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Digital Game-Based Learning
Chapter 3

Why Education and Training Have *Not* Changed

by Marc Prensky

I got into what was supposedly one of the best colleges in the country for technology. The professors were all from MIT. But in class all they did was read to us from their textbooks. I quit.
– a former college student

The reason most kids don't like school is not that the work is too hard, but that it is utterly boring.
– Seymour Papert

We learn more from a three minute record, baby, than we ever learned in school.
– Bruce Springsteen – "No Surrender"

So many writers on training, learning and education have pointed out that if an observer from 200 years ago were to come to the US in the year 2000 they would be amazed and uncomfortable with changes everywhere *except* in a school or corporate classroom that it has almost become a cliché. But so what? Is this so terrible? After all, the same time travelers would certainly recognize that we still all wear shoes, eat food, and go to sleep

at night. Maybe education and training *should* stay the same. After all, "If it ain't broke, don't fix it" is a practical American approach, and just plain commonsense.

But the truth, as we all know — and most of us admit — is that our learning and training system *is* broken. Seriously broken. The evidence comes from reading and math scores, boredom, dropout rates, and lack of skills in the workforce. It comes from the fact that standardized tests are "dumbed down," [1] that colleges and businesses must do remediation of basic skills [2] , and that over 45 percent of American adults scored at levels 1 or 2 in the 1992 National Adult Literacy Survey, which means they "lack a sufficient foundation of basic skills to function successfully in our society." [3] The fact is that parents are desperately seeking to move their children to places that they perceive *do* work, through vouchers and other plans, and a growing percentage of them don't bother with schools altogether, preferring to educate their kids at home. [4] In their book *The Monster Under the Bed*, [5] Stan Davis and Jim Botkin argue that business is taking over by default many roles of education. This is in some ways laughable, since, as Roger Schank, noted trainer and author, points out, the thing that is *worst* about business training is that it is just like school! [6]

So what's going on? Is it the system? Is it society? Is it the environment? Is it the parents? Of course each plays a major role. But in almost all the analyses that we read or hear, one point of view is surprisingly absent – *that of the learner*. What is it actually *like* to be an elementary, high school, college or business training student today? The answer, overwhelmingly, is – it's BORING! Boring compared to television, boring compared to computer games, boring compared to movies, boring compared even to WORK! Pretty much any teacher or trainer will tell you it's difficult to compete with what's out there. Outside of the classroom today's kids and workers today are empowered and stimulated. Yet corporate training is almost always an unwelcome burden, and school, according to Jon Katz, a writer on technology, is "a nightmare, dull and claustrophobic and oppressive..." [7]

Does this *have* to be the case? Why is school and corporate learning so incredibly *un*engaging? And what, if anything, can be done to make a difference?

The answer to the first question — does school and training *have* to be boring — is an absolute and emphatic *no!* School and training do not have to be boring at all. There are lots of instances — mostly isolated, unfortunately — where it isn't. If our training or school is boring to our students, it is *entirely our fault* as educators. Blaming anyone else — especially our students — is like a doctor blaming his patients for getting sick. While our students certainly have done some things that have contributed to the situation — such as play videogames for example — this is not something we can blame them for. People live in the world into which they are born, and do the things of their time that appeal to them. It just so happens that because of outside forces around them as they grew up, as a result of just normally living their early life in the last third of the twentieth

century, learners' habits, preferences, and needs have radically changed. So, despite school's hundreds of years of tradition — yet *only* hundreds, not thousands or millions like human history — it is now time for education and training to finally change, or else to continue to fail us. Why? *Because it no longer holds the interest of its students, even under duress.* While there are still, obviously many students who succeed at learning, in most places they do it in *spite of*, not because of, their schools and training.

There is a wonderful book for helping adults to play the piano, called *How to Play the Piano Despite Years of Lessons*. [8] Its premise is that most piano teaching has been based around what the "classiscists" have thought you should know, and taught by exercises that fit players of eighteenth and nineteenth century music. While some learners clearly enjoy this repertoire, many more would like to be able to just play their favorite songs, and improvise and accompany in the styles not of the eighteenth century, but of *today.*

What, if anything, can be done to make a difference? My answer is clear from the title of this book. I strongly believe Digital Game-Based Learning can make a huge difference. But to understand *why* this is so, we must examine the second question carefully **—** *Why is school and corporate learning so incredibly unengaging to today's learners?* Interestingly, the answers are not so radical as to make solutions impossible. On the contrary, there are ways to fix the problem that are clearly within our means.

Content-centered versus Learner-centered Approaches

You might think that learning is about learners. But to many, if not most, trainers and educators, learning, training and education are *not* about the learner, but primarily about *content*. It is about "what" to teach or train, rather than about "why" or especially "how." A majority of the educational discourse taking place in our society schools and companies centers around *what* to teach — what is known, in the beloved Latin of academia, as the "curriculum," — rather than how to learn it. What I mean by "content-centered learning" is treating learners as if they were, in the words of Luyen Chou, "receptacles for knowledge that is stuffed down into them, whether by a teacher or a computer." [9]

AFTRB

I once asked a colleague who had just returned from a training course how it had gone. "AFTRB" she replied. "What's that?" I asked. "Another *%$#! three ring binder," she snickered. Anyone who has ever been to a training course knows precisely what she means. The training was done with slides and handouts, copies of all of which are contained in the 3-inch binder, between gobs of tabs. Many training veterans still have

literally walls of these binders on their office shelves, each stamped with its own acronym for the name of whatever course it was.

