Design Components and Processes

- "Behind every design is a process – a thought process. And that process transcends design itself. If you are mapping out a sales strategy, or streamlining manufacturing operation, or crafting a new system for innovating – if you work in the world of business – you are engaged in the practice of design."

Chris Bangle, Design Director, BMW

Summary

- Player-centric Game Design Approach
- Central Components of Video Games
  - Core Mechanics
  - User Interface
- Design of the Central Components
- Job Roles on a Design Team
- Game Concepts

Image Source: https://i.pinimg.com/736x/86/a6/08/86a608e4be2a6ffe64cfcabb4691b0d0--retro-games-game-character.jpg

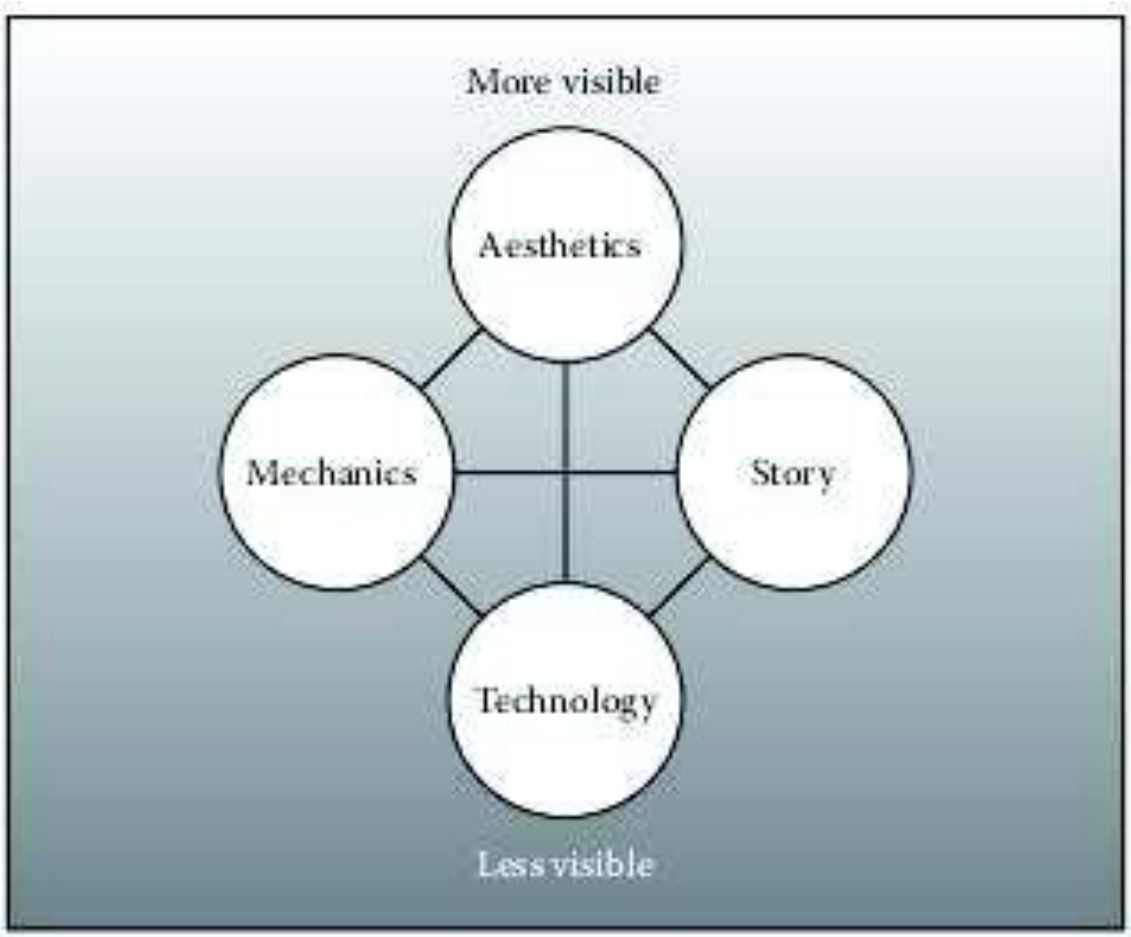
Game Design

Image Source: http://www.haroldli.ca/files/special/gamedesigners.png

Game Design Definition

- Game design is the process of:
  - Imagining a game
  - Defining the way it works
  - Describing the elements that make up the game
    - Conceptual
    - Functional
    - Artistic
  - Transmitting information about the game to the team who will build it

Game Design Definition



Game Design Definition

- Mechanics: These are the procedures and rules of your game

  Mechanics describe the goal of your game, how players can and cannot try to achieve it, and what happens when they try

- Story: This is the sequence of events that unfolds in your game

  It may be linear and prescripted, or it may be branching and emergent

Game Design Definition

- Aesthetics: This is how your game looks, sounds, smells, tastes, and feels

Aesthetics are an incredibly important aspect of game design since they have the most direct relationship to a player's experience

- Technology: The technology you choose for your game enables it to do certain things and prohibits it from doing other things

The technology is essentially the medium in which the aesthetics take place, in which the mechanics will occur, and through which the story will be told

Art, Engineering, or Craft?

- Game design is not purely an art nor an act of pure engineering

- Game design is a craft
  - It includes both creative and functional elements
  - It can be learned

A screenshot from the game «Limbo»

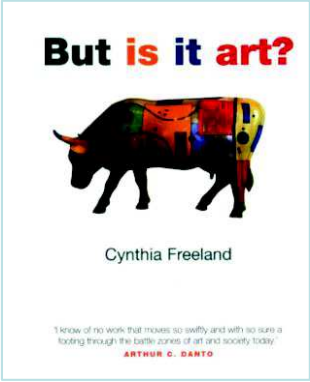
Art, Engineering, or Craft?

- Not purely an art -> it is primarily a means of aesthetic expression
- Not pure engineering -> not bound by rigorous standards or formal methods
- Designing a game requires both creativity and careful planning

...But Is It Art?

"Industry has been mechanized and an artist cannot work mechanically for mass production.... Artists find it incumbent ... to betake themselves to their work as an isolated means of 'self-expression.' In order not to cater to the trend of economic forces, they often feel obliged to exaggerate their separateness to the point of eccentricity."

Cynthia Freeland. But Is It Art?: An Introduction to Art Theory (Kindle Locations 123-125). Kindle Edition



Art, Engineering, or Craft?

- A game must:
  - Be aesthetically pleasing
  - Work well
  - Be enjoyable to play

- The greatest games are the ones that combine their artistic and functional elements very well, achieving a quality of «elegance»

Is it Art? Video Games

- https://www.youtube.com/watch?v=2kEX9EOgVig

The Player-Centric Approach

- Player-centric game design is a philosophy of design in which the designer envisions a representative player

- Two duties in player-centric design
  - Entertain the representative player
  - Empathize with the representative player

Common Misconceptions

- «I am my own typical player»

  You ARE NOT your player!
  Professionalism is just as important as passion

- «The player is my opponent»

  NO! Game design is not about opposing the player, but it is about entertaining the player
  This misconception tends to equate “hard” with “fun”

The Lens of the Player

Lens #19: The Lens of the Player

To use this lens, stop thinking about your game, and start thinking about your player.

