

345 Ludic Computing

Lecture 14

Designing for Play

Simon Colton & Alison Pease

Computational Creativity Group

Department of Computing

Imperial College London

ccg.doc.ic.ac.uk

Overview

- How do we design and evaluate systems for play?
- Some ideas from game design
- Techniques for measuring experience

Designing Games

What's a Game?

- Bernard Suits: “Playing a game is the voluntary attempt to overcome unnecessary obstacles”
- “To play a game is to attempt to achieve a specific state of affairs, using only means permitted by the rules, where the rules prohibit use of more efficient in favour of less efficient means, and where the rules are accepted just because they make possible such an activity.”
- All games necessarily involve adopting a **Lusory Attitude**, the player’s willingness to accept the rules and goals.

See Salen & Zimmerman for a list of alternative definitions

I Have No Words & I Must Design

(Greg Costikyan 2002)

- A game is “an interactive structure of endogenous meaning that requires players to struggle toward a goal.”
- **Interaction:** player actions change the game state
- **Structure:** system that shapes the players’ choices
- **Endogenous** (internal cause): the structure creates own meaning
- **Struggle:** overcome other players or obstacles
- **Goal:** explicit or self-generated purpose, adopted in order to play

Required reading: <http://www.costik.com/nowords2002.pdf>

Designing Games

“Game design is... the creative attempt to imagine, a priori, the kinds of experiences players will have with your game, and through that act of imagination, to create a structure to point them toward the kinds of experiences you’d like them to feel.”

Greg Costikyan (2002)

Designing Gameplay

Game designers design **gameplay**: a system of rules and structures that result in experiences for players

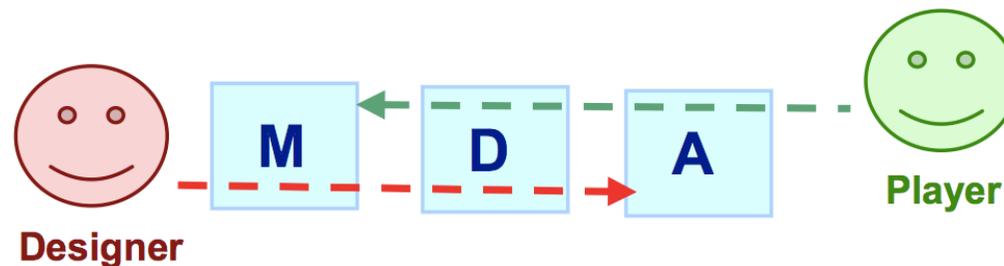
Computers support particular kinds of gameplay

- immediate but narrow interactivity
- the manipulation of information
- complex automation
- networked communication

MDA Design

(Hunicke, LeBlanc & Zubek)

- Iterative design framework developed at the Game Design & Tuning Workshop @ GDC
- **Mechanics:** actions, behaviours and control mechanisms.
- **Dynamics:** model of gameplay that emerges from mechanics.
- **Aesthetics:** the players' experience of the gameplay.



- Design and tuning focuses on desired A. D is designed to support A. M implemented to provide D.

Designing for Pleasure

(Jordan 2000)

- What about ludic systems in general? Playful products need to provide benefits to their users, i.e. pleasures
 - cf. Tiger's pleasures (physio, psycho, ideo, socio)
- Pleasures of need (food when you're hungry) versus pleasures of appreciation (taste of chocolate)
- **Practical** benefits, e.g. well-formatted documents
- **Emotional** benefits, e.g. fun or self-confidence
- **Hedonic** benefits, e.g. visually beautiful, pleasant tactile feedback

Designing for Pleasure

(Jordan 2000)

- Instead of task completion look at the system's role
 - Think of systems as living objects with which people have relationships, not tools with which users complete tasks
- How does the system benefit (provide pleasure to) the user?
- Instead of a functional requirements specification write a benefits specification
 - Relate benefits to properties of the system design

Gameplay Vocabulary

- Game design is the least understood aspect of game creation, and often lags behind other aspects of game production
- Church (1999) suggests designers need to develop a common vocabulary of gameplay if they are to build on successes of the past
- **Formal:** precise and communicable definitions
- **Abstract:** transfer of ideas between games and genres
- Church defines intention, perceivable consequence and story

Intention & Consequence

- **Intention:** Making an implementable plan of one's own creation in response to the current situation in the game world and one's understanding of the game play options.
- **Perceivable Consequence:** A clear reaction from the game world to the action of the player.

