

"EDF Final on Games"

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**[Note from the authors: the following white paper is the transcript of an “interactive fiction” game that can be played at [stanford.edu/~pefranz](http://stanford.edu/~pefranz). The text in brackets below is part of the game’s code.]**

Constance Steinkueller is a room.

"[if unvisited]You plug into a virtual world, surrounded by the avatars of other 'players.' Looking around you see students and experts engaged in conversation, playing games together, arguing over the merits of gaming to learn. Some of the avatars sit in elaborate, but semi-transparent offices. You see James Gee and Dan Schwartz in the distance.

As you gain your bearings you realize that you have plugged directly into the virtual office of Constance Steinkueller. In front of a framed picture of President Obama, you see Constance herself, an associate professor at Wisconsin Institute for Discovery University of Wisconsin-Madison, and cofounder of the Games+Learning+Society Initiative. You approach Constance, curious about her connection to the White House.

Constance introduces herself, and tells you that she believes that she was drawn to the White House because of the administration’s interest in 'games as a vehicle for thinking about cognitive and behavioral change.' She claims that her perspective is unique because she understands the dangers of this mission — warning of the Orwellian 'gamified citizenship,' but saw the possibilities to 'get it right.'

You then ask Constance what her perspective is on the general games market. She responds by contending that although there is a diversified game market, it is not widely known or widely accessible. Kids spend more time on game than homework, yet people are reluctant to acknowledge (which she believes to be empirically true) that learning happens when kids playing games. Her support — 'Games are hard!'

You then ask Constance to delve deeper into the empirical proof for her claim, which she responds to by presenting the results from a study she conducted that demonstrated increased reading performance among boys, when the learning was gamified. You finally ask Constance to share her recipe for the famed 'gamification secret sauce.' She tells you that the sauce must consist of one part content expert, one part game designer, and one part data scientist in order to cook up a great educational game. [end if]

[if visited]Constance smiles, 'Nice to see you again.'[end if]

Time to move along.

South (s) is James Gee.

Southeast (se) is Malcolm Bauer.

Southwest (sw) is Dan Schwartz."

James Gee is a room. James Gee is south of Constance Steinkueller.

"[if unvisited]You enter another online affinity space, this one for a massive multiplayer social game. A thousand digital avatars have connected to form the represented collective mind of Jim Gee, a sociolinguist at the University of Arizona. Jim describes how books were once held up as a savior of education, and are indeed powerful tools for learning when used in a context of rich dialogue, discussion, and design. Instead, we skim massive textbooks without active engagement. Jim feared that games would fall into a similar trap, becoming 'schoolified' and leeched of their potential for rich learning context (EDF website).

He then goes on to describe how we can make technologies that fit 'the nature of human beings as learners.' Humans are built for goal-based action; we remember an activity better when it is directly connected to a meaningful outcome. Together, humans function best as 'plug and play' devices. While intelligence is typically pictured as the trait of a single individual, our cognition evolved to be used in networks with other human beings. A collectively-intelligent network will enable you to harness individual differences in people's abilities, so that crucial pieces of information are not missed.

In addition to strengthening the networked intelligence of the human mind, games can also extend its ability to simulate potential scenarios using self-representative avatars. Jim closes with a piece of advice to game designers to not just build games — to build capital-G Games with networks of supportive shared activity (EDF Website). [end if]

[if visited]The James Gee collective consciousness is too busy playing its game to talk to you anymore.[end if]

East (e) is Malcolm Bauer.

West (w) is Dan Schwartz."

Malcolm Bauer is a room. Malcolm Bauer is southeast of Constance Steinkueler. Malcolm Bauer is east of James Gee.