When a request comes in for training from an executive, it is typically a "what," rather than a "how" request — "my people need to know this", "my sales force needs to know that," etc. The trainers are supposed to know how — after all, that's why there *is* a training department — and so they run out to create or find a solution, which generally takes the form of an "intervention" or course. Their first priority is, or course, to find the right content. Only secondarily, if they have time or if they have a choice, will they consider *how* the content should be delivered. And, typically, there will be little variety in the alternatives, but a rather limited "bag of tricks" ranging from lectures with slides, to handouts with a few exercises to fill in, to making or renting a video, or, increasingly, licensing an online solution from a vendor. Occasionally they will go out and commission something completely new from a vendor. In such cases there is some hope for more learner-centered training — but only sometimes.

Many times training purchasers care only that the required content be available to people. This "CYA" approach was the reason that so much "shelfware" was purchased in the 90's, especially in the IT area ("shelfware" refers to courses, typically on CD ROMs, that are bought but never used – they just sit on the shelf), making a few training vendors very successful and starting a stampede into the IT area. Now much of this training is quickly moving online. Organizations still sign up for large, multi-year contracts giving their employees access to the same, or — because of the technical constraints of the Web — an even less interesting, more "tell-test" version of the same curriculum. The content in the shelfware has just been replaced by the same content in what Paula Young of PricewaterhouseCoopers refers to as "click and fall asleep"–ware. [10]

Contest #2 : What is the online equivalent of "AFTRB"? Email your entries to *www.twitchspeed.com* ***. The winner each quarter will receive*** *something related to Digital Game-Based Learning and a mention on the site!*

Don't get me wrong – I'm not saying we *shouldn't* think about what we want our people to know. But figuring out the content and putting it into slides and reading them to people is not the same as people learning it. Of course most trainers would say the same thing. They often search for ways to "spice up" training sessions, as evidenced by the crowds around only the booths of the companies selling "training props" at ASTD.

But even these props, like the Internet, are just forms of *sending*. As anyone who has ever sent a Fed Ex package knows, having even the best system in the world doesn't help if the person isn't home to receive it. And more and more our trainees just "aren't home," when it comes to receiving training. So the package of content either gets left on the doorstep unopened, or — via bored looks, people getting up to get coffee, and scores on tests — gets "returned to sender." All trainers may *say* and even *think* they consider the

learner and want to have him or her involved as an active participant in the learning process. But it is amazing how many courses I have attended, often at the largest and most progressive companies in many industries, where the training consisted of showing and *reading every bullet point* on slides, slides often not even written by the person doing the training!

The online version of this exact same approach is found in almost every course available on the Net. One company even touts as it's great interactive invention the fact that it inserts a slide show every so often among its printed text! The famous "anywhere anytime" is really, says Paula Young, "nowhere, no time," and I would add "no thanks!" This is what Elliott Masie is talking about when he says the "e" in e-learning should stand for the user's experience. [11] What is this experience, typically?

Tell-Test

I never try to teach my students anything.
I only try to create an environment in which they can learn.
-Albert Einstein

Boiled down to its core, most of what is billed as training, school, and "learning" consists of being told information, via lectures or reading, and then taking a test to "measure" whether the it "went in." I have found many other critics of the practice who have used similar or other terms for the same thing. Jonathan Kozal used the term "tell-'em and test-'em" in the 1960s. [12] Don Tapscott uses the term "Broadcast Learning." [13] Others, like Luyen Chou of Learn Technologies Interactive, talks about "the sage on the stage." [14] ("Oh yes, we have a *lot* of "Sage on the Stage", says one IBM employee.) The idea is the same. Someone who supposedly knows more than you (at least about the matter at hand), tells you about it, either live, through a lecture, or through readings such as textbooks, handouts or online text.

Despite the fact that there are many creative trainers and teachers out there, the vast majority of our education has become a series of informational or logical presentations or readings, followed by some sort of quiz or examination. Tell-test is the basic teaching method used in corporations, schools, colleges and, worst of all, in almost all the new "e-learning" experiences being offered with increasingly competitive frequency on the Net, even when touted with some fancy marketing hype as "the new way to learn" — a trademarked phrase. Other than coming to you through a browser, it is not new at all, but merely tell-test to be read off the screen.

"Tell-test" education is highly *ineffective* with today's younger workers — it just bores them to tears. It's not exactly working great with older workers, either.

Of course many trainers and teachers will point to all the various things they do to make the "telling" more interesting to their students. And of course they are right. But there are two problems with this. First, most attempts to make learning more interesting than plain tell-test are *haphazard*, relatively *infrequent* as a percentage of the total learning time, and *not at all at the core* of they are doing. This is not a guess. I have sat through course after course at the most prestigious institutions, including investment banks, and world-class companies in all fields. The presentations were almost all slide shows, usually written by someone else and often read word-for-word. Questions? There frequently were none at all — questions only slow down the process of getting out of there. And this happens not only in business, but in university settings as well. (Note the statement from the college student that dropped out after realizing that his faculty was reading from their textbooks.)

