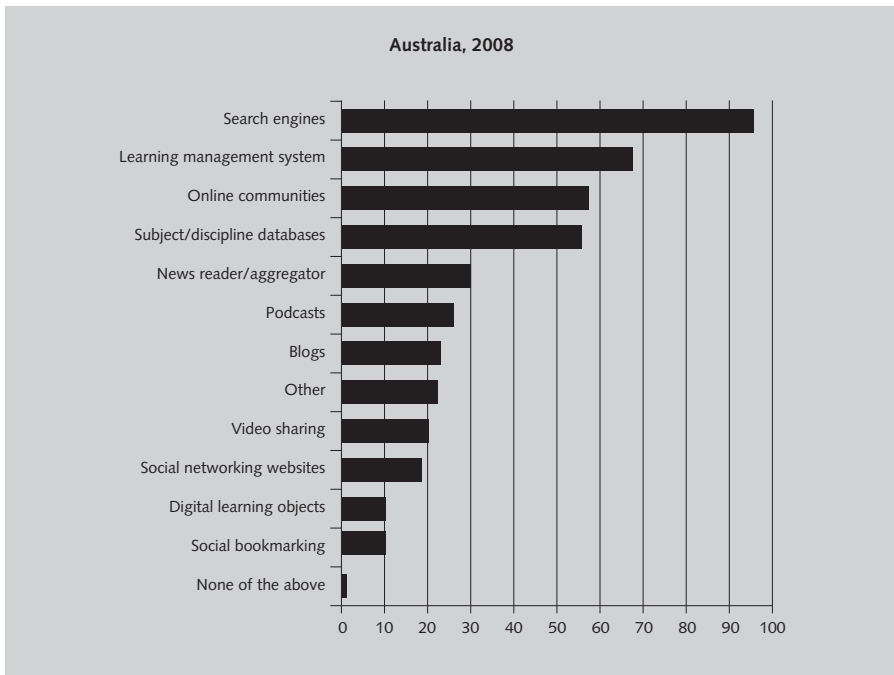


Source: Edna, 2008.

increasingly using technology in their capacity as students to find and collect relevant information, to process it and to transform it into knowledge, but their instructors also seem to keep their promises in doing their best to incorporate technology to facilitate, if not learning at least a number of activities that surround it, such as access to study materials, course notes, guidelines for coursework, recommended reading lists and the like.

As a matter of fact, the assumption that most teachers in higher education are digital immigrants (Prensky, 2001) might be true only on the basis of their age, but certainly not regarding their technological skills and competences. For a number of reasons, including the important role that research plays in academic development, which increasingly requires a mastery of technological tools such as digital databases and libraries, most academics may have a quite impressive attachment to technology although not necessarily to do the same that their students do. It is important to realise that when compared to primary and secondary school teachers, higher education teachers tend to be well equipped and behave as heavy users of technology. Interestingly, the *Europaem* survey found that in 2003 European academic staff were more frequently networked from home than students, 83% possessing access to email from home, and 52% having direct access to the university campus intranet at home. Needless to say, ownership of computers by staff was very high (95%), with 91% reporting that they use email to communicate with academic colleagues, 86% with administrative staff, 78% with students, and 78% with friends. One out of two staff report regular accessing of the campus intranet while almost 10% claim that they never access this part of the network. Of course, all this might be the

Figure 4. Most frequently used online services by higher education teachers



Source: Edna, 2008.

outcome of their careers being so attached to research, and thus to technology to access sources and to process information, and probably less as an implication of their teaching and learning assumptions –although it may well also be the case. A very recent Australian survey (Education Network Australia, 2008) found that 90% of higher education teachers considered the Internet as very important for their work and, interestingly enough, it was not only for research purposes but also for improving teaching and learning opportunities and resources for students, as Figure 3 shows.

When it comes to the most frequently used online services, the profile of Australian higher education teachers depicted in Figure 4 shows precisely the combination of three different activities: research-oriented activities (searching subject or discipline databases), teaching-oriented activities, and activities related to community life. Clearly, the most frequently used application is a search engine, but immediately after this comes the university's learning management system, which gives an indication of the impact of technology on teaching and learning. Certainly, some of the applications can be said to

serve multiple purposes (e.g. a search engine), but the reference made to digital learning objects (mentioned by 10% of the teaching staff) is an additional indication of the importance of the digital dimension in teaching and learning in higher education.

As was said when describing the different profiles of university students, it is clear that not all university instructors are eager to adopt technology in their teaching. The *Europaem* survey (Flather & Huggins, 2004) found three types of them:

- *enthusiasts* (12%) who claim to spend three or more hours a week publishing online course materials while the majority of staff (58%) spend one hour or less on this;
- *pragmatists* who see the value for both students and staff and feel reasonably comfortable with increasing use; and
- *sceptics* (17%) who still have a reluctance, and some even antipathy, to them.

