Evolving Instruction?
Seven challenges

By Marc Prensky

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*"The issue we always face is that while lecturers might find
something interesting, actually getting them to use an alternative teaching
practice takes time, persistence and persuasion."*
– Christopher Cheers, Singapore

Many of us think of evolution as happening over centuries, if not eons. But recent work by Princeton researchers Peter and Rosemary Grant in the Galapagos has shown that if conditions warrant, evolutionary changes can show up in as little as a single generation. In 1977, for example, Darwin's famous finches were left by a drought with only big, tough seeds to eat – their offspring were born with bigger, blunter beaks. (Jonathan Weiner, *The Beak of the Finch: A Story of Evolution In Our Time,* Vintage Books, 1995).

Are there conditions that will cause post-secondary instruction to evolve equally quickly, perhaps in just one generation? Or will it actually take eons if it ever happens at all? What should it evolve into? And can we speed it up?

In the past half-century the Academy has come under some very large environmental stresses. Beginning 50 years ago the numbers of college students increased dramatically, thanks to the GI bill. But meeting the stress of this increased quantity and its concomitant change in the preparedness of students was accomplished without any major evolution in instruction. College teaching in the 00's is not much different from the 50's. The wiring of our campuses is used mainly for research, administration and games.

As I have discussed in previous articles, the brains, styles and needs of our current and future students *have* evolved, due mainly to new digital technologies. If the former stresses led to little evolution, I think we're now in for a fast evolutionary ride.   Why? Because the existing structures and the approaches they favor do not mesh with the current market.

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How can college teaching evolve to meet the needs of changing students in a changing society and still maintain quality and academic integrity? As instructors and administrators struggle to best serve the coming generations of students, here are seven of the issues they will need to confront. I've chosen these from among many others, based on recent information that has come to my attention.

1. Who Knows More About What?

The traditional academic teaching model is based on a hierarchy of knowledge – the senior professors know more than the junior ones who know more than the grad students who know more than the students. These days this is true in some cases, and untrue in others. Students arrive at our colleges and universities with the relatively unsophisticated formal education of our increasingly poor secondary schools, yet having done on their own on computers some of the most sophisticated things imaginable, including flying jets, building civilizations and fighting wars.

In many areas the students know more than the faculty – not just technically, but in terms of what is high and low quality. Were you to start a program in computer game design and development, as a number of colleges and universities are doing, there would be a lot of places that the students are far more informed and sophisticated than the teachers. Just what the instructor's value-added is under these conditions has to be carefully thought out.

Even the most senior instructors need to be willing to accept that sometimes they don't know and need to be taught by their students. Not just in the general sense of "Of course I learn from my students," but in a formal sense as well. A Microsoft-funded program to produce video games that can teach college courses allowed MIT students to get senior professors – most of whom had never played a video game – together for a "show and tell" at which the professors realized there was a lot going on that they didn't know about. The goal of the program is to combine the knowledge of the faculty with the interests and expertise of the students, with a comparative media professor acting as the "bridge."

To keep everybody happy and engaged in such cases, we need to evolve new roles for everyone in the process. Instructors can become students and vice versa. There is a need for intermediary roles for people respected by both sides and who have a respect for what each side brings to the table. This may provide a potential new and important role for Teaching Assistants, who more than anyone, have a foot in both worlds. Another model is programs, such as those in business schools, which have developed expertise in facilitating students' learning mainly from each other.

2. Teaching at the Interstices

Just as players in Hollywood transformed over the last decades from single function specialists to "hyphenates" (actor-director, director-producer), today we are seeing the

same crossover desires in our students. Many of the traditional disciplines are becoming less "sexy" as science and technology advances, and much of the "interesting stuff" is going on at disciplinary boundaries. The excitement today is about interactive media, nanobiology, neuropharmacology, and bioinformatics, to name just a few interstitial areas. How should these be taught? Will students need to master each discipline before they can cross, or can they start in the middle and pull whatever they need? Who will guide them?