Ask yourself these questions about the people who will play your game:

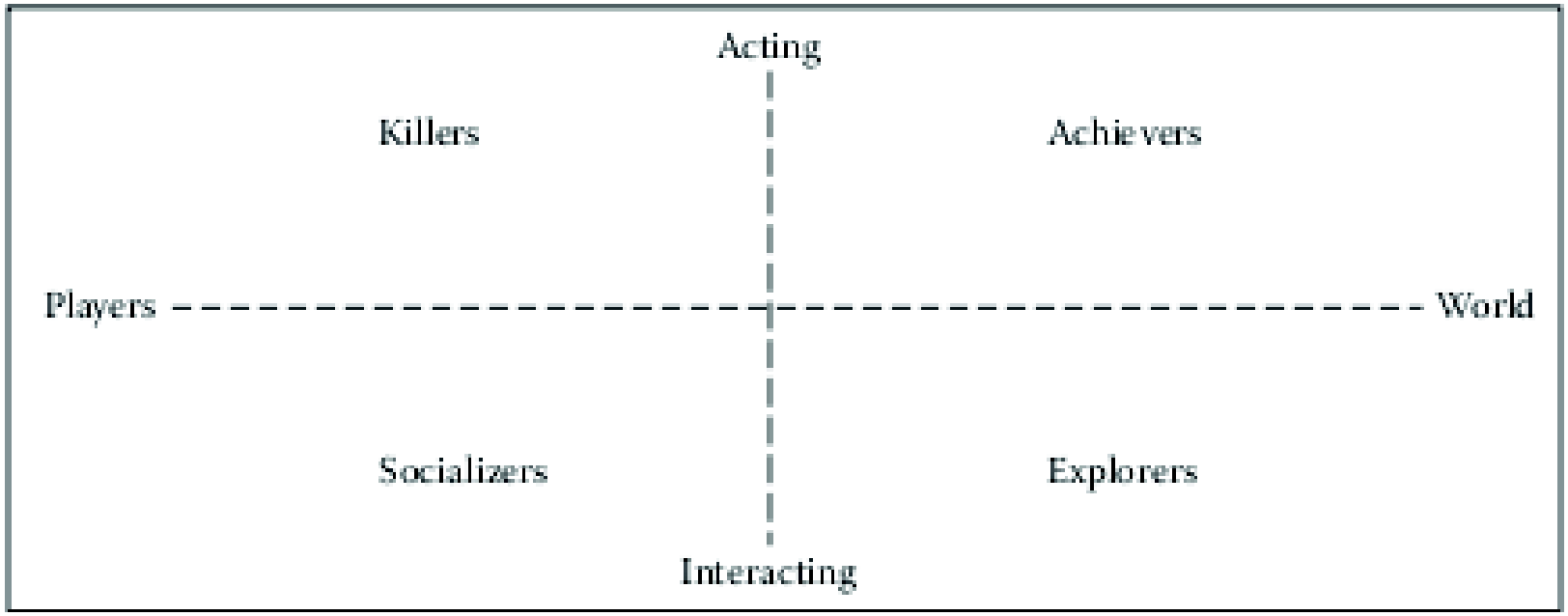
- In general, what do they like?
- What don't they like? Why?
- What do they expect to see in a game?
- If I were in their place, what would I want to see in a game?
- What would they like or dislike about my game in particular?

A good game designer should always be thinking of the player and should be an advocate for the player. Skilled designers hold The Lens of the Player and Lens #10, *Holographic Design*, in the same hand, thinking about the player, the experience of the game, and the mechanics of the game all at the same time. Thinking about the player is useful, but even more useful is watching them play your game. The more you observe them playing, the more easily you'll be able to predict what they are going to enjoy.

Bartle's Taxonomy of Player Types

- Achievers: want to achieve the goals of the game. Their primary pleasure is challenge
- Explorers: want to get to know the breadth of the game. Their primary pleasure is discovery
- Socializers: are interested in relationships with other people. They primarily seek the pleasures of fellowship
- Killers: are interested in competing with and defeating others

Bartle's Taxonomy of Player Types

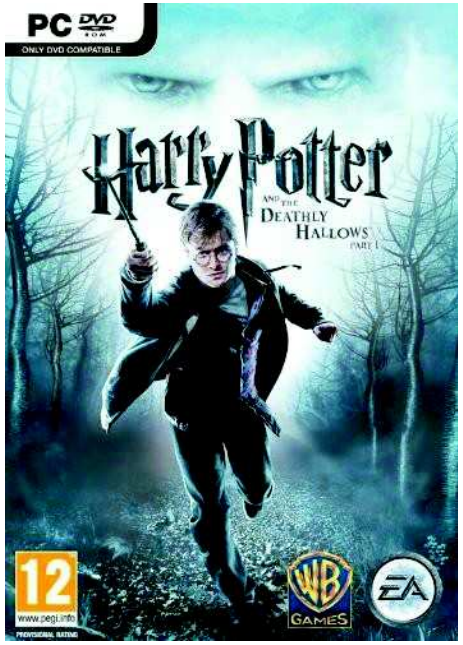


Other Motivations that Influence Design

- Designer-driven games

  Designer retains all creative control
- Games for a specific license

  Content must fit into an existing world
  Limits creativity, but often very profitable



Other Motivations that Influence Design

- Technology-driven games

  Games built to show off the hardware running the game (e.g. Crytek's game Crysis - Crytek's 3D graphics engine)

- Market-driven games

  Games trying to appeal to the maximum number of people, regardless of implications for harmony

- Art-driven games

  Games built to show off the artwork

  Games are visually innovative but seldom good otherwise; comparatively rare

Other Motivations that Influence Design

- Art-driven games

  Games built to show off the artwork

  Games are visually innovative but seldom good otherwise; comparatively rare

- Examples of «elegant» games

  Journey (https://www.youtube.com/watch?v=_mF8KkDiIdk)

  Child of Light (https://www.youtube.com/watch?v=ygs0ZZhT4Cs)

Integrating for Entertainment

- Integrating characteristics to entertain players requires designer to

  Have a specific vision
  Consider the audience's preferences
  Understand licensing benefits and use them to the game's best advantage
  Understand the capabilities of the technology
  Consider aesthetic style

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

MMI 505: Game Development Pipeline

Key Components of Video Games

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Graduate School of Informatics, METU

Key Components of Video Games

“Curiosity is one of the most permanent and certain characteristics of a vigorous mind.”

Samuel Johnson

Key Components of Video Games

- Core Mechanics
- User Interface
  - Storytelling engine

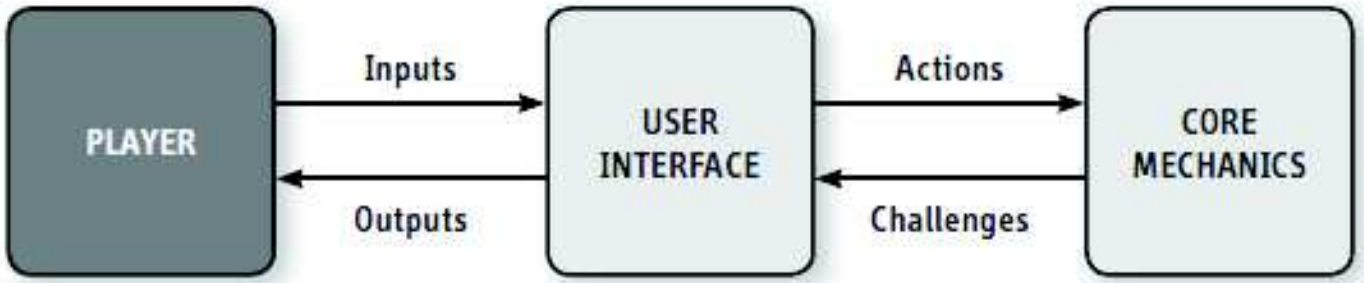


FIGURE 2.1
The relationships among the core mechanics, the user interface, and the player

Core Mechanics

- Core mechanics generate the gameplay
  - Define the challenges
  - Define the actions
  - Define the player's effect on the game world
- Core mechanics determine how realistic the game world seems to the player
  - Realism is a continuum between abstract and representational

User Interface

- Acts between the core mechanics and the player
  - Interprets player's mouse clicks or button presses
  - Displays the result of the player's input

- Can also be called the presentation layer
  - Presents the game world to the player
  - Includes artwork and audio effects

User Interface

- Interaction model

  Identifies the way in which the player acts upon the game world; common models include:

- Avatar-based: through a character in the world
- Multi-present: the player can act on many places at once

The Structure of a Video Game

- Structure is composed of:

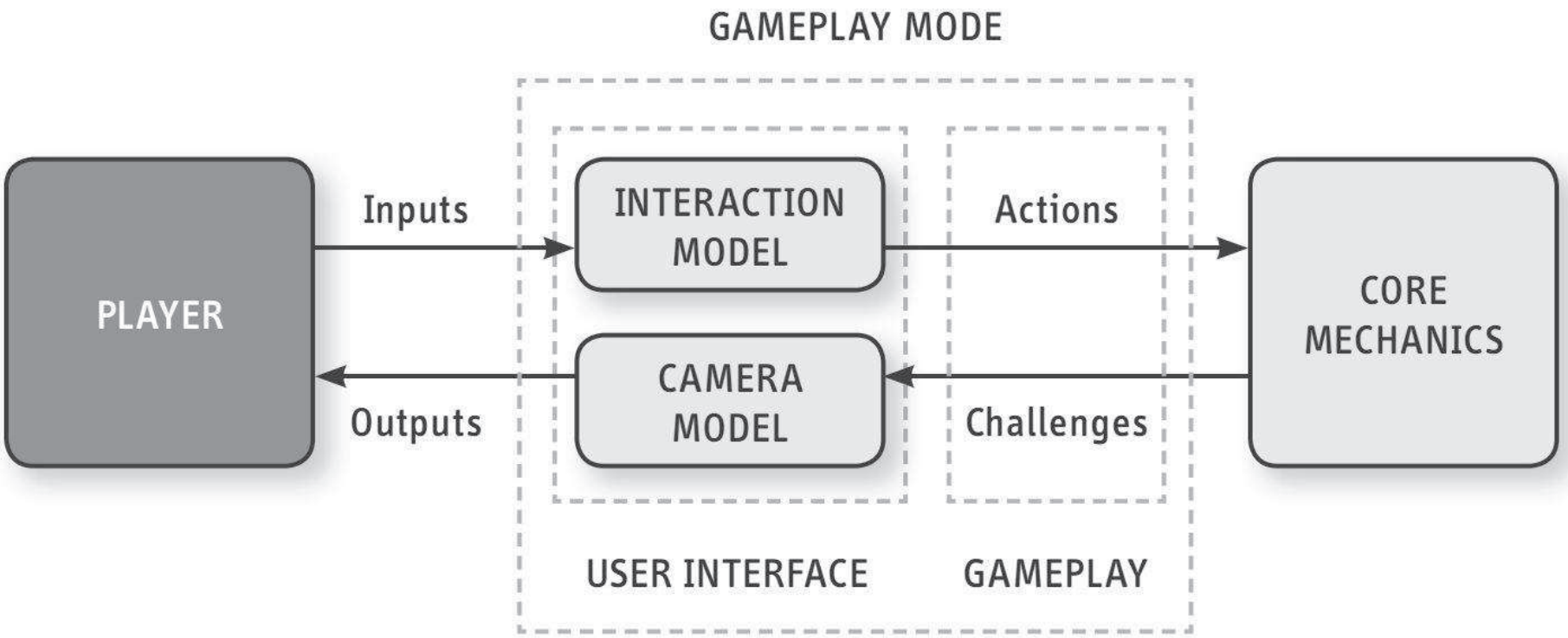
  Gameplay modes

  Shell menus

- Gameplay modes consist of the available gameplay and user interface at a specific time
  - Not all actions are available at all times
  - Available user interface choices should be related to the current actions

- A game is in exactly one gameplay mode at a time
  - It can move to another mode as necessary

The Gameplay Mode



Shell Menus and Screens

- Shell menus are used when the player is NOT in a gameplay mode

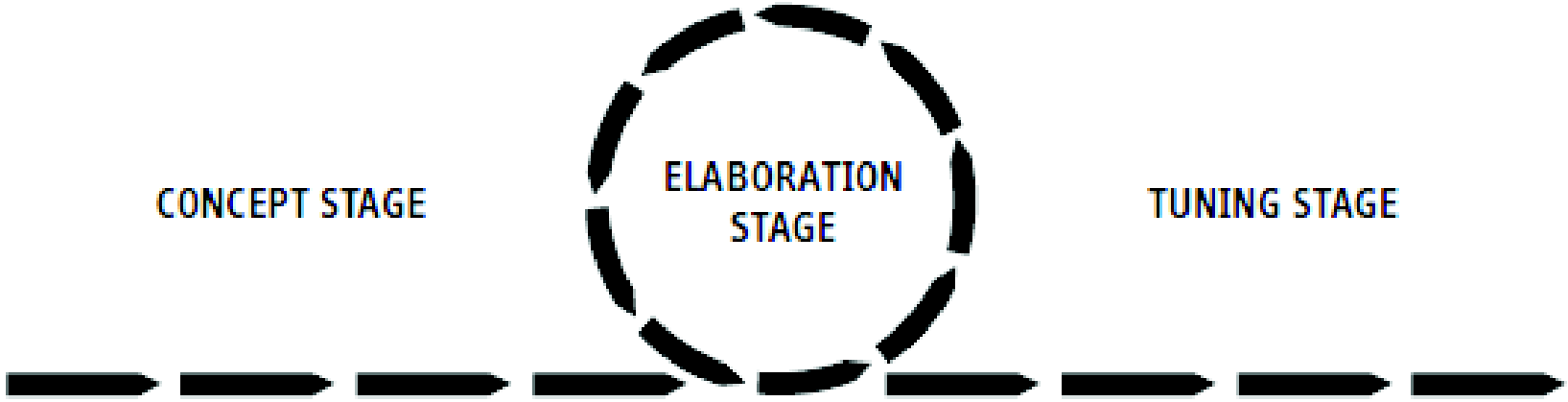
  The player can't affect the game world
  The player can save or load a game, adjust the hardware, etc.

Forming the Structure

- Gameplay modes + shell menus = structure
- The game switches between gameplay modes as required:

  In response to specific player requests
  In response to events in the game

Stages of the Design Process



Stages of the Design Process

- Concept stage
- Elaboration stage
- Tuning stage
- Note that these are purely stages of design, not of development; development includes many more factors

"Pre-production" and "production" are development stages that overlap the design stages

Concept Stage

- During the concept stage, you
  - Define the fundamental game concept, including the game's genre
  - Define an audience
  - Determine the player's role in the game
  - Think about how to fulfill the player's dream
- Concept should not change after this stage

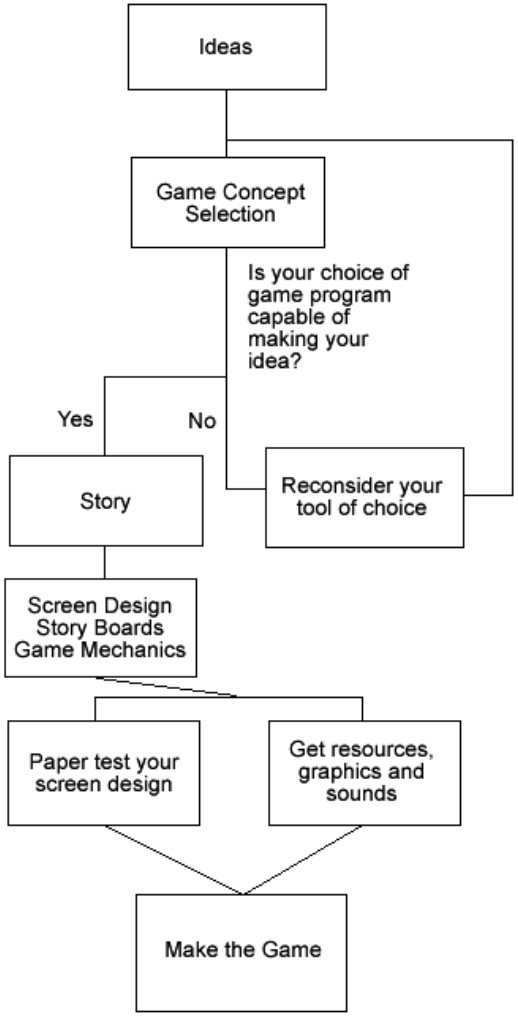
Elaboration Stage

- During the elaboration stage, you
  - Define the primary game mode
  - Design the protagonist
  - Define the game world
  - Design the core mechanics
  - Create additional modes
  - Create the first playable level
  - Write the story
  - Build, test, and iterate