A second, and more important problem, though, is that even when instructors and instructional designers *do* try to engage learners, they often miss the mark. How many of the so-called engaging "tools" or "tricks" trainers use are *actually like* the things that really engage people — fast-action-based or high emotion-based movies and MTV (as opposed to just video); videogames (as opposed to Bingo or Jeopardy)? Some of this may be due to the instructor's thinking "what would engage *me*," which may be fine for students from their own age cohort, but not for twitch-speed learners.

The Linear/Logical Approach

There are a number of reasons why tell-test is used to such a high degree in teaching and training.

A certain amount can simply be chalked up to inexperience. Lao-tse tells us that "the novice teacher shows and tells incessantly." I can still remember my first days of both teaching and consulting when I thought that the best way to communicate something was just to lay it out as logically as I could.

A second reason may be, as Paula Young says, "some people are attracted to training and teaching because they love to stand up and story tell."

A third reason might be that the means or know-how to do anything else are lacking. Roger Schank quotes John Dewey, writing in 1916 in *Democracy and Education* asking "Why is it that, in spite of the fact that teaching by pouring in, learning by passive absorption, are universally condemned, that they are still so entrenched in practice? … enactment in practice requires that the school environment be equipped with agencies for

doing…to an extent rarely attained.' [15] As Schank argues, we need other available alternatives.. Even *this* is not insurmountable, because as this book shows, we can and are inventing and creating these alternatives.

But there is at least one other, more profound reason for tell-test, which is linked to the way school developed over the last 300 years. It has to do with the technologies of "literacy": printing and reading.

A brief history of learning and technology

In the view of Robert McClintock, Frank Moretti and Luyen Chou, the evolution of, and transformations in, teaching and learning goes hand-in hand with the evolution of technology.

Originally, education and training was a process of imitation and coaching — "pick up rock and throw at animal". If you can't do it the first time, practice over and over until you can. "No, do it this way." To make this repetitive skill-based learning both bearable and memorable, practicing became, even in animals, a form of play. This "apprenticeship" type of learning — demonstration and practice — which is still with us today, requires good coaches, typically in a one-to-one relationship. It is how people learn to do sports, to play musical instruments, and to master other physical skills. At it's most basic; even language is not necessary, which is why athletes and musicians are often expertly trained by people who barely speak the same language as they do.

One early technical addition to this process was pictures and symbols**.** I don't have to physically show you, I can draw, in the sand or on a wall, a picture (or several) of a man throwing a spear, and a crude map showing you how to cross the river to get to the hunting grounds, and you can "get it." Cave paintings may contain some of this learning. Today we use it every time we actually heed the flight attendant's directions to "remove the card from the seat pocket and follow along."

Undoubtedly the next great technological innovation in learning was the development of spoken language. Now I can describe to you, or "tell" you how to do something, even if you are not doing it. To help you remember, I can invent stories and parables that help you see points and make the learning memorable. This happened so long ago that it is wired into our brain. Many of the great teaching stories of the past, such as the Iliad and the Odyssey are in meter and rhyme so that people will be able to memorize them more easily. With spoken language, I can also ask questions and see if you can answer them in a way that shows your understanding. This form of dialectical oral learning purportedly reached its peak with Socrates. The so-called dialectical or "Socratic Method" of

questioning is still in use, for example in Law Schools. The requirements of this type of learning are good storytelling, excellent memory and the ability to think on your feet.

Next, sometime around the time of Socrates, came the invention of literacy: writing and reading. While Socrates told his stories and asked questions, Plato wrote them down. Plato's *Dialogs* do not have to be retold or memorized (although maybe they should be). They can be read, over and over again. Ideas and learning could now be codified in other ways than just in stories and questions and answers. Learners could read the thoughts of others on their own. These thoughts could be collected in libraries. Thinkers of one time and place could read what others wrote and build on it. The concept of the scholar arose as one who spent time reading many learned books. However this form of written knowledge and learning was both rare — limited to the few who could read and write (mostly clerics), and fragile — a single fire at the library at Alexandria could eliminate a high percentage of the world's stored knowledge, and make it impossible for scholars to learn. This type of learning required knowledge of reading and writing. Meanwhile the other types did not die, but flourished in other parts of the general population.

We now come to the next-to-last great technological change — the invention of the printing press in the West. Now "educational" materials could be distributed to anyone who wanted them. They could even be posted on bulletin boards, such as Martin Luther did with his 36 theses, and translated into the vernacular, as he did with the Bible, allowing access to learning to many new people. Printing led to the art of logical expository writing of speeches, essays and books.

