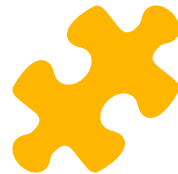# Requirements Engineering and the Creative Process in the Video Game Industry - Paper Analysis

Introduction

Let's get acquainted with our topic of discussion.

1

Purpose

- Video games are popular as multimedia entertainment

- Requirements Engineering struggles to express nonfunctional expectations of video games

- This research paper looks to understand communication issues in game development
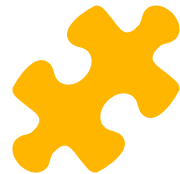
2

Background

Insight to what matters for requirements and gaming

Emotions, Language and Feedback

- Emotional factors in requirements are difficult to pin down

- Game designers commonly use natural language in their documentation

- Feedforward and Feedback between staff in gamedev teams can elicit emergent requirements proactively

Emotions

- Emotional factors in requirements are difficult to pin down

- Little research has been conducted on emotional requirements

- A player's ability to reach *flow state* is one indicator of emotional satisfaction in a video game
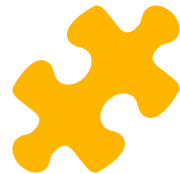
Language

- Domain definition in requirements engineering necessitates clear and concise language

- Game designers commonly use natural language in their documentation

- Formalization of documentation is almost an afterthought
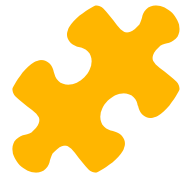
Feedback

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3

Game Development

Writing plays an important part in defining the game you play
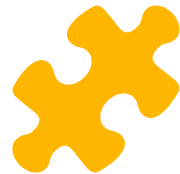
The Process

- For every advertisement of a video game, many other projects have failed in the same development period

- Extreme difficulty lies in the transition from pre- to production

- Functional and Non-functional factors must be addressed by the game development documentation

Process Model
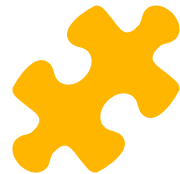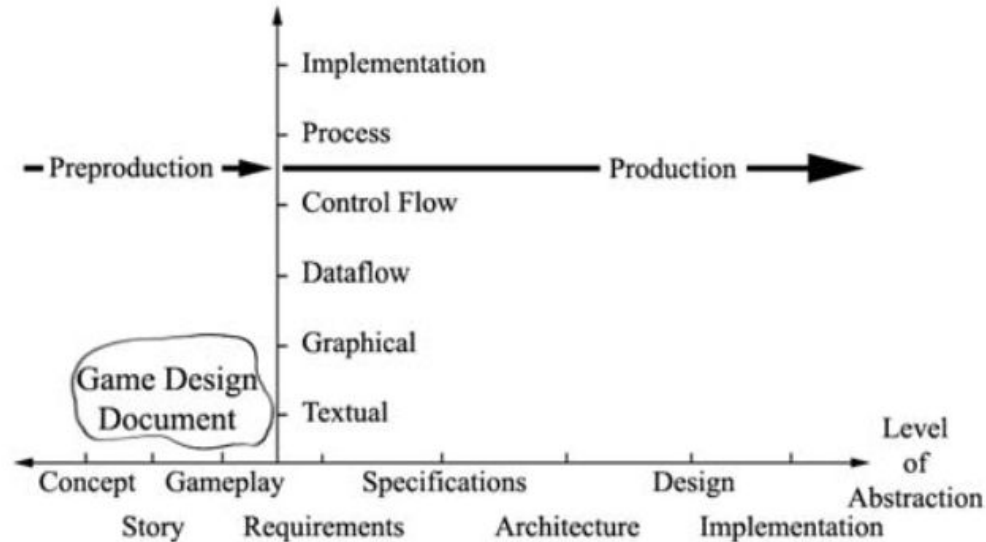

Figure 1. Video game development

Game Design Document

- Acts as the requirements document for game preproduction

- No standard format exists for this document, though some common elements show up

- Two sets of documentation must be managed once the production phase begins

4

Preproduction vs. Production

Moving from one to the other is not as easy as changing a Trello Board

Pre v.s. Pro

Projects could remain in preproduction for longer (normally too short) to reduce surprises and develop intermediary documentation that is more formal and structure than the normal informal manner this switch is conducted under.

Despite the fact that this change occurs in every game, there is no documented strategy to go through this process. The existing processes are likely kept by the company's management and not publicly released, but insiders say the transition rarely goes well.

