

Chris Bennett: Game Design Thinking

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Gaming and Peace-building

My starting point is a Venn diagram with three intersecting circles: game design, behavior design and neuroscience. Five or six years ago I was invited to sit in on one of BJ Fogg's courses, my first time in a college campus since the 1980s. I don't have an academic background but I was really taken by his style of teaching. I am a practitioner in game design, Margarita Quihuis (a former student of BJ Fogg's) is a practitioner in behavior design. Neither of us are practitioners in neural science, but we have access to people who are. We are trying to take the frameworks of those three things, and combine them into something that is used for practical purposes.

The Mechanics-Dynamics-Aesthetics (MDA) framework is a tool used to analyze games, first presented in 2001 at the Game Developers Conference in San Jose by Robin Hunicke of UC Santa Cruz. MDA formalizes the consumption of games by breaking them down into three components: Mechanics (the rules, the algorithms, the data), Dynamics (the run-time behavior of the mechanics as users play the game, i.e. the result of the player's interaction with the mechanics) and Aesthetics (the emotional response evoked in the player). About seven years ago, Heather Browning in San Francisco modified it to include the desired "Outcomes" of a game and it became the MDAO framework. As she wrote in a book's chapter, "games are a successful pedagogical tool to change attitudes and behaviors". Most games don't aim for a specific outcome (other than generating revenues for the game designer!) but some games are designed as an experience that can help people. For example, a game could have a desired outcome to help a war veteran who is suffering from Post-Traumatic Stress Disorder.

I came to realize that even if you are designing a game that is going to sit in a shop somewhere, you don't necessarily begin with a mechanic. Sometimes it is nice to start with a desired outcome in mind. When you have specified a desired outcome, the correct approach is to follow the MDA approach but also applying backward design. So when I work with my students or with practitioners or clients, I ask them: "what is your desired outcome?" According to the MDAO framework, you start working backwards from the outcome. If you have outcomes in mind, you'll list them out and quantify them. For example, when you say that you want to help veterans with PTSD get better, what does that mean? We want the outcome to be very crisp so that we know what we are measuring. For example: I want to help US veterans in the Pacific Northwest who are between 25 and 35 years old who have done one or two tours in Afghanistan and in Iraq and elsewhere, veterans with convulsive symptoms, get better in these particular ways. Something that we can actually measure. And start to work backwards from there. Now we can look at the aesthetics, with the emotions: what is going to drive those outcomes?

When players say that a game is fun, it doesn't tell me much because I can't measure that fun. We try to quantify what is actually engaging the player inside the fun. Once we've reached that level, we go backwards and ask: what are the dynamics that need to happen when someone is playing this game, that are going to, hopefully, lead us to the desired aesthetics.

This is not aesthetics in terms of art. This aesthetics in term of the overwhelming feeling of looking at an artwork. When I first saw the David, I stood there transfixed for 15 minutes. It was the most amazing thing I'd ever seen, and it was right there in front of me. It's literally larger than life, sculpted so hyper-realistically, with a sense of being grandiose, so real. No selfie or VR simulation can replace standing in front of that sculpture and being drawn into it. Other than the birth of my daughter, that was the most amazing experience of my life. That's the aesthetics that I am talking about.

And, once we figured out the dynamics, what about the mechanics, the rules of the game? As someone who has created games and played thousands of games, I have a good library of mechanics in my head that I can draw from, but until I understand these other things, it's kind of useless.

An important aspect of the life of a game designer is that you can't control the outcome, you can't control the aesthetics (what will happen inside the brain of the player), and you can't control the dynamics (how the player will play your game). You can only control the mechanics.

If you start with your game mechanic, and you start to design the way through to the dynamics and the aesthetics, by the time you get to the O, you may be off course. You need to start with your O and realize that this is the critical part. The critical part is not that two people are holding iPads together. The critical part is not that it is a fighting game. The critical part is not that this is a famous shooter. The critical part is that we are trying to cause a change to happen. What is that change? How do we define it? and how can we track that it actually happens? Only when you have defined properly the "O", you can work backwards into what are people feeling, what's going on in their heads when they play it.