"[if unvisited]Stepping towards Malcom Bauer, you feel as though you fall asleep and reawaken. As you shake off the confusion you realize that you are in a classic arcade. The decor is circa 1978. A friendly group of teenagers call you over to join in Tank 8, a multi-player arcade game. As you join in, you overhear Malcolm Bauer (managing senior scientist at ETS and director of assessment at GlassLab Games) talking to some other visitors nearby — 'in the play, in the collaboration... there was learning, there was excitement, there was risk, and there was bonding.' If only the education games of your own time could generate the same level of engagement. The thought rattles around in your mind, when hand touches your shoulder and beckons you to disconnect from the game. The hand belongs to Malcolm Bauer himself.

Malcolm too has considered the question of how to 'gamify' schooling, or how to 'schoolify' games. There are a few great examples of software that finds the game mechanics inherent in knowledge. For example, the iPad app Dragonbox challenges children with manipulating colorful tiles to clear a board, and gradually transforms the surface decoration of the ruleset until the player suddenly realizes that he/she is performing complex algebra. This game has selected a small but important bit of math, and operationalized it perfectly into a game. At the GlassLab, Malcolm works as a cognitive scientist alongside game designers, artists, and educators to build games that act as true formative assessments, with properties like clear expectations and immediate feedback. Their pioneering games aim to be an existence proof of rigorous, polished, and sophisticated educational entertainment (EDF Website).

Adding Malcolm's expertise to your own, you find yourself once step closer to understanding this world of 'gamification.' But where to go next?[end if]

[if visited]You take another spin playing Tank 8 before deciding it's time to move on.[end if]

North (n) are students.

West (w) is James Gee."

Dan Schwartz is a room. Dan Schwartz is southwest of Constance Steinkueler. Dan Schwartz is west of James Gee.

"[if unvisited]You come to a new, surprisingly bland room. You turn around and around and see nothing of interest, but suddenly you bump into someone, who must have appeared from nowhere. Before you can even see who it is you're getting an earful. 'You think that knowledge transfers? I don't even know if transfer is possible!' An intense, curly-haired man glares at you as you try to come up with a response. He smirks, 'Of course, the problem is the way you

education people try to measure and classify knowledge. You think it's all information this, cognitive processes that. But that's just the obvious stuff, not the important stuff. What you really want to assess is choices. If a student makes a good choice, what does anything else matter? Knowledge - procedural knowledge or content knowledge — will come from good decision making. So assess that.'

'What does that have to do with games?' You reply.

'Everything! Look, games are a great way to measure choices. You can see exactly what a player looks at, what they click on, whether they choose to persist when they fail, whether they seek the easy way out of a challenge. It's all choices, and it's easier to measure in a game than in a normal test. And, as I was saying, the content knowledge doesn't transfer out of the game anyway.'

You stand amazed. 'Who are you?'

'A dark humanist. You can call me Dan.'

As you try to puzzle out what a dark humanist is, Dan continues, 'Anyway, student choices do transfer. If you set up the game right, you can predict student performance in class highly accurately based on what they do in the game. The question is, how can we use that to teach.'

You look down as you try to think of an answer, but when you look up Dan is gone. Maybe a dark humanist is like a warlock or something.[end if]

[if visited]You hurry through Dan Schwartz's domain as quickly as you can.[end if]

North (n) are students.

East (e) is James Gee."

Students Discussing Choice is a room. Students discussing Choice is north of Dan Schwartz. Students Discussing Choice is west of Students Discussing Gaming Outcomes.

"[if unvisited]You can not help but step in the direction of a group students gathered in some kind of virtual ice cream parlor. You listen in on a discussion of choice in learning and the implications of gamification. You do not recognize the dark, cloaked member of the group, but as common as anonymity is online, you're not put off by this. Instead you listen in and try to get a sense of the questions that are driving this intellectual adventure.

Matt Williams begins, 'Much of what was discussed at gamification was old educational theory, boiled down to this: choice in learning contexts helps children learn. James Gee implored us to not use tech the same way we used the technology of books (the invention of the textbook,

etc.). But, seriously, what's stopping us from doing that? As long as education remains a system that is contingent upon a certain construction of a learner, then how would games be any different?'

