

Chapter 2

Game on! Choosing a Topic

In every job that must be done, there is an element of fun. You find the fun and snap, the job's a game.

—Mary Poppins

Abstract This chapter provides an overview of the process of designing curricular games while emphasizing the iterative nature of game design. In doing so, this chapter explains that this process is only a guide and encourages readers to develop their own process on the way. This chapter suggests several ways the reader can brainstorm and narrow down the topic of his or her curricular game by drawing on curricular planning techniques such as Wiggins and McTighe's (1998) Backwards Design process as well as brainstorming techniques proposed by game designers such as “growing an idea tree” (Game design workshop: designing, prototyping, and playtesting games, CMP Books, San Francisco, 2004). The chapter then helps the reader develop the topic into a theme (The art of game design: a book of lenses, Morgan Kaufmann, Burlington, 2008) in order to capture the feeling the curricular game intends to provoke.



Choose—**Diagram**—**Tell**—**Gamify**—**Create**—**Render**—**Teach**—**Reflect**
Topic **System** **Story** **Story** **Quests** **and Test** **Game** **on**
 of Topic **of System** **Game** **Teaching**

TOPIC QUEST:

After reading your proposal, the Commander arranges to meet with you. You walk into the her office eager with anticipation, head held high—after all, you are the Chosen One. When you walk in, she is in the middle of a conversation with the lead historian of the committee who chose you. You overhear her saying, “Why didn’t you choose E.D. Hirsch instead of this bozo?”¹ You clear your throat, both to announce your presence and to prevent tears from welling up in your eyes. When she finally looks up to acknowledge your presence, her face immediately tells you she read your proposal with skepticism. The ensuing conversation reveals that she lacks even a basic understanding of the learning process, making it impossible for her to understand your proposal, and her unwavering eye contact suggests an unwillingness to learn. You realize you are making the same teaching mistake you seem to be doomed to repeat—assuming prior knowledge. You lower your head and find yourself mumbling and fidgeting. After an exasperating exchange where you fear she will decide you are a fraud because you cannot even teach her, you look up in frustration. You see her ceiling has an image of the constellations that shows how they move throughout the year. You realize that she is someone who thinks in systems, a way of thinking you try to teach your students. Your confidence restored, you animatedly draw a diagram of the learning process for her.

After glancing over it, she holds it up and says, “I just do not get why learning has to be so complicated. Why not just tell someone what they are supposed to know?”

You launch into learning theory and watch her eyes glaze over. You then say, “See? That’s why. I was just telling you what I wanted you to learn, but your brain did not receive it.”

She concedes your point but counters with, “I’ve played every decent video game out there. They are just mere entertainment!”

“Let’s do a little experiment,” you suggest. “I will create a game on a topic you know nothing about. If, after playing the game, you have learned something about the topic, this exemplar can be used as a model for your experts so they can design their own games to teach the next generation their knowledge and skills.”

“You have ninety days,” she growls. “At the end of ninety days, not only does your game need to teach me, it will have to teach a random group drawn from the next generation, after all, they are your audience. If you haven’t proven yourself by then, we’ll have to send you back and bring in another teacher to do this job.”

She then leans over and looks you straight in the eyes and says, “And whatever you do, do NOT communicate with anyone from your time period. Bringing you here is enough of a risk. Communicating with the past could disrupt the space-time continuum and alter the course of history. Do you understand me?”

Instinctively you respond by saying, “Yes ma’am.”

As you step out of the Commander’s office, determined but overwhelmed, you hear her say one last thing, “Good skill!”² You feel a glimmer of hope that maybe, just maybe, she thinks you can succeed.

¹E.D. Hirsch advocates for a shared “cultural literacy” and has created lists of “what every American should know” which largely reflect knowledge valued by white males in his own era, and promotes a content-based curriculum.

²My father who did not believe in luck would always say, “Good skill!” to me before taking a standardized test.

Where to begin? If only you could ask your video game designer friend Amy how she comes up with ideas for her video games. You think, “There must be some way to communicate with people from my time, otherwise the Commander would not have warned against it. I wonder what would happen if I tried texting her?” Do you dare?

IF YES, THEN: Knowing it is a long shot, even though you are back in your room, you bend over and covertly send a quick text in case you are being watched: “Just curious, how do you come up with ideas for your video games?” You wait eagerly for a response but of course nothing happens. Texts cannot travel through time. After staring at your phone for what feels like forever, you put it in your pocket. When you look up, you realize your door is ajar. “That’s odd,” you think. You could have sworn you shut the door.

ELSE: You stare at your cell phone but decide you need to figure this out on your own. It’s just not worth the risk—of getting caught or messing up history, or the future, or whatever it would be. However, when you look up, you realize your door is ajar. You see a figure quickly dart away. You put your cell phone in your pocket and slam the door.