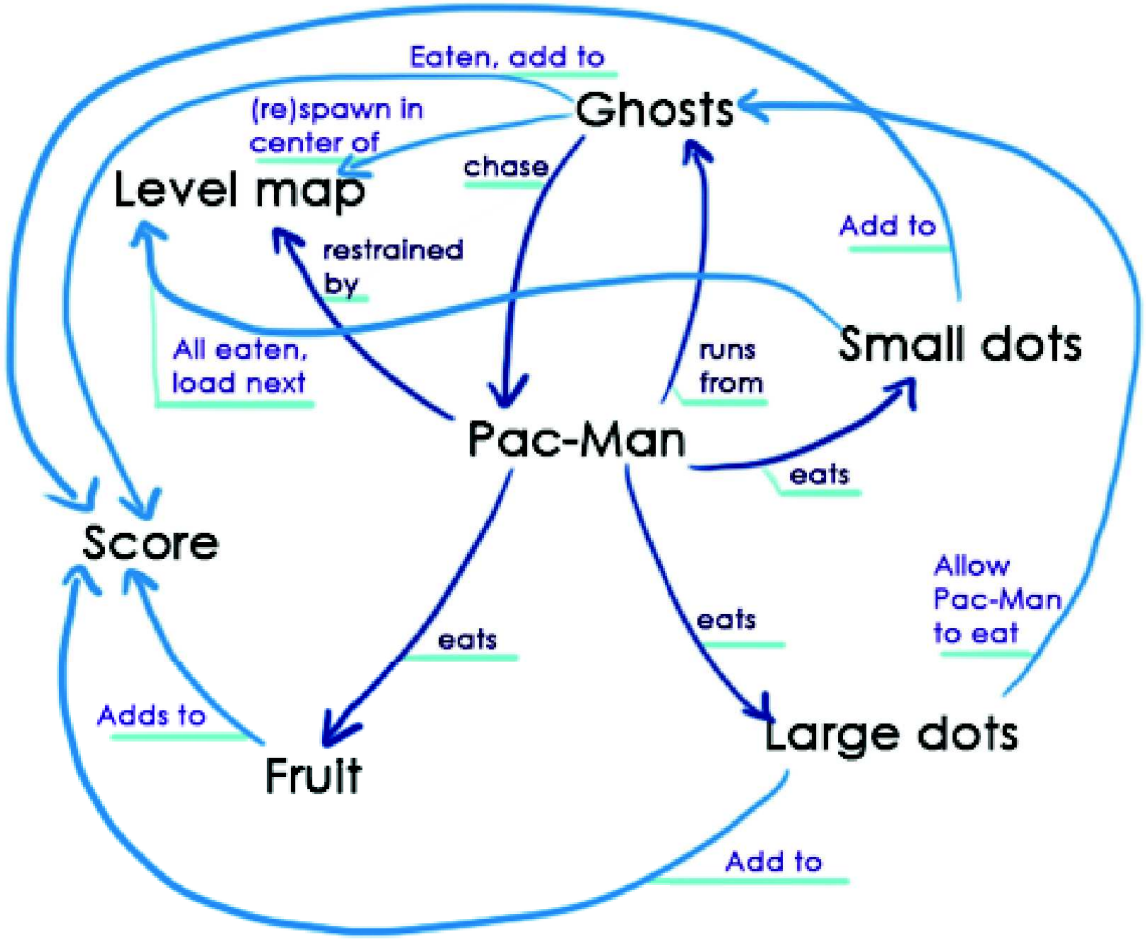
Tuning Stage

- You enter the tuning stage at the point when the entire design is locked and no more features may be added to the game
- During the tuning stage, the design team makes small adjustments to levels and core mechanics
- Polishing is a subtractive process—removing imperfections

Game Design Flowchart



Game Design Flowchart



Game Design Teams

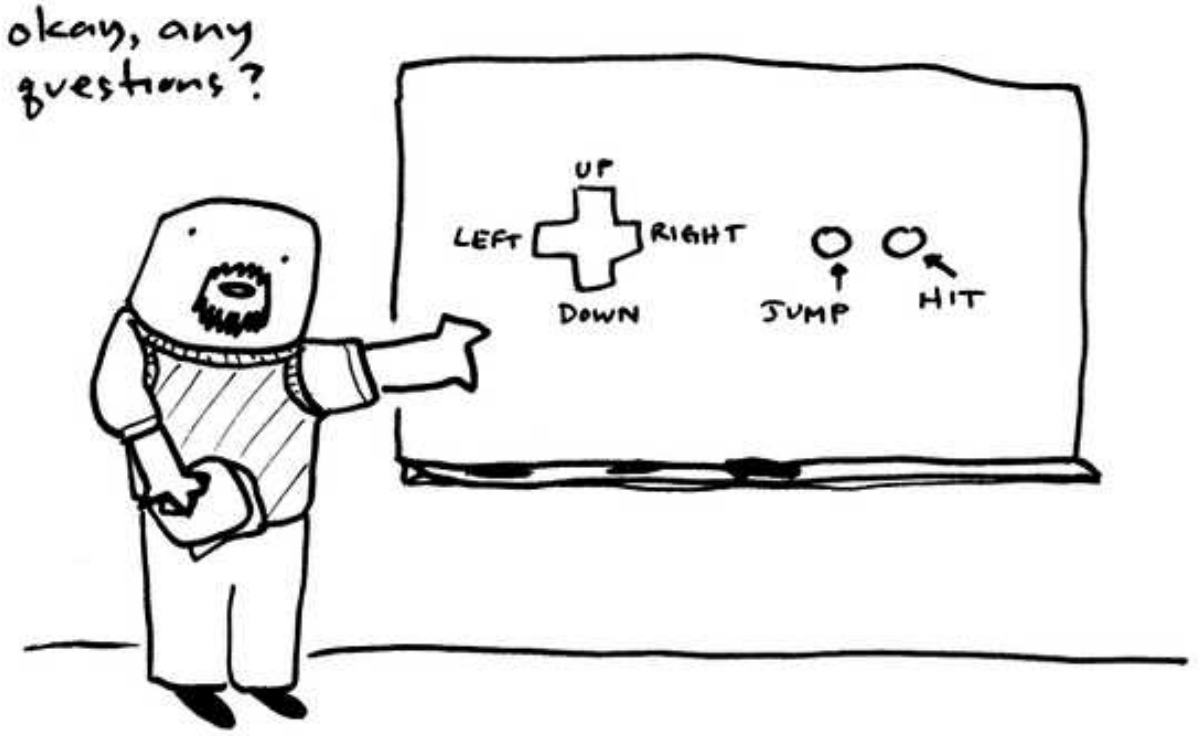
- A game design team may include:
  - Lead Designer
  - Game Designers
  - Level Designers
  - User Interface Designers
  - Writers
  - Art Director
  - Audio Director

Getting Started

- IGN's Top 100 Game Developers: Industry Advice - How to Get Started

  https://www.youtube.com/watch?v=bgwG-VBKStU

Documenting the Design



Documenting the Design

- Design documents are used:
  - To communicate your ideas clearly to other team members
  - As sales tools
  - As design tools
  - To record the decisions made
- The process of writing a document can turn a vague idea into an explicit plan

Types of Design Documents

- High concept document
  - Tool to sell your game concept
  - Two to four pages

- Game treatment document
  - Sales tool with more detail than the high concept document
  - Summary of the basic game design

Types of Design Documents

- Character design document
  - Design one character in the game
  - Include moveset
  - Include concept art in different poses
  - Include the character's backstory

Types of Design Documents

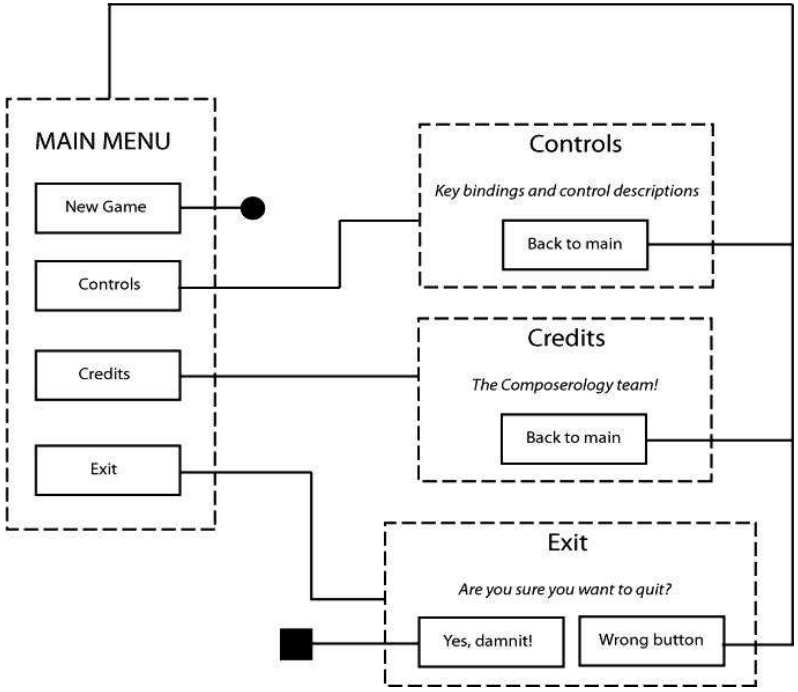
- World design document
  - General overview of the game world art
  - Types and locations for sounds
  - Include a map

