COMPLEX MECHANICS:
9 GAMED-UP TEACHING APPROACHES

FOR CREATING RIGOROUS LEARNING GAMES

BY PROF. JOE BISZ

FIND THE CLUE

random
rival
reward

ANALYZE any facts, concepts, or procedures for hidden information

Situated Meanings ● Well-Ordered Problems
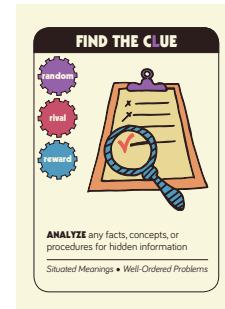
GAME RULES (Version 1.6)

Audience: Educators (all levels), Training Managers, Instructional Designers & Learning Game Designers
Great for professional development workshops!
Length: 25 minutes (45 minutes if playing the pre-game)
Players: Solo, or 1 group of 2-8 players.
If you have more than 1 group, you'll need another copy of the game.
Contents: 9 Complex Mechanic cards, 5 Simple Mechanic cards, 4 Action cards

Description

One of the biggest challenges for educators and training managers is to create meaningful exercises, which means exercises that give their learners both deep learning and engagement.

This game presents you with 9 teaching templates that gamify any of your existing instructional exercises, whether for the classroom or workplace. All templates are academically grounded: classified by Bloom's taxonomy, deep learning principles, and engagement mechanics. After a thorough "pre-game" where you study the templates, you are walked through a brainstorming game, where you will design your own non-digital learning game!

A Brief Research Summary

If you've ever designed a fun, interactive exercise before, it was probably close to a learning game already. However, the best exercises should contain multiple moments for both engagement and deep learning. When they do, they feel like the best games in the stores, that continue to attract dedicated players, despite their high level of complexity.

That's because good games are built on 4 deep learning principles that help players comprehend their difficult content. Games also operate on 5 simple mechanics that help players stay engaged. Designing exercises to be like these games may seem mysterious, but my *Complex Mechanics* will show you how. Let's review them now.

Simple Mechanic Card Breakdown: Front

To the right, you'll see **Random,** one of the most popular Simple Mechanics. Go ahead and pull this card out now. I provide a short definition, followed by a few ways the concept of random can be achieved.

Remember, games operate on 5 simple mechanics that help players stay engaged. These are the same mechanics we should be plugging into our exercises to create engagement. You're holding Random right now, but there are 4 others: **Rapid, Reward, Rival,** and **Role**. What's the difference between these 5? Essentially, the *pace* of your exercise should be **Rapid** or **Random.** The *goal* of your exercise should be to have a **Reward, a Rival, or a Role.**

By the way, a "mechanic" is an easy word for a rule designed to create interactivity in a system. In other words, it's the gears that drive the engine known as *game.*

Simple Mechanic Card Breakdown: Back

The back of the card describes the simple mechanic in detail, with sample **Exercises**. These exercises are not very elaborate, since my aim is to show you small incorporations of the random element, a little package-of-random you can tuck into your existing lesson. Once you understand the gears, I can show you the engine.
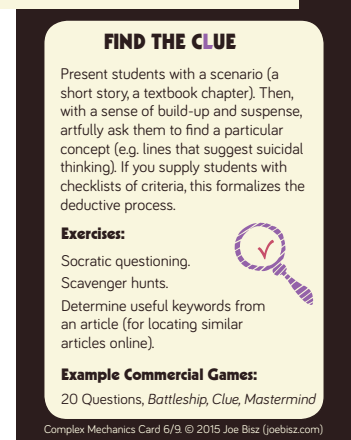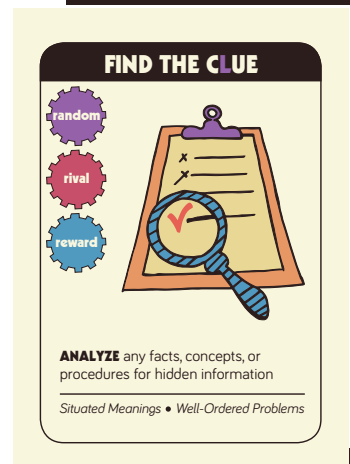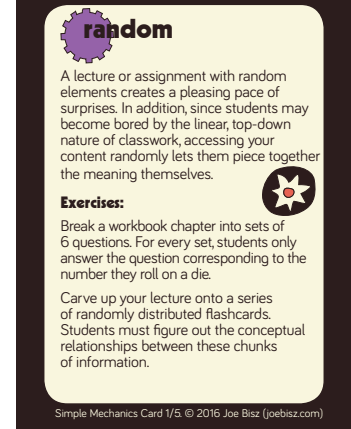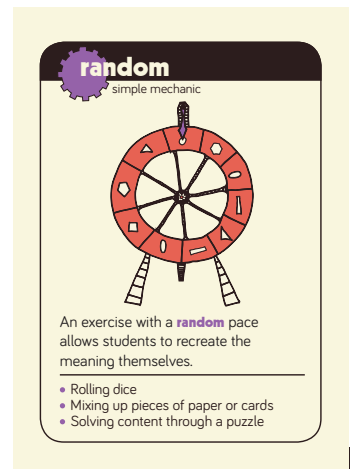
Complex Mechanic Card Breakdown: Front