*You resign yourself to relying on your own experiences. Your thoughts go back to your own attempts to plan a curriculum in your first year of teaching. You had no idea what to do so you began with day one, then planned day two, and so forth with no end goal, no “win-state,” in mind. As a result, your curriculum was all over the map, map, map. Hmmm. That word seems to stick out in your mind, but you can’t quite figure out why. Your thoughts return to the present mission. You then remember how important Wiggins and McTighe’s (2005) *Backward Design* process³ was to your own teaching. Quickly, you choose a topic and brainstorm some enduring understandings⁴ or underlying concepts you want students to learn. You choose one, but then remember you have to check to see if the Commander has any knowledge about the topic. She said she’s played every video game, so you do a quick search to see if a commercial off-the-shelf (COTS) video game already exists on your chosen topic. **ACTION:** Brainstorm topics, choose one, and list some enduring understandings.*

If a COTS does exist, THEN: you remember she said “decent” and you realize you have to determine if the video game is “decent” to see if she has played it. You play the game and ask yourself the following questions:

- Does it have language or anything explicit that might not be appropriate for students?
- Is there a possibility of nonstudent avatars’ “griefing,” i.e., harassing, or otherwise interfering with your students’ game play? If so, is there a way to create a closed system where your students only interact with each other?

³For instructional designers, this would be comparable to ADDIE—Analyze, Design, Develop, Implement, Evaluate or to the Dick and Carey Model.

⁴“Enduring understandings” is Wiggins and McTighe’s (2005) phrase for those underlying concepts that reside within a student long after the initial learning has taken place. For example, an enduring understanding might be that you do not need to speak a language perfectly in order to communicate or that there are multiple ways to solve a math problem or that no history is objective because everyone has their own biases or that today’s science is tomorrow’s bunk. Think about the stance you want your students to take or the mindset you want to develop.

- Does it meet your learning objectives, i.e., have a high likelihood of teaching your chosen “understanding” in a way that is “enduring”?
- Is it too expensive—both in terms of the classroom time it might take and in terms of cost for both software and hardware required to run the game? Keep in mind that students may not have the technology they need at home. If you plan on playing the game only during class time, you can purchase just one copy, display it using an LCD projector, and have the students play it as a class using either personal response devices such as clickers to make choices after a whole class discussion or by having the class vote by raising their hands. This may be difficult, though, if the environment is too exploratory, i.e., too many choices. You can purchase several and have students play in small groups or with a partner if you have access to enough computers.
- If it is a cloud-based game, i.e., available only on the Internet, is there reliable Internet access at school? Will it pass through the school’s Internet filters? If your students are under thirteen, can the students access the game⁵?

IF decent, THEN: *you have to go back to the drawing board because this means the Commander has played this game and therefore knows the topic. You need to choose another enduring understanding. However, you may want to consider using that commercial game as a teaching tool yourself.*

ELSE: *you recall one of your education professors admitting that teaching is really all about “stealing” and adapting someone else’s curriculum to your purposes. You remember Amy saying this is true in video game design as well: “This spirit of studying one another’s games—and then ‘stealing’ features that work—is one reason that the games industry has grown and improved so rapidly. Commercial game designers play one another’s games all the time. If there’s a feature that works in one game, it will be adopted by others in the next production cycle. Ideas jump across games at a dizzying pace that puts academic ‘knowledge dissemination’ to shame” (Squire 2011, p. 8). You decide you can use the ideas from this video game and modify or “mod” them to create your own classroom game.*

If no COTS exist, THEN: *you decide to create your own game from scratch. However, you keep your list of enduring understandings just in case you run into problems and have to return to it.*

Just like you do when you plan a curriculum, you work on turning your enduring understanding into an “essential question,” a question that:

- **Has multiple answers**, e.g., “What makes a poem good?”
- **Is still being debated**, e.g., “What counts as a civil war?”
- **Can be revisited**, e.g., “How does your cultural background shape your identity?”
- **Is multilayered**, i.e., students at different levels can access it, e.g., both a first-grader and a city planner could answer the question, “What makes a city?”
- **Is rich and engaging**, e.g., “What does it mean to be alive?”
- **Causes someone to rethink previous ideas or see something from a different perspective**, e.g., “How can mathematical formulas explain our world?”

⁵ COPPA—The Children’s Online Privacy Protection Act forbids sites that gather information to be made available to users under 13 without parental permission which is why several social media sites do not allow users under 13. Despite that, Facebook kicks 20,000 users off a day for being underage (Varlas 2011).

*You realize that what you choose as your essential question can greatly alter your game. For example, if your topic is the Cold War, asking “How is the Cold War a ‘war’?” leads to a very different game than asking “How could the Cold War have been prevented?” or asking “How does the Cold War affect today’s foreign policy?” You realize your choice of essential question depends on the enduring understanding you want your students to experience. You run your essential question through your simple test: “Can it be answered with a yes or a no?” If the answer is no, you are ready to proceed to the next step: determining scope. **ACTION:** Write an essential question about your topic.*

*Because a game could last for a typical class session, for a project, for a unit, or for a whole course, such as Barnard University’s Reacting to the Past semester long role-playing games, you determine what is feasible for your purposes. **ACTION:** Determine the scope of the game. You remember Amy talking about a game’s theme. You think that has to do with what the player experiences or feels while playing the game. You jot down some ideas. **ACTION:** Decide on a theme. Now that you know what your game is going to be about, you sit down to figure out the nuts and bolts, nuts and bolts, nuts and bolts. Hmmm, like a machine...*

