

Panel: Falstein, Swartout, Brannon, Gaba

LeRoy

Imagine a scenario in which there's a busy intersection, a bus stop, a car explosion, and there's a radioactive bomb with fragments that go everywhere, but they're in a finite area. It might be yards, it might be feet. And they're in a set of first responders, come to evaluate, check for the rate, the activity and these days, the modern unit are carrying Geiger unit counters that give these data to them. They find the problem, there are containment areas, set-up command posts, deploy the aid units, and do triage. Separate the living from the dead: those who can be helped and give first aid and evacuate the rest. and get additional resources needed to the hospital. Inform them of what's coming; where emergency care must be given with radiation precaution and of course, part of the triage, is to set-up a morgue. The bitter realities of a dirty bomb blast. We'll hear much more than we'd like to know about that these days, but without the radioactivity, fortunately.

A second scenario. This is in a hospital. The background is three people critically injured in an auto collision and they must be taken to an emergency department for emergency and OR Management, all requiring surgery. So the emergency department goes through a process of assessment. They treat the emergency problems, stabilize patients status and the trauma teams are activated. Appropriate imaging studies, if necessary, and surgery schedule, and anesthesia consultation is obtained, the form consent must be given to or gotten from patients and or family and then in the operating room there's a secondary assessment with possibility of blood transfusion, anesthesia which has its own set of requirements, possibly complications related to injuries, say neck injuries. The team must select a procedure, the surgical approach, and then conduct to surgery. Here's where individual skills are necessary and of course they have to manage complications intra and operative of those in the ICU as well.

So imagine a couple of scenarios, one related to care of three patients where there is a crisis. Another is a community crisis of the first type. So these are the scenarios I'd like for our panelists to consider as they come forward. The first panel is identified for a discussion of **Game Design**. That's Noah Falstein, Bill Swartout, Crag Branon and David Gaba. You've met all except David Gaba. David is Stanford's Dean of Immersive and Simulation Based Training, a person who really began human patient simulation and is now a leader in that field which is developed in worldwide use.

So, I'm going to ask the panel to be self-initiating and to pitch in and take off on part of either of the two scenarios but focused on how you would go about in developing a game, design a game for either of these scenarios.

David

Well, I don't know anything about game design personally, because I've done the recreations of real environments. So I think, the first step is to define what the scope is of the target populations we're trying to address. What we're trying to accomplish with those target populations and those two decisions will start to drive the design considerations and the decisions as to what kind of thing to create. Is it a game? Is it a simulation? Is it a hybrid? What modalities that will require to do those?

LeRoy:

Let's consider how this will be different if it's a game for learning versus a game for entertainment.

Noah

One of the first things I see just from my game design background, looking at this, maybe if we could go back to that dirty bomb scenario. Several things leap out at me and that I often look for those opportunities where there is a great correspondence between what games and computers can do well and what's going on in the real world. And looking at this scenario, there are two things that popped out at me: one of them was the idea of a 911 responder.

You could, on a computer, set up an almost perfect simulation of what that person at the 911 call center would have, and they would be able to, basically record a bunch of simulations of people calling in panic. You can have their computer screens show up. You can selectively knock out services and even information coming in from different parts, knock out some cell phone towers in a virtual sense. And therefore, this would be a great opportunity to train those people, the dispatchers specifically.

Now, unfortunately, 99% of the time when I'm called in to consult on something, it's not "here's a whole situation, what's the best training opportunity," rather, we have a grant, we have money to train these particular people to do this particular thing and it's almost never the perfect solution there.

The other thing is that giving you the chance to learn by failure. In a lot of positions, and medical situations, you don't get that chance to try stuff randomly and fail. And I mentioned earlier, dirty bomb, is one of those cases where hopefully, is something that people will never experience or maybe only experience once in their life. The simulation becomes a great way, therefore, of gaming out all the possibilities of what happens if this type of bomb goes off in the middle of the day or the middle of the night, middle of downtown, or off on the river. Those are all things that come to mind as design considerations to identify.

