9 Paradoxes of Educational Simulations

By Clark Aldrich

A new way to view a world that is not that tidy.

More organizations are bringing simulations into their curricula to improve both the effectiveness and appeal of formal learning programs.

And that's a good thing, but simulations can be disorienting. They cause "frustration by design" because they force participants to challenge their assumptions of the world (see paradox eight), and they also challenge what users think of as a "formal education" experience. Gone are the tidy learning objects and familiar instructional systems design. The simulated experience plays out more like life—only more intense. Muscle memory and applicable intuition are emphasized, which means that for everyone involved, the unfamiliarly with a typical simulation experience can create a compounding frustration that needlessly undermines an entire program.

So this begs the question: When it comes to simulations, what is the new normal?

I have found nine interrelated paradoxes that most people find surprising—not just for what they say about using simulations, but also for what they say about learning programs that do not use them.

The first paradox

People learn more from the underlying systems and interface in any educational experience than from the surface content.

In traditional classrooms, most students learn more about how to take notes and complete tests than linear subject matter such as history or ethics.

The second paradox

Educational simulations can never be completely comprehensive and accurate.

Reality is not always the best learning environment. There is often too much noise to isolate the relationships that support the learning. Real life also takes time to play out—a step that simulations condense.

"The most exciting areas of sims," recounts Tony O'Driscoll, performance architecture analysis and design at IBM On Demand Learning, "is not in how well they mimic the real world, but instead how rapidly they allow players to viscerally parse through scenarios so that the learnings can be arrived at in a much shorter time frame."

Sharon Sloane, CEO of WILL Interactive, adds, "It is not that we will encounter the exact situation in real life that we faced in the simulation. It is rather that when we face the real situation, there will be a sense of having 'been there before,' making us better prepared to make decisions." This is what Malcolm Gladwell, in his bestseller *Blink*, calls "thin-slicing" (see Books in the March 2005 issue of *T+D*)

Jake Stahl, director of client systems delivery at Purdue Pharma, sums it up this way: "Sims cannot guarantee an outcome, but can reduce the odds of things going astray."

There is also a desired role for randomness. "Analysts like to take out the effects of chance from simulations," notes Robert Carpenter, deputy director of simulation development, in Australia's Land Warfare Development Centre. But "the commanders are comfortable with simulations that create 'random' events. This reduces the affect of shock."

Finally, reality also needs to be looked at comprehensively. "The reality has to reflect the learners' emotions and beliefs as well as their knowledge and skills," notes Sloane.

The third paradox

One can't even begin to understand a sim by watching someone else play it; one has to play it himself. One can't even begin to evaluate a sim by playing it; one has to measure the results of someone else playing it.

We are used to skimming content. But, "having trainers evaluate the value of sims [using their intuition] is like having buggy manufacturers evaluate cars," observes IBM's O'Driscoll. "Their perceptions on what transportation should be cloud their ability to recognize the possibilities."

WILL's Sloane, an instructional systems designer, worries that systems designers are the biggest censors. "Some attempt to make the tail wag the dog by insisting on force fitting new learning technologies into old instructional design models."

Curiously (which is my code-word for "insanely frustrating"), when evaluators dive deeply into a simulation personally, they often walk away saying, "I get this, but I am not sure if others will." Because the simulation's content and process is less familiar, we often feel the change in what we know and what we do, while being less sure of how that change was brought about.

The fourth paradox

Things that seem simple, narrow, and isolated when "taught" through traditional linear means are deep, complex, and extendable when practiced in simulations.

This may just be the most far reaching of all of the paradoxes. When playing pinball, you can nudge the machine to keep the ball in play. But if you push the machine too hard, you will "tilt" the machine, which will end that play.

It is incredibly easy for a student to "learn" that statement to the point that they could write it on a test. But to nudge a pinball machine at the right time takes skill and practice. Even the best pinball player in the world cannot always perfect that skill.

If you modified a machine to emphasize pinball nudging, any traditional instructor would say, "That seems like a lot of work to teach one simple statement." However, if you were becoming a pinball expert, you would need the deeper approach.

Ken Kupersmith, co-founder of SimuLearn, notes, "Sometimes information alone is all that is needed. In basic sales training, learners should be reminded to 'ask for the business.' But when trying to decide when is the right time to ask for it, how much of the business to ask for, who is the most important decision maker, and even what criteria are important to them, you might want to practice that complex behavior in many iterations with lots of variations."

Adds Purdue Pharma's Stahl, "If [former NFL quarterback] Joe Montana said to me that throwing a football is simple, I would agree that from his perspective it is. But can he explain to me in words how to do it, or does he need to show me? Once he shows me, do I now know, or do I need to practice? Once I practice, have I perfected it or do I need to fine tune?"