One of my first teaching disasters happened when I incorporated gaming into my teaching. I was doing my student teaching and it nearly drove me to quit teaching right then and there. I decided to enliven my teaching by conducting a Jeopardy review game, where groups of students would compete by answering review questions. I drew the Jeopardy board on the chalkboard (this was 1993), put students in groups, and had them “slap in” when they thought they knew the answer. Little did I know, while my back was turned to make changes to the Jeopardy board, students were wadding up paper and throwing these “snowballs” out the window. Directly beneath the classroom was the vice principal’s office. He was not too pleased to look out the window to see that it was “snowing” in April in Durham, North Carolina. He came storming into the classroom to see what was going on. I vowed that if I did remain in teaching, I would never play Jeopardy with my students again. I later recanted and redesigned my version of Jeopardy with very strict rules. This version worked well and this type of one-shot classroom gaming served me for quite a while, but ultimately left me unsatisfied.

This book is not about creating a game to be played on Tuesday. This book is about turning your curriculum into a game. Those one-shot games are fun and can be motivating (at least sufficiently motivating to get students to learn enough facts to win the game), but tend to be recall games, not games that promote deeper understanding, critical thinking, problem solving, or innovation. Do you really care if your students can name all 50 states and their associated

capitals, something they could find out instantly on the Internet? Or would you rather students understand how and why state lines were drawn where they were and how capitals got chosen? Or, better yet, think about ways to redraw the states⁶ and choose new capitals to better reflect today's needs, or create a new country, or even imagine a unified Earth without any continental distinctions?

After redesigning my curriculum using game design principles, my students started making statements like:

- “Having played my share of video games in my life, many of which were role-playing games, I liked being able to solve problems multiple times and how assignments and lessons would change depending on the choices we made in terms of teaching style.”
- “Though I found many of the preplanning projects frustrating at first, I feel that I learned a lot from struggling through them and felt driven to submit multiple attempts in order to improve my score, something I have done while playing video games.”
- “Love, love, loved the structure of this class. I never felt any pressure, as I do with other classes, so I was able to put more thought behind my submissions.”

Other teachers who have turned their classrooms into curricular games have reported similar sentiments among their students (Sheldon 2011).

Before examining how to make your curriculum a game, we need to explore what we mean by “game” to begin with. The term “game” is one that people outside of the gaming industry often do not question because “you know one when you see one.” However, within the gaming industry, the meaning and nature of a “game” is hotly contested. Let's start with a basic definition of a game: problem solving in a risk-reduced environment. In other words, a game is a problem space where players can try out different solutions without suffering real-world consequences. For example, raising a child or improving your health is not a game, but you can probably imagine video games about raising kids or improving one's health where the player gets to choose various actions and virtually experience the consequences of those actions or at least the results of preprogrammed algorithms hopefully based on current research. My goal is that at some point while reading this book, you gain a game designer worldview if you do not have one already. You will know you have achieved this when you start seeing games in everything.⁷

At this point, though, you may need some support, a.k.a. scaffolding, in thinking of a topic for your curricular game. To start, let's look at what the game designer Jesse Schell has to say on this subject:

⁶The television show *Saturday Night Live* featured a skit one time where the boundaries of the states in the United States were redrawn. The one that made me laugh out loud had the South labeled “those still fighting the Civil War” and the rest of the country, “those who got on with their lives.”

⁷A warm-up activity I sometimes do when presenting about game-based teaching is to have participants partner up, name something they did the weekend before, and then the partner has to turn it into a game.

There was one juggler who stood out from the rest. He was an old man in a powder blue jumpsuit, and his tricks were not like the others at all. He used patterns and rhythms that were unique, and his tricks, though not astonishing in their difficulty, were simply beautiful to watch.... Suddenly he looked at me, and said ‘Well?... Aren’t you going to try to copy me?’ ‘I—I don’t think I would know how,’ I stammered out. He laughed. ‘Yeah, they never can. Know why my tricks look so different?... The secret is: don’t look to other jugglers for inspiration—*look everywhere else.*’ He proceeded to do a beautiful looping pattern, where his arms kind of spiraled, and he turned occasional pirouettes. ‘I learned that one watching a ballet in New York.’ And this one... I learned from a flock of geese I saw take off from a lake up in Maine. And this... from a paper punch machine on Long Island.... People try to copy these moves, but they can’t... [because] they can’t copy my inspiration.’... his advice changed my approach to creativity forever. (Schell 2008, p. 59)

This mirrors my experience with teaching. I always felt my teaching was missing something so I looked to other teachers, to books about teaching, to teacher educators, and so forth. Meanwhile, I loved playing video games. I even had the hubris to think at one point that video game designers could make their games more educational by learning techniques from educators. The turning point in my thinking occurred during a humbling moment when I realized that it is actually the other way around—educators can learn a lot from video game designers. I had to take my blinders off and look outside my own field. Now, I do not want to write myself out of a job; after all, I am a teacher educator and there is a lot to learn from other teachers and from teacher educators. But there is also a lot to learn from everywhere else, including from students. Luckily, as teachers, we not only know pedagogy, but we also know our content—that can be a good source of inspiration. It may be helpful to think about how experts in your content area derive their inspiration. How do novelists think of new books? How do scientists come up with new discoveries?⁸ How do historians uncover new truths? According to Warren Robinett, designer of the first graphical adventure video game, “every verb in the dictionary suggests an idea” (quoted in Salen and Zimmerman 2004, p. 431). If you are struggling, turn to the glossary in the textbook you use for your class, and turn every verb into a game. Even if you can turn a verb into a game, there are some topics, however, you may want to avoid or at least be very sensitive about. For example, I would hope that all students would object to playing Hitler.

