Designing for Collaborative Games

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Summary & Learning goals

The students are introduced to the concept of collaborative games and how they can be designed. The recommendations for design are described through the use of gameplay design patterns and a design space describing the design of collaborative games also in terms of gameplay design patterns.

Learning goals:

- recognize collaborative games
- describe lessons and pitfalls when designing collaborative games
- describe the concept gameplay design patterns and its use for design and analysis of collaborative games
- recognize design space as a concept
- describe how the CoCe design space can be used for design of collaborative games

Recommended readings

- Zagal, J. P., Rick, J., & Hsi, I. (2006). Collaborative games: Lessons learned from board games. Simulation & Gaming, 37(1), 24-40.
- Eriksson, E., Baykal, G. E., Torgersson, O., & Björk, S. (2021). The CoCe Design Space: Exploring the Design Space for Co-Located Collaborative Games that Use Multi-Display Composition. In Designing Interactive Systems Conference 2021 (pp. 718–733): Association for Computing Machinery.

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- Summary

Traditional Game Categories

- Traditionally 2 categories of games
- Competitive
  - Players form strategies that directly oppose the other players
  - Many (most) traditional board games
  - Chess, Checkers,…
- Cooperative
  - Two or more players have interests that are neither completely opposed nor completely the same
  - Working together can be a win-win situation
  - Includes some kind of bargaining, benefits need not be equal to participating players

Collaborative Games

- A third category
- All the participants work together as a team towards a shared goal
- If the team wins or loses, everyone wins or loses
- All the members of the team share the same interests and beliefs

- Collaboration vs Cooperation
  - Cooperative players can have different goals and payoffs
  - Collaborative players have the same goal and share rewards and penalties

Identifying Collaborative Game Features

- How can we find features that work well in collaborative games?
- Digital games complex
- Study board games instead
- Lord of the Rings

Collaborative games:
Lessons learned from board games

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Collaborative mechanisms are starting to become prominent in computer games, like massively multiplayer online games (MMOGs); however, by their nature, these games are difficult to investigate. Game play is often complex and the underlying mechanisms are frequently opaque. In contrast, board games are simple. Their game play is fairly constrained and their core mechanisms are transparent enough to analyze. In this article, the authors seek to understand collaborative games. Because of their simplicity, they focus on board games. The authors present an analysis of collaborative games. In particular, they focus on Reiner Knizia's LORD OF THE RINGS, considered by many to be the quintessential collaborative board game. Our analysis yields seven observations, four lessons, and three pitfalls, that game designers might consider useful for designing collaborative games. They reflect on the particular opportunities that computers have for the design of collaborative games as well as how some of the issues discussed apply to the case of computer games.

KEYWORDS: board games; collaboration; collaborative games; cooperation; computer games; decisions; game design; individuals; lessons; multiplayer games; LORD OF THE RINGS; payoffs; pitfalls; teams; utility

Although the vast majority of games played all over the world are collective in nature, practically all electronic games are individual (Zagal, Nussbaum, & Rosas, 2000). Many reasons have been proposed for this dichotomy such as high costs of technology (Zagal et al., 2000), the isolated location of computers in homes (Bunten, 1996), and the inherently single-user nature of the personal computer (Costikyan, 1998). The good news is that this is changing. Faster always-on Internet connections together with cheaper technology have witnessed an increase in the amount of games that can no longer be played alone. Multiplayer is now an important part of computer games.

However, the design space for computer collaborative games remains largely unexplored (Manninen & Korva, 2005; Salen & Zimmerman, 2004; Zagal et al., 2000). Recent years have shown an increase of cooperative game mechanisms in games that do not always result in players collaborating to play the game. Li (2004) describes the "honor system" implemented in AMERICA'S ARMY (2002) as a system designed to

Example - Lord of the Rings

- In focus for Zagal et al's study
- Reiner Knizia

"People say, you can't play with each other—you have to play against each other, otherwise there's nothing to do. Of course, that's not true. I actually believe that playing with each other and really facing a common opponent in the game makes a much richer playing experience. My challenge was to create an atmosphere in the game that pushed people together and made them naturally want to stay together. . . . The players realize after the first few turns that they get hit so quickly with so many bad things that if they want to just go off by themselves they have no hope. (Reiner Knizia, in Glenn, 2002)"

Lessons Learned

- Lesson 1: To highlight problems of competitiveness, a collaborative game should introduce a tension between perceived individual utility and team utility

- Lesson 2: To further highlight problems of competitiveness, individual players should be allowed to make decisions and take actions without the consent of the team.

Zagal, J. P., Rick, J., & Hsi, I. (2006). Collaborative games: Lessons learned from board games. Simulation & Gaming, 37(1), 24-40.

Lessons Learned

- Lesson 3: Players must be able to trace payoffs back to their decisions.

- Lesson 4: To encourage team members to make selfless decisions, a collaborative game should bestow different abilities or responsibilities upon the players.

Zagal, J. P., Rick, J., & Hsi, I. (2006). Collaborative games: Lessons learned from board games. Simulation & Gaming, 37(1), 24-40.

Challenges

- Pitfall 1: To avoid the game degenerating into one player making the decisions for the team, collaborative games have to provide a sufficient rationale for collaboration.

- Pitfall 2: For a game to be engaging, players need to care about the outcome and that outcome should have a satisfying result.

- Pitfall 3: For a collaborative game to be enjoyable multiple times, the experience needs to be different each time and the presented challenge needs to evolve.

Zagal, J. P., Rick, J., & Hsi, I. (2006). Collaborative games: Lessons learned from board games. Simulation & Gaming, 37(1), 24-40.