Intention & Consequence

Church's Mario 64 example

- Simple and consistent world design means players know what to expect.
 - So they can easily form and act on their own goals (intention)
 - The world reacts consistently to actions with direct visible feedback (perceivable consequence)
- This encourages players to create and work on multiple goals at different scales, e.g. from “get over this bridge” to “collect all the red coins in this world”.

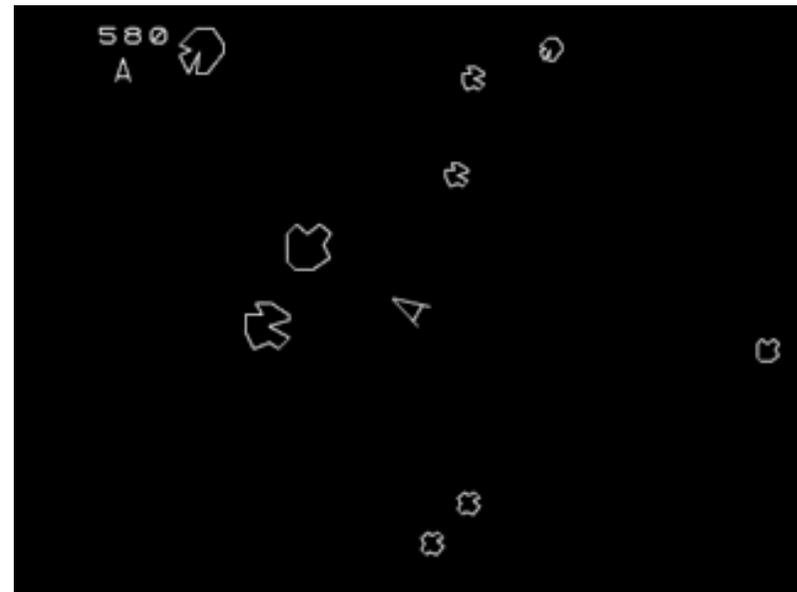


Meaningful Play

- “The goal of successful game design is to create **meaningful play**” (Salen & Zimmerman)
- Emerges from the relationship between player **action** (*intention*) and system **outcome** (*consequence*).
- Occurs when this relationship is **discernable** (*perceivable consequence*) and **integrated** into the larger context of the game, i.e. part of a coherent internal system of meaning.

Meaningful Play

- **Action:** press fire
- **Outcome:** ship shoots bullets (*discernable*), which can destroy asteroids, which helps ship survive and progress to higher levels (*integrated*).
- Play becomes meaningless if outcomes are arbitrary or disconnected from context.