The actual applications and uses of technology by teachers in higher education may not all be impressive innovations. Rather, it appears to be that “faculty have typically used advances in information technology either to automate conventional forms of instruction or to make small steps in expanding the range of communicative and experiential patterns we accommodate” (Dede, 2007). In so doing they are trying to replicate the productivity gains that they have obtained from an intensive use of technology in their research and managerial tasks, as well as the accompanying convenience and commodity.

It may be taken for granted that not all universities or countries have implemented these developments equally at the same rate. In particular there seems to be a clear gap between the majority of higher education teachers in continental Europe and in Anglo-Saxon countries, where developments have been faster and pioneering in many different ways. There are four main reasons for this gap between continental European and Anglo-Saxon universities. First, the technological context of the country matters a lot. Second, there is an important cost attached to investments in technology and the rates of expenditure per student, and inevitably the fees, if any, are quite different. The investment capacity of many continental European universities depends heavily on direct State support, whose political priorities in higher education might be more focused on research than on improving teaching.⁸ Third, continental European universities do not compete to attract students in the same ways that American universities do. The residential campus experience is far from being as frequent in continental Europe as it is in Anglo-Saxon countries. Finally, despite the efforts made so far under the framework

8. In a pioneering dissertation, Boezerooij (2006) suggested that there are both external and internal contingencies that can help to explain which kind of strategy on the use of e-learning higher education institutions are adopting. Interestingly enough the two abovementioned factors, the technological context and the investing capacity of institutions, ranked very highly in her empirical analysis.

of the Bologna process, the fact is that the predominant approach to teaching and learning in continental European universities seems to depend more on lecturing than on interaction. This difference in approach might be the result of different factors, ranging from larger classroom sizes or a teaching paradigm which puts less emphasis on teacher communication and didactic skills, or a combination of these factors.

Looking forward

What will the future bring? How should higher education institutions prepare for that future? If anything is clear, it is that technology will continue to evolve as fast as it has done in the past decade, if not more so. Digital devices that are considered to be indispensable by today's higher education students were not accessible to a majority of them only five years ago, if not less. As a number of reports outline (Johnson, Levine & Smith, 2009), the future will also bring new applications and environments that may have, once again, an impact on the way young people communicate, are entertained, socialise and deal with their coursework.

It is unclear, however, whether the new technology developments will transform students' learning expectations and demands or not. Drawing on recent years, a prudent approach would be to state that a certain evolution will take place, particularly if the experiences with technology in the previous school years contribute to raise students' awareness of the opportunities for improved learning processes and outcomes. In the absence of previous successful experiences, an important level of reluctance will remain.

Until now higher education institutions have done a lot to support technology adoption in teaching, with important investments in infrastructure as well as in services both for students and teachers. They must keep up with emerging technology developments, equipment and applications, and contribute to the support of innovations intended to explore the value and possible benefits of adoption for teaching.

Institutions have to invest in empirical research to elucidate ways in which technology can provide more than convenience and productivity, in particular learning benefits, either by providing a more rewarding experience or better learning outcomes, or both. As Dede (2007, p. 4) has already outlined, one starting point for fruitfully locating technology in higher education pedagogy is to observe how students are using technology in other aspects of their lives, "sifting out the dross of behaviours adopted just because they are novel and stylish from the ore of transformational approaches to creating, sharing, and mastering knowledge." What is at least as important as the research effort is the ability to share the results in fora where they can be translated into recommendations for better practice. This should not be an individual task but a commitment of the whole academic community.

Finally, no one can predict now what the teaching and learning experience in higher education will be like in a decade. The recent evolution shows that whatever has taken place has been the result of the dialogue between students who master digital media but have quite prudent expectations about its use in teaching, and teachers who want to extend the benefits of convenience and academic productivity brought about by technology to enrich their teaching responsibility. It is in the best interest of higher education institutions to nurture this ongoing dialogue with accompanying measures and incentives. It should remain as open as the future usually is.

References

- BOEZEROOIJ, P. (2006). *E-learning Strategies of Higher Education Institutions*. Enschede: University of Twente.
- CARUSO, J. B.; KVAVIK, R. B. (2005). *ECAR Study of Students and Information Technology, 2005: Convenience, Connection, Control, and Learning*. Washington, DC: Educause Center for Applied Research.
- CARUSO, J. B.; KVAVIK, R. B. (2006). *Preliminary Results of the 2006 ECAR Study of Students and Information Technology*. Washington, DC: Educause Center for Applied Research.
- DEDE, C. (2007). "Foreword". In: G. SALAWAY; J. B. CARUSO; M. R. NELSON (editors). *The ECAR Study of Undergraduate Students and Information Technology, 2007*. Vol. 6. Boulder, CO: Educause.
- EDUCATION NETWORK AUSTRALIA (2008). *ICT and Educators Market Research*. Higher Education: Education.au.
- FERRI, P.; SCENINI, F.; COSTA, E.; MIZZELLA, S.; CAVALLI, N.; POZZALI, A. [et al.] (2008). *Snack Culture? La dieta digitale degli studenti universitari*. Milà: Università Milano Bicocca.
- FLATHER, P.; HUGGINS, R. (2004). *Europaeum survey*. Oxford: Future of European Universities Project. Daimler Chrysler Services AG.
- HIGHER EDUCATION ACADEMY (2007). *Comparative review of British, American and Australian national surveys of undergraduate students*. Higher Education Academy.
- IPSOS MORI (2007). *Student Expectations Study. Key findings from online research and discussion evenings held in June 2007 for the Joint Information Systems Committee*. Londres: Joint Information Systems Committee (JISC).
- IPSOS MORI (2008). *Great Expectations of ICT. How Higher Education Institutions are measuring up*. London: Joint Information Systems Committee (JISC).
- JOHNSON, L.; LEVINE, A.; SMITH, R. (2009). *The 2009 Horizon Report*. Austin, Texas: The New Media Consortium.

