

Requirements Engineering and the Creative Process in the Video Game Industry

By:

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Introduction

- Paper published in 2005
- David Callele, Eric Neufeld, and Kevin Schneider
- University of Saskatchewan, Canada

- Challenges in game development
- Why do things fail or succeed

Video Game Development

- Big industry in recent years
- Many different disciplines working together
- The emotional part

Development Process

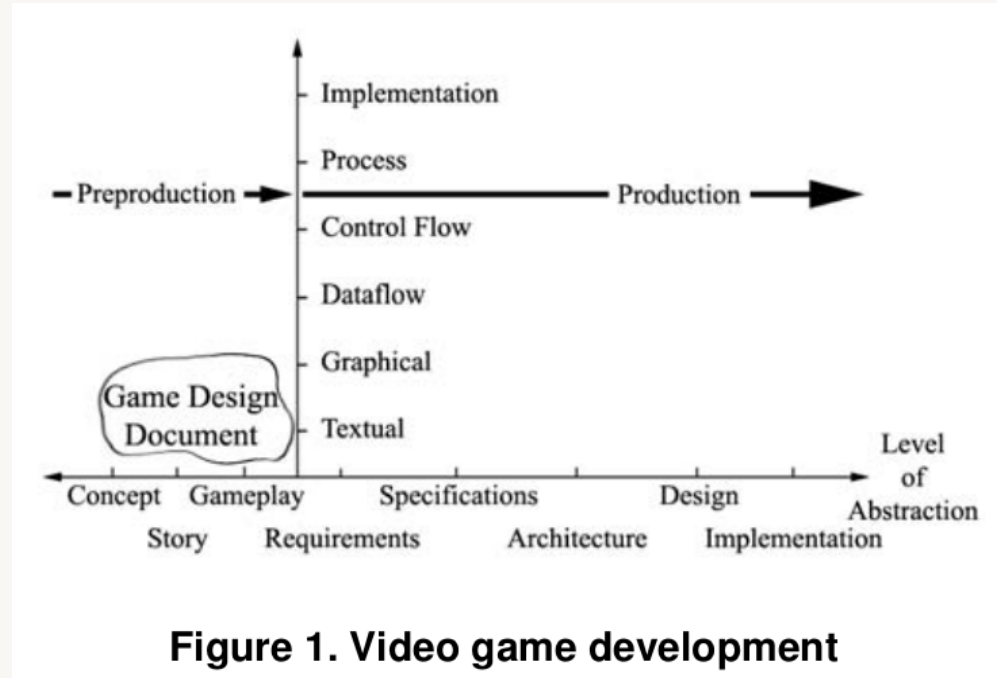


Figure 1. Video game development

The Game Design Document (GDD)

- Creative work written by the game designer
- Requirements document defined by the preproduction team
- Includes main information about the game

Challenges with the GDD

- People talking in different languages
- How do you describe NFR's

The Transition from Preproduction to Production

- Costly mistakes
- Updating GDD

Document Transformation Example

- Begins with a story written in narrative style

1	Story	After her father, Bernard, died, Crystal did not know which way to turn – paralyzed by her loss until the fateful day when his Will was read.
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Document Transformation Example

- Translated elsewhere in the design document to a more formal form
- Describes the action as a task and a justification for that task

2	Gameplay	The Player must visit Anna the Lawyer to receive a copy of Bernard's Last Will and Testament, thereby obtaining the information necessary to progress to the next goal.
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Document Transformation Example

- Determine set of requirements
- Identifying in-game assets
- State of the player progress is used

3	Requirements	The Player must be represented by an avatar. Female Non Player Character required: Anna the Lawyer Inventory Item: Last Will and Testament (LWT) Player can not progress beyond Game State XYZ until LWT added to Inventory
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Document Transformation Example

- Detailed description like artistic style, animations and game state

4	Specifications	Could easily reach 50 pages
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Review of Postmortem Columns

- Game Developer magazine
- 5 things that went well
- 5 things that went wrong
- Unique to their project

