

# Educating the Net Generation

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Diana G. Oblinger and James L. Oblinger, Editors



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# Using Technology as a Learning Tool, Not Just the Cool New Thing

**Ben McNeely**

*North Carolina State University*

I fully realized the digital age when I first spoke to my grandparents over the “talk” feature on AOL Instant Messenger. How cool is it, I thought, to have grandparents that not only have a computer, but know how to use it? What was more striking was that my grandfather, a man who never had much formal technical education, built not one, but two, computers from parts—motherboard, disk drives, hard drives, and so forth—with the help of my cousin. He has high-speed Internet access, sends and receives e-mail, burns CDs, and chats online using IM. He even built a computer for my grandmother, who uses it to check the obituaries daily on the *Winston-Salem Journal* Web site and does online jigsaw puzzles. She can no longer do real ones, as the pieces are too small for her to see and grasp.

## Growing Up with Technology

In kindergarten, I was introduced to the Apple II computer. We were herded into the library and seated in front of a big-screen television. There, the librarian demonstrated the computer and its uses. She even showed us a game: *The Oregon Trail*—arguably the most popular computer game of our generation. It was simple, informative, and interactive. I can’t tell you how many times I got my wagon stuck in the mud or how many teammates I killed off with cholera or malaria.

For my classmates and me, computers were just tools to get things done. Mastery of technological skills was a way to show we were advancing further than our classmates. In middle school, my family bought our first home computer. We also were hooked up to the Internet for the first time. It was a dial-up connection, slow compared to the instantaneous broadband speeds nowadays, but nonetheless, we were surfing the Net.

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As a Boy Scout, my troop would participate in scout shows at the local mall. While other troops demonstrated traditional scouting skills, like pitching tents and lashing up towers, my troop set up a computer cluster and took digital pictures of people in the mall. Using Photoshop, we cut their images out of the pictures, placed them on backgrounds of their choosing, and gave them printouts.

My brother, a senior in high school, now uses WebAssign to complete homework problems for chemistry class. A Web-based learning application developed at North Carolina State University (NCSU), WebAssign is used across disciplines as a way for teachers to assess their students and offer supplemental information outside the lecture. He even applied to college using an online application.

As a member of the Net Generation, I have been surrounded by advances in digital technology, almost to the point where I cannot do my work as a journalist without it. In university, I have used assessment tools such as WebAssign and WebCT in classes as supplements to lecture and textbook. But now technology is advancing at such a rate that traditional ways of teaching and learning are not pushing students and teachers to their full potential. By using IT properly in the classroom, teaching and learning are enhanced and given a new dimension. Before curricula can be created to challenge the Net Generation, though, faculty must know how Net Geners learn and interact with each other, with technology, and with life in general. Remember that word—*interact*.

## How the Net Gen Learns

Are you interested in knowing how Net Geners learn? Let me illustrate using my friends, me, and my grandfather.

### Learning by Doing

Patrick Clarke, graphics editor for a student newspaper, sits down at a computer and launches Adobe InDesign. He opens a template for the news page and pulls in graphics, pictures, and text. He manipulates the blocks on the virtual newspaper page, moving back and forth between two other Adobe products, Photoshop and Illustrator. By the time the page is sent to the printer for printing, the elements on the page would have been manipulated, edited, and reedited at least a dozen times. Patrick is a creative and dynamic designer, but he is not a design major—he's in computer engineering.

Chris Reynolds is a business major and wants to open a music store when he graduates. In his spare time, he is a DJ musician. He spins and mixes his own

beats, using a computer, sound-editing software, turntables, and a keyboard. He teamed up with a friend to make a how-to video on spinning. They used digital video and professional editing software to create the video. Because he is a DJ, he worries about court cases involving the music industry. A recent case where the use of “sampling” was ruled illegal hit him hard, as sampling is widely used by DJs when they create their music.

Jake Seaton is a big arts and entertainment fan. He lives and breathes for music, movies, and anything Hollywood. He can tell you about film and music history and can quote even the most obscure lines from zombie movies (his favorite). He also is up-to-date on the latest in computer and console gaming. He chose a multidisciplinary degree in music journalism and has taken distance-education courses. In high school he won a state architecture award and has taught himself to use Photoshop and InDesign.

These are representatives of the Net Generation. They all use computers in their class work and in their hobbies. They have a wide range of interests, outside their chosen area of study. They are not locked into one thing, although all are highly motivated and pursue their interests with passion. They use the latest in technology, whether cell phones, computers, PDAs, MP3 players, or digital cameras. They expect things to work properly and work fast. They get bored if not challenged properly, but when challenged, they excel in creative and innovative ways. They learn by doing, not by reading the instruction manual or listening to lectures. These are the learners that faculty must reach.