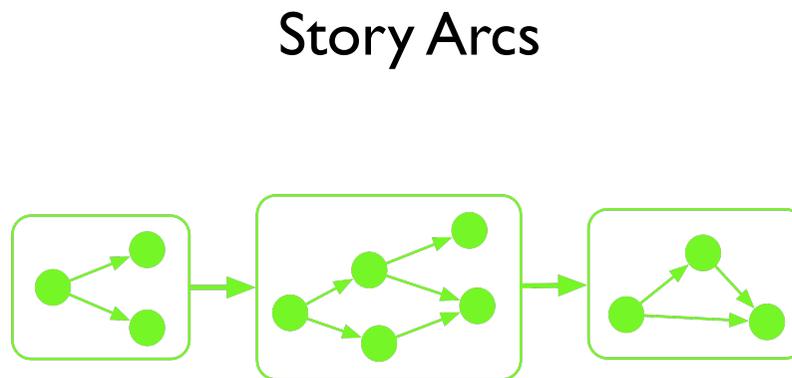
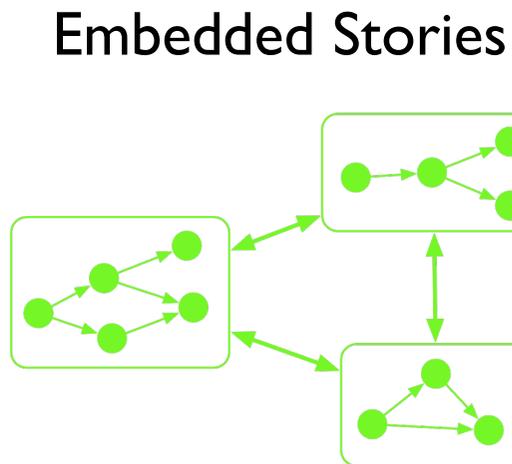
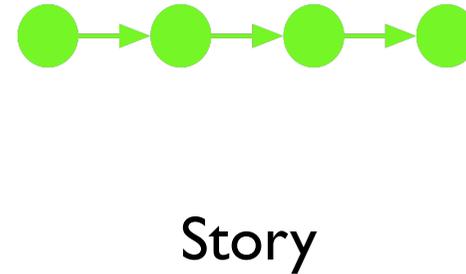
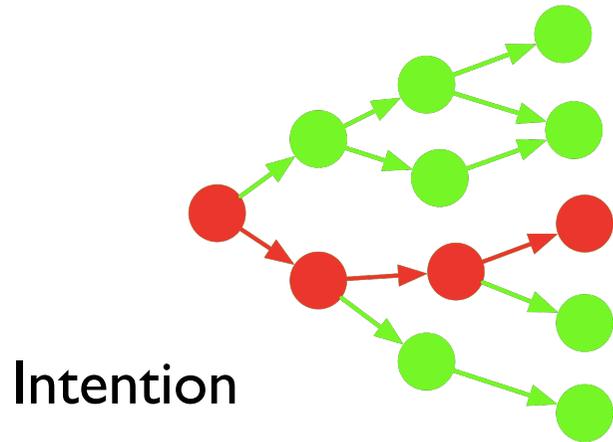


www.play.vg/games/4-Asteroids.html

Intention vs. Story

- Story is the narrative thread, created by designers and players, that binds events together and drives the player forward toward completion of the game
 - Players can impose their own story on their intentions and actions, e.g. simple sports or combat games, or Tetris
- Tension between linear story and non-linear intention
 - Longstanding debate on what games ‘should’ provide (ludologists vs. narrativists)
 - “The more designers want to cause particular situations, the less control we can afford to give players.” *Doug Church*
- Authoring multiple story lines can quickly become impractical (combinatorial explosion) and can lead to wasted content
 - Can use embedded stories and freedom within story arcs

Intention vs. Story



Measuring Experience

- **Subjective measures:** ask the player to report their conscious experiences.
 - Concurrent: immediate, can interfere with play.
 - Retrospective: detailed, with forgetting & fabrication.
 - Quantitative (statistical) or qualitative (rich data).
- **Objective measures:** concurrent unconscious responses that correlate with experiences.
 - Construct validity: how do you know the subjective quality of what you're measuring?
 - Can be affected by other factors.

Concurrent Subjective Measures

- Experience Sampling: interrupt play after regular periods to answer short questionnaire.
- Continuous Assessment: player provides a constant experience rating while playing, e.g. use a slider to indicate affect.
- Think Aloud: talk about the current experience while playing with minimal prompting. Difficult for fast-paced games.

Retrospective Subjective Measures

- Questionnaires: rate items (e.g. “I enjoyed playing the game” on a scale 1-5)
- Think After: talk about experiences with minimal prompting while reviewing some record of gameplay, e.g. a video.
- Interviews: more data but biased by interviewer.

Objective Measures

- Psychophysiological measures
 - Cardiovascular (Heart rate, heart rate variability).
 - Skin conductance (EDA) and temperature.
 - Eye tracking (attention) and pupil response (affect).
 - Face muscles (Facial EMG, affect).
- Behavioural measures, e.g. facial expression or posture (scored by hand or automatically).
- Performance measures, e.g. task completion time
- Neural correlates
 - EEG: scalp electrodes measure “brain waves”
 - fMRI: measuring changes in blood flow to brain areas.

Comparing Measures

- Validity: measure what is intended. Agreement with expert observation (face validity), theory (content validity) and other measures (construct validity).
- Reliability: should be consistent over time.
- Sensitivity: degree to which it can distinguish different experiences.
- Robustness: applicable across a range of contexts.
- Non-intrusive: should not interfere with experience.
- Convenience: easy to learn, administer, low cost and portable.