Bill:

I would like to share a few thoughts based on the experiences we had when the ICT was started up. The army arranged for us to go on what they called "Greening Trips", as it turned up, had nothing to do with the environment. But, in fact, refers to the fact that the army wears green uniform, and so this was to get us familiar with how the army does training or did training at that time. And we had an opportunity to see to climb into lots of different simulators, and see how they all worked and watched all the simulations in progress. And there are some things that really emerged from that that were very telling in terms of the distinctions between how people build games that are going to be engaging and entertaining versus the way simulation training is done.

One of the key things that you could do in game is to create emotional involvement. Get the participants somehow engaged so that they really care about what's going on. So that could be done through a pre-story where you set things up and you begin to develop a relationship with some of the people who are later affected in the automobile accident, or the dirty bomb incident.

But you basically set things up so that people actually care about what's going on and creating that emotional involvement is something that's important in making the game compelling.

Another thing is, we found that the army, when they did training simulations, they really like everything to go correctly. But in fact, when you learn is when things go wrong. And so, one of the things that should be done in creating a game like this is set things up so that some of the equipment, for some reason, just doesn't quite work and you have to improvise around that. Maybe there's a secondary event that happens during the automobile accident that distracts the attention of the caregivers. And they have to deal with that, it's unanticipated, it's a surprise, it's not welcome, but they have to deal with it. The other thing is, in terms of how things are set up. One of the simulations or training systems we put together involved a story about a food distribution operation in Afghanistan that didn't work out. It went badly. And it was a fictionalized story. But one of the key things was, the way it was set-up. The officer who was in charge, who had some leadership issues, wasn't basically given enough time to prepare himself. Not the usual kind of briefing that the army would give people. So he was put into a deliberately, somewhat unfair situation. I think, making it so that the situation isn't always what you'd expect; what is the textbook case, but instead is a little bit off, a little bit different. This is where some of the learning could come in, where you can stress people and get them to be more engaged, I think in the experience.

Craig:

One thing I thought about when thinking about this scenario was that it would be good if there could be some online and multiplayer component where different people could take on different roles and then people would interact with each other online and give a lot of realism of people, dealing with other people, rather than just with the computer.

One of the earlier things I want to think about would be:

- What are the components in this world?
- What are the things that you can do and can't do?
- Are we manipulating objects?
- Are we dealing mostly with communication, or a chain?
- Are we dealing with a list of things?
- What, I think, that can help guide me in terms of the direction of the game design.

David:

I'd like to respond to Bill's comments. Those of us who've done medical simulations as opposed to games with healthcare people, getting the emotional investment is not that hard if you create something, even remotely credibly like a medical environment. People buy into it because, they know what the job is, they don't need an emotional attachment to the patient. Your whole career is an emotional attachment to patients.

I totally agree with building into any of these things. Stuff that doesn't work right, stuff that goes wrong, challenges, distractions, red herrings, green herrings, and so forth. Now if the public is the target population for this game so that we're gonna try and educate the entire public about what the ramifications of a dirty bomb blast would be and how they should respond if they're in the affected zone or in the zone next to the affected zone, then you have a whole different set of issues about the emotional investment. The choices that they're going to be offered and frankly,

a whole set of meta issues about whether they would want to play this game or protest against people even promulgating this game.

But again, the target populations are the really critical, one of the key critical things here and any of those targets: whether it's the public, the dispatchers, the paramedics who now have to go with geiger counters, or the people who are in the ER who have to have geiger counters, they're all fair game because none of us know how to respond to this. There maybe a few thousand people around the country who've thought about this but the vast majority of us have not. So, any of those are fair game, so to speak but the question is, if you're not coming from, you know, we have a grant and here's the population we're targeted to deal with, if we have a tabula rasa for this kind of situation, we know confronts our society, where are the best intersections and where should we start?

Noah:

I'm hearing some resistance sometimes of people of why we should make something game like, or really isn't trying to turn this something into a game, perhaps inappropriate or whatever and in fact, lots of times, I would say absolutely, yes, but one thing that I want this audience to consider, those of you who are not from the game side. The games industry can bring things besides the ability to make games per se, and we in the games industry have spent a lot of times working out interfaces, figuring out ways to make interfaces accessible, and some of the stuff that had been mentioned about scaling the interfaces so that at first you can only do a few things but it opens up almost like a flower, as you learn to do more, it shows what you have mastered and are comfortable, the interfaces show you how to do more things.