Unlike Simple Mechanics, my Complex Mechanics are intended to give you an open template for designing a completely gamed-up exercise. That's because Complex Mechanics are more, um, *complex* than Simple Mechanics.

First, in colored circles, you'll see the related simple mechanics operating within the Complex Mechanic engine. Our **Find the Clue** card is run by the simple mechanics random, rival, and reward. Next, the highest **cognitive process** that card can normally teach (e.g. analyze), and the **knowledge type** (e.g. "facts"). Finally, the **learning principles** this card helps bring to the surface (e.g. situated meanings). More on those later.

Complex Mechanic Card Breakdown: Back

The back of the card describes the complex mechanic in detail, including sample **Exercises** and **Commercial Games** with that mechanic. You may observe that the exercises do not look like full games. That's because you need to add the related simple mechanics (from the front of the card) to them. For example, **Find the Clue** shows "Socratic Questions" as an exercise. Asking socratic questions of your audience is not a game (sorry, Socrates). BUT, if you add a **reward** and a **rival** to the exercise... or even better, focus on making your questions seemingly **random**... now you definitely have a game.

Action Card: We'll skip these for now.

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random
simple mechanic

An exercise with a **random** pace allows students to recreate the meaning themselves.

- Rolling dice
- Mixing up pieces of paper or cards
- Solving content through a puzzle

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random

A lecture or assignment with random elements creates a pleasing pace of surprises. In addition, since students may become bored by the linear, top-down nature of classwork, accessing your content randomly lets them piece together the meaning themselves.

Exercises:

Break a workbook chapter into sets of 6 questions. For every set, students only answer the question corresponding to the number they roll on a die.

Carve up your lecture onto a series of randomly distributed flashcards. Students must figure out the conceptual relationships between these chunks of information.

Simple Mechanics Card 1/5. © 2016 Joe Bisz (joebisz.com)

FIND THE CLUE

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ANALYZE any facts, concepts, or procedures for hidden information

Situated Meanings • Well-Ordered Problems

FIND THE CLUE

Present students with a scenario (a short story, a textbook chapter). Then, with a sense of build-up and suspense, artfully ask them to find a particular concept (e.g. lines that suggest suicidal thinking). If you supply students with checklists of criteria, this formalizes the deductive process.

Exercises:

Socratic questioning.

Scavenger hunts.

Determine useful keywords from an article (for locating similar articles online).

Example Commercial Games:

20 Questions, *Battleship, Clue, Mastermind*

Complex Mechanics Card 6/9. © 2015 Joe Bisz (joebisz.com)

Part I: THE PRE-GAME (20 minutes) *(Note: You only need to do this part once.)*
If you haven't done the pre-game before, you should do it *at least* once, since it explains to you some of the theory and meanings behind the cards. Once you finish the pre-game, you'll be ready for the main game in part 2. If you intend to play the main game with a group, and one or more people haven't done the pre-game before, you should do the pre-game.