Schell (2008) writes that his “silent partner” is his subconscious. He advises game designers to “pretend [y]our creative subconscious is another person, what is that person like?” he goes on to describe some characteristics of his subconscious: “can’t talk..., impulsive..., emotional..., playful,... irrational” (Schell 2008, p. 64). Basically, he is suggesting you tap into your 2-year-old self. He continues by saying that, like people, “If you get into the habit of ignoring [your subconscious], it is going to stop making suggestions. If you get in the habit of listening to it,... it will start to offer more and better suggestions” (Schell 2008, p. 65). He then describes

⁸Current events can be a great source of inspiration for curricular games. My father sent me an article about scientists trying to figure out why wildlife living along the river we used to live on were dying. In the article, the author stated: “the list of suspects rivals a game of *Clue*” (Pittman 2013).

an example of thinking of a surfing game when a thought pops into his mind, “‘What if the surfboards were bananas?’ which is crazy of course... Now you could say to yourself, ‘That’s stupid...’ Or you could take a few minutes and seriously consider the idea: ‘Ok, what if the surfboards *were* bananas?’ And then another thought comes: ‘With monkeys surfing on them’” (Schell 2008, p. 65). Now you have the start of a game!

The painter Salvador Dali asserted that inspiration will come if you fall asleep while holding a key between your fingers with a brass plate below so that you will wake up right after falling asleep. The chemist Kekulé supposedly figured out that benzene is a ring molecule from a daydream about a serpent biting its own tail (both examples taken from Schell 2008, pp. 64–65). However, as you know, dreams can be fleeting. One trick to listening to your subconscious is to record your ideas. My father always said, “The shortest of pencils is longer than the longest of memories.” Nowadays, however, there are many more options than pencils including recording devices, such as having a digital recorder next to your bed or using your phone to record your ideas—either voice memos on your phone or calling your voicemail. You could even set up a dedicated e-mail address where you send all your ideas.⁹ Fullerton et al. (2004) call your own personal database of ideas an “ideabase” (p. 142). They suggest “growing an idea tree” (p. 143) by listing several topics, a couple of subtopics per topic, and then sub-subtopics. After scanning your tree for patterns, they suggest using these patterns to apply “conditions” to your tree. For example, you might have a branch about dogs. Applying the concept of “space exploration” to that branch allows you to see that branch differently, as you might think about the dogs Russia sent into space without any means of return. This then could lead you to think of a game where the player travels back in time to convince Russia to redesign these space missions to sustain the lives of the dogs, or for the player to design the space missions him or herself, or for the player to play a dog who has to figure out how to save herself from death in space.

While everyone has their own unique approach to coming up with ideas, and every idea has its own conception to birth story, some of which are not even known by the parent of the idea, I thought it might be helpful to explore one such game idea I had and how I came up with it. I taught Homer’s epic poem *The Odyssey* to ninth graders year after year when I was a high school English teacher. I wish I had thought of this Odysseus Order game back then, but it was only until I was reading material for this book that I thought of it. The game involves students speculating on what might happen if the order of events in *The Odyssey* were changed. You could even set a goal of putting episodes in the correct order in order to get Odysseus to reunite with Penelope. How did I think of this? I was thinking about how games can be replayed from different characters’ perspectives to evoke different experiences. I then started toying with the idea of changing other story elements such as

⁹I got this idea from a friend who knew she did not have the time to write in a journal so instead set up an e-mail address with her son’s name when he was born. Periodically, she sends an e-mail to this address with her thoughts and stories about him so he can read them when he is older.

setting, which is a common English teacher essay prompt (e.g., “write a contemporary version of *Romeo and Juliet*”). At the time, I had been reading about nonlinear narratives where the reader can experience the events of a story in random order and the reader has to do the work of putting together the clues to construct the narrative. I thought about how order *does* matter in story building, for example, if a character kisses someone before getting to know him or her, the other character might get scared off instead of falling madly in love. I then tried to think of a “string of pearls” story, a story with a series of episodes. *The Odyssey* clearly fits this bill. Conveniently, each episode has a lesson. This “core game mechanic” of exploring the impact of changing the order in a sequence can easily be applied to other subjects as well. For example, the order of scientific discoveries, the order of mixing chemicals, the genetics of a family tree, the order of operations in mathematics, and, well really, all of history. According to Gee (2011):

Good games are nothing but well-designed problem-solving spaces with copious feedback, good mentoring from the game’s design and associated fan communities, and a ‘win state.’ Actually (though no one should tell gamers this), having a win state and way stations—‘levels’—on the way to it is just a form of ‘assessment’. (p. x)

These are the nuts and bolts of creating a game. How to develop each of these nuts and bolts so they fit together like a well-oiled game machine is the thrust of this book.