Types of Design Documents

- **Flowboard**

  Document the structure—links among gameplay modes and shell menus

  List available menu items and player inputs

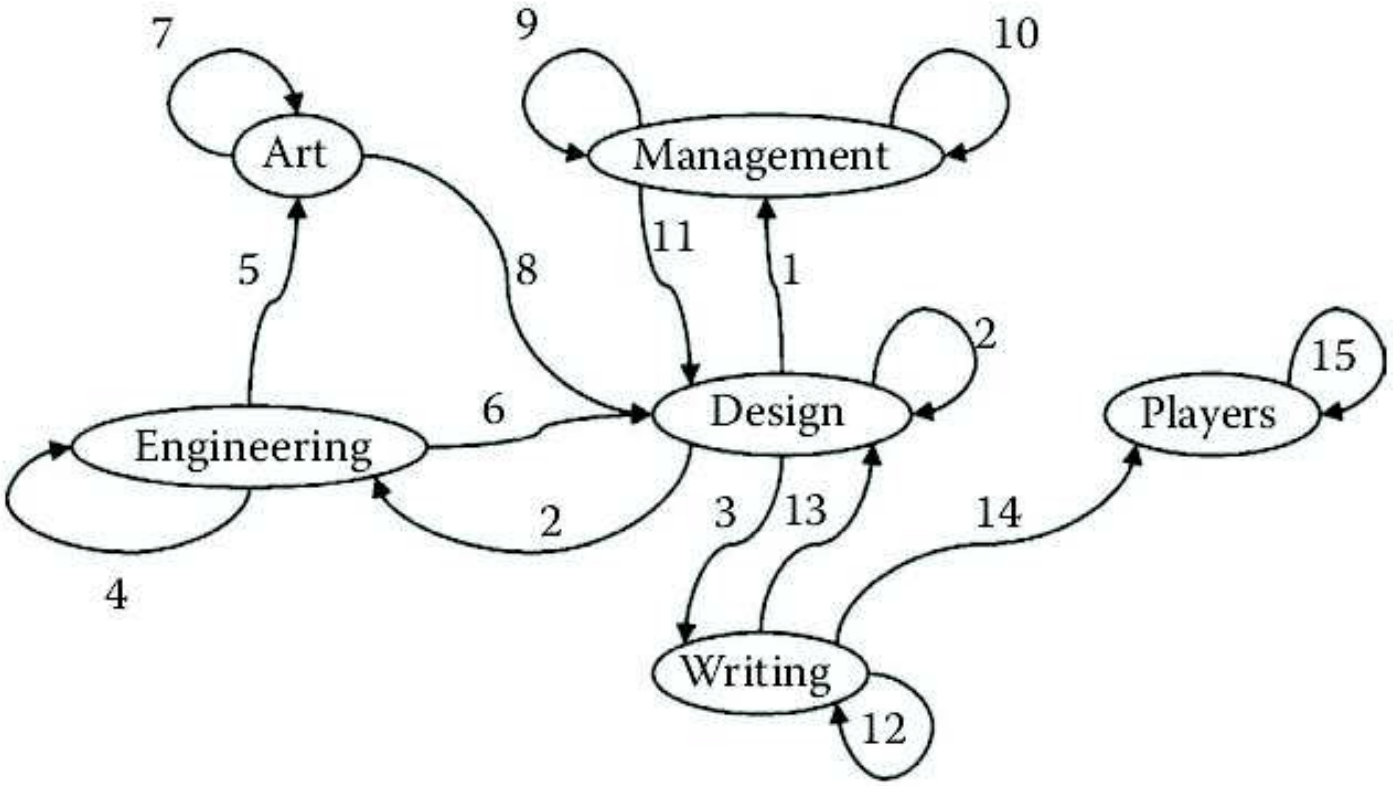


Types of Design Documents

- Story and level progression document
  - Tell the story
  - Record the player's progression through the game

- Game script document
  - Specifies rules and core mechanics in enough detail to play the game

Types of Design Documents



The Lens of Documentation

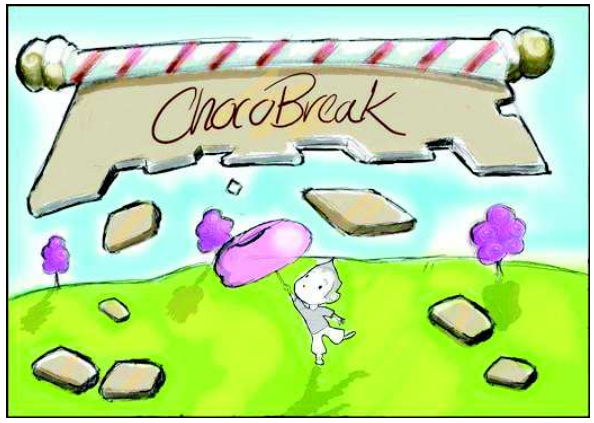
Lens #102: The Lens of Documentation

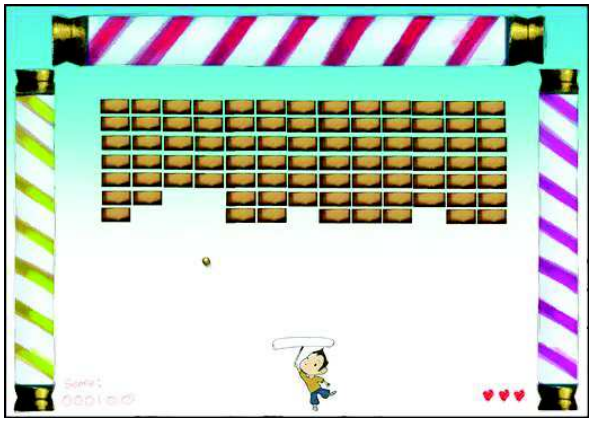
To ensure you are writing the documents you need and skipping the ones you don't, ask yourself these questions:

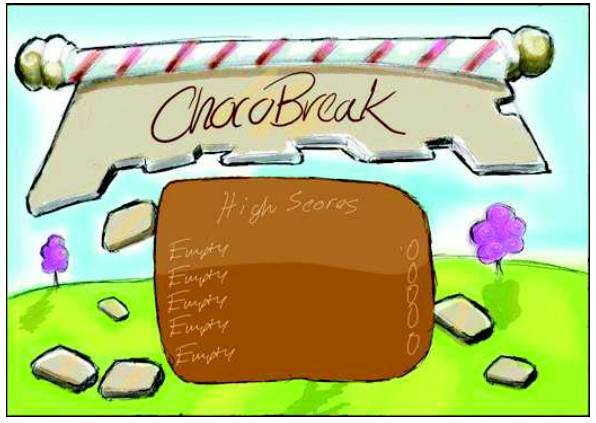
- What do we need to remember while making this game?
- What needs to be communicated while making this game?

Storyboarding

- Storyboards are graphic organizers such as a series of illustrations or images displayed in sequence for the purpose of previsualizing a motion picture, animation, motion graphic, video game or interactive media sequence, including website interactivity

