LEARNING TO PLAY TO LEARN
Lessons in Educational Game Design

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An Education in Educational Games

Educational games are a hot topic these days. From game developers and learning theorists to classroom teachers and policy wonks, all manner of curious folk seem drawn to games that teach something, to someone, in some way or another. However, the only consensus in this whirlwind of activity seems to be that educational games are something of a failure. To quote industry veteran Brenda Laurel at a recent conference, *"I can sum up educational games in one word – and that word is... CRAP!"*

Why would anyone want to take part in such a doomed enterprise? Educators are energized by games' ability to engage with students, to capture their wayward attention and help them learn in rich and dynamic ways. Game designers and developers are increasingly drawn to create educational games as well – perhaps from a desire to make new kinds of games, to create work with a purpose beyond pure entertainment, or even just as an escape from the rigid confines of the mainstream game industry. Each of these camps – developers and educators – has its own agenda for taking on projects, its own set of particular dissatisfactions with the current crop of educational games, and – all too often – a complete lack of experience with the concerns of those working on the other side.

We (Nick & Eric) have designed games for both entertainment and education. And in the process of juggling player enjoyment and learning goals, development schedules and research agendas, we've learned that there are a great many misconceptions regarding educational games. Some of these misconceptions come from educators and some from game developers. In the spirit of bridging this divide, we'd like to tackle head-on some of the key issues involved in creating educational games.

Our position, in a nutshell, is that no one has all the answers. Developers and educators need to work *together* to tackle these issues. So in the short space that follows, we have tried to highlight some of the ways that educators, developers, and others involved in creating and studying educational games fail to see eye to eye. Perhaps by planting some seeds in the fertile "crap" of current educational games, we can begin to grow some new ways of thinking.

Game design fundamentals

As game designers, we're loath to theorize on how and why people learn. Cognitive neuroscientists, learning theorists, and professional educators work on these problems

full-time. But just as we always seek out the research and advice of our educator colleagues to better understand the learning process, we do know what *we* have to bring to the discussion. And that is a thoroughgoing knowledge of *game design*.

It may sound trite, but for us educational games are first and foremost *games*. Whether a bona-fide contest with logical rules and a winning condition, or a Sim City-style sandbox playtoy, a game experience needs to have certain basic elements to be a meaningful experience for players. These elements include interactivity designed with clarity of input and output; short-term and long-term goals to shape the player's experience, a well-designed ramp for beginners to learn the ropes; and a game structure that actually contains the possibly of genuine *play*, not just quiz-style questions and answers.

Why emphasize what seems so obvious? Because many times we've seen educators entering into game development that are content to transfer the *style* of games onto educational tasks without understanding the *substance* of what makes a game work. And without these fundamentals, the end experience can be dead in the water. What exactly creates that elusive feeling of "play?" No one really knows. And it varies from game to game. But experienced game designers are probably the best-equipped folks to bring it into your project.

Respect the challenge

Everyone – both developers and educators – forgets this one: *making games is really hard*. Even creating a *wholly derivative game* (a blow-by-blow clone of Bejeweled, or You Don't Know Jack, or Tomb Raider) is *incredibly difficult* to do well. When you add to this the ambition of creating an innovative game with new kinds of content and gameplay, as well as a game that actually tries to teach something meaningful to players, the problem is multiplied by orders of magnitude.

So one piece of advice we'd offer to those going into educational games: *keep it simple.* Set your sights lower than a massively multiplayer online role-playing game, or a simulation with the depth and complexity of The Sims. Resources are typically limited in an educational game project, and it usually takes guerrilla-style design thinking to pull something off. For example, if your game needs online player interaction, there are many ways to socialize on a computer besides a full-blown real-time 3D world. Don't rule out a Habbo Hotel-style 2D world, a turn-based game a la SiSSYFiGHT, imaginative use of message boards and email, or even hotseat-style interaction in front of a single terminal.

This is why we are skeptical of many educators' claims that given access to the latest game engines, they will be able to create top-notch educational games and succeed where everyone else has failed. It's simply not going to happen. Tools by their nature limit as least as much as they liberate, and creating innovative games on any scale usually means coding them from scratch. That's not to discourage educators from getting into game development. But all sides that want to get involved need to recognize the challenges and demands of making games.