There are metrics that we can use, but it depends on what your desired outcome is. If you just want to know how good the game is at engaging players, at the meta level you can measure how many monthly active users you have and how many times a day these people are playing this game? But you can also measure at a microlevel, within the game itself: you can break it down into the features and sections and measure which ones are played the most. For example, you can measure the social aspects of a game: do players tend to be more competitive or more cooperative? Sometimes you join a group or a clan, and in the game you are cooperating with the group or cooperating against these other groups. Then you can create mechanics and content with specific measurements in mind: I want people to play more often, I want to have longer sessions, or I want them to be more social, or I want people to be more competitive, etc.

The difference with these serious games that are outcome driven is the masses don't always matter: what matters is the "needle" that you are aiming to move. You have to understand the needle that you're trying to move. You don't necessarily need 10 million people to play the game, if you are trying to get people to change their lives. Your outcome may impact just 100 war veterans. You want at least a third of them to have measurable changes.

The MDAO is a framework, not a formula. Designing the actual game always requires skills that cannot be easily quantified. You have hundreds and thousands of different mechanics that you try based on the D and the A and the O. A lot of it is intuition and experience: sometimes I just sense that we can achieve a goal, but I don't have a good, quantifiable answer for how I proceed. Having played the 5000 games that I have played, I have built a sort of internal catalogue. I intuitively sense that "Oh, this mechanic from this game, and this mechanic from this game, is going to be useful for this goal".

You can conceive of game mechanics as giving people badges and points for achievements, they are intrinsic awards, and the only reason they're there, even in a game, is to attract people to the point to which playing the game itself is an intrinsic award for them. Intrinsic rewards burn out pretty quickly. It's like my little girl who is in the girl scouts now: they have badges for everything that girls-couts do. But no one is staying in the girl-scouts for 12 years for silly badges. The girls stay in the program because they got to like the activity, and they like the other girls that are there; so the badges are being used as an

extrinsic device to move people into the intrinsic. Extrinsic motivation is : if you do this chore, I will give you a cookie. Intrinsic motivation is: if you do this chore, you will feel better for having helped the household, that's the basic difference between them. This is an important part that a lot of people miss.

Designed this way, a game can be a powerful tool to achieve a desired outcome. What games can do is to educate people on how to bring people together; help moving people up the line through cooperation, collaboration and synergy; help them create something that hasn't been created before. I actually spend a lot of time talking people out of creating games. Why? Because they are difficult to do, they are expensive to do, and even the people who do them for a living, who are only trying to make money with them, most of them fail. It is worth getting into game design only if you want to achieve something useful for society, otherwise your chances of monetary success are slim.

How can you design the aesthetics from the outcome? That is the part with which I struggle the most. But I believe in it, I believe that I'll find a scientific solution. Because I understand the process: I understand how the mechanics drive the dynamics, and how the dynamics drives emotion and emotions drive outcomes.

MDAO at Work

Game design thinking starts with the desired outcomes. You need to be granular about your outcomes. When you say, that you want this game to make people cooperate and not be competitive, that's a good first step but you need to be more detailed. What does cooperation mean for you? How do you know when you see it? How do you quantify it? What are you looking for? For example, your goal could be "after someone plays this game, they will be 30% more likely to cooperate with the person they're playing with in the southern area". The important part of learning is that you really learned something for lie: now that you have learned it here, you'll play it elsewhere too. You play a brain game and it teaches you how to play that brain game better. But it doesn't teach you how to transfer that knowledge elsewhere. For it to be effective learning, you should be able to take that and play it elsewhere. My mom plays a crossword puzzle every day. That game teaches her to play crossword puzzles better. It doesn't easily transfer to something else.

You need to be very intentional about what your outcome is and be able to write that out and quantify it. People qualify it: they may say that, after playing the game, they feel more apt to be cooperative, but it doesn't really mean anything. You have to be able to quantify it and then, when you look backwards from there, the aesthetics, the emotions that you are actually making happen in the brain, those are the actual changes that you caused. And then you work backwards from there and look for the dynamics that have to happen. For example, we need to have more face to face communication and not side by side communication. We posit that, if there is more face to face communication, there is a greater chance of cooperation. You posit and, again, you work backwards: what can we put in the mechanics that will encourage face to face interaction, as opposed to side by side interaction?