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Postmortem Columns

Insight to the game development world

Classifications Scheme

(1) Preproduction

issues outside of the traditional software development process such as inadequate game design or inadequate storyboarding,

(2) Internal

Issues related to project management and personnel

(3) External

Issues outside of the control of the development team such as changes in the marketplace and financial conditions

(4) Technology

Issues related to the creation or adoption of new technologies

(5) Schedule

Issues related to time estimates and overruns. Schedule issues are a subset of internal issues

Classification Results

PM4W52 notes "inadequate planning"

PM20W3 claims a lack of success due to "underestimating the scope of tasks"

PM9W3 calls their schedule "too aggressive,

PM18W2 states that "clear goals are great when they are realistic"

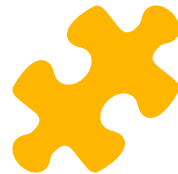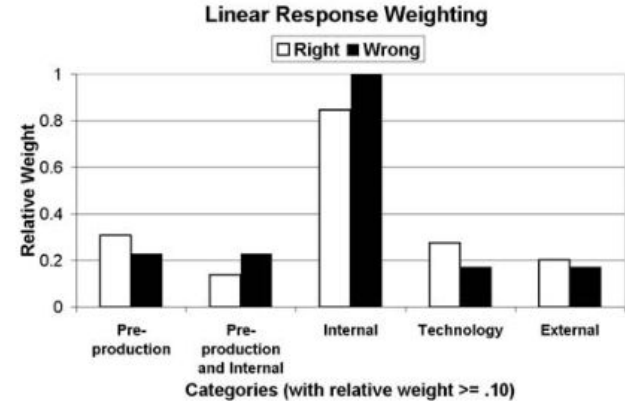PM21W1 states that "an unrealistic schedule can't be saved without pain."

Figure 2. Observational Report Analysis

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Examples from Real Games

Documentation, Implication, *a Priori* Knowledge, Evaluation

Documentation

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.
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.
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
4	Specifications	Could easily reach 50 pages
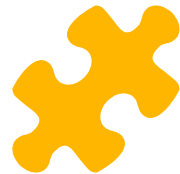
Implications

1. First Level: Table #1 shows implications that can be derived directly from the materials presented to the team.

2. Second Level: Require knowledge of the general domain (genre, style, gamemode). These implications are normally around things like the game world/environment.

3. Third Level: Revolve around the target architecture, game engine, and controls. This is handled by an experienced team that can describe the needs of deploying to a specific hardware platform, game engine needs and features, and player interaction with the controls, movement, and world.

A priori Knowledge

- Nuanced knowledge of game design during pre-production is quintessential for smooth production

- Without it, documentation and prototyping often suffers

- Need for pre-production upper staff is often needed for this aspect, but are often "too busy" to work on it

Evaluation

- Creativity and game design are a large contributors to good games

- Monetary and business demands need to be considered

- This tightly managed balance brings variety to Requirements Engineering

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Summary/Conclusions

Requirements

- Project management is **vital** to the success of game development.

- Lack of requirements engineering in pre-production contributes to loss of cohesive vision
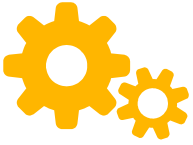
Implications

Three Levels:

- Derived directly from material

- Understood from introductory knowledge of a domain

- Only found with implementation details

  - (i.e.: target architecture)

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Challenges for Req Eng

Media and Technology, Non-Functional Requirements, Gameplay

Issues applied to Req Eng

- Communication between stakeholders

- Consistent focus of goals and resisting feature creep

- Influence of prior work

- Media/Technology interaction and integration

- Importance of non-functional requirements

- Gameplay requirements

Media and Technology

- A production pipeline that accommodates both artistic and technical members.

- Deciding minimum target requirements for systems helps limitations be clear.

Non-Functional Requirements

- NFRs are arguably the most important, including story, art, and overall appeal of the game

- Validation of these is vital, but extremely tedious when attempting to follow overall creative vision

Gameplay

- Functional and well tested elements are a top priority

- Often overlooked due to NFRs, but can be the cause of the most frustration for users.

  - Clipping through the floor of the world or being able to walk up a sheer cliff face can cause loss of immersion.

Future Work

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Future Work

- Analyzing reports of other examples of game development
  - Helping to connect games and requirements engineering
- Finding ways to improve validation, measurement, and verification of NFRs (like fun)