It also led to a need to teach more people to read and write. Our modern mass education, according to Neil Postman, the distinguished NYU communications professor, author, and social commentator, began essentially as a product of the printing press, and was designed to bring everyone to a basic level of literacy. School was developed, he argues, primarily to teach people to read books. [16] The mass distribution of the book, says Luyen Chou, gave you the ability to standardize education on a very wide basis. "Within 200 years of the invention of the printing press in the West," he points out, "we had all the trappings of the modern educational system – division of learners into age groups, division of knowledge into disciplines, and, especially, textbooks." [17] But more was involved than just literacy. School, Postman says, is intended to equip us not only to read, but to *think* along the lines of books — linear, reasoned thinking. Book-based learning favors logical exposition and presentation. And while at its best logical exposition *can* be riveting and compelling, relatively few of our teachers are capable of making it so on the fly. So over time much of "teaching" has been reduced to pre-prepared lecturing, and learning has turned into merely "reading or listening." Hence the *telling* part, which stems principally, I think, from school's desire to be logical.

Then came the industrial revolution and industrial competition, which led to both further standardization of the school system ("a machine to turn out workers" says Seth Godin,

in *Permission Marketing* [18]) and particularly to the need for testing to put people in the correct jobs quickly. Standardized testing, actually grew out of military needs in World War I. [19] Hence, the *testing* part**,** which is even more recent.

Thus tell-test education is in reality a "tradition" that is less than three hundred years old. Now that may be longer than anybody's living experience, but it's a very short time in the history of man's education, learning and training.

Tell-test actually worked pretty well through the late 19th and early and mid 20th century, and wasn't changed much by other new technologies that came along such as the telephone, radio and television. One argument to explain this is that these were really less transformational technologies than language, literacy or the printing press. But another reason that these technologies didn't have much influence on education, according to Luyen Chou, was that the education system made a *really concerted effort* to keep them out. "I wonder," he says, "if there had been a telephone on every students' desk for educational purposes, how much it would have changed things."

Perhaps the literacy-oriented, industrially standardized tell-test system could have gone on longer, but once again a major technological change intervened.

That change, as we all know, is computers, interactivity, and their associated technologies — the great technological revolution of the late 20th century and beyond. And compared with the others, it was a massive one. Bran Ferrin, Head of Research and Development at Disney, calls multimedia computing "the most important technical innovation since the invention of language. It makes the printing press look small." [20]

Seemingly gradually to those living through it but extremely quickly compared to the past, a number of extremely important changes happened:

Written language began to be less dominant (Ferrin goes so far as to predict that reading and writing will eventually disappear, after having been a three or four hundred year "fad" [21]).

Linear organization was supplemented with a random-access (hypertext) organization.

Passive media, such as books and TV, were supplemented with active ones, such as interactive games and the Internet.

Speed in general increased — to what I call "twitch speed," — leaving far less time and opportunity for reflection.

Probably the biggest reason that tell-test is failing to do the job it used to is that the world of the learner has changed so dramatically. As a result, *learners no longer see themselves*

as receptacles to be filled up with content, but as creators and doers. And that these changes have happened so quickly is a primary reason education and training hasn't changed to keep up. Even in normal times education is slow to change. But now there is the phenomenon in which kids have totally outpaced their parents and elders in the new ways of the world.

Learners have access to and experience with so much before they ever hit a training or education classroom that they are rarely "empty vessels" (or *tabulae rasae*) when they get there. In business it is extremely rare to find an audience that knows *absolutely nothing* about the subject matter at hand. *Everyone* knows something about it – we just don't know who knows what. So by "telling" everything we wind up boring all the people most of the time. Even online, the supposed advantage of technology-based learning — go at your own pace, skip what you already know —often is more of a slogan than a reality. And while people may choose to listen in their cars to commercially produced "great lectures" about art, literature or music (or even business) in order to learn more about such subjects, I've yet to meet anyone who *wanted* to hear a tape — audio or video — of any organization's internal business training class; it's almost always worse than being there. There was at one time a company that specialized in reducing the length of corporate tapes so they could be listened to more easily. They were typically able to get an hour's lecture or speech down to 10 or even 5 minutes of real content.

That's the kind of improvement we need to be working towards. In terms of learning methods, we are all desperately in need of new approaches to replace tell-test. *We have to stop telling, because almost nobody's listening.* Who is working to invent these new methodologies that speak to this highly technological generation? Precious few, but some are, and certainly the creators of one of these new approaches — Digital Game-Based Learning — are among them. But even among the people *trying* to invent new ways there is no consensus, and in fact a lot of internecine criticism, to a large extent because people have very different ideas about how people actually learn.

The Great "How do People Learn?" Debate

We know more about how to improve the use of diapers than of brains.
-Stan Davis and Jim Botkin: The Monster Under the Bed

Asking the question "How do people learn?" is a lot like asking "What is the true religion?" Every religious person is convinced his or her religion is the true one, and yet there are, according to the Religions of the World Organization "literally thousands" of different religions in the world. [22] The truth is that learning is a really complex

phenomenon with a huge number of variables. While we know many things about learning, we don't completely know how people learn. In fact we really can't even define *what learning is* with a measurable degree of precision, although like many things, we know it when we see it or feel ourselves doing it. There is a whole branch of science – known as epistemology – devoted to the topic. Inside and outside this field there is much heated discussion, lively debate and research about the topic of learning. But not nearly enough. In *The Monster Under the Bed*, an excellent book about corporate learning, Stan Davis and Jim Bodkin point out how relatively little research is actually done in this area. Nationally, they say, "less than .1 percent [yes, that's one tenth of one percent] of our school budgets is destined for educational research—the lowest figure for research spent on any major budgeted activity. Compared with health, defense, space, energy or new products, new knowledge on the learning process is definitely a poor relation.…The federal government spends three times more for agricultural research, twenty-one times more for space research, and 30 times more for research on health. We know more about how to improve the use of diapers than of brains." [23]

So absent more research, we are left with a variety of theories of learning, each with its own self-proclaimed experts, each with a particular theory of learning to champion. Let's look at some examples:

Learning happens when one is engaged in hard and challenging activities.