The mysterious, shrouded figure jumps in, 'One of the themes in this course and in the wider education reform discourse is the role of choice in student learning. We spoke about choice during the class on high school/college line in talking about where agency lies in schooling. During the K-12 school years, the control over choice tends to lie with policy, administrators, teachers and parents and yet this agency seems to switch from the institution to the individual when reaching higher education. As agency is key ingredient for engagement, I believe that games, which can foster a sense of ownership and choice, are a vital asset to K-12 education.'

Finally, Abby Larson turns toward you, asking, 'Do games have the potential to change where structural agency sits in K-12?'

She stares at you intently, but you have no answer. She takes a bite out of an ice cream cone as you promise to think about it. As good as virtual ice cream sounds, the only hunger motivating your quest is the hunger for knowledge[end if].

[if visited]The ice cream parlor has attracted more conversants, though many have chosen to leave. In fact, you recognize only the anonymous figure from before. He? She? beckons to you. You come closer.

'Why did you not consume any virtual ice cream?' the figure asks.

'I chose not to,' you reply.

'You chose... poorly.'

You can't tell whether you've had this conversation before, but something tells you it is time to leave.[end if]

South (s) leads to Dan Schwartz.

East (e) are other students.

Northeast (ne) are still more students."

Students Discussing Gaming Outcomes is a room. Students Discussing Gaming Outcomes is north of Malcolm Bauer.

"[if unvisited]You walk through a small lounge, seeing a couple of students chatting with each other. At the end of the room you see a student virtually skydiving, her avatar racing through

the air and buffeted by wind, even though she looks still from inside the lounge. You go to the window and see that the avatar belongs to Meaghan Stearn, who turns towards you, saying, 'Thinking about gaming to learn has led me to think about the role of games in student's non-academic development. What is the potential of games to impact or teach soft-skills, life skills, and skills crucial for use in the community? Games, because of their low-stakes nature, are also environments in which students are able to take risks, engage in interactions, and participate in scenarios that mimic real life situations without the risk of failure. Games can be learning opportunities where students can try different strategies without high risk. There are also games that expose students to experiences outside of their immediate realm. An example is Third World Farmer, which aims to build a more globally aware consciousness in its players through the activities and hardships embedded in the game.'

As she finishes her parachute fails to open. 'See,' she says, 'in the game failure is not punished in the way it would be in real life.' Her avatar plummets past you, making a cartoonish whistling noise before hitting the earth. Of course, Meaghan is unharmed by the virtual crash, getting up and smiling at you.

Shaheer Rizvi, one of the chatting students in the lounge, taps you on the shoulder, and you turn around to listen, 'One of the questions raised by the panel was: can games help kids pick up essential skills needed in the 'real world?' Given recent research showing the importance of non-cognitive skills such as creativity and emotional resilience, especially at younger ages, this is a question that is being asked of our educational system as a whole. But given the fact that (1) Jim Gee noted how engaging games can be for kids, (2) kids spend significant time on their gadgets anyway, and (3) schools traditionally focus less on non-cognitive skills, it seems like this could be a particularly useful niche for educational games.'

The other student, Anita Varma, chimes in, 'I think gamification poses a new set of questions around how to do assessments of student learning: in what ways can we distinguish between excelling at playing a game versus excelling at learning and deeply comprehending the material? In the best-designed games, I suspect there wouldn't (or shouldn't) be a way to complete a level without comprehension.'[end if]

You walk back through the lounge and look back outside of the virtual window and consider giving virtual skydiving a try, but think better of it. Instead, you head onwards to more conversation.

South (s) leads to Malcolm Bauer.

West (w) are other students.

Northwest (nw) are still more students."

Students Discussing Affordances is a room. Students Discussing Affordances is northeast of Students Discussing Choice. Students Discussing Affordances is northwest of Students Discussing Gaming Outcomes.