I've instructed several times; I've worked with scientists and they show me 3-D simulations they've done that often they will have taken a computer science approach with 3-D simulation and they go out and they get some super computer and they run through this huge set of numbers. I saw them doing this for Shell Oil. They were modeling the underground domes where the oil and gas tends to collect and they had so many data points that it was almost impossible to tell. You had to be an expert in using this thing to see what they were doing and it still was rotating the thing around at about one frame a second it was this incredibly jerky thing because they were showing 10,000 data points. And all sorts of things the games industry has learned how to model 3-D for example on absolutely minimal hard ware and what psychological visual cues people pick up on so that you can actually display huge amounts of information with very little processing and let the correct information go through, the key information go through using color and shapes and all sorts of other tricks. So, something to consider is not necessarily adopt a game but work with game engineers or game artists or game designers about very specific elements of what you're trying to do in the simulation and plug them in as components almost into your team.

Bill:

Just to pick up on Noah's point I think there's a related thing that very much goes on in the game industry which is basically when they are putting together a game and you see this also in the film industry it's the whole idea of selective focus. You're not portraying the whole world at the same level of fidelity. This is actually in contrast to what I've seen in military simulations where the sage bust in the middle of the desert is at the same resolution as the town that you're supposed to be having an operation in.

I think that is a key insight because it is by focusing the detail and the attention and the effort around the pedagogical goals, around what you're trying to teach you can get a lot farther with a lot less cost and it's really a key insight of the game industry in contradistinction to a lot of the simulation works.

LeRoy:

To take off on the discussion by Dave Gaba and Bill about motivation, in medicine you have folks who are committed to a career in medicine and you give them a critically ill or dying patient and there's always the motivation to try to do some mediation, that is restorative. In the gaming space about learning, how does one motivate a person to want to go through an exercise for learning when the teacher or the professor says these are the goals that you can learn here or do you expect some just absorption with the topic? Or is there something different between learning with games and particularly massing games?

Bill

It's all a matter of picking the right tool for the job. There are certain types of learning that games are wonderful at. Building an intuitive sense of a system and how it operates for example, is something that games do better than almost anything else other than actually going out and doing it in the real world. And that's why flight simulators people can actually train on flight simulators and go out and fly real planes at this point because that sense of a whole system and building in into your brain and muscles the intuitive response. A lot of what Butch Rosser's doing fits into that of finding a place in laparoscopic surgery, where there is a very close correspondence between what you can train on with these electronic tools, and what you can have in the real world. And there are other things that games aren't so good at like memorizing lots of detailed information about all sorts of different things that I hesitate because in some games, you learn huge amounts. I've seen my daughter play Pokemon and learning about each of the different creatures or knowing my own experience and all of the different army units and real time strategy game and precisely what their attack and defense values are. Games are really good but only if the things that you're learning are critical to what you're having fun with. Not if it's memorizing these lists of boring stuff and then we'll reward you by playing a game. That's a model that people have tried over the years and that has never worked. So something's, the only ways I think you have to learn them that anyone's ever come up with are unfortunately boring repetition and are sort of pavlovian: if you get this happening over and over again, it will sink in. Other things, games can make it come alive; become more compelling than a book or a lecture can.

Craig:

For both of these scenarios, the key thing that games could contribute, is the opportunity to integrate together, in practice, a number of different skills that are usually taught separately.

So, for example, if you were an EMT, in the accident scene, the kinds of things that EMT's are taught, you know they come on scene, they have to first secure the area, and they have to assess the patient to maybe communicate to other caregivers who are on the way. These skills are all taught in the classroom on different days on different lectures. What this does is it puts it all together. You've got to now do all of those things together to have a successful outcome and that is one of the key things that a game or a simulation could contribute in terms of just bringing all the skills in together.

Dave:

I'd like to emphasize that to some degree in contradistinction to what Butch Rosser was talking about, about breaking things down to a constituent of parts, that's useful for a certain application and we all need to do that. But a lot of the simulations, kinds of simulations I've done, aim at the integrative parts. The integration is not only being able to integrate all the different pieces of knowledge, and tools. It's also actually practicing deploying that knowledge cause there's a lot of what psychologists call inert knowledge, which people know, but they can't actually bring forth the moment when they actually need to bring it forth.

