Episode 13: The Psychology and Design of Everyday Games

Show Notes

What might a cognitive psychologist say about game design? We discuss some of the issues Don Norman raised in his classic book The Design of Everyday Things and how that relates to game design, both from the player and the designer's point of view.

Game References

Assassin's Creed, Atari 2600, Catan, Fresco, Horizon Zero Dawn, Nintendo Wii, Pandemic, PS4, Scythe, Terraforming Mars, Ticket to Ride

Research References

Lindsay, P. & Norman, D. A. (1972). *Human information processing; An introduction to psychology*. Academic Press, New York.

Norman, D. (1988). *The Design of Everyday Things*. Basic Books, New York.

Selinker, M. (2011). *The Kobold Guide to Board Game Design*. Open Design, .

Transcript

Hello! This is Episode 13 of the Cognitive Gamer podcast. I am your host, Steve Blessing. In this episode we're going to talk about a set of issues that I find very interesting, and I believe many of you will as well. It has to do with design, so for you game designers out there, I hope you find it particularly fascinating. But, if you find yourself mostly playing games, I believe this discussion will give you some insight into what designers should be thinking about as they create games, and perhaps why you find some games more enjoyable and delightful than others.

A lot of this discussion will be coming from a book by Don Norman. Don is a big name in cognitive psychology. Indeed, he and his co-author Peter Lindsay wrote in 1972 an early textbook in the field. Later in his career, Don took a real interest in how cognitive psychology could be applied to the everyday world, particularly as it relates to design. In the 1990s he worked for Apple Computer, and has done a lot in both the academic and industrial fields. Probably his best known book is *The Design of Everyday Things*, and that's the book that I'm going to draw a lot from for this podcast.

To give you a little background, the original title for *The Design of Everyday Things* was *The Psychology of Everyday Things*. In it he talks about how what we know about human psychology should be brought to bear in understanding what good design is, and how to avoid bad design. I read this book back in graduate school, and it's one whose ideas I still find myself thinking about, particularly when I find an example of either really good design or really bad design. Indeed, Don does Twitter, and he recently tweeted out that the error in Hawaii in which a missile

warning was accidently sent was more than likely not human error, but rather bad design. Across his books, that's one of his big ideas, that many mistakes that humans make can be attributed to bad design. That's a good thing for all designers, including game designers, to take to heart: if you see an error being made by a user or player, think about how the design could be improved so that error won't be made.

I thought of Norman's book recently when I was reading Rob Daviau's chapter in Mike Selinker's book, the *Kobold Guide to Board Game Design*. Rob relates an exercise he had done in a class setting, where he gave students games without their instructions, and they had five minutes to figure out what the rules might be, and then teach the class the game based on what they surmised. He found that the students actually didn't do that bad. This led to an epiphany for Rob, which he states as, "Rules shouldn't explain a game; they should only confirm what the rest of the game tells you." His epiphany pretty much nails Don's thesis in *The Design of Everyday Things*. Good design in general, and game design in particular, assists the player in understanding what the game is all about. In fact, Rob's essay goes on to underscore some of the points that Don makes in his book. I had been thinking we needed to have a podcast on Don Norman, and Rob's essay pushed me to do it. There's a lot of interesting overlap here that we can talk about.

Don lays out a number of principles of good design in the first chapter, and then expounds upon them as he goes through the rest of the chapters. Let me talk about them as Norman discusses them, and then I'll relate them back to game design, both board and video game design. The topics I'll talk about include conceptual models, visibility, mapping, feedback, and constraints.

First up, conceptual models. When a user interacts with a device, they probably come into the situation already knowing some things about the device, and as they interact with it, their knowledge of the device will grow. This all contributes to the user's conceptual model of the device. This is not only true of devices like TVs and vacuum cleaners and toasters, but also games as well. The last episode I talked about Horizon Zero Dawn, a third person action adventure game. When I first started playing the game, I pretty much knew how it worked, because I have a good conceptual model of how such open-world adventure games should operate. Guerilla Games did not re-invent the wheel with how you moved Aloy around in the virtual world. Having played many twin stick games in the past, I caught on quickly. Someone who has never played such a game will have a fair bit of a learning curve. A number of years ago Nintendo came out the Wii, and attracted a lot of first time computer game players. In large part, that was thanks to the wii-mote motion control system. To bowl a ball or swing a tennis racket you didn't have to learn some seemingly arbitrary series of key presses, but you could take the knowledge of how you do those things in the real world and apply it to the game environment.