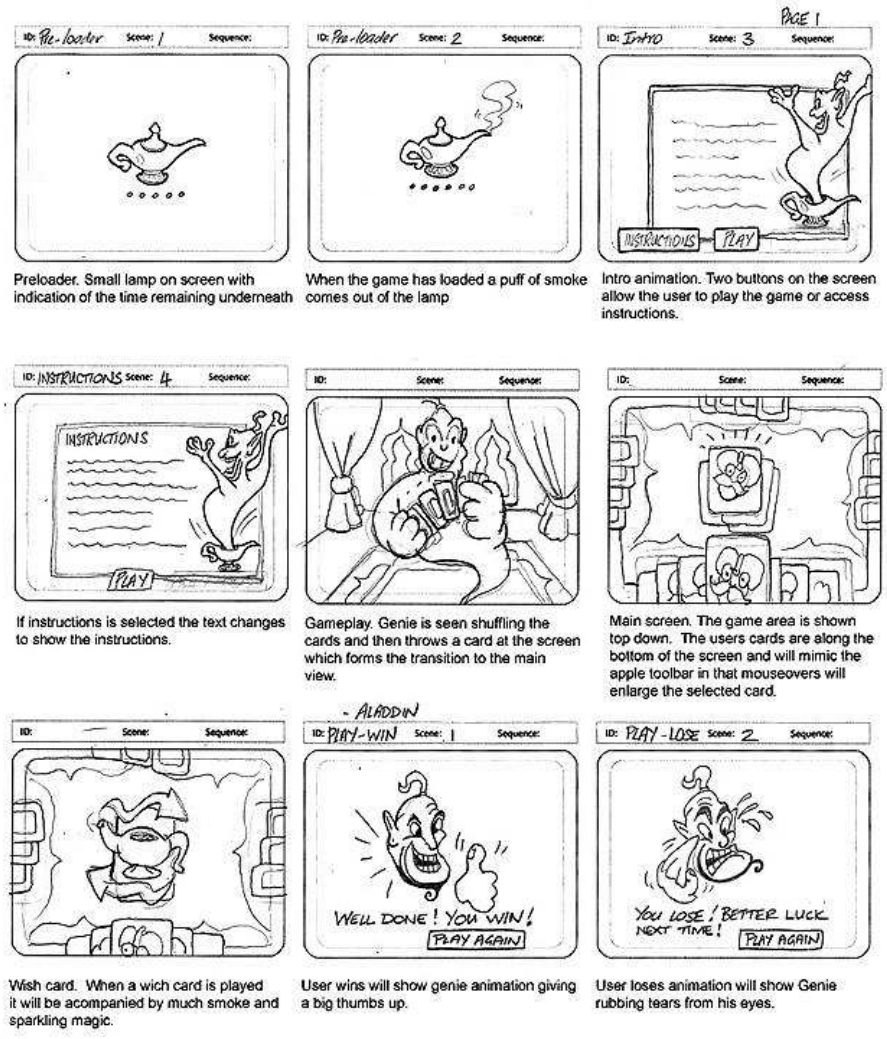






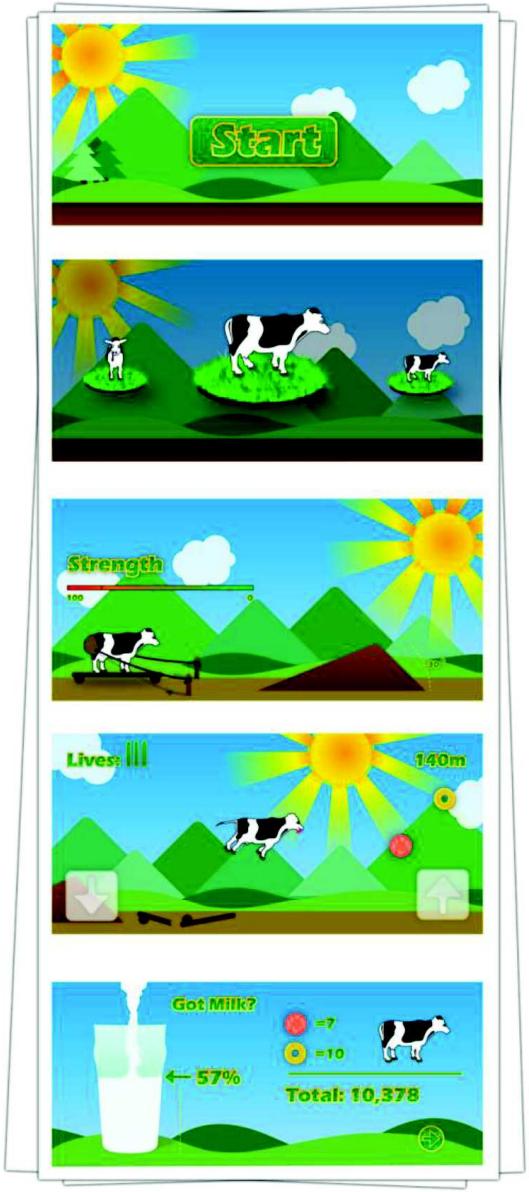
Storyboarding

- The storyboarding process, in the form it is known today, was developed at the Walt Disney Studio during the early 1930s, after several years of similar processes being in use at Walt Disney and other animation studios



Storyboarding

- Storyboards are created in a multiple step process. They can be created by hand drawing or digitally on the computer



Anatomy of a Game Designer

- Skills most useful for professional game designer should have:
  - Imagination
  - Technical awareness
  - Analytical competence
  - Mathematical competence
  - General knowledge and ability to research
  - Writing skills
  - Drawing skills
  - Ability to synthesize

How to Get Started? Vol.2

- IGN's Top 100 Game Developers: Humble Beginnings

https://www.youtube.com/watch?v=CIQ4Yty1ask

Inspiration

Getting an Idea

- You can find game ideas anywhere
  - Dreams of doing something or achieving a goal
  - From media such as books or movies
  - From other games
- When evaluating ideas, remember that the game must provide entertainment

Inspiration

- «When you know how to listen, everybody is the guru.» - Ram Dass
- Lens of Inspiration: To use this lens, stop looking at your game and stop looking at games like it. Instead, look everywhere else
- Ask yourself these questions:

What is an experience I have had in my life that I would want to share with others?

In what small way can I capture the essence of that experience and put it into my game?

Inspiration

- As an alternative to brainstorming, we found that gathering art and music with some personal significance was particularly fruitful. People have commented that many of the games like «Gravity Head» or «On a Rainy Day» create a strong mood and have strong emotional appeal. It is no accident. In these and many other cases, the soundtrack and initial art created a combined feeling that drove much of the gameplay decisions, story, and final art

IdeaSpotting

- «Nobody spots hot ideas in cold offices. So why sit there?» Sam Harrison

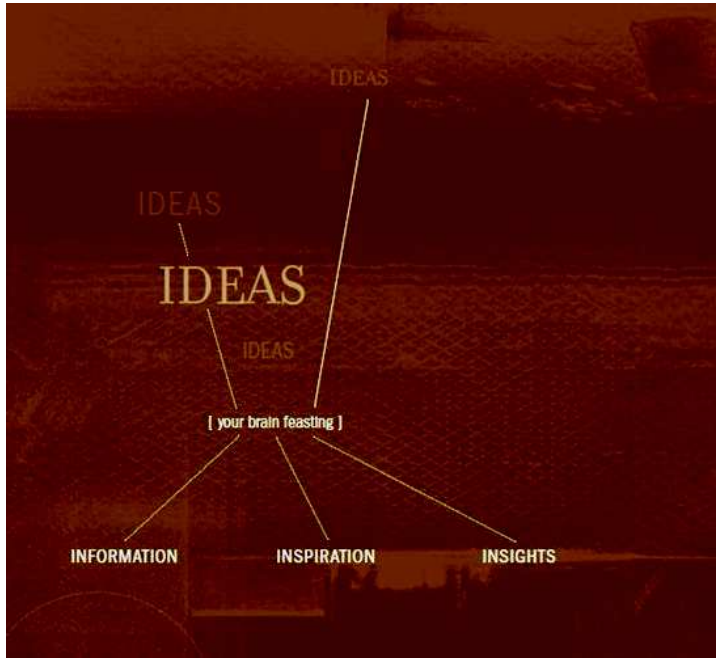


Image Credit: Harrison, Sam. Ideaspotting: How to Find Your Next Great Idea. How Books, 2006. page 16.

State the Problem

- «How can I make a browser-based game that teenagers will really like?»

- Broader creative space
- Clear measurement
- Better communication

State the Problem

Lens #14: The Lens of the Problem Statement

To use this lens, think of your game as the solution to a problem.
Ask yourself these questions:

- What problem, or problems, am I really trying to solve?
- Have I been making assumptions about this game that really have nothing to do with its true purpose?
- Is a game really the best solution? Why?
- How will I be able to tell if the problem is solved?

Defining the constraints and goals for your game as a problem statement can help move you to a clear game design much more quickly.