And I don't think any of us can think of many other ways for people to get reliably good at that without being able to practice it and for a certain kinds of things, it's impossible to practice it except in simulations or games or these kinds of settings for practicing. In practicing, we're running a game right now around the world, it's called Medical Care – it's called Medical Training and the players are students, and interns and residents, and the game pieces are all of us. So what we'd like to be able to do, I think the reason we're all here is to give other people the opportunity to play out some of this without having to play on us.

Craig:

We would want to also include short term goals and long term goals within the game that are aligned with the learning objectives, and that can help with motivating the player. Even longer term goals that include social aspect, you know like being able to go up in rank or having high score lists that motivate players to continue on and learn more.

Audience:

How do we decide that gaming technology is the best way of providing training and teaching and teaching tool for medicine. What if maybe open reality with patients later, open reality with patients would be a better choice. So its almost like with the big gap is to understand the essence of learning and training in medicine and then using your technology is yet another tech. to be tailored to it and this literally understood and known how the other side would be learned and studied. Butch Rosser just showed in his case that unrelated games can be helpful but we really still don't know how to approach it in a systematic way.

Dave:

Well first there's more than one way to skin a cat so there maybe different ways and some will depend on the learners styles and others will be a spectrum but I think one of the things that hasn't come out yet is what are the advantages of these kinds of games that can be played, either on your own computer, your play station, over the internet or with computer screens, goggles, whatever else, versus simulations, versus standardized patients or other kinds of medical care situations in trying to delineate what the advantages and disadvantages of each of those are. I think the game thing is, once you've invested your 5 million dollar which is a lot more than it takes to do a lot of kinds of role playing games and even full blown medical simulations. But then every body can play it for 50 or a 100 dollars or cheaper or whatever but by the same token there are certain things you can't do in a game world like that that you can in these others. So I think part of the job of this community is to articulate the advantages and the disadvantages of the different modalities.

Craig:

I think the biggest advantage that games have is their intrinsic motivation for people to want to engage with them and that's says a lot because if you're comparing that with say a textbook that yes may have some more precise knowledge in many respects but if learners can interact with the game much more than they would with traditional methods then it's certainly worth considering. Also keep in mind that games have a wide range of budgets and there obviously not only 5 million dollars games. There are obviously different games at different scales.

LeRoy:

Considering the motivation issue which is paramount let me read you what was "America's Army" says on page 1. What is the army? Now listen to these words: "It's having individual strength and support of an unstoppable team, its you at your best, with training technology and support you will be come stronger smarter and better prepared for the challenges you'll face. You'll gain invaluable skills experience and opportunity to use them in working in a challenging environment. Being a soldier means upholding the ideals set forward in the US Constitution, becoming a respected part of your community. You'll discover a life filled with adventure, and meet other smart motivated people like you, because the strength of the army doesn't lie in numbers, it lies in you. An Army of one. Listen to that line. The message is clear. It's elevating in the mind of the person who they can become. Is that part of the learning?"

Noah

I think one of the opportunities to tie back to the scenarios here: one of the things I liked about the dirty bomb scenario, and I guess you were alluding to the idea of a multi-player thing where you could end up coming up with a easily 5 or 6 separate roles of the people who were 911 dispatcher, a doctor at the scene doing triage, somebody operating on people, policemen trying to direct traffic, a lot of different roles that are necessary to deal with, that sort of thing. And the idea here would not necessarily be for the policeman to come in and play the policeman but to let the policemen play the 911 dispatchers and the doctors. Games may not be so good at deep detailed simulation that they may seem to be better at a sort of top level simulation. I contradict that. I think they can be very good at detail it's often not cost effective to do for reasons that people have discussed but lets just take the fact that games can really give you a taste of what it's like to jump into these roles and the fact that I was hired to do a job for shell oil along similar lines they had all these different roles of the people who go out and the seismologist who find the stuff in the first place and the drilling people who have to drill down to get the stuff out, the storage people have to figure out where to store all the stuff before the ships come in to take it away, and they really wanted to cross train people so that if you have one specialty to go back to our simulation here, if you are a 911 dispatcher you get to see how crazy and chaotic it is out there on the street and you get a much better sense of why, there is so much craziness and tension in peoples voices and vice versa. The cop on the beat may have great intensive view of what's going on within a hundred meters around him but he doesn't have that dispatchers view of the problems that are city wide, and games can be very good at very quickly giving people a sort of gut-level intuitive sense of things that might otherwise take many years of actually doing it and being a cop on the beat or somebody working on a 911 call.

