Game Systems, Content and Design Work

Mr. Dinesh Kumar Baghel
Asst. Prof., SCSE,
Galgotias University

30-July-2020

Game Systems

Game Systems

Systems are organizations of related elements that work together to produce a result.

Game Systems

Systems are organizations of related elements that work together to produce a result.

All systems can be described in three aspects:

Game Systems

Systems are organizations of related elements that work together to produce a result.

All systems can be described in three aspects:

- **Elements (objects)** — multiple parts form a system

Game Systems

Systems are organizations of related elements that work together to produce a result.

All systems can be described in three aspects:

- **Elements (objects)** — multiple parts form a system
- **Interconnections (relationships)** — the elements influence each other.

Game Systems

Systems are organizations of related elements that work together to produce a result.

All systems can be described in three aspects:

- **Elements (objects)** — multiple parts form a system
- **Interconnections (relationships)** — the elements influence each other.
- **Function (purpose)** — what the system does.

- Systems are composed of elements.
- There are no real limits to what an element can be—large, small, simple, complex, physical, mental, etc.
- System elements are often other systems too.

Game System

Below figure shows a ring, a line, and a weight.
In this arrangement, these are objects and the objects are collected together, but they do not represent a system.

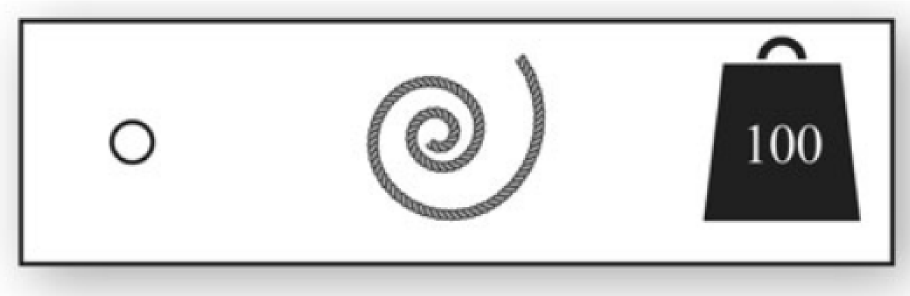

Figure 1: Three unrelated elements.

Game System

- In Figure below, we create the first relationship by attaching the ring to the line.
- This creates an interconnection by physically attaching the two elements; pull one part and the other will follow.
- With just that step, a simple system that could lift or pull is created.

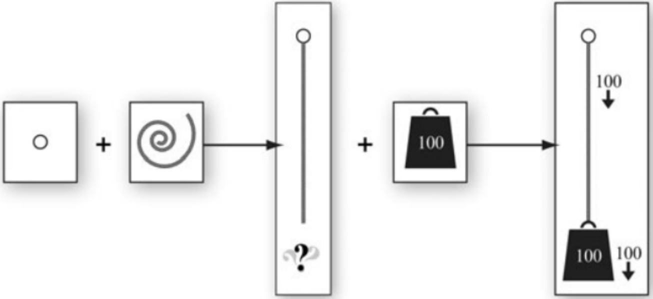

Figure 2: Interconnected elements arranged in a simple system.

Game System

- Note that function and purpose both refer to what the system actually does rather than what it is “supposed” to do; the designer’s intent is something else entirely.
- System designs usually begin at a high level, starting with the intended play mechanic.
- Each step along the way, things are broken down into more specific details, refining your questions and answers.
- When at all possible, build your systems as pro- totypes and test them frequently with anybody you can find.
- If we keep **adding objects, behavior** continues to **change**. But there are **two reasons to be careful** when adding complexity to a system. **First**, continuing to add elements seldom keeps improving the ability of the system to achieve the same goal. **Second**, the more things that are in a system, the harder it is to predict the actual behavior.

Game System

Dynamics of System

- Game dynamics result from continued interactions between the players and the game system.
- Because the behavior of a system is dependent on its unique structure, it can be hard to determine just how it will operate.
- As systems get larger, involving more elements, this challenge can become immense.
- One tool is known as systems thinking and was begun in 1956 at MIT by Dr. Jay Forrester to study how systems change over time.
- Systems thinking is a model for understanding general behaviors we can find in systems.
- For the game designer, it can explain why some parts of our game that are supposed to do one thing are, instead, doing something else.

Game System

Dynamics of System

- System dynamics describe everything in two aspects. Stocks (levels) are a stored amount of something—gold, enemies, etc. Flows (rates) are changes in the level of that amount; inflows are increases, and outflows are decreases.