People tend to think of the mechanics first: "what game mechanic can I use that will make people want to play it more?" And I REPLY "that's a good question, but that's not the best question". The best question is to put your mechanical ideas aside for the moment, and first define what your intention is. And then start working backwards from there.

Gamification needs Intrinsic Motivation

The power of gamification has been wildly exaggerated. Having 50% of corporate innovation gamified doesn't mean anything to me. How is it gamified? how is gamifying different from their corporate

innovation practices? and how is gamifying actually having an effect on what they do? The vast majority of the gamification that I have seen focuses on extrinsic motivation. (Note: in 2016 Gartner Group estimated that 50% of corporate innovation was gamified and the gamification market was expected to expand with CAGR of 23%). People were writing books about how the world was going to turn into a game. Alas, it doesn't make sense that you take a problem, add a game element to it, and the problem will suddenly improve. The whole movement crashed. But, along the way, I realized that if I built something to draw people into intrinsic motivation in the first place, that was going to be more useful. And the main thing that drives intrinsic motivation is what is happening inside your brain. Your feelings. People play games, just like people go to the movies and read books, mainly to be moved. Movies and books kind of manipulate us. Emotions are what drives motivation, emotions are what drive engagement. And we are starting to see that in neuroscience.

The assumption is that a game designer takes things that are boring and turns them into things that are fun. But that's like saying: "Oh, I understand music, so I'm going to turn this into a piece of music". What you really understand is 4/4 time and you're pretty much 4/4 time all the time, and then you expect that somebody is going to be moved by this piece of music, and wants to listen to it over and over again? Music is something else, it is emotion.

Most of the people who imported gamification into corporate research only understood the surface of gaming. "Games have points! And games give away badges for doing things! That must be what makes games engaging". That is as much as they understood of games, and that is what they incorporated into their gamified experiments. That is indeed one level of motivation, but games are engaging because of intrinsic motivation, not just because of points and badges. If you are only doing it for the material reward, eventually you'll go away or you'll start asking for double reward. That's not scalable. You have to keep giving more and more and more, and the rewards become more and more and more meaningless. In good game design, instead, the extrinsic motivation is simply the breadcrumb trail that gets the player to play the game initially but what will sustain the experience is intrinsic motivation. Games rely on this strategy. They have extrinsic motivation built into them, but only to drive the player into their behavior engine. The goal is to get the player to play the game because it's fun or because she gets tense when she plays it. It's the same thing that happens when you watch a TV show or watch a movie or when you read a book: the point system, the badges and so forth are just to lure you into the game. The behavioral engine is really what gets you addicted. That's why I feel most gamification has not been effective.

When the goal is to peace, we need to start with the smaller problems, with the problems that are "solvable", the problems for which we understand the needle, we understand where the needle is and have the capacity to scale it. We need to understand the system from a micro-level perspective, and then find a way to scale it; sensor prototyping to understand the system, and then attach scalability to it.

The Neuroscience of Gaming

When we started thinking of turning game design into a science, we knew that we wanted to use behavior design and we sensed that there was a third circle but we weren't sure what it was. So we tried a couple of things for six months or a year. We tried design thinking, as it is practiced here and elsewhere, and didn't really hit it for us. We tried system design: it's closer but it still wasn't quite there, because we were dealing with things at the mechanistic level. Eventually, I started to think about neuroscience. If you design a system for an outcome, you can measure the result by putting your target into an fMRI machine, or making her wear a neuro-device on her head. That's what makes it a science: experiments and measurements. We are looking for research and practical work in game design and behavior design, and now also neuroscience, and see how those three things overlap.

The CDR – Stanford Center for Design and Research – has invented the interactive dynamic notation (IDN), a language that can be used to express innovation. So, basically, you'll have cameras, like the ones in this room, as we do our design problem together. I like visual ways of thinking. I like the fact that we can quantify creativity. People are always wondering how to make students or employees more creative, or more innovative. Start with mapping their discussions.