Departmental crossing in any formal way conflicts strongly with the traditional academic-discipline, departmental-based structure of the Academy.   Keith Devlin, program director of "Media X," a cross-disciplinary research program in Interactive Media at Stanford, [see article in this issue] has written "…we will need a small number of cross-disciplinarians…university faculty, occupying truly "integrative chairs," located not within any department."   But he went on to say that "Such is the inertia of the traditional departmental structure in today's universities that establishing such positions is likely to be the one place [where we are liable to get] faculty opposition."   And his program is for research, not for teaching. Maybe we need a *large* number of cross-disciplinarians – *everyone*. Perhaps our students are all cross-disciplinarians already, and we must evolve to keep up.

3. Avoiding Patronizing or Pandering

I recently read about undergraduates (and graduates!) in certain courses being given permission to write their term papers entirely in "multimedia" languages where words are not allowed. While I aggressively highlight all the changes that media have wrought on students' minds and preferences, that picture gave me pause. It is no doubt based on thinking that students have to master the non-traditional media of their age. Yet because our students are typically way ahead in using these media, it has the potential to be extremely patronizing. This kind of thing is being done with 12 year-olds – in a recent UK study they were given video cameras and the single word "tacky," and set them loose to produce something. "The results were quite remarkable," says one observer.

It seems to me that our students' difficulty is typically *not* expressing themselves in media *other* than words, but expressing themselves *in* words. Whatever media are used, there ought always to be articulate verbal assessment as an output. Not making this a requirement in everything students do not only patronizes them but demeans their education as well. Would any non-Chinese fluent professors, for example, tell their native Chinese speakers that they can do their term papers in their own language, even though the teachers can't read the language well? As with the video games, faculty should be attending remedial courses in "multimedia literacy" taught by the students!

Not only do we need to evolve without patronizing, we need to do it without "pandering" either. Many universities, for financial reasons, have required their departments to be self-funding – i.e. to draw in enough students to meet or exceed their cost.   They apportion budget to departments on the basis how many students sign up for their classes,

leading to an urgent need in every department for courses with "sex appeal." For example, one history department introduced "The History of the Body," a big seller.

Such self-acknowledged "shop window" courses can, of course, be serious, well thought out, and full of interesting issues in the discipline. But it's difficult to include everything in this approach. "It's hard to package all the basics in a sexy enough way that you get them done," says the professor of one such course. It's basically pandering.

An extreme example of how far this pandering can go is the theatrical approach taken by some "alternative" education. "We don't call them classes – we call them shows," says Bill Zanker, Founder of The Learning Annex, a chain that provides short non-accredited "courses" for adults in everything from French to flirting. ("Classes for the Masses," *The Wall Street Journal*, May, 17, 2002)

But is this the best we can do? We are supposed to be (1) passing down the skills of thinking and understanding that have been developed up to this point in our history, (2) laying the foundation for future study and (3) helping students grow up, be productive society members, and prepare for the future. How can instruction evolve in a way that lets us both do this and hold our students' interest?

4. Making the Basics Compelling

We need, of course, to make the *standard* curriculum more engaging. The most urgent pressure for such evolution comes not at the advanced end, but early on: the basics of every subject, and, before that, the foundation tools. We need to find new ways to teach these, especially for the single thing that is most often complained about – writing (some might add numeracy as well.) Clearly this is not something our current system is good at. Returning to business school mid-career, I was appalled by the lack of ability of most of my classmates to clearly express even simple written thoughts.

Given this, why are there no standard, required courses for all freshmen called "Writing the one-page paper,"? the five pager?, the 10 pager?, the longer research paper? Rigorous, hard courses, without which a student can't move forward. Courses that not only are effective, but also engage. Not just in language departments, but in all departments. Suppose every student were required to write a publishable essay on "How Math (or history or science or whatever) Affects My Life" before being *allowed* to take courses in that discipline?