Bill:

Back to the question of motivation and the quote from America's Army, that clearly is written as a recruitment tool. What a game can do is basically give you a safe environment and a chance to experience at least what we understand, and what that experience could be like. In a way you're free to fail, and ultimately when you successfully get through it, it's a confidence building experience. The motivation is you have a better feeling, rather than this is something I don't want to think about because I don't have a clue of how would operate. You have the feeling: You know, I might know what to do if this were to happen.

Audience:

Madeleine Keehner. I'm from UCSB, and I'm a cognitive psychologist so I have maybe a slightly different take on this. There are a couple of things I think have come up so far today, which I think I'd like to speak in cognitive terms. One is the issue of what's being learned and it seems as if there are two different kinds of learning that we're talking about. On the one we have kind of skills based learning which is about task processes, and practicing and learning a skill, and becoming proficient as a skill.

And on the other hand, we have a kind of higher level cognitive process like decision making. And those are the two really very different kinds of functions and processes.

And maybe we talked a little about the differences simulations and games. Perhaps simulations are more about the tasks, skill orientated activities. Perhaps what games would be really good at about are the more high level functions like decision making in complex scenarios and being able to use the kind of flexibility that games have. And maybe we should be thinking about them separately and approaching them differently because they really are different kinds of learning.

The other thing that came up earlier was the question of whether we were talking about novices or experts and who these things are aimed at. And again, I think that's an issue we should think about whether we need to be approaching two different audiences with different tools or whether you can actually bridge that gap by having, for example, different levels in gaming terms.

And I think that actually goes back to my previous point because with something like the acquisition of a skill, its more like a quantitative continuum between novices and expertise but with something like decision making, we know from the cognitive literature that they are qualitatively different processes that go on when an expert makes decisions in those kinds of scenarios and when a novice does and those kind of audiences for that kind of high level strategic thinking might have to have a very different scenario, very different set of tools to deal with.

Noah:

Well, it's been a real interest of mine as well and I wouldn't make the distinction between games and simulation that way. There are many games that basically span the continuum and they are good precisely because they do span that continuum. One of my favorite games that Ben mentioned on his list there is Civilization, or the Civilization series of games and one of the things I find amazing about that series of games just to take the latest one as an example, is that I have seen six or seven year olds playing that, learning it on a completely different level dealing with some superficial sorts of things. Other people like myself who have put hundreds of hours into it over the course of many years who have learned all sorts of very abstract things that I

wasn't even conscious of. You know, the first fifty, sixty hours I was playing that game, I wasn't even aware there were certain subtle things going on until I've become enough of an expert.

And one of the other things that I think the gaming simulation world is good at is providing something that unlike a book that tends to be able to focus only on one element of that at a time, games can kind of present you with the whole thing and if their well designed, allow you to learn what is accessible to you now but come back to it over and over again, finding new layers, new levels.

Another game that Ben and I both like is Advanced Wars II which on its surface is an incredibly kid oriented infantile thing and I just love that game and I put in hundreds of hours mostly while I'm pedaling on an exercise bike. It's a games for health in that sense. But it's amazing, the degree of subtlety that you can abstract out of a good game or simulation without you having to beat you over the head with it because of that motivation to want to learn more you go up these steps really and when you're at the level that I'm playing at now, it's hard for me to remember what it was like when I was first looking at some of those scenarios.

Dave:

The other thing I think, the distinction between skills and decision making and behavioral skills like team work and other things is not quite as sharp as you would make it. In fact, in all the world, certainly in the medical world, one of the key things people need to learn is to be able to do the skills while doing the decision making and the team work and the other things. And we found that extremely valuable to do the kinds of simulations we do. Many of those things can be replicated in games but some of them can't. We would probably imagine there's a spectrum between all these different modalities. They're all complementary. They're not for the most part, one replaces the other. But it's just qualitatively different having to actually do it rather than thinking about it or saying it.

Bill: I'm just going to add, whether you're talking about more cognitive approach or skills based, I think it's important to consider including an evaluation component in your product and I think that can help guide the learner as to what they did right and wrong and what they missed and things like that.