Learning comes from observing people we respect.

Learning comes from doing.

Learning is imitation, which is unique to man and a few animals.

Learning is a developmental process.

You can't learn unless you fail.

Learning is primarily a social activity.

You need multiple senses involved.

Learning takes practice, says one. No says another, that's "Drill and kill"

People learn in context. People learn when elements are *abstracted* from context.

We learn by principles, says one. By procedures, says the other.

They can't *think*, says the one. They can't *add*, says the other.

Everyone has a different "learning style."

We learn X percent of what we hear, Y percent of what we hear, Z percent of what we do

Situated Learning, says one. Case-based reasoning, says another. Goal-based learning says a third. All of the above, says a fourth.

Learning should be fun, peeps the girl in the corner. Learning is hard work, answers another.

We learn automatically, from the company we keep, says another.

People learn in "chunks."

People learn just in time, only when they need to

People learn aurally, visually and kinesthetically

People learn through feedback

People learn through reflection

People learn through a loop of doing and reflecting

People learn through coaching

People learn through failure

People learn from constructing things for themselves

People learn from models

People learn from mistakes

People learn from stories and parables

People learn by constructing their own knowledge

People learn when they're working

People learn by playing

People learn through games

People learn when they're having fun

People learn when things are relevant

And on, and on, and on.

For all the books published on this subject, do we know how people learn?

Behind the theories of most trainers are the researchers, doing studies. Most are academics, each taking a tiny piece of the puzzle, and doing very small experiments. Their research, while potentially helpful, is often reported in ways that only an academic audience can understand or even tolerate reading. Unfortunately this academic' style is often what is fed to our budding teachers. There is an urgent need for researchers on learning to present their findings in more easily comprehensible ways, both to teachers and to the general public, so that we may use as much of it as possible in our designs and also understand what areas have *not* been researched, which are many. Some reconcile the variety of theories of how people learn by saying people are different – everyone has his (or her) own "learning style." "Learning styles" are big these days, and certainly important, but they are also problematical in designing learning. How many styles are there? (Again, differing answers.) If they are really different for everyone, how does this help us? Do I need different learning for all of them? There is in psychology something called the "fundamental attribution error" which is the tendency for humans to explain human behavior in terms of the traits of individuals, when powerful situational forces are at work. Could our need to think of ourselves as individuals be blinding us to other powerful forces? While learning styles, certainly, are an important *piece* of the learning picture, they also beg the question of whether there are fundamental ways in which we *all* learn.

I think there are. And it seems to me, from my experience as a trainer and teacher, that there is another way of looking at all of this, a way which is, surprisingly, often missing in this debate. *How do they learn <u>what</u>*? It turns out that this perspective is very useful, because it helps us a great deal in constructing new ways to learn, including (but not only) Digital Game-Based Learning.

There is a variety of material or content to be learned by students, ranging from information/facts, to tasks, to processes, to skills, to theories and more — all of which are best learned differently. *So the first cut, it seems to me, is not by type of learner, but by type of material to be learned.* Learning style, or type of learner, can still be, and should be, a second cut.

To illustrate what I mean, take a budding doctor in medical school. Among other things, he or she needs to learn the English and Latin names of all the parts of the body (facts); learn the ways the body systems behave (theory, observation, dynamics); learn how to

perform procedures (physical skills); learn how to diagnose (process, judgement, reason); learn how to talk with patients and manage time (behavior, skill); learn how to present cases to other doctors (language); learn how to do research (organization, discovery); etc. etc. While we hear a great deal of "this is how people learn," and, more recently, "this is how this style of person learns" we rarely, if ever hear "these are ways that people learn *facts*. And these are ways that people learn *skills*. And these are ways that people learn *theory*. And these are the ways people learn *judgement*. And these are ways that people learn to *reason*. And these are ways that people learn to *create* new things. And these are ways that people learn to *change their minds*. Once we do this, some of our problems in creating learning begin to sort themselves out:

We learn *facts* through questions, memorization, association, and drill.

We learn *skills (physical or mental)* through imitation, feedback, continuous practice and increasing challenge

We learn *judgment* through hearing stories, asking questions and making choices & getting feedback and coaching

We learn *behaviors* through imitation, feedback and practice.

We learn *processes* through explanation and practice.

We learn *about existing theories* through logical explanation and questioning.

We learn to *create and test theories* through experimentation and questioning.

We learn *reasoning* through puzzles and examples.