Embrace the "gameness" of games

Part of these demands involve the recognition of what is essential to a game. Many people diving into educational games want to capture the excitement and interest that games inspire but simultaneously excise those very aspects of games that generate passion in players. Take the idea of "competition." One common misconception we've seen among educators is to view competition between players as a hindrance to the learning process. Not wanting to classify people as "winners" or "losers," they envision feel-good cooperative experiences were nobody has to come in second.

While well-intentioned, this approach completely misunderstands how competition and collaboration function in games. Every game contains a seed of conflict, whether it comes from the human opponent of a chess game, the hidden word in a game of twenty questions, or a field of AI enemies in a console shooter. The struggle to overcome these obstacles, the engagement necessary to outwit the opponent or solve the riddle, is a primary source of fun.

At the same time, every game also intrinsically involves collaboration. Even the most aggressive boxing match requires the fighters to agree to the rules of the game: no foreign objects, no hitting an opponent who's down, and respect for the judges' call at the end of the bout. This accord between players is at the heart of any play experience and is exactly what creates the environment where winning and losing are both fair and safe – preparing the way for the game to be played in the first place.

Competition and collaboration is just one example of the "gameness" of games. The excitement of games doesn't magically emerge from fancy graphics, well-written stories, or point-based rewards. Good games integrate a number of complex elements (moments of decision-making, challenging goals, rewarding feedback, etc.) to create a fun play experience. The best way to understand all of this is to try these games yourself. Good game designers don't just make games; they play them. Lots of them. The best learning games research groups, from MIT to University of Wisconsin to Copenhagen's IT-U and Learning Lab, incorporate daily hours of play into their practice. If you want to make games, you need to know them, and to know them, you need to get your hands dirty playing them.

Process, not data

By now, everyone has heard of the poor poster child of educational game crappiness, Math Blaster. Given a mandatory mention at every educational game conference, Math Blaster's drill-and-practice design carries the failed weight of learning and games on its straw-man shoulders. We don't see any need to point out yet again how Math Blaster falls short. We'd rather discuss how to avoid making a Math Blaster in the first place. One crucial step is recognizing the importance of *process-based gameplay*.

One feature in all good games is a marriage of form and content. If you want to make a game about car racing, you want the game's play to feel like racing – fast and risky with lots of quick thinking and make-or-break decisions. A game about diplomacy (like, say, Diplomacy) should not just depict but *embody* the heady distrust, provisional alliance-making, and social give-and-take of politics. There's no one right way to design play for any given content, but the result should be that the way the players interact with the game, the *process of play,* parallels what the game is about.

To restate this subtle point, the play of a game is not just graphics, audio, and text. Play is an *activity*, and the content of a game should be expressed in that activity. The actual repeated actions, decisions and choices, and thinking processes that the game design engenders should themselves embody what the game is about. This is easier said than done – especially for new kinds of subject matter. One important approach is to choose content that is as game-like as possible. Games are dynamic, participatory systems, and process-oriented content is much better suited to games than factual content. For example, if your aim is to create a game about history, an experience in which players learn historical dates is less of a game-native approach than one about historical causality, or a simulation of a historical period.

While process-based gameplay is important for "pure entertainment" games, it is particularly relevant in regards to games that teach. Simply slapping educational content onto a generic play style is an often-seen formula for failed educational games. Instead, the educational content should be tightly coupled with and integrated into the play of the game. If you want to make a game about the scientific method, have the players actually hypothesize, experiment, observe, and analyze in order to achieve their goals. Want them to learn about handling money? Give them virtual currency and build the game around spending and saving over time. By integrating the learning content directly into the play of the game, it gives you the chance to make the learning itself enjoyable, rather than being the bitter vegetables a player has to eat along with the fun gaming dessert.

What are games good for?

For all the talk about the potential of educational games, remember that no one is suggesting that games can or should completely replace traditional education. Even the most casual observer can see that effective learning is a combination of many different elements: skilled teachers, dedicated study, good learning materials, the larger social environment, etc. Games simply can't carry the entire burden of education alone.

As we've argued, games are good at showing and embodying *processes*, rather than delivering raw facts. Games give players the opportunity to get their fingers into a system, muck about with it, and see the results. So when you make educational games, let the games be games. A game that quizzes you on presidents' names or periodic tables is just a gimmicky test, but a game that simulates the planning and execution of your own archeological dig gives you a direct experience of process that a textbook or lecture can't.