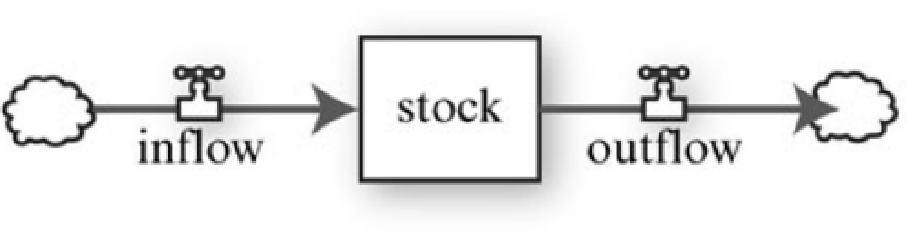

Figure 3: Stocks and Flows.

Game System

Dynamics of System

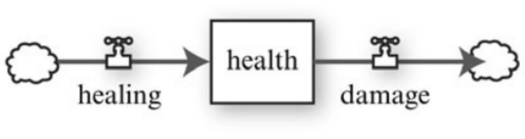

Figure 4: A basic combat system.

Not everything has inflows and outflows.

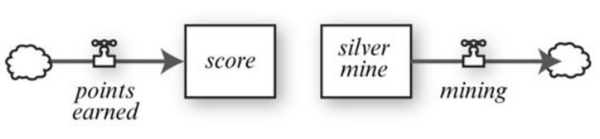

Figure 5: Earning points and mining a limited resource.

Game System

Dynamics of System

Game systems often have multiple inflows and outflows to a given stock.

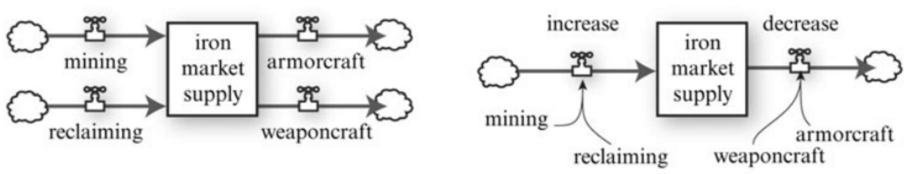

Figure 6: Multiple inflows and outflows.

Game System

Dynamics of System

Stock and flow diagrams are fine for sketching structure, but we also need a way to view behavior over time. For this, basic graphs are fine; they're easy to read and make.

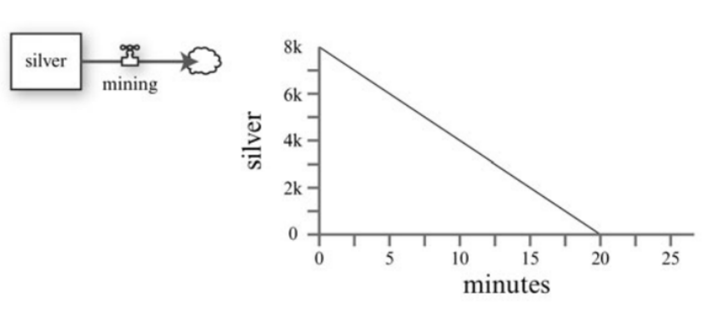

Figure 7: Multiple inflows and outflows.

Game System

Feedback Loops

- The systems we have been looking at have all been static.
- While stocks have risen or fallen, it has all happened at a constant rate. Game systems don't get really exciting until they start changing.
- So we need to put a hand or two onto those valves to get things really changing.
- Feedback is what happens when changes in a stock alter the rate of the flow in or out of the same stock.

Game System

Feedback Loops

Feedback is part of a tool for controlling system behavior; the name of that tool is called a feedback loop. The arrow point from the stock to the controller of the flow.

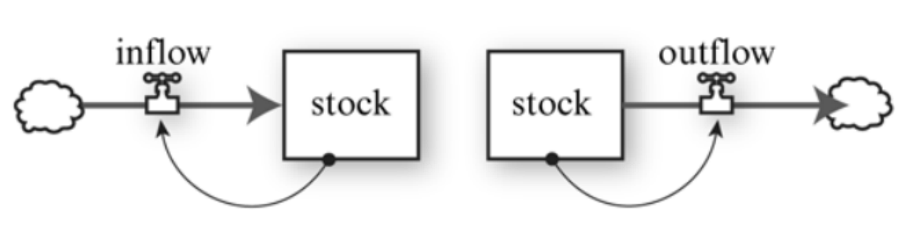

Figure 8: Feedback loops diagrammed.