When I first came to NCSU in 2000, I came to a public university dedicated to technology. There were numerous computer labs all over campus, and professors actively used assessment tools like WebAssign and WebCT in their classes. In an experimental psychology class, I used SAS statistical software to crunch data I collected from experiments. I used online message boards to post ideas and criticism in my opinion/editorial writing class.

In my technical document design class, I experienced the best use of technology in a class: hands-on, experimental, and interactive. This course covered the fundamental designs of technical documents: instruction manuals, memos, resumes, and so forth. Taught in a computer lab, the class sat one student to a computer. We learned to use Adobe Pagemaker, the most popular desktop publishing program at the time. With basic exercises from the instructor and trial-and-error assignments with broad guidelines, I learned not only how to use the program but also design fundamentals—by doing the actual design, not by reading it out of a book.

This is how the Net Generation learns: by doing. Many of my peers have emerged as the leaders of my generation. They will go on to become the leaders of our nation in many different roles—politicians, business executives, artisans, scientists, and journalists. Much like how we learn by doing, we lead by doing; that is, by practicing the art and science of our chosen paths.

## Human Interaction

Generational differences in learning techniques are apparent in how people of different ages approach technology. It has been said that we, the Net Generation, are closer to our grandparents—the Greatest Generation—in our work ethic and optimism about the future than to our parents' generation. But how we approach problems is totally different.

My grandfather is a tinkerer—he figures out how things work by trial and error. He is very mechanically inclined and has spent his life working on many kinds of machinery. But when it comes to computers, he approaches it one thing at a time, step by step.

Every time I come home from college, he has a new problem for me to fix on his computer. He will fiddle and fiddle with a program until he is befuddled. Usually it is because he missed a step somewhere. If I show him and write down steps, he takes the information I've given him and works it out for himself. Even though the computer's parts are more complex than a carburetor or gear drives, the skills my grandfather used to put it together came from decades of tinkering with machines. He still uses a step-by-step thinking process used in mechanical arts to figure out software and basic functions like e-mail and Internet browsing.

Similarly, Patrick sits down with a new piece of design software and tinkers with its features. "Usually, if it is from a software company I know, I can figure out a new program easily," he said. He has fundamental knowledge about how certain software should work. By tinkering, he can figure out shortcuts and pick up the gist of the program quickly.

Even though Patrick uses step-by-step problem-solving skills, he also is pulling information from his own memory, experience, and base knowledge to master the new program. Patrick has had almost two decades of experience working with computers—almost to the point that it is second nature. My grandfather, on the other hand, has only had about five years of computer experience. Because they have been wired since grade school, Net Geners are likely to grasp technological concepts faster.

But the same “tinkering” practice applies in the classroom: doing hands-on work and working in groups, students get a better grasp of concepts the professor is trying to teach. Using technology only enhances the hands-on experience; it does not—and cannot—replace human interaction. There’s that word again.

## Interaction, Not Isolation

Distance education is the popular option for nontraditional learners. With many traditional industries such as manufacturing and textiles going offshore, 20-year veterans of the workplace are being laid off and going back to school to learn a new trade. Distance education—through Internet and video courses—helps those who have to work a job and go to school at the same time better schedule their learning opportunities. These people are usually older, in their 30s or 40s, and are learning to use technology, like the Internet and computers, while training for a new career. In theory, the Net Generation should learn better through Internet courses because they have been surrounded by computers all their lives and know how to use the technology already.

Just the opposite is true. Net Geners like the social interaction that comes with being in class with their peers. While they may use technology in their daily lives, relationships are a driving force in the learning process.

Jake Seaton, as a part of his multidisciplinary degree, took a video course through distance education—and didn’t like it. “I needed the structure of going to class. I would go to my other classes and then come home and have another class to watch on TV,” he said. “I didn’t like it. At the end of the day, I wanted to be done, not have to work at a class at home.”

This is typical among Net Geners: learning through social interaction is important. Feedback from the professor is vital, and working in groups is the norm. Arman Assa, MBA candidate and president of PackMUG—the Mac Users Group at NCSU—said that learning technology has not advanced enough to replace the social interaction in the classroom. “Historically, communal learning has always been the most effective way for educating the student and generating thought-provoking discussion in class. I don’t believe technology has reached a point where we can duplicate that effectively on a computer,” Assa said. “Some instructors argue that chat rooms, message boards, and instant messaging are good substitutes, but they are by no means replacements for the exchange of tacit knowledge.