LeRoy:

As we look at designing games, you used an example Noah, about what you learned at the subtle things. In the design, is making realities implicit versus explicit for learning, is that an effective approach so that you learn because you're there, instead of you learn because you intended to learn?

Bill:

I think one of the things games can be quite good at is helping you learn tacit knowledge. Basically, things that are not on the surface directly teachable where you have to experience them or watch other people experiencing them to really understand them. So its really more a learning process as opposed to facts and I think this is where being able to create these integrated environments that allow you to integrate a variety of skills is important.

Audience: My name is Amir Vardi. I am a pediatric intern from Israel. I also work at simulation center emisar in Israel and my question has to do with the part of learning

from evaluation. When we do real life medicine, if we're lucky and we make a mistake, there's a senior physician there

to step in and correct us and we learn from that. When we do simulation, we have the debriefing and we learn a lot during debriefing. In serious games, in my experience, you get to the point when you finish playing and then you get told you've done this and that, you should've done different. This is annoying, I always skip that and I want to play again. Real games, in contradiction to serious games, they don't have that. When my son plays his games, you don't get that. So, is there a way to learn in serious games that's different than this session of being told you've spent too much time on that and you did this rather than that?

Bill:

One of the ways of doing that is to actually imbed a coach into the game so that there's another character. Could be another character, could be something that appears separately on the screen that can pipe up at appropriate times and offer you advice about what your doing and point out perhaps that you're making a mistake. Now the issue of when that character pipes up, when that character offers advise and when that character keeps silent is actually is actually a very interesting design issue because there are advantages in some cases, to allowing someone to go down a path for awhile, making the mistake and then discover they made a major mistake here and that's actually motivating to remember not to do this again. But other times, it is better to mediate right when the mistake is being made.

Dave:

And that may depend on what the level of the learner is but I think the core thing is the quality of the advise because what I found annoying about some of these things, the demos I've seen, is that the advise or the critique is very simplistic. And I don't think the state of the art has yet reached a point where we can make really good critiques that people will value then because it will be the equivalent of the debriefing that we do. We don't have a machine that can do that debriefing.

Craig:

Another way of achieving both is by having short feedback or coach but then also have the ability that the player can choose more in depth feedback if they want to pause the game, for example, and access some resources.

Bill:

And sometimes the difference between frustration and pleasure is coaching that in terms of you've done something wrong. Here's now how I will tell you how you failed but rather you've got 27 points out of a 100. If you want to learn how to get a higher score, [click here](#). And you might get exactly the same information but it now becomes I really want to do better rather than oh, I screwed up and I'm being scolded.

Craig:

Two things, one on that. There is a great game, another Sid Meyer game, the guy who did civilization, was Pirates. And at the end of Pirates, they type out sort of a mini novel of like what your life was like. They show you the woman you have earned the right to marry, what land the King has deeded you for your work, and it really became an embedded assessment that motivated the player to think about well, what could I have

done earlier in the game to end up with a better end story. In fact, Fable does the same thing, a recent game by Peter Moulineer.

So there's some really creative sort of things that are taking the notion of score which is an assessment in a game that we have been doing for thirty years, and changing it in a way where you do not feel you are being told what to do but you are being motivated by that end scenario.

The second thing to go back on something that was said before. One of the things that we need to have an appreciation with game are: is that because games tend to take a subject, a simulation and break it down to very core interesting interactive components, you need relationships and cast away all the rest of it. You get this incredible emergent property with games and players are great with this because you have emerging game play where they go into a simple system like Sim City, and as a designer, you're thinking you need one police station for every ten houses and players say well, what about fifty police stations for every house? And you never intended that to happen but something very unique happens and new ways of learning come out of that. That's the subtlety that I think games bring out because they get that from simplifying the system: Going back to making the game more like checkers than like chess and then giving you the chance to get this incredible learning out of it. So that is actually something that's really important to all of this.

Audience:

In my instruction design background I would say that content validity is one of most important design constraints. When you're designing something for use by professionals, if they don't accept it, forget about it. They just won't look at it. If you're creating a military simulation and something simple like the rank is upside down, they won't use it. And I think one of the ladies was discussing use of a magnifying glass, I guess, for a procedure.