Measuring Immersion

Case Study: Jennett et al. (2008)

- Developed an immersion questionnaire that it measures 5 components:
 - Cognitive Involvement
 - Emotional Involvement
 - Real World Disassociation (time, surroundings)
 - Challenge
 - Control
- Eye-tracking study showed in immersive gaming condition (exploring a virtual environment vs. clicking boxes) player's eye-movements decreased over time, becoming focused on the centre of the screen.
- Some people rated clicking boxes as immersive! Clearly more to game design than immersion.

Measuring Affect

Case Study: Nacke & Lindley (2009)

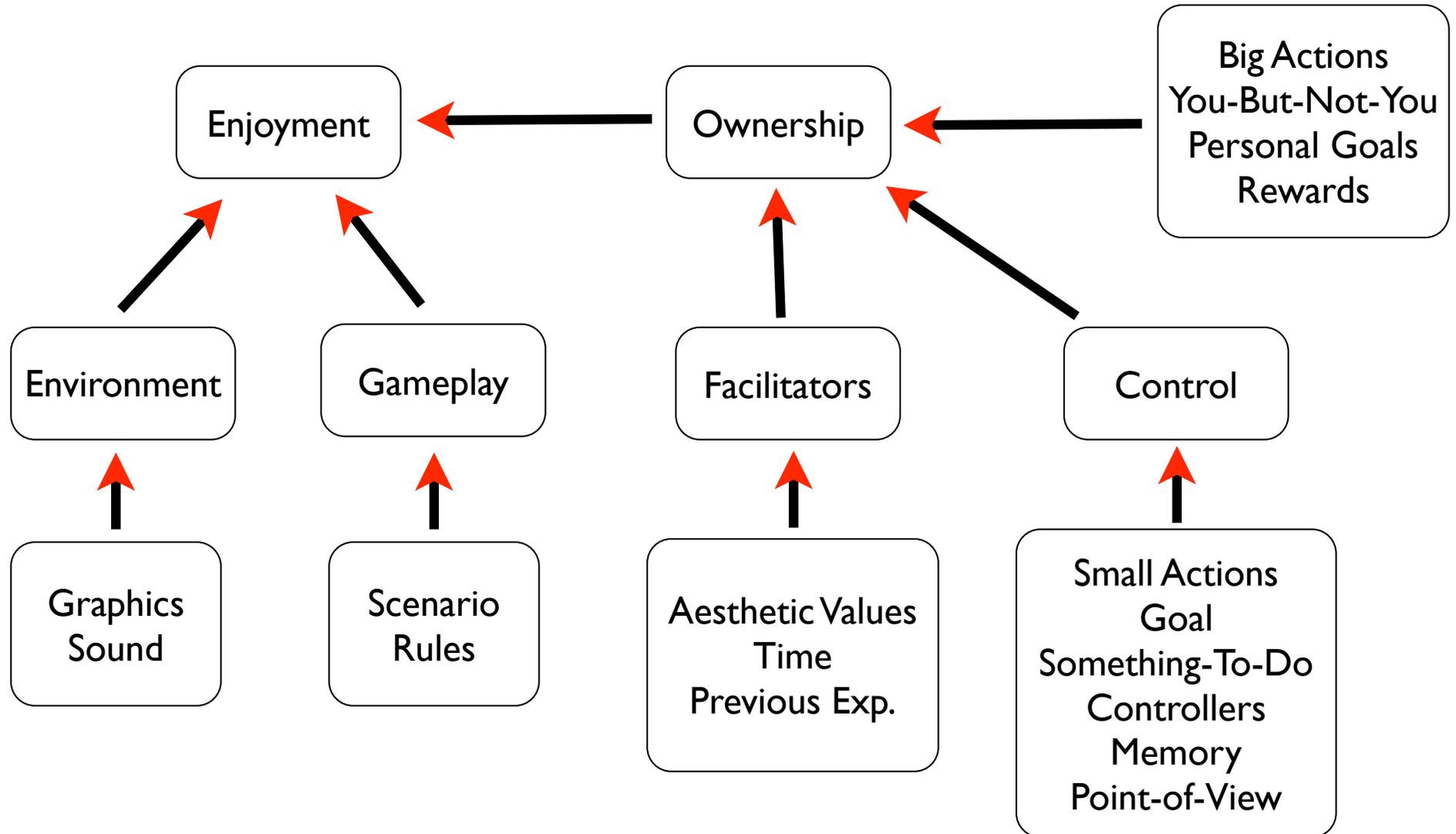
- Had volunteers play three Half-Life 2 levels:
 - a boredom level (linear, easy, visually dull)
 - an immersion level (complex, variety, novelty)
 - a flow level (one weapon, increasing challenge)
- Measured affect using Facial EMG for valence and arousal, EDA (skin conductance) for arousal.
- The level designed for a combat-oriented flow experience had significant high-arousal positive affect.