I'm sure such courses exist in some form somewhere. But how effective and motivating are they? (The ones in b-school were a joke.) How much do they depend on the strengths and weaknesses of individual instructors? How can our abilities to do this evolve?

5. Sharing Expertise Broadly

One of the greatest potential benefits of Web-based technology for the university is the ability to share expertise very broadly. Students, of course, figured this out immediately, with hundreds, if not thousands sharing the same term paper (fortunately, technology provides tools to combat this, and instructors must learn to use them.) But technology also gives us the ability to share *teaching* that works – taking the best from our colleagues' courses and using it in our own. In business this process is known as "Best Practices." In academia though, would it be called "best practices," or "plagiarism" (at least without a thousand footnotes)? If we take the latter position on teaching methods, it sets us and our students far back, since we're not all creative inventors.

The more we have "scale," i.e. something that we want *everybody* to do, such as learn the basics, the more likely it is – *if we share*– that we'll figure out good ways of doing it. Just as to evolve the corporate training world must stop labeling training as a "competitive advantage" and keeping it's successes secret, so must academia avoid "ownership" of teaching ideas, and especially the newly-found academic imperative to "protect IP" (intellectual property) in this area. If there *were* a standard course like "Writing the 5,000 Word Paper" and there *were* a Web Site for instructors around the world to post and share successes (and failures) about that course and things that worked, with feedback-based incentives – such as prizes or the "found this helpful" votes on Amazon.com – the state-of-the-art would likely evolve pretty quickly. This kind of sharing, which could be done for any subject course or discipline might be a way to do "teacher training," without actually calling it that. It's certainly about time!

6. Not Assuming We Know

The New York Times reported recently ("Lessons Learned at Dot.com U", May 2, 2002) on the colossal failure to produce revenue of Columbia's Fathom program, an e-learning collaboration between some top schools and institutions. They spent $25 million on e-courses that it turned out no one would pay for, and which they are now giving away for free. (NYU did something similar and spent a roughly equal amount, according to the *Times*, and several other e-schools have closed as well.) Some assess what went wrong as a "business model" failure, but I'm not so sure that was the biggest issue. I think the failure was more in the product, which, for all its expensive video still relies heavily in text and telling, and hasn't yet figured out how to be compelling enough to justify its $500.+ price tag. Clearly was not designed with enough user input to assure it was providing value for money. The computer games world understands that an "iterative" design process (as opposed to an "engineering" one – design and build to spec) is the only way to design a compelling – and financially successful – user experience and product.

You can do a lot for $25 million – the average video game costs only three. You can do a lot for $1 million or even $500,000 or less. But what we must do in order to accomplish this is to evolve a better model than the current combination of "subject matter experts" and "instructional designers" trying to create online courses together. This is perilously

close to "ghost writing," which I assume most academics would abhor. Instructors need to learn to design compelling on-line experiences by themselves. Even if they can't build them, many of their students can, and they should certainly be able to prototype them and test them with users in an iterative process. Says Richard Barkey, a designer of business simulations "The role of the subject matter expert is to write the simulation. It's the only way you get depth and subtlety to the environment."

And what can we learn from the single biggest success in the on-line area, the University of Phoenix? Other than that marketing expertise is important, we can notice that their e-courses are typically not designed and taught by traditional faculty members, but mostly by adjuncts with the required skill and expertise. We can also observe that they chose to specialize in "vocational" areas like technology, where students are to a large extent self-motivated.

7. Finding New Sources of Motivation

Motivation, I maintain, is the real function of the traditional Academy, and is the hardest thing to achieve online. When it does its job right, the physical campus uniquely provides a place that motivates people to learn and create knowledge. It does this through isolation (that's all we do here), imitation (see, others are doing it), intimidation (flunking out or not being promoted), rewards (grades, honors, degree, chair), and, occasionally, pleasure (that was fun!). At least for a while, motivation will be one of the few competitive advantages of the "bricks" over the "clicks."

But not forever.