As teachers, we know that a major part of teaching is matching instruction with content, i.e., some types of instruction are better for some types of content than for others. This is part of what Shulman (1986) calls “pedagogical content knowledge.” Some of you might be protesting that games do not fit your content. Prensky (2011), however, argues that any subject matter can be turned into a game: “there is enough variation in what we call a ‘game’ that, with some imagination, a high-quality engaging and effective game that works for a large number of people can be designed and built for *any* topic” (p. 268). To demonstrate the variety of games, I have taken Callois’ (2006) categories of play and placed them along continua below. Imagine these continua as a stereo equalizer, each with a slider, resulting in an infinite number of combinations leading to an endless number of games:

Agon (competition, games based on skill)-----▲-----*Alea* (gambling, games based on chance)

Mimicry (simulation, based on imitating real world)----▲-----*Llinox* (pursuit of vertigo, based on distorting the real world)

Paidia (free play with little to no rules or improvising rules on-the-spot)----▲---
-*Ludus* (well-regulated, rule-bound play)

Prensky (2001) provides a useful chart in his book *Digital Game-Based Learning* (p. 156) outlining which types of games better fit which types of goals. Except for learning facts, most of the goals are matched with adventure, simulation, puzzle, and/or role-playing games. Especially if you think about learning your topic like a detective piecing together clues, no matter what the topic is, it is possible to “find the game in the content” (Klopfer et al. 2009, p. 31).

CHALLENGE 2.1: I miss Amy! She would always push me to flex my creativity muscle. Back in college she would make us play that game. What was it she called it? Impromptu Game Design? She would make us create a game on-the-spot by mixing and matching game elements. I feel so rusty. Maybe I should play a round now. Let's see. The directions were to take a stack of colored index cards and assign each of the following game aspects to a color. Then, write out the different possibilities on the corresponding colors:

- *Number of players (1, 2, 5, 10, etc.)*
- *Age of players (preschoolers, grade school, high schoolers, college students, adults)*
- *Public v. private information (all information public, all private/individual, one player with private information, private information hidden to all players until they do something)*
- *Social goals ("competition, collaboration, flirtation" (taken from Salen and Zimmerman 2004, p. 16), backstabbing, status-mongering, challenging stereotypes, negotiating peace, provoking war, persuading someone to do something, getting someone to guess something, etc.)*
- *Site of game (classroom, school/campus, open field, woods, Starbucks, subway train, city landmark, riverbank, etc.)*
- *Amount of game play (5 min, 20 min, 60 min, 3 h, etc.)*
- *Game materials (card game, ball game, board game, computer game, dice game, etc.)*
- *Characters (hero, mentor, sidekick, etc.)*

*We always played with friends, but Amy said she sometimes played by herself. We would draw cards and try to describe a game that fits those constraints in two minutes. The first round, do it with just one category. Each subsequent round, add a category. If someone cannot think of a game that fits the constraints within two minutes, they are out of the game. We would play until only one player was left, usually Amy. Then Amy would have us discuss whether or not adding more constraints made it more difficult or easier. Was there an ideal number of constraints? Were some constraints easier or harder? Now I just need to make some friends here so I can play! There was that one person who kept looking at me with curiosity during breakfast. Maybe I can recruit him to play with me. **EXERCISE:** Play the above game either by yourself, with a partner, or with a group.*

As teachers, we also know that a major part of teaching involves not just matching content with pedagogy but also matching content and pedagogy with students—interests, needs, prior knowledge, and learning styles. In this case, however, an additional dimension needs to be considered since our students will also be game players. Edwards (2004) identified three different types of game players: gamists who “seek competition and challenge,” narrativists who “seek story and characters,” and simulationists who “like exploration and experience” (Tennyson and Jorczak 2008, p. 18). The steps in this book include ways to address all these different gaming styles.

You may have encountered educational software that does what is described above—adjusting content and complexity to fit student needs—but does so not as a game but rather as an intelligent tutoring system (ITS). In other words, there is no storyline, no role-playing, and no overarching goal, just a problem set that branches based on a student's responses. This does not promote deep learning or student motivation¹⁰:

Though intelligent tutoring systems (ITS) may share similar characteristics in that the system within which a student interacts may be modified based on performance, ITS are not generally 'playful' in nature, that is, there is no element of play or competition, and the learner usually engages as a learner rather than a character or role. Therefore, ITS may often lack the motivational aspects that are inherent in many effective games. (Baker and Delacruz 2008, p. 29)

This is evident in the high dropout rates of schools that implement this type of learning (Kellinger 2012). Although ITS does add a dimension of “personalization,” a new term being bandied about in education circles (basically differentiation at the individual level), when personalization simply replicates drill and skill practice with an added dimension of mastery learning, it does not foster transfer to real-world problem solving nor does it tap into students' natural curiosity, creativity, or achievement motivation.