“Does this mean that interactive technology is bad for the classroom? No. It means that it should simply augment what is already there,” Assa continued. “For instance, one of my human resource classes in the MBA [program] has regular classroom discussion, but the instructor augments it with message board interaction. It was a very effective tool for helping introverts who don’t talk in class to join the discussion.”

## Cut-and-Paste Culture

Technology is everywhere. Net Geners cannot remember a time in their education where a computer was not used for some learning experience. Because of this “tech-savviness,” traditional educational practices and ethics are coming into question. Cheating, for example, always a major academic infraction, is on the rise on college campuses—and technology is helping with cheating. Talk to students and any one of them will tell you that cheating is prevalent and part of the culture, especially in technical disciplines. That is, if you use the strict definition of cheating.

NCSU uses WebCT and WebAssign extensively. Since a faculty member cannot directly supervise students and only the answers are recorded in WebAssign, not how the student came up with them, students often work together on their assignments. But students must submit their own answers. In computer engineering, students must write a program and submit it as a part of learning different coding languages. Patrick says these programs are worked over with a fine-tooth comb. “The TAs and instructors run the programs line-by-line to see if any code was copied,” he said. “There may be opportunity to cheat, but you will get caught.” He adds that there is not much opportunity to cheat during exams.

Plagiarism is the academic infraction of choice. How can it not be, though? Information is easily available from the Internet, especially from sites like Wikipedia. Old term papers are being sold online. Because the Internet provides easy information fast, the temptation to click “copy/paste” and pull in quotes from a Web site without attribution is great. But students still get caught because faculty members can search for familiar phrases or quotes to root out plagiarism.

Cheating is on the rise in universities. Is it because students aren’t learning the material? Or is it because their learning and work ethic are so different from their professors that working together to solve a problem is no longer that serious an infraction? Remember that teamwork has been emphasized to Net Geners since

the first day of kindergarten. Businesses are also looking for graduates who can work effectively in teams.

Based on the very social nature of Net Geners and the tremendous amount of information available to students these days at the touch of a button, the traditional definition of cheating is changing. How faculty assess students is changing as well. Faculty still give written exams (in English, it is still a certainty), but they must be ever more vigilant to catch the cheating student. Cell phones and text messaging have allowed students to text back and forth between each other, conferring through the airwaves on exam questions. Because of emerging technologies, faculty are having to adapt their classes and how they assess students in order to uphold academic integrity.

## Challenges for Higher Education

So what do Net Geners want from learning technology? Interactivity—whether it is with a computer, a professor, or a classmate. They want it; they crave it. Traditional lectures are not fulfilling the learning potential of typical students today. Distance education and online courses don't work well with Net Geners—the social component of learning is required. As technology in the classroom progresses, more and more students are going to demand it be included. This will pose challenges, though.

## Funding

First, technology costs money. What else is new? Faculty members can receive grants for using technology in the classroom and developing new learning technologies. This is fine on the department level, but for a university to implement learning technology on a massive scale will take an act of Congress. State legislatures are listening and meeting the basic technological needs for public universities. But it takes bond referendums for state-of-the-art classrooms in order to implement technology on a university level. And bonds are paid by the taxpayers because the referendums are voted upon by the taxpayers. No vote, no bonds. So it goes, I suppose.

## Access and Skills

Second, students need to be able to use the technology. In North Carolina, students must pass a computer competency test in the eighth grade before being promoted to high school. They are tested on the most fundamental computer skills: word

processing, creating a spreadsheet, using Web browsers, and e-mail. Beyond that, students either pick up skills on their own, take a class outside the primary educational setting—say at a community college or library—or don't learn at all. Users—even Net Geners—will only learn so much when operating a computer. The average student will use a computer for homework, online chatting, checking e-mail, and surfing the Internet. The more advanced users will know how to write a simple Web page, update a ready-made blog site, or download music and movies—perhaps illegally—and burn CDs. But for the most part, users have no knowledge about how to set up a local area network or how to troubleshoot their own computer for minor problems.

On a more fundamental level, there is such a thing as a “digital divide.” Technology is expensive, and the only way for some school systems to afford computer labs is if computers are donated. These computers often are refurbished and several years old. While they are useful in teaching fundamental skills, like those tested for in the North Carolina standardized computer test, they will not be able to support the latest technology. Once a computer or software is released on the market, it is usually replaced in 18 months. How can a Pentium II running Windows 95 properly prepare a high school or college student for the working world, which uses Windows XP? It can't. These computers ideally should be relatively up to date and able to provide students with not only fundamental skills but also the chance to learn intermediate and advanced skills as the “cool new thing” rolls out of the factory.