That said, even explicitly non-educational games often teach players useful skills. A great many gamers (including both of us!) unknowingly picked up probability theory and basic algebra in elementary school by rolling D&D character stats and juggling combat options. Even the most casual word game can expand a player's vocabulary. And Kurt Squire's work with Civilization demonstrates how a classroom can use a game to point out the way its systems reflect – and occasionally misrepresent – the facts of history and cultural development. Games do have a lot to teach us, but perhaps not in every field we desire or in every way we expect.

One final word on this topic: *keep expectations in check*. The hype of educational games often runs away with itself, resulting in unrealistic promises. A game can teach about activism, but that doesn't mean it also needs to be a generator of real-world political activity. It's difficult enough to conceive and execute a game on a social issue; when such a game gets saddled with the responsibility of generating letters to senators, planning a demonstration, and real-political organizing (difficult activities to coordinate in and of themselves) the result can be a diluted heap of nothing. To put this another way, you can learn about medicine from a game, but don't expect by playing the game to discover the cure for cancer.

The larger context

No game is an island. You may have designed – and even created – a fun and unique educational play experience. But getting it into the hands of players is another matter entirely. The design of a game needs to take into account its context of use from the very beginning of the process. In the commercial game world, context is often taken for granted – a game under development will eventually become a box on a shelf, or a link on a mobile phone.

While context should *never* be taken for granted, it's especially important to consider context in the educational game world. Revenue models, distribution strategies, and regulatory policies are much more diverse and unsettled than in the commercial game industry. Are you making a CD-ROM to be played in a classroom? An online game that kids will be accessing from home? Or some unique hybridized mishmash? Who is playing your game? Where? And for what reason? There isn't space to detail every context possibility here, but understand that each context raises its own unique issues regarding the design, business, culture, and educational strategy of your game.

For example, if you're creating a game that will be available online, remember that you are suddenly competing directly with the incredibly compelling landscape of popular culture, for audiences that often are playing games of adult complexity by the time they reach 10 years old. If you're creating a game for a classroom, on the other hand, your project is likely to be received as a precious bit of escape from the dreary regimen of the schoolday – if you can actually get it in the room. In the US, for instance, each state has

its own educational policies and procedures, and the oppressive federal testing system leaves teachers little room for curricular flexibility.

Considering the context opens up a cornucopia of issues. Here's a few more: game developers tend to create games that are fun for *them* to play. But young children and non-gamers have very different kinds of play skills and experience. Even the difference of a couple of years or a little computer exposure can have a huge impact on what a player finds challenging, interesting, or fun. And here's another one: educational games usually need testing verification. It's mighty difficult to evaluate what a player has learned, especially if the game encourages open-ended, exploratory play. (Playing the "wrong way" might be just as educational as winning!) Educators and scholars generally have much to teach game developers about these kinds of issues, whether the game developers want to hear it or not.

The two cultures problem

And in the end, that's the one point we want to leave with you – listening to what the "other side" has to say. Let's face it. Professional educators and scholars of learning have pretty naïve ideas about game design and development. They're generally not gamers, and lack the hands-on experience to really know what makes a game tick. Regarding development, they are prone to envisioning disastrously ambitious game designs when a much simpler solution will likely do the job.

But game designers and developers are equally flatfooted when it comes to understanding the educational process. Too many think of "learning" as something that happens only when reading a textbook. And few are equipped to understand and navigate the jungles of educational standards, developmentally appropriate design, rigorous learning assessment, and other crucial components of making educational games. We know we're not.

Yes, these are gross generalizations in many ways – including our false dichotomy of "educators and developers" and our somewhat narrow sense of what might be considered educational. In this brief essay, we've been able to do little more than scratch the surface of these incredibly complex topics.

In the final analysis, do we think all educational games are doomed to be "crap?" Of all the parties involved – game developers, researchers, teachers, and others – nobody has a monopoly on the answers. But the only way we are going to solve this problem is if everyone can figure out how to communicate and work together. That way, bit by bit, we can begin the alchemy to turn our crappy games into gold – or at least, into something that can fertilize our players' minds. We're ready to learn. Are you?

Recommended Resources

If you're only going to read one book on games and learning, we recommend *What Games Have to Teach Us About Literacy and Learning*, by Jim Gee. And likewise for game design, we recommend the book Eric co-authored with Katie Salen, *Rules of Play: Game Design Fundamentals*. Also required: get involved with the Serious Games Initiative (www.seriousgames.org), the Digital Games Research Association (www.digra.org) and the International Game Developers Association (www.igda.org).

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