Subconscious Tips

- ❑ Pay Attention
- ❑ Record Your Ideas
- ❑ Manage Its Appetites (Judiciously)
- ❑ Sleep
- ❑ Don’t Push Too Hard

IdeaSpotting

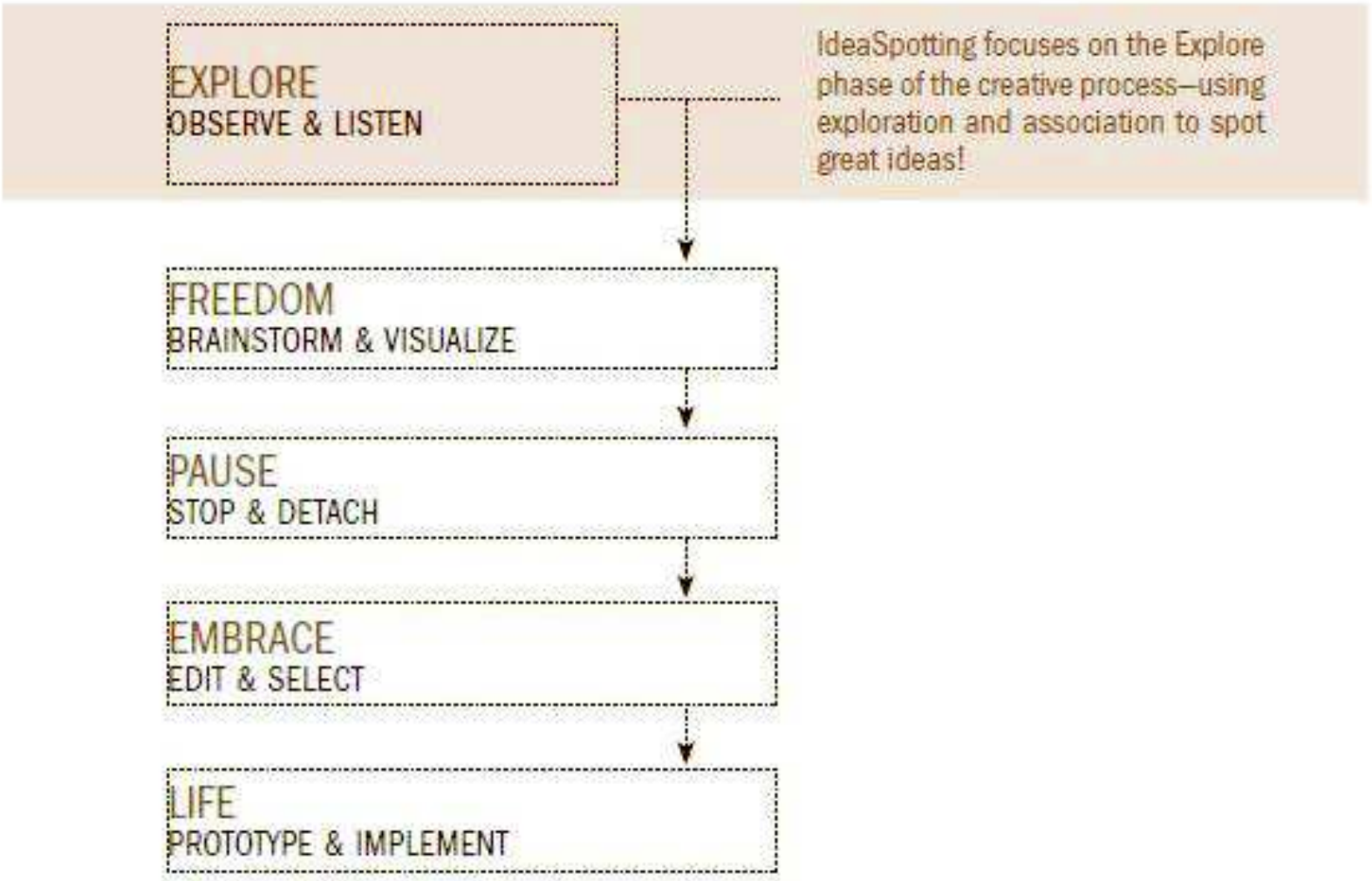


Image Credit: Harrison, Sam. Ideaspotting: How to Find Your Next Great Idea. How Books, 2006. page 21.

Brainstorming Tips

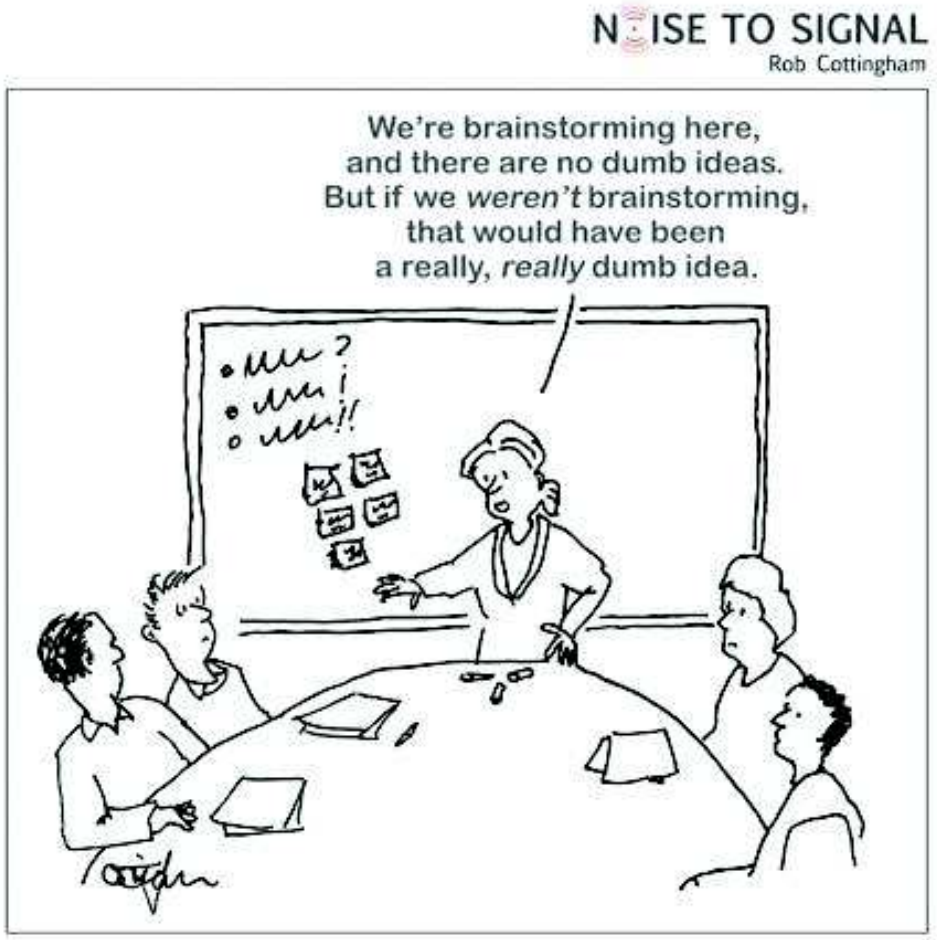
- ❑ The Write Answer
- ❑ Write or Type?
- ❑ Sketch
- ❑ Toys
- ❑ Change Your Perspective
- ❑ Immerse Yourself

Brainstorming Tips

- ❑ Crack Jokes
- ❑ Spare No Expense
- ❑ The Writing on the Wall
- ❑ The Space Remembers
- ❑ Write Everything
- ❑ Number Your Lists

Brainstorming Tips

- ❑ Destroy Your Assumptions
- ❑ Mix and Match Categories
- ❑ Talk to Yourself
- ❑ Find a Partner



From Idea to Game Concept

- **A game concept is a description with enough detail to discuss it as a commercial product**
- **A game concept should include:**
  - High concept statement
  - Player's role in the game
  - Proposed primary gameplay mode
  - Genre
  - Target audience
  - Hardware
  - Licenses
  - Competition modes
  - General summary of progression
  - Short description of the game world
  - Key characters, if any

The Player's Role

- Define the role
  - What is the player going to do?
  - Most important part of the game concept

- Make the definition clear and simple
  - Help the player understand the goals and rules
  - Help publisher, retailer, and customer decide to buy the game

Choosing a Genre

- A genre is a category of games characterized by a particular set of challenges, regardless of setting or game-world content
- Many players buy a particular genre because they like the type of challenges it offers

Classic Game Genres

- Action games—physical challenges
- Strategy games—strategic, tactical, and logistical challenges
- Role-playing games—tactical, logistical, exploration, and economic challenges
- Real-world simulations (sports games and vehicle simulations)—physical and tactical challenges

Classic Game Genres

- Construction and management games—economic and conceptual challenges
- Adventure games—exploration and puzzle-solving challenges
- Puzzle games—logic and conceptual challenges

Hybrid Games

- Games that cross genres
- Risky because it might alienate some of your target audience
- The most successful hybrid is the action-adventure

  Mostly action

  Include a story and puzzles that give them some of the quality of adventure games

Defining Your Target Audience

- Who will buy the game?
- The representative player is a member of your target audience

The Dangers of Binary Thinking

- Binary thinking—assumes that if group A likes a thing, everyone outside that group WON'T like it
- Interests overlap among groups
- Avoid exclusionary material

DESIGN RULE Keep Exclusionary Material Out of Your Game

To reach a large audience while still creating a harmonious, coherent game, don't try to attract everyone by adding unrelated features. Instead, work to avoid repelling people who might otherwise be attracted.