Review of Postmortem Columns

- Preproduction
- Internal
- External
- Technology
- Schedule

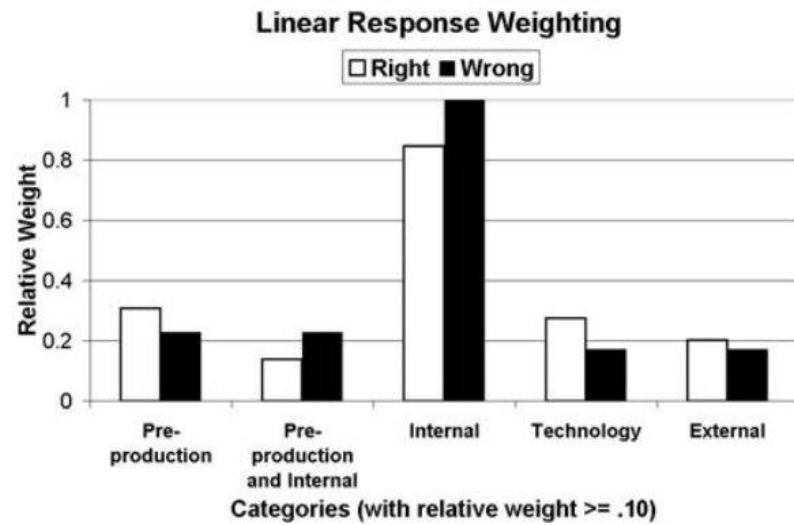


Figure 2. Observational Report Analysis

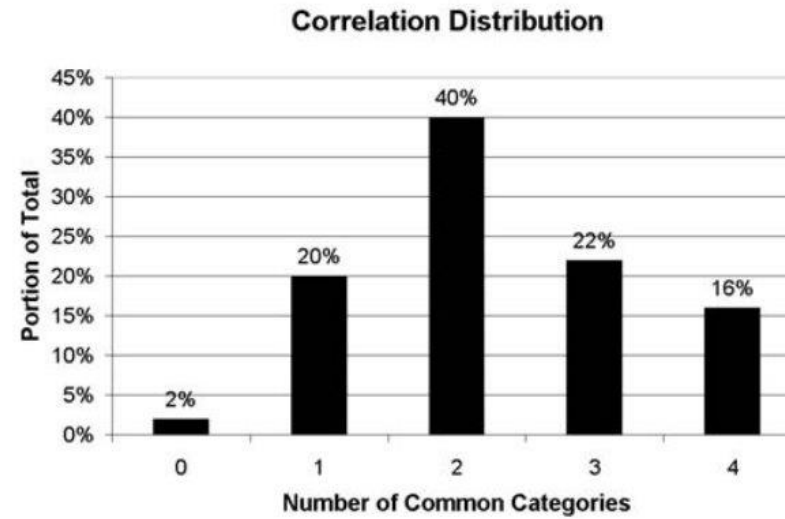


Figure 3. Correlation Within a Project

Examples from Real Games

- Finding implied information in the game design document
- Apply knowledge to identify engineering requirements

Implications

Game design document has implied information

First level implication

- Derived directly from the materials
- No additional information needed

Implications

Second level implication

- Requires general knowledge of the domain
- Implications about the game world

Example: "The Player must visit Anna the Lawyer"

- Implied environment
- Perhaps an office building with other office interiors
- Background sounds, NPCs

- Second level implications can use many people to work on
- Modelers, artists, animators, ...

Implications

Third level implication

- Requires knowledge of implementation details and target architecture
- Captured by experienced teams

Questions about the connectivity of elements

- Is there more than one way to get to Anna?
- How does the player experience the journey?
- Must the player guide their avatar through the virtual world?

Implications

Question: When should feedback happen?

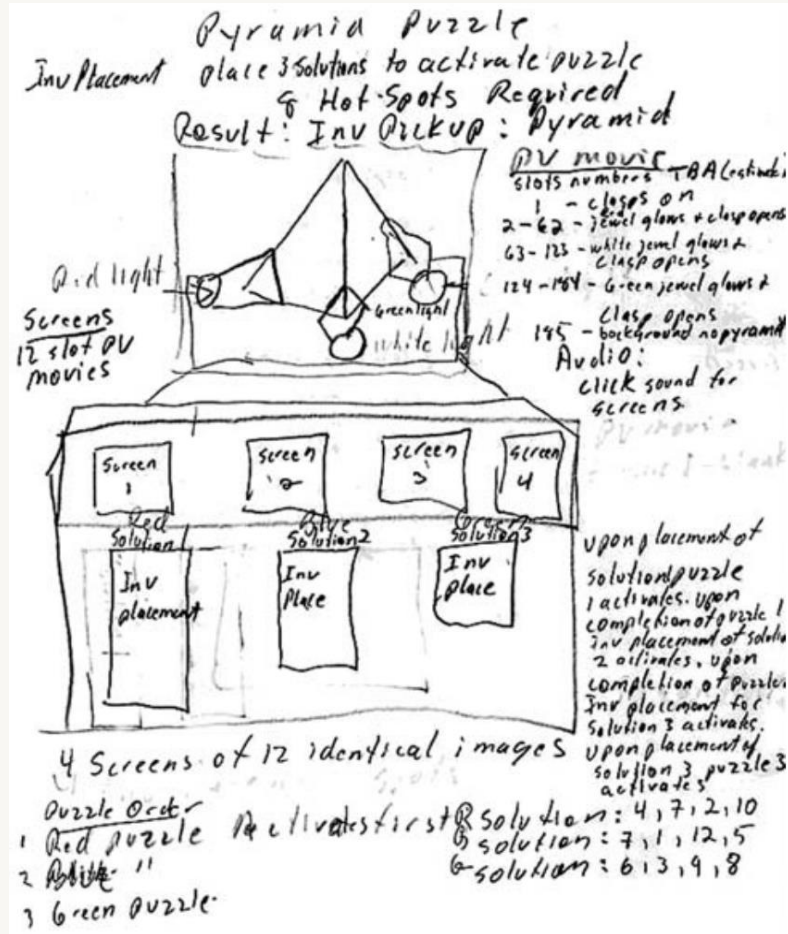
- Intuitively early feedback is better.
- Can have negative effect on the creative process