It is important to capture the details that make it valuable. For example, I think you need to have friction in the system. If you and I are trying to have a conversation, and you interrupt me every 20 seconds or talking over me, there is friction. I actually think that friction is good, because it challenges us. Friction is part you being frustrated and part you being bored. I want to create a model of those friction points where they are most valuable. For example, someone succeeds at the lowest level of a game and is ready to try the next level. She plays that level 16 times and on the 17th time she passes. On the 14th time she was ready to throw her tv set out of the window. The 17th time, instead, she felt like the coolest woman in the world. That's friction. I want to find the science behind friction. Hopefully, soon we will be able to match brain scans and notation, and then we'll be able to pinpoint where in the brain the "friction" occurs.

I have spent a lot of time playing tabletop role-playing games, and I see the creativity that happens around that table, when people are creating these microcosms and these fantasy worlds together, and I would love to videotape it and watch it later, and compare it with IDN. IDN can help identify the signposts that lead to to creative breakthroughs. IDN is just observing things in a new way, in a different way, an "annotated" way. We can look at the graph and say: we think that creative things are happening here. Therefore we can try and elicit more of this in a room full of people who either aren't being creative, or who have the potential to be creative but aren't being triggered in the right way. There are lots of instances in which people should have been creative but were not. Or they don't work well together. Or they work well together but don't have that friction that leads to creative solutions. When I watch tabletop gaming sessions, I can see that friction leads to more interesting creative solutions.

If I design a good game I get to the point that the player says "Oh I learned something, that was fun!" I would like to put the player in an fMRI machine or put a neural headset on her. I would like to track the blood flow in your brain, and see if we can find out what is happening in the brain and in your body. What are the tell-tale signs that you are having fun, or that you are scared or that you learned something or that you made a social connection. I am interested in the intersection of those three elements: gaming, behavior design and neuroscience. This feels to me much deeper than the term gamification, which is often used by people who aren't trained in game design.

What I am trying to do is translational research: every disciplines uses different languages, and even within the same discipline. You talk to people about emotion, and you get two different doctors from two different universities who will talk to you about emotions in different ways. What I am trying to do is find common ground. I am not trying to break new ground in neuroscience. What I am trying to do is to study the breakthroughs that have happened in neuroscience, and to find out how they respond to the mixture of game design and behavior design.

What I am trying to do is to take the science of game design out of making games, and see where I can play it elsewhere.

Gaming Trends

Twenty years ago we didn't have big data and there were no user experience experts. You created a game, put a price on it, package it into a box, display it on a store shelf, and hopefully someone would buy it. And the only feedback that you would get was either the magazine reviews or when people called in to customer support. These days gaming companies carefully collect data about how people react to

games, and then use these data to fine-tune the games. If you are an independent game designer, you also get a lot of feedback straight from the player. You have people texting you and emailing you: “I hate you, you’ve ruined my game with the latest update”. That empathy and that emotion that drive games in the first place become part of the game experience. The other thing that has become part of the game experience is the sociality of gamers. It used to be that when you were stuck in a puzzle, you were screwed, if none of your friends even played the game. You had to write to some magazine and wait three months to see if they answered. Now you go online and you get instantaneous responses. Some companies released games with little information in the manual: they assume you will go online to learn about it. That social component has become part of the game experience.

E-sport is watching someone play a game. It started out in South Korea, and it spread throughout the world, and now it is common to have tournaments where you have 16 people on the stage and 20,000 people in the arena watching that live. The audience pays to come in and watch 16 people play a game that is being broadcast live on the Internet and being watched online by literally millions of people. E-sport is becoming as big a real sport. E-sport is the tidal wave that’s going to hit us.

Let’s tie this into gamification. One of the biggest parts they are missing is the socialization. It’s difficult to make a game that doesn’t have a social component to it, even if it’s not multi-player. Even if it’s a single person game, you’re going online to read the reviews and to talk to people about it. You’re going to read blog articles, you’re going to write blog articles. Games are inherently social now. And I am positive that if you don’t have a social aspect built into it, it’s like you’re trying to make a rock band without percussion.

Gamification was the wrong answer, but there was a valid question. The problem that corporations wanted to solve was low engagement. A lot of it was internal: “we’re trying to train our employees, and we’re getting low engagement from them”. For example: “we started this program to keep people aware of the health benefits and no one is paying attention to it”. But in some cases it was also external: “we want our customers to be aware of these important things that are useful for them”.

Low engagement is a general problem and we haven’t found any other remedy that compares with playing a game. After all, we are born players as babies and then we grow up.