The Dangers of Binary Thinking

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To reach a large audience while still creating a harmonious, coherent game, don't try to attract everyone by adding unrelated features. Instead, work to avoid repelling people who might otherwise be attracted.

The Dangers of Binary Thinking

- Core versus casual—the most significant method of grouping players
- Other groups that exhibit trends in game-playing preferences:
  - Men and women
  - Children and adults
  - Boys and girls
  - Players with disabilities
  - Players of other cultures

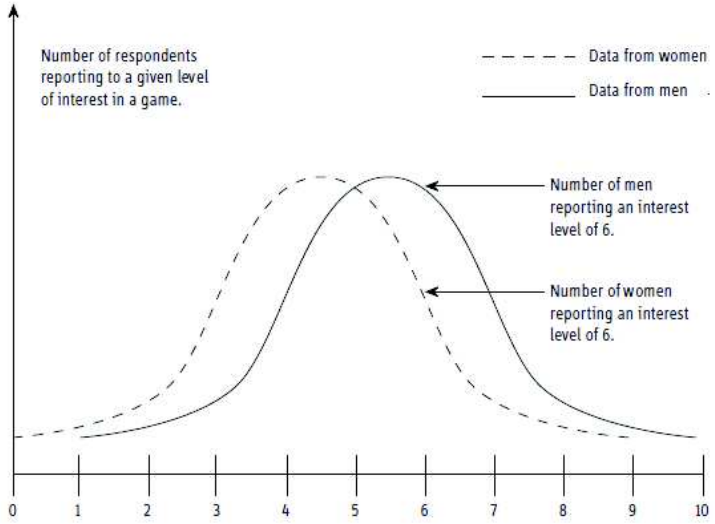

FIGURE 3.2
Reported level of interest in a game on a 0–10 scale

Progression Considerations

- Players need to feel they are making progress when playing long games
- Progress can be implemented through
  - Levels
  - Story
  - Both

Types of Game Machines

- Home game consoles
  - Simpler, bolder graphics than a PC provides
  - Standard controller
  - Excellent for multiplayer local games
  - Slower computing and less storage space than a personal computer

Types of Game Machines

- Personal computer
  - Keyboard, mouse, joystick
  - Very high-resolution graphics
  - Intended for a single user
  - Internet connection is common
  - License or special equipment not needed for game development
  - No standard configuration

Types of Game Machines

- Handheld game machines
  - Very popular and inexpensive
  - Fewer control mechanisms
  - Small LCD screen
  - Less storage space than a PC or console

Types of Game Machines

- Mobile phones and wireless devices
  - Little memory or processing power
  - No standard specifications
  - Can provide portable networked play
  - License not required for game development (Apple's iPhone is an exception)

Types of Game Machines

- Other devices
  - Personal digital assistants
  - Video gambling machines
  - Arcade machines

Teams and Processes

The Secrets of Successful Teamwork

- Love problem #1: Team members incapable of loving any game.
- Love problem #2: Team members in love with a different game than the one they are making.
- Love problem #3: Team members in love with different visions of the same game.

If you can't love the game, love the AUDIENCE!

The Secrets of Successful Teamwork

Lens #100: The Lens of Love

To use this lens, ask yourself these questions:

- Do I love my project? If not, how can I change that?
- Does everyone on the team love the project? If not, how can that be changed?

Team Communication

- Objectivity
- Clarity
- Persistence
- Comfort
- Respect
- Trust
- Honesty
- Privacy
- Unity
- Love

The Lens of the Team

Lens #101: The Lens of the Team

To make sure your team is operating like a well-oiled machine, ask yourself these questions:

- Is this the right team for this project? Why?
- Is the team communicating objectively?
- Is the team communicating clearly?
- Is the team comfortable with each other?
- Is there an air of trust and respect among the team?
- Is the team ultimately able to unify around decisions?

Programming Teams

- In the 1980s programmers developed the whole game (and did the art and sounds too!)
- Now programmers write code to support designers and artists (who are the real content creators)

Programming Areas

- Game code
  - Anything related directly to the game
- Game engine
  - Any code that can be reused between different games
- Tools
  - In house tools
  - Plug-ins for off-the-shelf tools

Team Organization

- Programmers often have a background in Computer Science or sciences
- They usually specialize in some area (AI, graphics, networking) but know about all other areas
- Teams usually have a lead programmer
- They sometimes have a lead for each of the major areas

Skills and Personalities

- Successful teams have a mix of personalities and skills:
  - Experience vs. new ideas
  - Methodical vs. visionary

Methodologies

- A methodology describes the procedures followed during development to create a game
- Every company has a methodology (way of doing things), even if they don't explicitly think about it

Methodologies: Code and Fix

- Unfortunately very common
- Little or no planning
- Always reacting to events
- Poor quality and unreliability of finished product
- “Crunch” times of extended work hours

Methodologies: Waterfall

- Very well-defined steps in development
- Lots of planning ahead of time
- Great for creating a detailed milestone schedule
- Doesn't react well to changes
- Game development is too unpredictable for this approach

Methodologies: Iterative

- Multiple development cycles during a single project
- Each delivering a new set of functionality
- The game could ship at any moment
- Allows for planning but also for changes

Methodologies: Agile Methods

- Deal with the unexpected
- Very short iterations
  2-3 weeks
- Iterate based on feedback of what was learned so far
- Very good visibility of state of game
- Difficult for publishers or even developers to adopt because it's relatively new

Common Practices

- Version control
  - Database with all the files and history
  - Only way to work properly with a team
  - Branching and merging can be very useful
  - Used for source code as well as game assets

Common Practices

- Coding standards
  - Set of coding rules for the whole team to follow
  - Improves readability and maintainability of the code
  - Easier to work with other people's code
  - They vary a lot from place to place
    - Get used to different styles

Common Practices

- Automated builds
  - Dedicated build server builds the game from scratch
  - Takes the source code and creates an executable
  - Also takes assets and builds them into game-specific format
  - Build must never break

Quality

- Code reviews
  - Another programmer reads over some code and tries to find problems
  - Sometimes done before code is committed to version control
  - Can be beneficial if done correctly

Quality

- Asserts and crashes
  - Use asserts anytime the game could crash or something could go very wrong
  - An assert is a controlled crash
  - Much easier to debug and fix
  - Happens right where the problem occurred
  - Don't use them for things that a user could do
    - Open a non-existing file
    - Press the wrong button

Quality

- Bug database
  - Keep a list of all bugs, a description, their status, and priority
  - Team uses it to know what to fix next
  - Gives an idea of how far the game is from shipping
  - Doesn't prevent bugs, just helps fix them more efficiently

Leveraging Existing Code

- A lot of code that games use is the same
- It's a total waste of time to write it over and over
- Instead, spend your time in what's going to make your game unique
- Avoid Not Invented Here (NIH) syndrome!

  Programmers criticize and reject any code they didn't write

Leveraging Existing Code

- Reuse code from previous project
  - Easier in a large company if you have an engine and tools group
- Use freeware code and tools
  - No support
  - Make sure license allows it

Leveraging Existing Code

- **Middleware**
  - Companies provide with components used in game development
  - physics, animation, graphics, etc.

- **Commercial game engines**
  - You can license the whole engine and tools and a single package
  - Good if you're doing exactly that type of game

Design Practice Questions (pg.111)

- ❑ Physical Dimension
- ❑ Temporal Dimension
- ❑ Environmental Dimension
- ❑ Emotional Dimension
- ❑ Ethical Dimension

Further Readings