Setup:
- Each person needs a full piece of paper, and a pen. (Do *not* do this part in your head; it won't be the same.)
- Also, organize the cards into 3 different decks by category (1 deck of Simple Mechanics, 1 deck of Complex mechanics, 1 deck of Actions).
- Read page 2, which explains the parts of the cards. If doing this in a group, read the page aloud and show them the cards depicted so they follow along; they will be answering the questions below *individually*.

1) Think of one exercise you've taught in the classroom or workplace where your learners were actively involved. It should be mostly non-digital. If it's hands-on, or full of audience interactions, that's even better. If you've never taught anything before, try to remember an exercise from when you were a student, or an exercise you've heard of.
   - **In two sentences or less, describe the exercise.**
2) Read over my "Core Game-based Learning Principles" (the green chart on next page).
   - **In one sentence, which single principle do you feel your exercise likely contained, and why?**
3) Read over my 5 "Simple Mechanic" cards.
   - **In one or two sentences, which 1 or 2 Simple Mechanic(s) did your exercise contain, and why?**
4) Now pick 2 new Simple Mechanics that *did* not exist in your exercise.
   - **In two sentences, describe how you might add these mechanics to your exercise.**
5) *This part will be harder.* Read over the long descriptions on the backs of all 9 Complex Mechanic cards, taking your time to get a hefty overview.
   - **In two sentences, which of my Complex Mechanics seems similar to your active exercise, and why?**
If you're not sure, or it seems like a stretch (which is a perfectly valid thought!), quickly pick the Complex Mechanic that *seems closest*, then explain.
6) *This part will be the hardest.* Shuffle the deck of all 9 Complex Mechanics, and draw 2 of them. Pick 1 that seems interesting, discard the other.
   - **In three sentences, describe how you might add this chosen Complex Mechanic to your exercise.**
When you're finished, read over your answers. If you did the pre-game in a group, have 1 or 2 people share their answers aloud to every question.

Congratulations! You have finished the pre-game, which has hopefully taught you the basics of my Simple and Complex Mechanics theory. Keep in mind that your answers (and my definitions) are not meant to be exact; there is no right or wrong in this pre-game, only a formal reflection on understanding my design tools. Be sure to keep the piece of paper you wrote on inside this game box for future reference. You are now ready for the real game--go to Part 2.

(I could not have done this pre-game without leveraging the power of the "Situated Meanings" principle. I could say more about the value of the principles, but for that, you'll need time, interest, and some rather academic readings in Further Academic Info below).

Core Game-Based Learning Principles:

Identity. Student might give a presentation from the perspective of a historical or fictional figure. Identity provides a student with a sense of academic responsibility.

Co-design. To encourage co-design, let students have agency over their work (e.g. choosing their projects).

Well-ordered problem. If your exercise is well scaffolded, then the hypotheses students form earlier should assist them later during more complex tasks.

Situated meanings. When you give new terms to your class, always 'situate' them by comparing them to similar items. This is because students try to fit new concepts within experiences they already know.

Part 2: THE MAIN GAME (25 minutes)

This is the actual game. Either alone or in a group, you will randomly draw cards and use them as prompts to design an interactive, non-digital learning game!

A Note About Group(s): If you are playing this game with a group(s) of people, it is no longer important to write things down when instructed below. Instead, just speak your answer aloud to the members of your group. If more than one group is playing, each group draws their own unique set of cards (from their own copy of the game), and I would strongly recommend having each group briefly (5 minutes) share their results with all groups.

Setup: Organize the cards into 3 different decks by category (1 deck of Simple Mechanics, 1 deck of Complex mechanics, 1 deck of Actions). Shuffle the decks.

1) <u>Set a Timer</u>: Set a clock for 20 minutes. *(This is important to constrain yourself to rapid associations without being critical of your thoughts. Cellphones often come with a timer in the Clock or Time app.)* Start the timer, now!