Game System

Feedback Loops

There are two basic types: **balancing loops (negative feedback)** try to keep the stock at a certain level; **reinforcing loops (positive feedback)** produce more change in the same direction, either an increase or decrease.

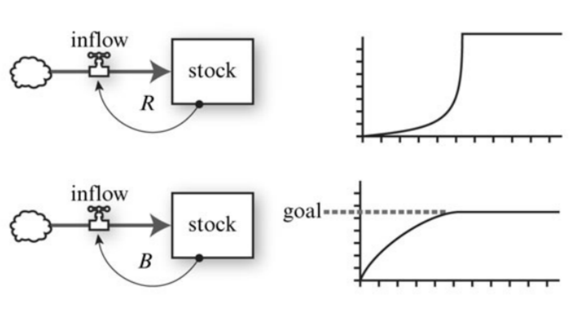

Figure 9: Comparing reinforcing and balancing feedback.

Game System

Feedback Loops: Balancing Loops

Figure shows the balancing loops in a "rubber banding" system. So balancing feedback loops—the Bs—slow a car that gets too far ahead and speed up a car that is lagging behind.

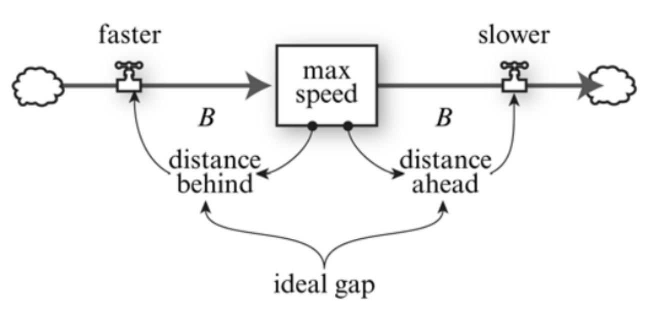

Figure 10: Balancing feedback in a racing game for a car.

Game System

Feedback Loops: Reinforcement Loops

Reinforcing loops, on the other hand, cause runaway behavior and havoc. As the player defeats enemies, she increases her level, which improves her ability to defeat enemies.

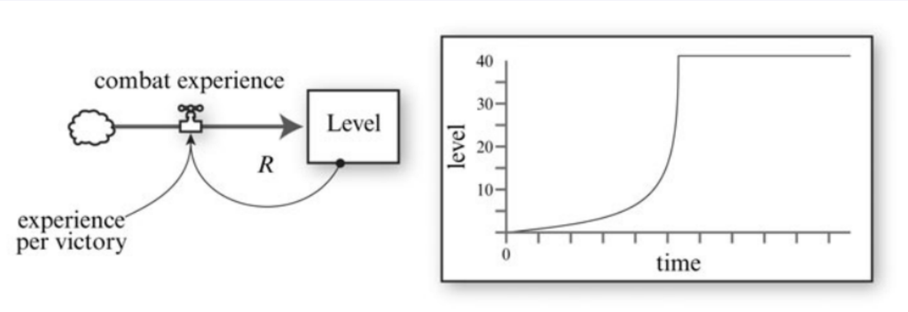

Figure 11: Leveling system run amok.

Game System

Feedback Loops: Levels

Like with many MMORPGs, we want the players of our fictional game to advance quickly at first, and then have to progress through levels slowly as they near the endgame.

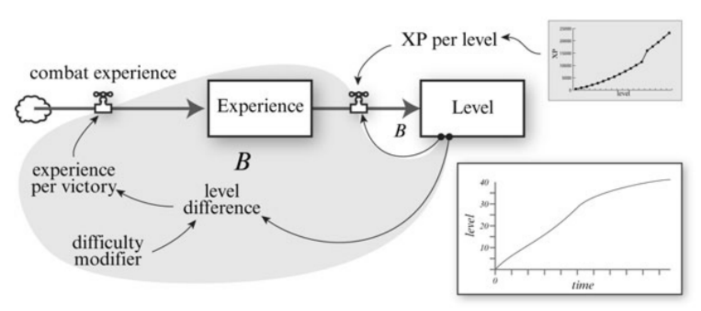

Figure 12: A normal approach to leveling.