Today many things that used to be entirely live – theater, music, games, and even churches – have all gone largely virtual. All that's left in the live worlds are the big names and the nostalgic audiences. Yes, people like "community," but recorded music dwarfs concerts, home video often exceeds box office, and evangelists preach on TV. Sooner or later this will happen to live education unless (and maybe even if) big evolutionary steps are taken. So the challenge is to capitalize quickly on this advantage in a rapidly evolving world.

Suppose, say because of terrorism, the entire Academy *had* to move online. What would be lost, if anything? And conversely, what might be gained? Once we get the hang of it, pretty much everything the Academy does is doable virtually. Lectures? Doable virtually. Testing? Doable virtually. Reading? Interaction and discussion? Asking and answering questions? Listening and learning from others' comments? Writing and evaluation? All doable virtually. Knowledge creation? Mostly done virtually anyway.

So the value of the physical Academy to its members comes down to (1) its "perks" – a pretty environment, nice places to live, great working hours, status in a hierarchy, the option of lifelong employment, decent, subsidized food, life without parental supervision, no "real" job (for full-time students), lots of mostly uncontrolled licit and illicit drugs,

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plenty of parties, sports, dramatics, music and other extra-curricular activities – and (2) its motivation.

But what are the most motivating elements of Academia? The friends you make. The heart-to-heart talks. The mentoring relationships. The exceptional professors. The shared experiences. Not necessarily the classes. And this is bad. Because it's going to be hard to get anybody to pay hundreds of thousands of dollars to have their kids make a few friends in most cases, especially once there are more motivating and equally effective options online.

So making teaching more motivating ought to be one of the biggest challenges to the Academy, because its future depends on it. How do we do that? "Time, persistence and persuasion" is the formula that Chris Cheers gave at the start of this essay. But if our goal is to *speed up* the evolution of instruction, what can we do now? What is the motivation to evolve, and especially to evolve quickly?

One answer, I think, is data. If our goal is to motivate students and engage their minds in the learning process, we ought to be closely and continuously monitoring just how motivated and engaged they are. Of course we currently do this to some extent through end-of-course evaluations.   In a 1996 online white paper, Kenneth R. Bain of Northwestern's Searle Center for Teaching Excellence surveyed over 1500 reports and concluded that "student ratings and comments can provide valid and reliable information that can help an evaluator determine the effectiveness of a teacher." He concludes they are "statistically reliable (i.e. they have internal stability and are consistent over time), are more statistically reliable than are colleague ratings and are not easily or automatically manipulated by grades." And he goes on to say that "if feedback is collected in the first part of the term it can help instructors improve the ratings they will receive at the end of the term." In other words, data works. (http://president.scfte.nwu.edu/White.htm)

Bain recommends adding motivation-related questions such as "Rate the effectiveness of the instructor in stimulating your interest in the subject" and in "challenging you intellectually" to the standard overall ratings of instructors. In the past, collecting this data on the macro level (i.e. once or twice a term) was all that was possible. And although there is clear evidence it can lead to teaching improvements, teacher evaluations by students have often received a mixed reception from faculty. (Bain debunks the standard objections about grade influence.)

However, I think this can, and will, go much farther. Through the fully-wired campus we are now in a position to collect such feedback at the *micro* scale of *every interaction*. We can ask students to report online, *after every class, test, paper or other academic interaction*, "How engaged were you in the learning process?" (Of course, we might also want to ask the students to report on their own input at the time – how awake were you?) We can instantaneously and continuously tally these and correlate them with student demographics and results. "Students, as a group," Bain reports, "are able to distinguish 'fluff' from substance."

Having such data and looking at it honestly will, I think, scare us to death. But if made public it will hopefully provide a great motivation for change. And once we know where things are working (and not) we can actually take steps to improve them – have teachers observe each other, comment on each others' teaching, share online, and decide on and all use best practices. Schools will be able to differentiate themselves on their *measured* teaching excellence.

A dry season produces a next generation with tough beaks. What changes will be produced in the next generation of post-secondary teachers by today's instructional challenges?

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