"[if unvisited]The room here is a plain lobby, much like you'd find in Stanford's Center for Educational Research building. The students here, however, are anything but plain. Stephen Frey has the head of a Triceratops, and Paul Franz is apparently made of spaghetti noodles. Along with Hallie Fox (as a toaster) and Anita Varma (who looks normal enough), they are engaged in a heated conversation about the affordances of games for learning.

Anita is speaking, 'On the other hand, there are affordances of games (pattern recognition, rote memorization of moves) that could afford space for 'faking through it.' This is not unique to games, of course — I have plenty of students who pantomime the pieces they need to get by on a very traditionally formatted exam.'

Hallie adds, 'The panelists all highlighted an important factor of gaming - goal based action. We are programmed to solve problems, set goals, and work to achieve those goals. There are not always logical, linear steps to achieving goals in life, nor in games. That's the excitement! We get hooked because we have not yet solved a problem. The problems to solve in games are not so impossible that we give up, yet challenging enough they may take more than one attempt to solve, or even a few. We come back to them because we know they can be solved, we learn more each time and get better at gaming - clues that lead us one step closer to achieving our goals. This is what makes them addictive.'

Spaghetti Paul Franz responds saucily, 'Yes, but let's be careful about these broad characterizations. Games are a complex category of media. Like books, they vary greatly in quality, purpose, genre, and design process. They have a variety of ideological purposes (often making money is a key, but independently developed games often have deep artistic goals and ideologies). They work differently for different gamers.'

Stephen adds, 'Indeed, and games are predictive only insofar as they model the real-life situation in which the skills will be applied. Fortunately, games' interactivity with the user can offer a more complex situational model than previous large-scale assessment technologies (i.e. Scantron paper). One interesting game model is 'Touch Surgery,' an iPad app that simulates common surgeries in glorious, gutsy detail. Most importantly, it tests decision-making procedures for the unexpected problems that occur the middle of an operation.'[end if]

You're not sure you want to hear any more about gutsy simulations from a talking Triceratops, so you quietly sidle away.

Southwest (sw) leads to a discussion of outcomes.

Southeast (se) is a discussion of choice.

From the Northwest (nw) you hear students excited about the future of gaming to learn.

From the Northeast (ne) you hear students discussing in more reserved tones."

Students Discussing Reservations is a room. Students Discussing Reservations is northeast of Students Discussing Affordances. Students Discussing Reservations is east of Students Discussing Possibilities.

"[if unvisited]You see three students working on what appears to be a text-based game essay thing. They're hanging out in one of those new Google-designed virtual workspaces. As they see you enter the room they launch into conversation. Max leads the charge, 'Why have schools been so slow or resistant to the adoption of a gamified approach to learning? The question seems inherently valuable, but ignores a much deeper conversation around the construction of the learning environments, both formal and informal, that facilitate student engagement in the first place. It seems like an obvious conclusion that students sitting around a TV playing games in their basement will be more engaged, on both emotional and intellectual levels, than they would in the more controlled school environment. So my question is- how do we address this disconnect? Is the conversation about 'gaming to learn' destined to fail if we don't first explore how to build school environments designed to promote student engagement?'

Paul Franz, presently in a non-comestible form, shares a reservation of his own, 'Multi-player gaming has merits, for sure, but many game developers - particularly in genres like turn-based strategy - point to how few users actually play games online (somewhere between 1 in 20 and 1 in 50 players of Civilization 4 ever even tried a multi-player game, for example, let alone play MP regularly). Reducing the category 'games' to multi-player games would be a mistake as grave as reducing the entire online course space to MOOCs. Are they sexy, large-scale, and highly visible? Sure. But they're far from the whole story.'

Finally, Michael McLaughlin shares a disturbing tid-bit, 'There was a rash of deaths in East Asian computer gaming bars only a little while back. This begs the question: will future students hyper-focus on gamification and ignore other, traditional teaching methods?'