The other thing is ROI. If you have a reasonable simulation or gaming device or training device for professionals, a technical clothe, in other words the technical expert says yes, I want to buy this, that is not really that difficult to get. But getting the administrator with the bucks, the ROI, that's the hard piece. And so when you design something and I would say this totally applies to medical simulation, it would apply in medical gaming for training, you have to be able to demonstrate to the administrator the ROI. What is the return on investment? Not just in terms of dollars but in terms of outcomes.

Audience:

How do you design the story component of a game? Maybe this is a question for Noah but in my company, I write the stories for our animations and I use like PowerPoint and it's a linear thing, I send that off to the animators and you get back in animation a lot. In games it just seems like the story is on multiple levels and there's maybe multiple stories going on and first of all, what kind of tools do you use for designing the story part of the game and second, is there any validation process that goes on. I mean for somebody to look at that, I guess that goes a little bit back to the prior comment. Does somebody sorta check that, or is it real, does it meet our goals and everything of what you're trying to accomplish from the beginning?

Noah:

This is actually a very strong interest of mine. I run a workshop of game designers who are also writers who are interested in story. We get together once a year and discuss these issues. There are no standard tools that I'm aware of. Certain companies if they have for example an adventure

game or a role playing game that has a complex interactive story, they will sometimes create their own in-house tools that are customized based on that particular engine. Mostly, the state of writing and story telling in games is woefully behind a lot of linear media and that's not because of immaturity of any other reason really than the fact that games are about interactivity. And there are elements of interactivity that are directly antithetical to good story telling.

And if you want a good game or a good learning simulation, you have to put the game play, the learning, and the interactivity first and mold the story around to complement that. And a good story can give you emotional involvement; can give you a wider range of interests, a wider group of people. But you've got to have the core interactivity designed to be optimum first and then find stories that are synergistic with that that will come into it. And because of that, I would say something that a lot of people say, oh we'd go to Hollywood and we'd get good screenwriters. Unless they've already worked in interactive or I could give you a longer description later if you want to talk to me offline, how to pick these people, you have to stay away from that because story-telling with interactivity is its own art and the fact is that people have shown again and again that you can have a great game with little or no story and its very, very rare that you have a game that has bad game play and a great story and gets more than just passing interest from people. If you want a great story, you don't care about game play, you run a movie.

LeRoy:

We have one last question.

Audience: Rick Severinghaus. One thing I heard a lot today was simulation of the AI concepts. There were two video clips this morning: one was the fellow trying to talk to someone moving his clinic and the other was the collision in space where they were trying to figure to go for the mission or to work on the side and work on the injured person. The question you brought up earlier was: what were the differences between games for entertainment and games for simulation. I would offer that we heard a lot about an aspect implicitly not explicitly and that is the benefits of team skills practice and interactive communications among team members. Most of my work is a team based simulation with groups of up to two dozen people. This is a military environment but what you got most of the training domain, the training environment, for a given level of simulation representation level of fidelity accuracy was team skills and talking to each other either well or not well.

And somebody asked about the debriefing. In that environment one of the most important benefits to get out of the simulation environment is to gather everybody up not with a novice but with a subject matter expert to debrief what they did in detail with clips, video, data that comes out of the simulation so that the poor guy who's trying to orchestrate a team of people understands what he did right or wrong and the objective in that case is to allow the guy, the girl, the military guy, the doctor, the medical tech, to do for real and when she gets there, and a couple of examples would be Air Evacuation Crew Resource

Management that are in the fields of Iraq or Afghanistan or Medical Emerg Evacuation from a submarine deck in the middle of the night to a helicopter which I've done.

Dave: There is a rich history now going back over fifteen years actually of doing that kind of thing with simulation in health care. That's a very growing area. Two weeks ago was the international meeting on medical simulation which historically has brought together more the

patient simulation and team training medical community than this meeting has and that's a very rich area. I think one of the interesting questions is whether a lot of that stuff can be done in the gaming environment as a complement to what's being done in the full-up simulation environment for exactly those kinds of skills of teamwork, negotiation, interaction. And I'll tell you talking about negotiation there's plenty of exercises we run and could be run on negotiating between healthcare personnel themselves and anesthesiologists and surgeons, doctors and nurses. You could probably have a whole industry just on that.

LeRoy:

With that, I'm going to ask you to thank our panel. Thank you