- KENNEDY, G.; JUDD, T.; CHURCHWARD, A.; GRAY, K.; KRAUSE, K. (2008). "First year students' experiences with technology: Are they really digital natives?". *Australasian Journal of Educational Technology*. Vol. 24, no. 1, pp. 108-122.
- KENNEDY, G.; KRAUSE, K. L.; JUDD, T.; CHURCHWARD, A.; GRAY, K. (2006). *First Year Students' Experience with Technology: Are they Really Digital Natives? Preliminary Report of Findings*. Melbourne: Centre for Study of Higher Education, The University of Melbourne.
- LENHART, A.; MADDEN, M.; RANKIN MACGILL, A.; SMITH, A. (2007). *Teens and Social Media. The use of social media gains a greater foothold in teen life as they embrace the conversational nature of interactive online media*. Washington DC, USA: Pew Internet & American Life Project.
- OBLINGER, D. G.; HAWKINS, B. L. (2005). "The myth about E-learning". *Educause review*. Vol. 40, no. 4, pp. 14-15.
- OECD (2007). *Participative Web and User-Created Content: Web 2.0, Wikis and Social Networking*. Paris: OECD.
- OECD (2008). *Broadband Growth and Policies in OECD Countries*. Paris: OECD.
- PEDRÓ, F. (2007). "The New Millennium Learners: Challenging our Views on Digital Technologies and Learning". *Nordic Journal of Digital Literacy*. Vol. 2, no. 4, pp. 244-264.
- PRENSKY, M. (2001). "Digital Natives, Digital Immigrants". *On the Horizon*. Vol. 9, no. 5, pp.1-12.
- SALAWAY, G.; CARUSO, J. B.; NELSON, M. R. (2008). *The ECAR Study of Undergraduate Students and Information Technology, 2008*. Vol. 8. Boulder, CO: Educause.
- SPOT+ (2002). *Survey report: Students' perceptions of the use of ICT in university learning and teaching*. Brussels: The SOCRATES Programme - MINERVA Action.
- ZEMSKY, R.; MASSY, W. F. (2004). *Thwarted Innovation, What Happened to E-learning and Why*. The Learning Alliance at the University of Pennsylvania.



Dr Francesc Pedró joined the OECD Centre for Educational Research and Innovation (CERI) in Paris, France, in 2005. In his capacity as Senior Policy Analyst, he is the principal administrator of the *Teaching and Learning International Survey* (TALIS, www.oecd.org/talis) which examines teachers and teaching conditions in OECD countries from a comparative perspective. Prior to this assignment, he was Director of the *New Millennium Learners Project* (www.oecd.org/edu/nml). He was also in charge of the *Reviews of Educational R&D* in OECD countries and of a project on *Systemic Innovation in Education*, which included a strand on vocational education and training, and another on digital learning resources.

Dr Pedró, born in Barcelona in 1960, obtained his MEd from the Autonomous University of Barcelona and PhD in Comparative Education from the Spanish National Distance Education University. He subsequently did a postdoc in Comparative Education at the University of London's Institute of Education. He has been Professor of Comparative Education and Public Policy at Pompeu Fabra University, Barcelona, and Academic Director of its educational quality programme. Prior to that, he was Vice President for Educational Research and Innovation at the Universitat Oberta de Catalunya (Open University of Catalonia, UOC), Europe's first public internet-based university.

His most recent comparative study was "Are the New Millennium Learners Making the Grade? Technology Use and Educational Performance in PISA (2010)".

Contact Information

Centre for Educational Research and Innovation (CERI)

Directorate for Education, OECD

2 rue André Pascal

75775 Paris Cedex 16, France

Tel.: +33 (0) 1 45 24 80 83

Fax: +33 (0) 1 44 30 63 94

Francesc.Pedro@oecd.org



This text, unless otherwise indicated, is subject to a Creative Commons Attribution-Non commercial-No derivative works 3.0 Spain licence. It may be copied, distributed and broadcast provided that the author and the institution that publishes it (UOC) is cited. Commercial use and derivative works are not permitted. The full licence can be consulted on <http://creativecommons.org/licenses/by-nc-nd/3.0/es/deed.en>.