A Priori Knowledge

The requirements engineering process

- Significant elements of the game design document are informal
- Just substantial visual content
- Often sketches
- Important piece in the development cycle

A Priori Knowledge

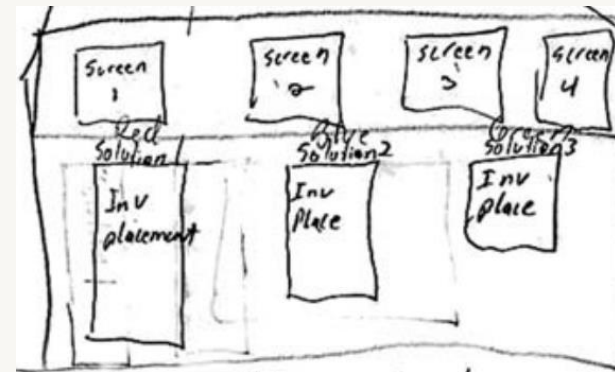


- Player must generate the correct sequence of symbols
- Screens below the pyramid
- Application of domain knowledge during development led to significant changes of the puzzle

A Priori Knowledge

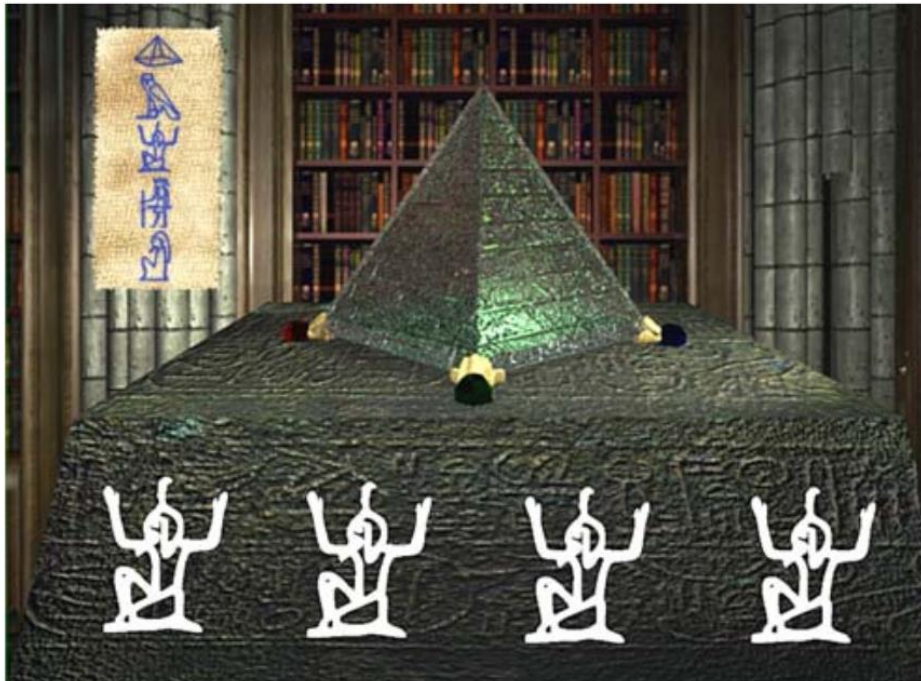
- Solution hints were provided in form of inventory items
- No way for the player to show scrolls and the puzzle at the same time
- Game engine did not support simultaneous operations

- New layout was proposed
- Place to hang the scrolls while solving



- Problem: The layout was beyond the resolution of the target platform
- Again, alternate layout required

A Priori Knowledge



- Compromise between the game designers vision, the technical capabilities of the game engine and the technology constrains of the target platform
- Only one hint shown at a time
- Player must shift between inventory and puzzle for each corner

Not ideal but the best solution within the constraints

A Priori Knowledge

Success was achieved through **dialog** between team members

Resources needed for this puzzle

- 4 new inventory items
- 12 secondary screen elements for user interaction
- Three animated sequences
- Sound effects

- Four state machines for user input
- Three state machines for the corner puzzles
- Possible interactions between game world state, current player state, inventory management, save game subsystem

- One of approximately **100 puzzles** in the game

A Priori Knowledge

None of these assets were explicitly identified by the designer

- Implied in the description of the puzzle
- Identifying these is part of the design process
- It is highly desirable that this process is efficient

- Puzzle description called for features that the underlying technology could not deliver
- Difficult to predict a schedule for this task

Summary and Conclusion

- Game Design Document as artifact of preproduction process
- Analysis of postmortem column showed that **project management** issues are the **greatest** contributors to success or failure in video game development
- Insufficient requirements engineering during transition from preproduction to production
- Detect implied information as early as possible
- Apply a priori knowledge from the production domain



Thank you for listening!

Questions?