As I delivered my second daughter to college this past fall for her freshman year, I was struck by the difference between her IT “outfitting” and that of her sister, who had gone off to college four years earlier. For daughter #1, getting a laptop for college was a big deal. She had been using desktop computers for years, of course, but the combination of starting college and getting a laptop was an enabling rite of passage. For daughter #2, the laptop was more like socks, sweaters, and shoes. She’d been using a laptop throughout high school, so she simply packed her laptop along with all the other essentials. No big deal.

An additional marker of change was the use of e-mail and Skype. Daughter #1 had used her college’s e-mail system. Daughter #2, who has been using Gmail for some time, never really gave a thought to using the campus e-mail system. In addition, daughter #2 has moved beyond her cell phone and is using Skype for many of her communications. This shift in my two daughters’ IT outfittings is mirrored by students at Dartmouth. Four years ago, when Dartmouth contemplated giving up its quaint but antiquated home-grown e-mail system (called BlitzMail), it was the students who protested the loudest. For those NetGens, life without BlitzMail was unthinkable. Today, with Dartmouth going through the same exercise, the majority of students welcome an upgrade. Many, perhaps most, don’t even use BlitzMail, preferring Gmail, Facebook, or some other hosted service they’ve been using for years.

Something has shifted. Perhaps one way to delineate this shift of the past four years is to say that students have moved from being the “NetGens 1.0” to being the “NetGens 2.0.” Signs of this evolution are everywhere. In the past, for example, Dartmouth sold laptops to as many as 90 percent of the incoming first-year students. Students received the laptops on the day they arrived on campus in September, often with parents in tow. Over the past two years, even with the innovation of shipping the laptops to students’ homes in June, this percentage has plummeted.

Quite simply, the laptop is no longer a big deal for many students: they bring from home the laptop they’ve always used, along with their socks, sweaters, and shoes. They also bring their cloud computing practices, which include social networking 2.0, communication tools 2.0, and productivity tools 2.0.

Other signs of these cloudy times are plentiful. Consider the August 2008 study conducted by the Pew Internet & American Life Project, which reported that 49 percent of all Internet users use a search engine on a daily basis. Search engine usage has increased 69 percent from January 2002, whereas e-mail usage has grown only 15 percent during the same period. The search engine, a cloud device, is increasingly the point of departure for forays into the Internet. This same report stated: “Younger internet users have been consistently more likely to search on a typical day.”

The Pew Internet & American Life Project uses the quaint term “Omnivore” to label that group of users who “do an enormous range of things online.” This report noted: “Perhaps unsurprisingly, many (42% versus the 13% average) of Omnivores are students.” Likewise, the Pew study of cloud computing usage affirmed that use of the cloud is growing and that those in the youngest cohort (18- to 29-year-olds) are leading the way, with 77 percent having used web-mail services.

Additionally, the authors of the recent book *Born Digital* state that a NetGens 2.0 student, when turning twenty years old, will have spent 10,000 hours online. To accumulate that much time at 3 hours per day would require just over 9 years; 2 hours a day would require nearly 14 years. The authors put it this way: 10,000 hours is equivalent to the amount of practice time someone would need to become a professional cellist.

The EDUCAUSE Center for Applied Research (ECAR) studies on undergrad-
uates and IT also paint a clear picture that those in the very latest generation of students are beating a path to the cloud. Consider the trends in what kinds of IT gear they own:

- Laptop ownership during the period 2005–8 increased at a rate of 55 percent (from 53% of students in 2005 to 82% in 2008).
- Desktop ownership for the same period decreased at a rate of 19 percent (from 63% to 51%).
- Smartphone ownership increased dramatically: from 1.2 percent in 2005 to 66 percent in 2008.
- Between 2005 and 2007, PDA ownership decreased at a rate of 14 percent (from 12% to 10%), and the 2008 ECAR study calls the PDA “a declining platform.”

The stages of technology diffusion are critical mass (ownership by 20–30% of the population), ubiquity (30–70%), and finally invisibility (more than 70%). In the last stage, so many people have the technology that it’s taken for granted. For the NetGens 2.0, the laptop has moved from ubiquity to invisibility, and the smartphone has entered the stage of ubiquity. If the trends continue, the smartphone will soon follow the laptop into diffusion invisibility.

These trends seem to support several conclusions. First, mobility is important, as signaled by the decline in ownership of desktops. Second, Internet connectivity—in particular, web access—is what is valued in the mobile device. Like the desktop computer, the PDA is on its way out; the smartphone, powered by a real operating system and supporting web browsers, is on its way in. Mobile devices in particular encourage computing in the cloud. The 2007 ECAR study showed a doubling, since 2005, of those students for whom wireless was their primary way of connecting to the Internet (from 12% in 2005 to 24% in 2007)—again, a sure indication of an increased reliance on cloud-based resources.

Although the NetGens 2.0 are at home in the clouds, it would be a mistake to assume that they are more likely to be all-around IT whiz kids than are their NetGen 1.0 forebears. Despite being cloud natives, many may lack the skills they need to successfully accomplish academic work at the higher education level. Recently, the Nielsen Norman Group study of teenagers using the web noted: “We measured a success rate of only 55 percent for the teenage users in this study, which is substantially lower than the 66 percent success rate we found for adult users.” The report added: “Teens’ poor performance is caused by three factors: insufficient reading skills, less sophisticated research strategies, and a dramatically lower patience level.” This same report found that the NetGens 2.0 are not drawn by glittery graphics or lots of text. Instead, interactivity seems key. Online quizzes, games, voting forms, feedback, the ability to give and receive advice, and the capacity to share stories and pictures will keep teenagers on a website.

In the same way that the NetGens 2.0 have both IT strengths and IT weaknesses, their cloud habits may intrude into the more formal sphere of academic work. Consider these Pew findings:

- 50% of teens say they sometimes use informal writing styles instead of proper capitalization and punctuation in their school assignments;
- 38% say they have used text shortcuts in school work such as “LOL” (which stands for “laugh out loud”);
- 25% have used emoticons (symbols like smiley faces) in schoolwork.

Clearly, the movement of students into the cloud will have major impacts for IT departments and budgets. But it’s not at all clear that this migration will make these students somehow “better” students than their predecessors. Nor is it clear that this migration will be evenly distributed. The authors of Born Digital suggest that the label digital natives be understood as referring to a population rather than a generation. The word generation is defined as “all of the people born and living at about the same time”; clearly, we cannot group all students under a single label. Just as one example, not all of the students at Abilene Christian University were pleased by that school’s iPhone initiative: about 200 students formed a Facebook group in protest, since many feel that a device like the iPhone will prove to be more of a distraction than a help.

We need to continue to watch the NetGens 2.0 carefully, in order to get a sense of how rapidly this migration to the cloud is taking place, as well as to see to which “provinces” within the cloud these cloud natives have moved. Where today’s undergrads go, there also will, a few years later, go young adult learners and junior faculty. The data and the signs of the times serve as a reminder: the clouds in the IT “rearview mirror” are closer than they appear.

Notes