This also applies in board games, particularly when it comes to how theme affects game understanding. Ticket to Ride is a great game for those new to the hobby because the conceptual model is pretty simple, and you can use past knowledge to help you out. Laying out tracks and thinking about route planning has some straight-forward real-world analogs. Fresco is a slightly more complicated game, but the theme really complements what you do in the game, like deciding when to get up in the morning affecting how much stuff costs in the market, and then also needing to have the right paints to create your art and how to mix the paints. It is pretty easy

even for new players, and those not used to those sorts of games, to create a conceptual model of how to play Fresco.

It is important, then, for game designers to consider what knowledge the player will bring to the game. And for the knowledge that the player doesn't have at the start, how can the mechanics of the game be easily communicated to the player via how the game presents itself. In the end, the game should complement player's prior knowledge and strive to make learning the conceptual model of the game as easy as possible. If the player finds the game too confusing, they will stop playing.

This brings us to the second issue I mentioned, visibility. There's an axiom in design that you've probably heard, that good design is invisible. To Norman, that would mean that users shouldn't have to think about how to use a device or puzzle over what a button might do. Using a device should be intuitive. In other words, good design shouldn't stand out. One of Norman's later books is titled, "The Invisible Computer," with the idea that computers and their interfaces shouldn't get in the way of what you want to do. They should be the conduit by which you get your work done, not obstacles. A running joke in Norman's book is that bad designs often win awards, because they stand out, look unique, and call attention to themselves. But, they don't help the user. For video game designers, think about button placement, menu design, and how the graphics all help to inform the user what to do when, and in a timely and helpful fashion. Same thing with board games. Many games have player mats, that have specific areas and boxes and cutouts for where particular player pieces should go. The more those are visible, the easier the game will be to learn. Take a look at the mat for Scythe. It's not the easiest of games, but there are some nice things going on with the player mat to help players out in terms of what actions to take when and what resources are needed.

The third issue to discuss is mapping. Mapping is about knowing which button or control performs what function on the device. The classic example are the knobs on a stove. On many stoves, it is not clear, just by looking, which knob affects which burner. Many times the knobs are in a straight line across the front, and it's not clear if the rightmost knob will affect the bottom right burner or the top right burner. That's a problem with mapping. By playing with the spacing or the placement of the knobs or burners, the designer can make it much more intuitive which knob goes with which burner. If the knobs are all in an equally spaced line, you will need to read the knob's label, which may also have a handy icon to indicate its associated burner. But, the point is, you shouldn't have to spend time reading text or deciphering an icon, the mapping should be obvious in this case. One design challenge, then, is to see if there is a way to structure your interface so it doesn't need icons or text to describe them.

I grew up with an Atari 2600. Most games used the simple joystick Atari provided that had just one button. Push the joystick in the direction you wanted your avatar to go, and it moved in that direction on the screen. Press the button to do whatever action your character does in the game, probably jump or shoot. The mapping between control and avatar was almost always clear. My PS4 controller has two joysticks, a directional d-pad, four shoulder buttons, a touchpad that you can swipe or click, and then the share, options, and Playstation buttons. Oh, and the two joysticks can also be used as buttons. There are some conventions as to how these controls are used, but in many cases the mapping is at least somewhat arbitrary. With all these controls the games can be

a lot richer, but that comes at a cost of learning how to move and operate your character. Again, that's why the Nintendo Wii sold to many people who never bought a game system before. For many Wii games, the mapping between controller and avatar was obvious, reducing the learning time and increasing the fun for casual gamers.

Mapping does not have to refer just to physical mappings between buttons and game. They can also refer to more conceptual mappings. As a simple example, the main board in Terraforming Mars has a thermometer. The cold temperatures are in the blue zone, and the warm temperatures are in red. That's a mapping we all know; blue for cold, red for hot. Red can also be used to mean danger or stop, and green for safety or go. Color and sound can all be used to indicate these sorts of mappings.

Next I'd like to talk a little more about feedback. This applies more directly to video game design, as it is much easier for them to provide feedback, such as through sound or visual cues. All of these design ideas mentioned here are pretty straight-forward, but I think feedback is particularly so. In short, when the user does something on the device, provide feedback that something indeed has been done. Light up an LED, make a click noise, change the state on the on-screen button to look like it's been depressed—whatever makes sense for whatever the user just did on your device or video game.