You may worry that any of your ventures into gaming may be met by guffaws from students who are used to photorealistic 3-D graphics and real-time physics in video games. This is the “ceiling” problem—“Do commercial video games create such a high ceiling that educational games can never succeed?” (Squire 2011, p. 96), otherwise known as “compet[ing] with *Grand Theft Auto*?” (Squire 2011, p. 96). First of all, keep in mind that you are building your curriculum on gaming principles. This book shows you how to do this with no technology, technology you are probably already familiar with, technology that may pose a bit of a learning curve for you, and a lot of technology. What we will concentrate on first is building the game, and then we will worry about how to render it. You may want to start with a no technology version and then build up from there. Trust me, students will appreciate your efforts and support you in revising and refining your efforts, partially because the “floor” of “standard school curriculum [is] so low that halfway decent games will be welcomed” (Squire 2011, p. 96). This is in no way reflective of your teaching. Of course your teaching is not the floor! However, all good teachers recognize that their teaching has room for improvement. And good students (and I believe that all students have the potential to be good students) recognize and respond when teachers are trying to build bridges between the curriculum and the students' own worlds.

Squire's (2011) own experiences indicate that the “floor,” not the “ceiling,” is the point of comparison used by students:

¹⁰ Some of my students stated that most educational games are really intelligent tutoring systems masquerading as games. As a result, they describe their students' reactions as “sighing in disdain” and using the words “boring” and “annoying” to describe using them.

Kids compared [*Supercharged!*—the educational video game Squire helped create] to ‘what they did at school’ rather than ‘the games they played at home’. We saw no evidence of kids rejecting *Supercharged!* because it wasn’t *Grand Theft Auto*. There was not one complaint about the graphics or lack of violent content. We presented *Supercharged!* as a game, and students played it. (p. 96)

However, Squire (2011) and his team did find that:

These kids *were* critical of bad design.... As kids grow up awash in software, their expectations evolve. Twenty years ago, when I was a kid, the computer was so interesting it really didn’t matter what we did with it. We were happy just to be on the computer. Now, almost every kid has access to an iPod touch, gaming console, and personal computer. They are sophisticated consumers who expect good design. (p. 96)

This book will take you through a series of steps to help you with the design and along the way provide warning flags to help you identify and resolve design issues.

The steps outlined in this book are offered as guidance. Take the advice within as “heuristic principles rather than universal laws” (Swan 2010, p. 109) and the worksheets at the end of the chapters as ways to work out your thinking. Keep in mind that the steps are not intended to be linear, but rather recursive. With each step, you should return, revise, and refine your earlier steps and then return to the current step and think about how your revisions to your earlier steps impact the current one. If, at any point, your process of designing your game takes a different direction, please follow your own path. This is not the definitive way for teachers to turn their classroom into a game. In fact, there is not even agreement on what actually constitutes a “game”:

A well-known philosopher, Ludwig Wittgenstein, asked readers to try describing a definition for the word “game.” Each time he proposed a necessary condition (a game must have competition; a game must be amusing, etc.), he would turn to a popular game that violated that condition. (Rabin 2009, p. 63)

McGonigal (2011) lists four requirements for something to be a game: goals, rules, feedback system, and voluntary participation. She uses several examples to illustrate how games must have these elements. For example, the goal of golf is to get a ball into a hole but without rules; this game would be no fun—a player would simply drop the ball into each hole (example from McGonigal 2011). Rules create challenge. The feedback system makes it possible for players to overcome the challenge and allows for mastery. All this leads to the thrill of achievement, what McGonigal (2011) calls “*fiero*” (p. 33), Italian for pride. Our mandatory school systems, however, make the “voluntary participation” part difficult. I contend that creating a game that makes learning enjoyable obviates the need for voluntary participation, but if this is a concern to you, you can always offer an alternative assignment for those who do not want to participate.

If you compare McGonigal’s list—at least the first three—to the ITSs described earlier, they would fit her bill, but I would not consider them games. I would add one more element to McGonigal’s list and to my earlier definition of a game, *fun*. This element is hard to pin down, especially since it can differ from person to person. For some, the fun resides in meeting a challenge; for others, in taking on an alternative

identity; and for even others, immersing themselves in a storyline. However, it is this last element, fun, that I think truly distinguishes games from other endeavors.

Karl Kapp defines games as: “a system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional reaction” (p. 7).