Gaming addiction can be deadly? Hmm... Perhaps you should make your way out of this virtual world.[end if]

Paul gestures for you to go away, as Max, Michael, and he get back to work. As you leave you catch a glimpse of a triceratops head as well.

Southwest (sw) returns to a discussion of affordances.



West (w) leads to a discussion of reservations.

To the Northwest (nw) you see an exit."

Students Discussing Possibilities is a room. Students Discussing Possibilities is northwest of Students Discussing Affordances.

"[if unvisited]It seems you cannot escape the talking triceratops. Here he is again! Apparently in the virtual world your avatar can be in two places at once. Tabbed browsing at its best.

Stephen asks a question, 'Beyond measuring an individual's content knowledge, how might games track students' work ethic, collaboration, or communication ability? For example, Dan Schwartz's studies showed how students' persistence in individual games predicted their later performance. If this data is collected, can it and should it be used in student assessment?' You remember back to Dan. He would say yes, you think. Indeed, it should be used to change what it is we assess.

Tyler McNally looks at you excitedly and shares his thoughts and dreams, 'Imagine K12 schools around the country setting aside not 20% but 5% or less – a few hours every month for teachers and students to experiment in the field of education games. Perhaps it's enabling kids/teachers to create game like elements in the classroom or related to a specific concept. But, this experimentation would also need to foster collaboration across classroom boundaries. The community / connection / collaboration aspect would give greater meaning to the project and increase opportunities for students to learn from each other.' Games as a vehicle for collaboration? Sounds promising!

Liam Aiello goes a step further. Why can't games be treated as works of art and objects for discussion? 'Just as teachers find ways to make students more aware of the strategies they employ as readers and mathematicians, I am curious to learn more about the way educators might facilitate post-gaming conversations – ones that ask students to go beyond talking about the content of a game; beyond what a child liked or didn't like; and further, into what the game required of them, what strategies they employed, and what analogies the game asks them to draw to real-life situations. I could picture a teacher, asking his or her students to enter into a dialog with the author of this piece, to creatively find ways to explore, 'What types of conversations were you just having with that Silk Road simulation?' or 'We just wrapped up our time playing Sid Meier's Civilization. What aspects of diplomacy felt really authentic? What aspects of diplomacy felt neglected by the designers?'

Stephen, Tyler, and Liam agree to work together on building a new gaming-infused curriculum. They put their digital heads together and start working. Tempted as you are to stay and help, you feel the need to move along.[end if]

[if visited]Stephen, Tyler, and Liam seem to be making progress. Others have joined them as they plot for a glorious future.[end if]

Southeast (se) returns to a discussion of affordances.

East (e) leads to a discussion of reservations.

To the Northeast (ne) you see an exit."

The Final Chamber is a room. The Final Chamber is northeast of Students Discussing Possibilities. The Final Chamber is northwest of Students Discussing Reservations.

"[if unvisited]You reach an exit portal that should allow you to leave this virtual world. But between you and the portal are two giants. The first looks down, 'If this is your first time in EDF,' it says, 'You have to introduce yourself.'

'You first, giant!' You reply.

'I'm Mitchell Stevens, and this is my co-convener Roy Pea.'

'I am Player One,' you respond, 'and I'm here to save the world and/or galaxy from some nameless evil force while rescuing various princes and princesses. With deep compassion and/or a succeed at all costs attitude I intend to defeat my foes and forge a civilization that can stand the test of time. Also, I will buy DLC only once it is on sale.'

'You are very strange, Player One,' Mitchell responds.

'As are you, Mitchell the Giant.'

'I am a sociologist.'

Mitchell stands aside. You look up at the other giant, who smiles down bemusedly. At last you reach the exit portal. You can leave.[end if]

[if visited]The giants are nowhere to be seen. On the ground, however, you see a fallen scroll. It says 'Dear Roy, All is going according to plan. We can begin phase two. Institute Operation Carta Candidus.' [end if]

To quit type 'quit.' To return to the beginning type 'restart.'"