Lastly, I'll finish by talking about constraints. By placing constraints in a design, a designer can make the user's job easier. Indeed, good use of constraints will also make the designer's job easier as well, as they won't have to write as many rules or explain the game as much! Norman talks about four different types of constraints: physical, semantic, cultural, and logical. A physical constraint forces the user to do the thing you want them to do, because there's simply not a physical way to use the object in another way. These can be particularly important when there are safety concerns, where if the user manipulates a device in the wrong way, something dangerous happens. Fortunately, game playing isn't a life and death matter, at least not in the real world. But, if in a video game or board game you can make an action physically impossible to do, that's going to cut down on the number of player errors. Disable buttons and checkboxes that do not apply to the current situation. Maybe make it impossible for a lower level character to go into a place they don't have enough power to enter just yet. Board games can also provide physical constraints as well. Take another look at the Scythe player mat. It has different shaped cutouts that make putting incorrect pieces in those spots impossible. I just played X-wing with my son, and the plastic bases for the ships have a couple of physical constraints on them. In putting the ships on the bases and pegs, you can't put the ship on except for forwards. Also, the base has two tiny nubs between which the movement arrows go. That's particularly handy for the ships with big bases, making it easy to always place the movement arrow in the middle of the base.

Semantic constraints are those that use a player's previous knowledge to help guide them in playing the game. If the game has cubes that represent money in the game, and some money cubes are gold and others are silver, the player will make the assumption that the gold cubes are more valuable than the silver cubes. There's nothing to say that the money cubes couldn't be any color, but using gold and silver, and then also using gold to represent more valuable money, is

using semantic constraints that build on the player's past knowledge, as most people know gold is more valuable than silver.

Cultural constraints are ones that don't carry meaning in and of themselves, but are agreed upon by convention by the culture. In video games that use twin stick controls for adventuring, it's convention that the left stick moves the character, and the right stick moves the camera. Ubisoft could easily reverse that for the next Assassin's Creed game, but players would hate it. They would adapt, but they would hate it. In almost all card and board games, play passes to the left, or in clockwise order. At least here in the United States and some of Europe. But, other cultures tend to play counter clockwise. So, obviously that's a cultural constraint. How many of you have ever been tripped up in Uno or Exploding Kittens when the play has changed directions to counter clockwise? And, what about that second age in 7 Wonders? Good thing they put that directional arrow on each card in the deck .

Lastly, there are logical constraints. I'm not talking about logic that might be used in Clue to figure out the who, what, and where of the game, but rather these are constraints that follow from just how the world must work. Logical constraints mostly follow from the use of the design principles mentioned so far, particularly the use of visibility. For instance, if a board game labels the starting position for a particular type of card, then logically the empty space next to that space is probably for the discards of that card type. This is the constraint used on the board for the first edition of Pandemic. The space for the Player Cards and the Infection Cards are explicitly labeled, that would be a semantic constraint, and there are simple rectangular outlines next to each to indicate the discard spot for each card type, a logical constraint. Subsequent editions replaced this logical constraint with the more semantic constraint of actually labelling the Player Deck Discard and the Infection Deck Discard. Maybe they found that people weren't quite as logical as Matt Leacock hoped.

A similar change happened through the editions of Settlers of Catan. The first edition had individual hexes for the surrounding water, and these hexes were identical in shape to the land tiles. In making an island, it's logical to have all the water on the outside, and the land in the middle. I imagine most players were fine with that, but then you also had the issue of where exactly the ports go; the individual hexes would allow for ports right next to each other so I imagine there might have been errors there. I believe it wasn't until the fourth edition where they had the water be an interlocking, puzzle style frame that provided a physical constraint as to how the water and ports had to go.

I hope you have enjoyed this discussion on game design. It's an interesting topic, and I encourage you to read Don Norman's *The Design of Everyday Things* if you haven't already. I recommend it for designers, but also to anyone at all interested in the subject. After reading that book, I never thought the same way about design. Even simple devices like doors and door handles can all benefit by the designer thinking clearly about how the device is constructed. This is true for everyday things, and that includes video and board games. And, read Rob Daviau's chapter in *The Kobold Guide to Board Game Design*, along with the other chapters in that book. Next time on Cognitive Gamer we will talk about decision making. As always, I welcome any comments or questions you may have, so please email me, steve@cognitivegamer.com and also visit my website, cognitivegamer.com. Also, you can like me on Facebook, Cognitive Gamer, or

follow me on Twitter, @cognitive_gamer. If you haven't done so already, I'd appreciate it if you took the time to give this podcast a rating and a few kind remarks on iTunes or wherever you listen to Cognitive Gamer. Like with rolling to see if you hit that monster in Dungeons and Dragons, higher numbers are better when it comes to reviews, so I appreciate those 5-star ones. This will help get the word out about the Cognitive Gamer podcast. Until next time, remember to think about what you play, and have fun doing it.