He then goes on to define each element of his definition:

- *System.* A set of interconnected elements which occur within the “space” of the game. A score is related to behaviors and activities that, in turn, are related to a strategy or movement of pieces. The system aspect is the idea that each part of a game impacts and is integrated with other parts of the game. Scores are linked to actions, and actions are limited by rules.
- *Players.* Games involve a person interacting with game content or with other players. This happens in first-person shooters, board games, and games like Tetris. The person playing the game is the player. Later we’ll refer to the players of games as “learners.” The act of playing a game often results in learning, and learners are our target audience for gamification of instruction. But, for now, in this context—defining a game—we’ll stick with the concept of player.
- *Abstract.* Games typically involve an abstraction of reality and typically take place in a narrowly defined “game space.” This means that a game contains elements of a realistic situation or the essence of the situation but is not an exact replica. This is true of the game *Monopoly*, which mimics some of the essence of real estate transactions and business dealings, but is not an accurate portrayal of those transactions.
- *Challenge.* Games challenge players to achieve goals and outcomes that are not simple or straightforward. For example, even a simple game like *Tic-Tac-Toe* is a challenge when you play against another person who has equal knowledge of the game. A game becomes boring when the challenge no longer exists. But even the challenge involved with the card game of *Solitaire* provides enough challenge that the player continues to try to achieve the winning state within the game.
- *Rules.* The rules of the game define the game. They are the structure that allows the artificial construct to occur. They define the sequence of play, the winning state, and what is “fair” and what is “not fair” within the confines of the game environment.
- *Interactivity.* Games involve interactions. Players interact with one another, with the game system, and with the content presented during the game. Interactivity is a large part of games.
- *Feedback.* A hallmark of games is the feedback they provide to players. Feedback within a game is typically instant, direct, and clear. Players are able to take in the feedback and attempt corrections or changes based on both the positive feedback they receive and negative feedback.
- *Quantifiable Outcome.* Games are designed so that the winning state is concrete. The result of a well-designed game is that the player clearly knows when he or she has won or lost. There is no ambiguity. There is a score, level, or

winning state (checkmate) that defines a clear outcome. This is one element that distinguishes games from a state of “play,” which has no defined end state or quantifiable outcome. This is also one of the traits that make games ideal for instructional settings.

- *Emotional Reaction.* Games typically involve emotion. From the “thrill of victory” to “the agony of defeat,” a wide range of emotions enter into games. The feeling of completing a game in many cases is as exhilarating as is the actual playing of the game. But at times frustration, anger, and sadness can be part of a game as well. Games, more than most human interactions, evoke strong emotions on many levels. (pp. 7–9)

Kapp (2012) concludes by tying all these elements together:

Together these disparate elements combine to make an event that is larger than the individual elements. A **player** gets caught up in playing a game because the instant **feedback** and constant **interaction** are related to the **challenge** of the game, which is defined by the **rules**, which all work within the **system** to provoke an **emotional reaction** and, finally, result in a **quantifiable outcome** within an **abstract** version of a larger system. (p. 9)

What this text offers is a blueprint for those who want to convert their curriculum into a game but do not know where to begin, by taking the reader through developing each of these various game elements and then putting them all together to create a curricular game. The steps roughly follow Warren’s (2009) nine principles for educational game design:

1. “Artificial conflict or problem-solving scenario
2. Realistic context and narrative structure
3. Rules or conditions for play
4. Learning tasks stemming from the narrative
5. Criteria for achievement
6. Instruction by pedagogical agent
7. The means for providing hard, technology-embedded scaffolds and soft, teacher-developed scaffolds
8. Means of assessment and feedback
9. Designed frustration points to engender cognitive conflict” (quoted in Travis & Young 2011 pp. 156–157)

For some, the initial steps may be all they need to be off and running. Others may want to do the steps in a different order, omit some steps, or create new steps of their own. However, for some, following this lockstep the first few times may be necessary before developing their own process. However, I do suggest you read through all the steps, even if your own process ends up taking a different path, because I include warnings about how to avoid potential pitfalls as well as other advice that may serve you on your path. I hope that for those of you who take different journeys, or even those of you who follow this one, that you write up your experiences so others can learn, in good video game style, from your mistakes as well as from your successes.

As mentioned earlier, all of these steps are recursive—they reach backward and reach forward as each step requires revisiting previous steps, revisiting previous

steps requires revamping the current step, and for each step you want to keep in mind future steps. This is because all these aspects of game design, just like all the aspects of playing a game, are dependent on one another:

Playing transformationally involves (a) taking on the role of a protagonist (b) who must employ conceptual understandings (c) to make choices (d) that have the potential to transform (e) a problem-based fictional context and ultimately (f) the player's understanding of the content as well as of (g) herself [or himself] as someone who has used academic content to address a socially significant problem. Playing transformationally integrates person, content, and context as part of a transactive system in which each type of positioning motivates and is motivated by the other types. (Barab et al. 2012, p. 309 quoting Barab, Gresalfi, and Ingram-Goble, 2010, p. 5)

There are more and more educational video games being developed, opening up possibilities for teachers to find a best fit between video game, curriculum, and student needs and questions (see Table 1.2 from Chap. 1 for a list of criteria for educational video games), but this book is written to help teachers fill the void by empowering teachers to create their own educational games. The chapters that follow begin your journey.

- Step 1: Choose a *topic* (the SO WHAT?)
- Step 2: Diagramming the *system* of that topic (the WHAT)
- Step 3: Telling the *story* of that system (the WHY, WHERE, and WHEN) and creating the *characters* (the WHO)
- Step 4: Turning that story into a *game* (the HOW)
- Step 5: Embedding *puzzles and challenges* into your game (the WHAT TO DO)
- Step 6: Rendering that *game*—no tech, low tech, medium tech, and high tech (how the WHO, WHAT, WHEN, WHERE, and HOW come together)
- Step 7: Playtesting and making subsequent *revisions* to your game (for WHOM?)
- Step 8: *Teaching* your game (by WHOM?)