We lean *procedures* through imitation and practice.

We learn *creativity* through playing.

We learn *language* through imitation, practice and immersion.

We learn *programming and other systems* through principles and graduated tasks.

We learn *observation* through examples, doing, and feedback

We learn *speeches or performance roles* by memorization, practice and coaching.

We learn *the behavior of dynamic systems* by observation and experimentation.

We learn *grammar* through — how the heck *do* we learn grammar??

This list is by no means complete or exhaustive, but is meant to show only that the same learning methods are not used for every type of thing we learn.

Even the old "learning by doing" saw — "We learn X% of what we hear, Y% of what we hear and see, and Z% of what we do" — which is sometimes filled-in with numbers which I'm almost certain are apocryphal, but are heavily skewed toward the doing — is not *always* true. There are things all of us have heard or seen that we'll never forget, and lots of things we've done (like put our car keys somewhere) that we can never remember.

As anyone who has a menial job will tell you, there is certainly such a thing as "boring doing." Doing *by itself* does not make anything interesting, or make you necessarily learn it. It has to be doing *what?*

Performing and using this kind of analysis does not make us "content-centered." On the contrary, it allows us to focus more directly on the learner. Every one of these types of learning is important to a learner, and each has its place. To return to our doctor example, he or she needs to use lots of different means of learning to master all the different information and skills to be learned. Some argue that memorization, — one way to learn facts — is not important. Would you want a doctor who didn't know what the tibia is? Or didn't know that this drug interacts with that one? (I remember a friend cautioning me after his first year in medical school to never go to a graduate of his medical school for a problem with my legs — "We only do one semester of anatomy," he grinned.) There are other ways to learn facts besides memorization, such as questions, association and mnemonics, but some variation of good old flashcards, often works fine. No need for a complex simulation or learning by doing project here. Nor do you need to actually *do* unethical behavior (*even* in simulation) to learn that it is wrong. (Maybe if you did do it you would get so rich you would get the wrong message.) Different types of content to be learned require different skills and learning tools and methods.

Of course *within* any one of these ways of learning there is considerable room for style, age, gender and other individual variations. We must fit the "how do people learn?" to "what it is they are learning."

What is so exciting to me about this is that *it leaves us lots of room and opportunity to invent new ways of learning things.* In fact people do this all the time. It's called creative teaching.

Instructional Design – Helping or Hurting?

There is a field, known as Instructional Design, which is supposed to be helping us out here. How is it doing in getting us away from content-centered, tell-test learning? Unfortunately, not too well, in my observation. Much instructional design is done very "by the book," and the book (a system known as ISD — Instructional Systems Design) is not very creative. It tends to have a lot of "these are your learning objectives," "In this module you will learn to…" etc. This may seem logical to the instructional designers, but I'm not sure it really helps people learn, especially people whose approach to everything may, in fact, be less logical.

"Nine times out of ten, if you see a great training program," writes Thiagi in *Training* Magazine's cover story "The Attack on ISD," [24] "you'll find it wasn't created by someone schooled in ISD and following that process." In the same article, John Murphy of the consulting firm Executive Edge, observes "The idea of learning styles seems to consume an enormous amount of time and concern in what the ISD people claim is their "technology." There is very little concern or focus on either business results, outcomes, or even the learners, he goes on to say. My own experience leads me to agree. I would hope that by adding an instructional designer to a design team a project would get the invention and creativity it needs, but I'm not sure that the opposite is more often true — in the name of their own doctrinaire thinking instructional designers too often create what Thiagi calls "boring, cookie-cutter outcomes." Designing design good, effective learning does not, I believe, require any formal instruction or specialized knowledge. It takes rather a thoughtful and creative approach to reaching the desired outcomes.

Now I'm sure there are many instructional designers out there who consider themselves highly creative, and I'd love to hear from you about any exciting Digital Game-Based Learning projects you have designed. I encourage you to contact me at the book's Web site: www.twitchspeed.com .

The Role of Practice

This is really important. Almost all training, and to a lesser extent school, tends to take place in bursts. If businesspeople don't know something, an "intervention" (read *interruption*) will be designed to teach it to them. This is fine if what they don't know is a fact, like "tomorrow is a holiday," or other less useful but important things. But much of what we want people to learn are skills and behaviors — things that are learned and acquired slowly, over much time, often an entire lifetime. The *only* way to make this happen is through *practice* "How do I get to Carnegie Hall?" asks the tourist in the old joke. "Practice, practice, practice" comes the answer. Musicians know it, athletes know it, surgeons know it. We *all* know it — who wouldn't want the more experienced surgeon to do our operation? Practice makes perfect.

But there is almost no recognition of this in training at all. To learn the skill of making music, we take lessons (often all our lives) and we practice. Who practices the skills of conversation, or leadership, or language? Smart learners, that's who. But with rare exceptions, like the two-year-long case method at Harvard Business School, they mostly have to do it on their own. Training doesn't help. It stops.

A few training programs have tried to address this. Some provide mentors. Others have created "immersion" type courses, which try to put the learner into the equivalent of a "foreign country" environment and let them try things out. But this is almost always limited to the length of the program. Maybe you'll get an hour or two of practice in a six hour program. But what do you do next week?