2) <u>Pick a Lesson</u>: Ask if someone in your group (or you) can think of a lesson he or she teaches and would love to see turned into a game. Maybe something that students or employees find boring or difficult. Perhaps a learning outcome or training objective of your organization. It should be normally teachable within a hour or two. Then, summarize the instructional goal in one sentence. Quick; time is running! *(2 minutes or less)*

3) <u>Draw Cards</u>: Draw the top 2 Complex Mechanic cards from their deck. (If you don't like seeing the top card you'll be drawing, draw from the bottom of the deck instead.) Then, draw 1 Action card from its deck. *(15 seconds)*

4) <u>Pick a Complex Mechanic</u>: Read over both sides of the 2 Complex Mechanic cards. Try to get a broad view of what a lesson might look like involving each of these mechanics separately, but don't write anything down. Also, keep in mind that although Complex Mechanics can teach facts, concepts, or procedures, not every Complex mechanic is best to teach all of these--check their one-line descriptions on the front. Then, select ONE card you'd like to try to incorporate in your lesson, and turn the card not chosen face down. *(4 minutes or less)*

5) <u>Find the Related Simple Mechanics</u>: Some mechanics (e.g. Random) are listed in color circles on the front of your Complex Mechanic. Find the Simple Mechanic cards matching these color circles, read them over, and place them before you. *(2 minutes or less)*

6) <u>Design Brainstorm</u>: Now brainstorm your game's appearance. In the beginning, don't get bogged down trying to think of how the *whole* exercise will work; just focus on writing down small connections between the Complex Mechanic and your exercise. You may not be certain if you're "doing it right," but you *are... this is just a brainstorm!* **(12 minutes or less)**

Other Tips While Brainstorming:

- <u>Use the Simple Mechanics</u>: Bring the related Simple Mechanics into your exercise, otherwise your game may lack engagement, and feel too much like regular work. Sure, just one simple mechanic would make it game-like, but the full power of the Complex Mechanic comes from using at least its simple mechanics listed on the front.
- <u>Use the Action</u>: Incorporate the "Action" card into your game, even in some small fashion. (If you've given the "Action" a full minute and it seems unfeasible, draw a new action. You don't have to use the "Action" cards, but most people find it makes the brainstorm easier.)
- <u>Add to the Example Exercises</u>: If you find yourself copying one or more of the sample exercises, be sure to flesh it out more, add something new and original to it as well.
- <u>More than One Complex Mechanic Card?:</u> If you couldn't help but also brainstorm ideas from the *other* Complex Mechanic card you drew and discarded (or perhaps another Complex Mechanic that you've studied before), go ahead and pull that card from the deck now to use. It's fun to combine Complex Mechanics together, but the process can also be challenging, so I'd save this until you are experienced.
- <u>Learning Principles</u>: Do NOT think too hard about how to use the learning principles. The Complex Mechanic will automatically push your game-exercise in a direction that uses these, and we can tighten up this part after the brainstorm. **It's okay to leave aspects out of the Complex Mechanic.**

7) <u>Wrap-up</u>: Once the timer buzzes, your formal brainstorm is over! Time to walk away, give your ideas room to breathe and germinate in the back of your brain. At this point, your game will likely feel as if there's several fascinating ideas, and potentially fun mechanics, but you're not quite certain how the whole thing should be put together for your learners. Then, good job! That's exactly what you should be feeling. My *Complex Mechanics: 9 Gamed-Up Teaching Approaches* is meant to be a rigorous brainstorm. Your fully designed game will take collaboration, testing with your audience, and countless revisions--just like a perfect exercise. When you return to work on this again, try to have a colleague or two with you. Or talk to your organization's leader about holding a professional development workshop (more about this below). And that will also be the time for more rigid thinking about how to incorporate the deep learning principles.

But before you walk away, let's record a few formal notes on paper:

- Name of each card drawn
- Your Lesson objective
- List 1 or 2 things that players will be doing in your game.
- List 1 or 2 things you are still uncertain of and must think further about.
  (5 minutes or less)