Simple theories take practice to grasp successfully, and the simplest rules when applied intuitively are more powerful than the broadest database or the most complex process.

The fifth paradox

When educational simulations are first created, they are heavy on simulation elements, and casual players complain they are too hard. Over iterations, as a result of the complaints, educational simulations are made easier and more fun, and serious players then complain they are not deep enough.

David Fry, an learning and development analyst for P&C Insurance Company, gives this example. "We developed a learning event in which the participants ran a simulated P&C Insurance Company for three years, making decisions on marketing expenses, premium levels, staffing, and other specific needs. Invariably, one (or several) would complain that the simulation was too complex and too difficult to master until we facilitated them on how their decision-making, specifically regarding the premiums they set, and made use of their relationship building and leadership. They "forgave" the travails to which they had gone in light of the lesson they saw they learned."

David Milliken, founding partner at Blueline Simulations, says, "The gamer generation is anything but casual when it comes to playing simulations. This new generation has grown up with complex games. "Unfortunately, many serious game developers have acquiesced to the demands of boomers and have oversimplified their games. But in the next five years, gamer populations in our workforce will have reached a tipping point." This will lead to more sophisticated simulations.

The sixth paradox

Vendors and builders of simulations like to describe them as vaguely and mystically as possible.

Yet this hype-driven misdirection blurs product categories in the marketplace, eradicating the critical lines between different types of simulations (branching stories versus interactive spreadsheets versus game-based models), which makes comparison hard and lessons learned to apply the right type of simulation for the right situation even harder.

"Setting expectations of what is to happen when a person sits down is paramount and truly leads to how they approach that medium," notes Stahl.

Suppose your friend just saw a commercial for a new vehicle. He was breathlessly quoting the tag line, "It gives you the freedom to go where you want to go. I think I will buy it." I would hope you would ask, "Are we talking about a skateboard, a car, a truck, or something else?" If your friend shot down your question as being too analytical and restated the tag line, "It gives you the freedom…" you would be less confident that he was making a good buying decision.

"The issues underlying paradox six are those to which we've given considerable thought," says Beth Aguiar, vice president of Apollo Publishing & Learning Technologies. "For example, we have simulations that are more analytical in nature and require the use of interactive spreadsheets. However, we have others that focus on discovery and are more game- or quest-

based. It all boils down to what learning objectives we trying to promote. Not to mention the fact that a cookie-cutter approach to simulations quickly leads to learner burnout and fatigue."

The seventh paradox

Most deployments of simulation-based programs look successful if measured forward from what a student learned, but most simulation deployments look like failures if measured backwards from what percentage of material that the students could have learned, they did learn.

"No two people who go through a simulation can be expected to come out with the same experience," notes O'Driscoll. "That is precisely the design point. The learning that occurs is surfaced at the moment where the lack of capability of the individual intersects with the need to have it, in the customized context that the learner herself has set up though earlier decisions."

The eighth paradox

Things get worse before they get better, even when the transformation is sought after and desired.

New clarity only follows frustration. New power comes from not being able to do things the way you have in the past.

When learning to ride a bike, or drive a car, or speak a foreign language, you experience lows, highs, frustrations, and resolutions. If you were a manager learning to listen more, and you were given the challenge of not talking during a staff meeting, that might not "feel" natural. If you had to outsource a team for the first time to India or China, that would also most likely create frustration.

Upon resolving the frustration, we even have difficulty telling ourselves and others what we learned. Words overtly betray us, which can trivialize the learning. But what we learn sticks with us. Hence, we remember riding a bike forever, while forgetting what year the Magna Carter was signed five seconds before we need to write it down on the test.

The ninth paradox

A good educational simulation takes traditional linear training just to use.

What we have learned around instructional design is still critical, but only to set up to more complicated material. The richest simulations do not replace instructors; they crave them.

Stahl recounts, "When I speak to people who have failed, I always find that they let e-learning stand alone. These types of things crave instruction."

This gets to a broader issue. "When using a serious game for the first time, the participants often treat it as a game. It takes an instructor to break them out of the 'game' mentality and to get them to understand the consequences of their actions," says Carpenter.

Next great movement

There have been two great formal learning movements during my professional life. The first was quality, where CEOs realized that a set of shared deep, belief-challenging skills could keep manufacturing organizations in business. The second, e-training, has succeeded in extricating education from classrooms, which greatly increases access and convenience, and automates labor intensive activities.

Simulations could well be a third great movement. Certainly, like the others, it has already forced us to rethink some basic assumptions we have grown up with. Simulations might even provide lasting organizational impact. If so, building a competency in simulation deployment might just be, as the Ford Motor Company once advertised, job one. TD

Clark Aldrich is co-founder of SimuLearn; clark.aldrich@simulearn.net.