And of course practicing can get boring, as any schoolchild or musician knows. I remember that as a lute player, I would invent games to help me through all the technical work I had to do. "Ok now I have to be able to do this 10 times in a row without a mistake, or I have to start over. Can I do this with my eyes closed? Can I do it four times as fast? Can I do it in a different rhythm?" And much of the tedium went away in the act of playing the games.

Pretty much everything we need to know has to be practiced, from the alphabet, to the multiplication tables, to calculation, to reading, to speaking with people, to negotiating, to leadership, to objecting in a courtroom, to working in teams. It needs to be done over and over — not in a confined period, but every week, or even every day, and especially — but not only — right before we are going to use the skill (it does you only limited good to practice a language only a day before you go somewhere.) Unless we are either incredibly disciplined (like those people who keep toothbrushes at work) or masochists, we need some incentive, some fun way to make us practice — to *want* to do it. This is one reason why games are an important piece of learning. When Jim Freund was using computer games to teach secretaries computer skills at Citibank in the 80s, he wouldn't say "OK, "here's the training." He would say, truthfully, "Now for the fun part of your day." Practice games are used with kids by any teacher worth his or her salt. But very few long-term, engaging practice opportunities exist for adults. This is a big mistake.

Why is Change so Difficult

We *know* things aren't working :

Faced with crippling skill shortages employers are spending skyrocketing amounts of money training workers. The problem? Many programs just don't work. $5.3-16.8 billion is wasted annually. Training problems: 1. Employees aren't motivated. 2. Programs are poorly designed. Companies may unwittingly support unimaginative or dull programs that employees find deter learning. 3. Trainers lack expertise – those providing training may not know their audience, or they lack teaching skills.[25]

It certainly isn't hard to get nods and agreement that our corporate education and schools need help and change. In fact it would be hard to find any *really* staunch defenders of the status quo. Yet aside from isolated classrooms and pockets of innovation, very little changes. Why aren't we doing anything about this problem? Why is training and education still so content-centered, "tell-test" and ineffective? Why is change so difficult and slow in training and schools?

Well the first thing to note is that in both the education and the training world *some change is happening*. And some of it is happening, in fact, fairly quickly. Infrastructure is changing — the majority of business workers *and* classrooms are now wired to the Internet. And businesses, as well as colleges and universities are moving increasingly from instructor-led training to technology-based and especially Web-based training.

But unfortunately, aside from some increased ease of access (mitigated in business by the fact that you often must do it at your desk or at home) most of the changes that are happening have made learning no less content-centered or tell-test than it was before. It's still something that most workers *don't want* to do.

Here are some of the reasons training and education is still so content and tell-test-oriented:

Money. In the words of Kevin Oakes, CEO of Click2learn, "Corporations have a defined training need. Tell-test meets that need at its lowest level and it's the cheapest, and so that's why you see that being most prevalent. Doing a sophisticated simulation or a game costs more money, takes more time — it provides a better learning experience, but the corporation's got to be willing to say that that better learning experience is really what I'm going for. Most corporations are looking for quick solutions to their immediate problems rather than long term better educational benefits." [26]

We don't know what today's learners want and need. While it is clear to many or most that today's learners need something different, even if it were free it is not at all clear what that alternative should be. The political debate on education focuses on getting better teachers smaller classes and more parental involvement, through programs like vouchers. These are not bad ideas, but they really don't address a key part of the problem. The issue is that most of our educators, coming from a previous generation and set of experiences, generally don't understand the new generation's needs or learning methods. Ditto for trainers.

Even if we have some idea of what it is, we don't know how to do it. Think about it – if you were (or are) a teacher or trainer, and you had to, starting tomorrow, do *all* your training in an incredibly engaging way *without* telling anybody anything, could you do it? How? There certainly isn't any "right way" — we have to experiment. And even the best way to do that is not at all clear. When I arrived at Harvard Business School in

1978, having previously been a very non-business oriented musician, I just assumed, naively, that business school would teach me *how to do business*. I was very wrong. What I soon discovered — pretty much to my complete shock — is that they *couldn't* teach us, because *nobody knows!!* Business is much too complex and fast moving, and has far too many variables to figure out "how to do it." In fact "The very best we can do," said the Harvard professors, "is to let you read a lot of little stories (i.e. "cases") about how various things in business were done in the past, and talk about what lessons they teach us. We expect these lessons will be of some help to you in the future, although we can't be sure."

Training and teaching is a lot like the rest of business – there is no formula for doing it right. We are all trying to figure it out. Given the changes in the world, we will probably need the help of our students to do it. Today's generation, as Don Tapscott points out repeatedly, is the first to know more than their elders about a key technology in the world — computers. [27] And how did today's kids learn so much about computers? Certainly not "tell-test" in a classroom, but in their own newly-acquired learning style.

We are in desperate need of new ideas and methodologies that will engage these new generations and help them learn. We can no longer "tell" them anything, because they're not listening. We can't drill, because it does often kill. Who is working on inventing new methodologies that speak to this highly technological generation? Not enough of us, I'm afraid.