= 25 minutes total for game
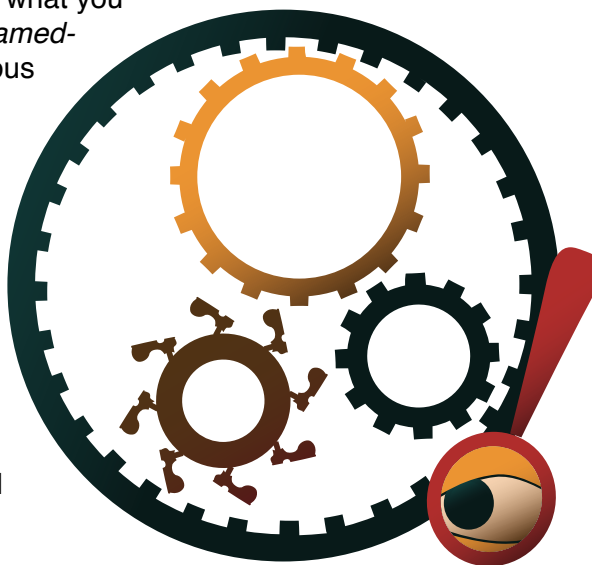
Further Academic Info

- The **learning principles** in my chart "Core Game-based Learning Principles," as well as the ones on the bottom fronts of my Complex Mechanics, are summarized from researcher James Gee's *Good Video Games and Good Learning: collected essays on video games, learning, and literacy* (2007). I highly recommend this text if you want to read one of the foremost theoretical texts that really break down the learning power behind games.
- To examine more closely my own theories surrounding complex and simple mechanics, go to my website at www.joebisz.com/researcher/, then scroll down to my linked article "Composition Games in the Classroom." The article is not as up-to-date as my cards and my current research, but it will still provide you with a thorough (and practical!) background.
- If you haven't figured it out, the **knowledge types** (e.g. facts) and **cognitive processes** (e.g. analyze) listed on my Complex Mechanics are from Bloom's taxonomy, and are what the card can normally teach, but it can also teach every process below the one indicated.

About the Graphic Designer

A wonderful designer named Nataliya designed all of the illustrations and templates for every card in this game (and my professional development website). She is gifted at working with intellectuals and creative people. Contact her for your own project at www.natsan.co.

About the Designer... and How to Find MORE Educational Games Resources:

Dr. Joe Bisz is a game designer, writer, and Professor of English at the City University of New York. He has led nearly 100 workshops to faculty, staff, and businesspeople on using game-based learning. His game design workshops make for compelling team-building or professional development experiences. To invite Joe to speak or consult at your school or organization, visit joebisz.com. You'll also find other educational game resources there.

Get Another Game that Teaches Game Design: *WHAT'S YOUR GAME PLAN?*

Can you guess what your lesson "Finding Citations," the game "Trivial Pursuit," and the mechanic "Bluffing" all have in common? *WHAT'S YOUR GAME PLAN?* is a brainstorming card game where your task is to enhance a traditional exercise with the mechanics of popular board games. It can be combined with the *Complex Mechanics: 9 Teaching Approaches* game, giving you **5 more ACTION cards**, 9 New "Lesson," 9 New "Mechanic," and 9 New "Game" cards. (This is a simpler game than my Complex Mechanics game, so it can be used with a larger variety of people.)

Using this Game as an Expansion for *WHAT'S YOUR GAME PLAN?*

Complex Mechanics: 9 Teaching Approaches can be used in combination with my first game about game design, called *What's Your Game Plan?*.

As an Individual: Do the pre-game in this document under "Part I: The Pre-game." Afterwards, IGNORE this document--you will not play the game in part 2. Instead, play *WYGP?* as normal, but instead of drawing just a Lesson, Game, Mechanic, and Action card, you are now drawing a 5th card: one random Complex Mechanic (no Simples). Follow the rest of the rules in *WYGP?*. This will be a challenging brainstorm, and is NOT recommended for one person (unless you've played *WYGP?* before).

As a Group: Since WYGP? is a complete game in itself, a thorough understanding of my Complex Mechanics is not necessary, and is better explained to groups in a long, facilitator-led workshop (such as the kind that I run!). Instead, describe the general intention of my Complex Mechanics, then explain ONE Complex Mechanic--but not in any more detail than what's already on the card. People may only have an abstracted understanding, but that's fine; we don't want to give the Complex Mechanic too much focus, or we'll obfuscate the fun of the WYGP? brainstorm. The only exception is if your group is an experienced game design group and most of them have played WYGP? before. Then, everyone in the room should do the Complex Mechanic "pre-game", as per my instructions above for "Individual": and welcome them all to the next higher level of game design!