Game System

Feedback Loops

LeBlanc has generalized some of the feedback behaviors as they relate to games:

- Balancing loops stabilize the game.
- Balancing loops stabilize the game. Reinforcing loops destabilize the game.
- Balancing loops forgive the loser.
- Reinforcing loops reward the winner.
- Balancing loops can prolong the game.
- Reinforcing loops can end the game.
- Reinforcing loops magnify early successes.
- Balancing loops magnify late successes.

Content

Mr. Dinesh Kumar Baghel
Asst. Prof., SCSE,
Galgotias University

August 4, 2020

Content

Definition

Content is the space of your game and everything that fits inside of it: the combined total of all areas, elements, and states throughout any moment in time.

- Content ordinarily means things like levels, models, missions, back-stories, enemies, animations, textures, dialogue, sound effects, music, particles, characters, and so on.
- We tend to think in terms of the things we need to create during the production of a game.You will be encouraged to hold a broader and more inclusive view of content.

Content

The range of content might include the following information:

- Game spaces—chessboards, The Barrens
- Game objects—a rook
- Narratives—back stories
- Characters—Mario, Frodo
- Scripted events
- Models and animations
- Sounds and music

Content

- A game's content and its systems are intertwined—two parts of the same whole.
- Through play, the player's experience results from the synthesis and the quality of execution in both the content and its systems
- A superb combat system could be transformed into a broken and frustrating mess if the game's levels are choked with too many enemies.
- Beautifully detailed woodland landscapes can be a total bore if the process of collect- ing what you need from them is tedious.
- Someone might describe some- thing as "system heavy" because the progression focused on the interplay of rules and behaviors (Civilization).
- Another is "content heavy" for using environments, narratives,and characters to do the same (Metal Gear Solid, Gears of War).
- Additionally, developers tend to say that players "experience" systems while they "consume" content.

Design Work

Mr. Dinesh Kumar Baghel
Asst. Prof., SCSE,
Galgotias University

August 4, 2020

Design Work

- One of the most exciting things about game design is the endless opportunity for solving new problems and learning new skills.
- Despite the various roles you may have in your career, most of your work will be approached in **styles** and **techniques** familiar to you.
- These will get bundled together, and **people will describe you by your general approach to design**.

Design Work

Designers Solve Problems

- When starting out, problems you have never seen before can be a little scary.
- Maybe it's a:
  - procedural mission system
  - a scripted event for a level, or
  - a new UI for virtual item trades

  if you lack a process for solving problems, it is easy to get overwhelmed.

Design Work

To describe a simple problem-solving method, we will use the **Plan Do Check Act** diagram. There are **similarities** between **PDCA** and the way **design** is generally carried out.

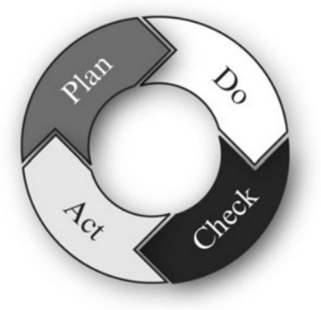

Figure 13: PDCA, The deming cycle.

design Work

PDCA: Plan

- Begin by developing an understanding of the current problem—the things that need to be done.
- Ask questions, write answers. Make lots of lists! You are creating a clear picture of what success looks like.
- Make lists of answers to questions like:
  - What are the requirements?
  - What are the goals?
  - What are the options?
  - What has been tried before?
- Sketch proposed solutions using brainstorming, mind maps, flowcharts, diagrams, spreadsheets, and any other tool you find helpful.
- Test those ideas with others or against objective criteria, and decide on a reasonable solution that meets the needs of the problem effectively and efficiently.

Design Work

PDCA: Do

- Take that reasonable plan and put it to work.
- Complete the work to the appropriateness of the problem.
- Resist the temptation to put extra effort into the solu- tion just yet.
- You are going to need to see if you're on the right track.

Design Work

PDCA: Check

- Test and measure the results, comparing them with what you had expected.
- List and describe the differences you find.

Design Work

PDCA: Act

- Review the results.
- Did they measure up to the expectations of the plan?
- Is the problem solved? If not, what didn't work?
- Will you need to change the plan?
- Will you need to change how the plan was carried out?
- Did you make a mistake while checking?

Design Work

PDCA: Repeat

- Cycles like this will rule your work.
- Something needs to be created or changed, and we need to figure out the best way to do it.

When the problem you are facing looks large, remember not to worry; you are making games! It gets easier over time, and when you are comfortable solving prob- lems, you won't worry about unknown challenges.

Thank You