It's a big, fragmented system. The training and education system is huge. In the US there are over 50 million K-12 students. [28] Add in college and training and there are probably closer to 150 million — more than the entire population of all but a handful of countries in the world. It's also a highly fragmented system — unlike France or Japan, where education is national and every student in every classroom learns the same thing on the same day, U.S. education has always been considered a local problem. Each state or school district, and in many cases individual schools or teachers, decides what they will teach, when and how. In business every company does its training slightly differently, with the differences sometimes being only a matter of words, but *highly* important to the people in the organization. What are "workers" in one company are "employees" in another and "associates" in a third, and this seems so important that training people will often spend unbelievable amounts to conform to it.

Like all big systems, training and education are slow to change. "If the cure for cancer were offered to schools", said one observer who preferred to remain anonymous, "in 20 years they would still have cancer. Not because they think cancer is good, but because the decision and change process is so long and hard." But change is sorely needed. Over 1/3 of U.S. adults are classified as either illiterate or near-illiterate. [29] Corporations are experiencing an influx of workers who can't do basic skills.

One of the saddest stories I remember from my time teaching high school in New York City's East Harlem is of one-on-one tutoring with 9th grade non-readers. One activity we would do daily was to read the headlines in the Daily News — pretty much the most basic paper you can get. One day the front-page headline (and in the News it is the *entire* front page) read something like "DA SEEKS LIFE." I was offering, as was my custom, 5 cents per word, and so the young lady tried her hardest: "dah" she began. She did know her phonics, but she totally missed the context. We must, and can, do better.

Reform of big systems *is* possible, with good leadership. In the summer before Harvard Business School we were given a book to read – *My Years at General Motors* by Alfred P. Sloane. He figured out a new way to organize a large company that hadn't been tried before, and it was extremely successful. Obviously what worked for GM in the 30's will not work for the future of education. But let us hope that the leaders working on the problem today – Gore, Bush, Powell and others — incorporate into their solutions the very real issues of generational change.

The reformers are fragmented as well. It would be great if there were just *one* reform party. But as we saw above, there is little agreement among educational and learning reformers, and much infighting and jockeying for both intellectual and, increasingly, financial superiority.

We need to get the infrastructure built first. Clark Aldrich of the Gartner Group thinks that infrastructure is where people's focus will be until around 2002. After that they will begin concentrating on meeting learners needs by making better content. "What Gartner is saying is that 2003 plus will be the 'content is king' stage. That will be when really great stuff comes out because there'll be good standards, there'll be good systems out there, there'll be machines that can run it in terms of graphic cards and having DirectX. I think around 2003 and 2004 is when the great content is going to come out." [30]

It might mess with the system. Schools, and to a lesser extent training, are big, big bureaucracies And, like all bureaucracies, very entrenched in their ways. Sometimes innovations require changes. At the Dalton school Luyen Chou designed a terrific new way to learn, but in order to get it to work effectively they needed longer time periods, which involved changing the entire school schedule. "Schedule is one of the hardest thing to change at any school," says Chou. "It's like written in stone. People die on their swords." There are lots of "system" obstacles to innovation. Teachers' roles change. The amount of time they have to put into things changes. Evaluation changes. Assessments have to change. Change creates disruption. Think about changing length of the school year, or of a school day, or of summer vacations. In training, think about changing the "course" as the basic unit of instruction. Companies are already finding it hard to move to the paradigm of computer training at your desk — people at their desks are expected to be working. "The real test," says John Parker of First Union "is will the

floor manager accept it — even with the 'don't disturb me, I'm training' sign on the back of the chair." [31]

It sort of works. If it ain't broke, why fix it. Students at many prestigious schools, that have the money and brainpower to innovate are still "succeeding" from the administration's point of view by, for example getting into good colleges. Similarly top colleges and companies that still draw "the cream of the crop," feel little pressure to change. The issue is more with the other 99 percent. As alcoholics anonymous and other recovery programs have taught us, it is impossible to fix a problem until we admit it exists. Most people do not think we have a problem in methodology. If you listen to the politicians' speeches, all they want is "a good teacher in every classroom." The cry is always for more "good" teachers — if we only had that, —along with smaller class sizes — all our problems would be solved. Unfortunately what politicians (or parents, or educators) mean by "better" teachers or trainers, is better in the old, 19th century tell-test sense. That just isn't going to cut it with the Games Generations.

Retraining the trainers and teachers is hard. Of course it is, because we don't yet know what to train them to do!

Accountability is harder. We certainly know how to measure tell-test — test scores. But measuring innovative programs is harder. With 52 million K-12 students in the United States, [32] multiple choice exams are the easiest thing to administer . But they are a very poor measure of process-oriented learning. As soon as you move away from standardization, measurement is difficult. So accountability is big problem. As it is in business, where the task of matching training efforts with business results in a very, very complex system is so difficult that people tend to fall back on scores as their only "gettable" metric.

So clearly there are a lot of problems to overcome. But there *is* hope. As I said earlier, solutions to the content-centered, tell-test problem are not impossible. There are ways to address them that are already being tried and are clearly within our means. And high among them is Digital Game-Based Learning.

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