Core Elements of the Gaming Experience

Case Study: Calvillo-Gómez (2009)

- CEGE model describes the hygienic factors (necessary but not sufficient) for positive gaming experiences
 - Based on interviews and game reviews
- Hierarchy of these core elements necessary for enjoyment
 - High-level theoretical elements (latent variables), e.g. enjoyment, ownership, gameplay
 - Defined in terms of low-level elements (observable variables), e.g. time, previous experience
- Observable variables can be measured by questionnaire

CEGE Model



CEGE

Control & Ownership

- Player can take Control given mastery of small actions via controllers, understanding of goal, memory for game and appropriate point-of-view, and something-to-do (constant activity).
- Ownership requires either strong Control or appropriate Facilitators, preferably both.
- Also influenced by the adoption of personal goals, mastery of big actions (combination of small action toward goal), desire for rewards, and changes in identity (You-But-Not-You).

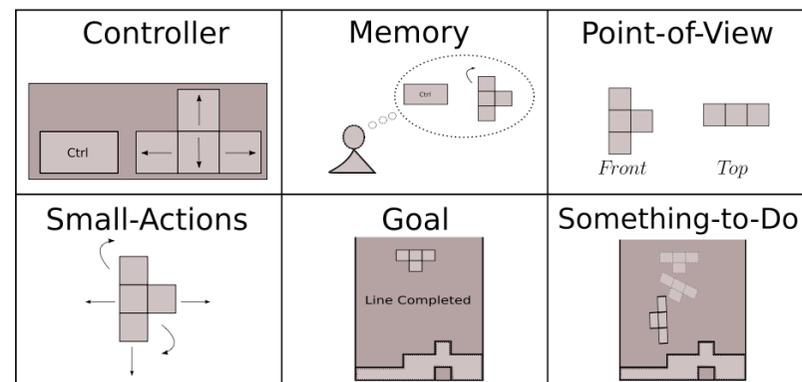
CEGE

Tetris Example

Ownership elements in my enjoyment of Tetris...

- **Big Actions:** I know the different small actions to make a line.
- **Rewards:** lines removed, points received.
- **Personal Goals:** I want to remove four lines at once.
- **You-But-Not-You:** a fast paced activity while sitting at my desk
- **Time:** I only need a few minutes (or hours...).
- **Previous Exp.:** I like finding new implementations (First-Person Tetris)
- **Aesthetic Values:** I like the retro music.

Control elements:



Summary

- Approaches to design: MDA, pleasure
- Game design vocabulary: meaningful play, story
- Objective and subjective measures
 - Concurrent/retrospective, comparing measures
 - Research case studies: immersion, affect, CEGE

Required reading: <http://www.costik.com/nowords2002.pdf>

Bibliography

(Just for further reading, not examinable!)

- Calvillo-Gómez (2009) www.eduardocalvillogamez.info
- Church (1999) *Formal Abstract Design Tools*
www.gamasutra.com/view/feature/3357/
- Jennett et al. (2008), *Measuring and Defining the Experience of Immersion in Games*. *International Journal of Human Computer Studies*, 66(9): 641-66
- Jordan (2000) *Designing Pleasurable Products*
- Nacke & Lindley (2009) *Affective Ludology, Flow and Immersion in a First- Person Shooter: Measurement of Player Experience*
<http://www.acagamic.com/lennart-nacke/>
- Salen & Zimmerman (2005) *Rules of Play*