There are students who cannot afford a personal computer in their homes and must rely on technology in their schools or local libraries. There are even students whose first real experience with technology will come when they go to college. How can they possibly survive in the high-tech college world if they don't know the basics?

Colleges need to teach students computer skills beyond fundamentals. Skills such as digital document archiving, Web page design using Dreamweaver or Flash, setting up wireless networks, and using a firewall are quickly becoming the norm, where in the past they were considered advanced knowledge. Even basic upkeep and troubleshooting is still left up to tech-support hotlines, often located halfway around the world. These are the skills students need to know to be competitive. Many colleges offer introductory courses in computer science that are available as electives in many disciplines. Updating the intro course curricula—or even the state standardized tests—will go a long way in fostering computer skills.

While usability has gotten better as operating systems have progressed, you still hear comments like “I can’t use a Mac, I use Windows,” or “I only know how to word process on my computer, I can’t use MS Word on a Mac.” Even though the Net Generation learns quickly, the old adage “You can’t teach an old dog new tricks” still applies. The inability to move between platforms—and the lack of accelerated fundamental skills—is a major hindrance to learning technology. The workforce is so competitive that the difference in knowing how to set up a simple network and basic computer troubleshooting over knowing just document preparation could mean a job down the road. It will be a challenge to overcome, but it isn’t impossible.

### Interaction

Third, technology must be relevant and interactive to the coursework. A faculty member who uses PowerPoint in a lecture is not using technology interactively. Students need a practical use for technology, whether to manipulate data or to explore the inner recesses of the human body without cutting up cadavers. Students need to communicate quickly with each other, but in a centralized manner. That is why message boards are great. Members-only message boards allow students and faculty to communicate with each other. Plus, faculty members can use the course lockers during lectures and provide information outside lecture for students to explore at their own pace.

### Relevance

Fourth, technology must be used for a practical purpose—that is, taking the fundamentals and technology learned over a semester and applying it to a final project, where creativity and uniqueness is required and rewarded. In my technical document design class, we had to create a useful technical document: write the text and design a technical document using Pagemaker. My group designed an instruction booklet for a video game. Chris Reynolds used his sound-editing software to help a friend with a music project. They wrote a short piece of music, recorded and edited it, and burned it to a CD for the professor to evaluate. Chris was excited because it gave him a chance to “play” with his software. While he doesn’t use his music software in his business courses, he is learning skills that could be marketable after college. Plus, his friend got an “A” on the project.

Using technology for some practical purpose, and not for the sake of using technology, must be the clear objective. “Students are often the guinea pigs in

‘IT-enabled’ classes as faculty test out whether the latest innovations actually help learning,” Assa said. “Some faculty, in an effort to use the latest buzzword or receive the next big grant, are testing technology simply for the sake of technology, rather than using technology as a tool for learning, such as paper and pencils. When people focus too much on technology, they lose sight of the true purpose of technology, which is to facilitate learning in the classroom.”

## The Next Generation

Turn on the TV on Saturday mornings and watch cartoons for an hour. Count how many commercials there are for interactive toys for toddlers and young children. Even babies have “learning centers,” with flashing colored lights and music. Whether or not the “Mozart Effect”—the theory that musical stimulation increases IQ scores—exists, parents have latched onto the idea that it does, and toy makers are obliging and capitalizing on their belief.

These new learners are exposed to technology—even on a rudimentary scale—from nearly the womb onward. My mother’s kindergarten class uses the computer for learning games that reinforce counting and spelling skills. A quarter of the population has a computer at home, and many more have access to a computer—and the number continues to grow every year.

The next generation of learners will meet and surpass the Net Generation’s expectations of educational standards. Those standards will only be met if faculty and administrators today establish the infrastructure of learning technology in the classroom. And not just using PowerPoint in the lecture hall, but understanding how technology can be used to reach the most people in an effective way. It will take great effort on both sides—students and faculty alike—to learn and use technology effectively. But the benefits will be well worth the effort.

## About the Author

**Ben McNeely** is the managing editor of *Technician*, the student newspaper at North Carolina State University. A senior in English, Ben hosts a talk show on WKNC-FM and also contributes to the yearbook and to the online magazine *Americana*. As an officer in PackMUG, the Macintosh Users Group at NC State, he was instrumental in bringing Steve Wozniak, cofounder of Apple Computer, to campus as a speaker. McNeely, an aspiring journalist and Eagle Scout, is interested in technology’s impact on today’s society and its implications for the future.