Notice there is a lack of standard educational jargon like “objectives” and “assessment” in the description of the steps above. That is because these are all embedded in the game. For example, the storyline establishes the objectives or the goals of the game by answering the “Why?” question. The storyline, however, should also answer the “Why should I care?” or “So what?” question. Assessment is built in through the feedback mechanisms embedded in the game. Be aware that you may have to do some translation in order to “sell” your game to your department chair, principal, students’ parents, or, in some cases, even the students themselves as they have also been mired in the same standardized testing culture as educators. One way to do this is to use the jargon du jour. For example, defending your curricular game in Common Core parlance might look like this: “The curricular game itself is a ‘rich task’ as it addresses multiple standards. Each level within the game has ever increasing ‘text complexity’ and the scaffolding within the game introduces and explains both ‘general academic’ and ‘domain-specific’ language.” While you yourself may or may not embrace a particular educational trend your principal or department chair wants you to, it is better to be proactive and control how it is deployed in your classroom.

For the first step, you have chosen your topic, thought about the enduring understandings, and converted one into an essential question, but you have not yet developed your theme, an element that moves your topic from something students learn about to something students experience. Transforming your topic into a theme involves focusing it on “something that holds meaning for your players” (Schell 2008, p. 56). When Jesse Schell’s team was trying to decide what a pirate’s virtual experience would be based on *Pirates of the Caribbean* theme ride at *Disney World*, on his way home from work he started humming theme song “Yo ho, a pirate’s life for me.” He states,

Suddenly it became clear! The *Pirates of the Caribbean* ride is not about *pirates*, it is about *being* a pirate! The whole goal of the ride is to fulfill the fantasy of what it is like to throw aside the rules of society and just start being a pirate! (Schell 2008, p. 50)

The topic is pirates, but the theme is “operating outside the law.” Your topic might be the Civil War, but there are lots of different types of experiences you might want to evoke (“brother fighting brother,” “grappling with secession,” “fighting for your own freedom” (for the black Union soldiers), and so forth. Whichever experience you choose is the theme of your game, focusing on the *experience* can help you turn a topic into a theme.

Perhaps your topic is music, but what resonates with your intended audience is how music inspires emotion. Turning your theme into a problem statement with goals and constraints helps shape it into a game. For example, you can ask how *does* music inspire emotion? In this case, the goal or “win-state” is evoking an emotion. The constraint is through music. What a cool game that would make—the player alters musical compositions to try to make an “intelligent agent,” which is an image of a person whose reactions are controlled by computer algorithms and display different target emotions. Of course, you could also do this in a no tech way by having humans be the “intelligent agents.” The original title I had for this first step was “inspiring.” I choose this because it is about you finding inspiration for your game but also because the theme of your game should inspire your students.

Now, run your game idea through a series of questions; “Is a game really the best solution [to explore this theme]? Why? How will I be able to tell if the problem is solved? (Schell 2008, p. 62), “Does this [theme] feel right?” “Will the [students] like this [theme] enough [to find it engaging]?” (Schell 2008, p. 77) Does this theme promise to evoke the intended experiences in the students? Does this theme help students discover answers to the essential question? Does this theme promise to create the intended enduring understanding? Can I create a game from this theme both in terms of time and technology? Does this theme meet my/the school’s/the state’s educational goals? Likely you will not have all these answers yet, but if the answers so far promise many yesses, then, game on...

I don’t have a fixed design process. Quite the contrary, I believe that starting from the same beginning will frequently lead to the same end.

—Reiner Knizia, designer of the *Lord of the Rings* board game

Appendix: Topic Quest Worksheet

Content area: _____

Grade level(s): _____

Any relevant information about students: _____

Topic	
Enduring understanding (underlying concept)	
Essential question (should have multiple answers)	
Scope (several lessons, project, unit, semester, year)	
Theme (experience and emotions game evokes)	
Possible game genre	
Questions:	Is a game really the best solution to explore this theme?
	Why?
	How will I be able to tell if the problem is solved?
	Does this theme feel right?
	Will students like this theme enough to find it engaging?
	Does this theme promise to evoke the intended experiences in the students?
	Does this theme help students discover answers to the essential question?
	Does this theme promise to create the intended enduring understandings?
	Can I create a game from this theme both in terms of time and technology?
	Does this theme meet my/the school's/the state's educational goals?
	Any other pertinent questions?
Initial thoughts/ideas	

Suggested Topic Quest Rubric

Quest	“Wow! I mean, I think this might work” (3)	“Hmm, this is acceptable” (2)	“I need more convincing” (1)	“Go back to the drawing board” (0)
Topic quest	Topic is developed into a theme likely for players to experience the enduring understanding and explore answers to the essential question	Topic fleshed out with an enduring understanding and one overarching essential question	Topic identified	Topic is vague, unclear, or too broad

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2017, XI, 349 p. 21 illus., 18 illus. in color., Hardcover

ISBN: 978-3-319-42392-0