Designing Collaborative Games

- Zagal et al deliver high-level guidance
- Good to keep in mind – how to realize?
  - E.g., solitaire play can be avoided by giving the players different abilities
  - Players should decide themselves but facilitate discussion with team members

- More concrete guidance can be found i *Gameplay Design Patterns*

Design Patterns

- Before we can talk about Gameplay design patterns we need to explain the idea of design patterns

- A design pattern is a re-usable solution to a common design problem

- The concept was first introduced by architect Christopher Alexander in the 1970s

- Popularized in Software development in the 1990s

Design Patterns

- Some application areas
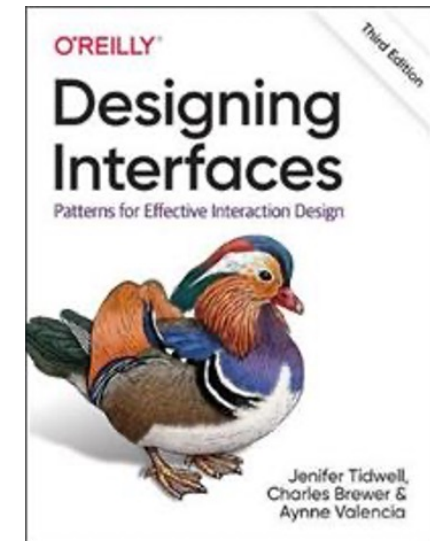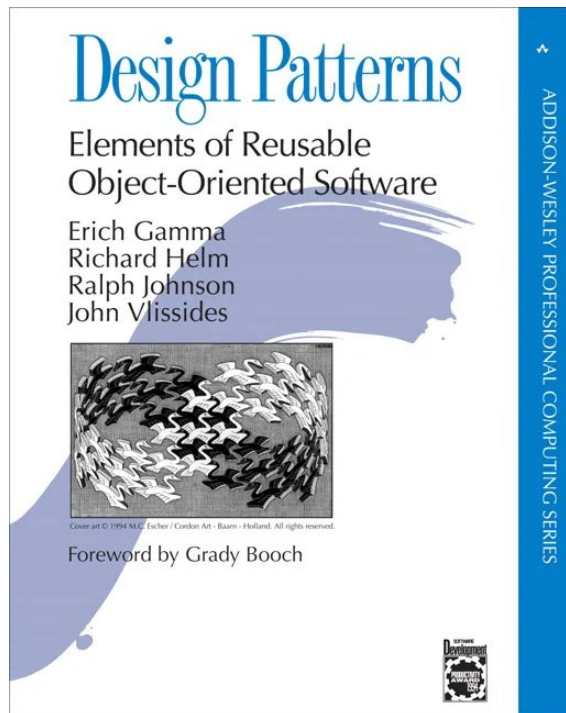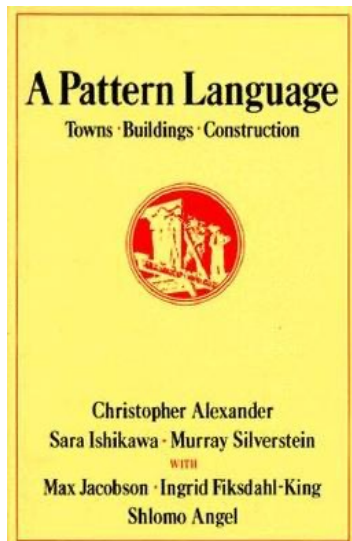
Design Pattern Contents

- **Name**: a clear and descriptive one is preferred.

- **Problem Statement**: describes the problem the patterns is targeting.

- **When**: "Context of use" is a critical component of the design pattern. This element helps people understand situations when the design pattern applies (and when it does not.)

- **Solution/How**: explains how to solve the problem the pattern is tarheting

- **Rationale/Why**: provides reason why the suggested patterns works.

- **Examples**: shows how the pattern has been successfully applied.

Example Design Pattern

- **Name**: Canvas Plus Palette

- **Problem statement**: how to design graphic editors in a nice and efficient manner

- **When**: applications where the user creates and edits visual digital contents

- **How**: put the canvas where the content is created in the centre and organize controls for editing in palettes around the canvas

- **Why**: minimize the navigation between different views and windows. A proven and well-known solution
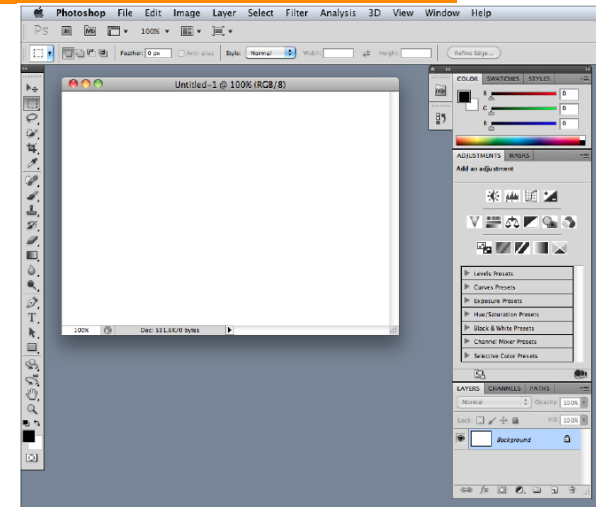
Why are Design Patterns Useful?

- Design patterns are proven solutions to re-ocurring problems
- General descriptions
  - Need to be adapted to fit the situation

- Knowing patterns means that one can find a proven re-usable solution to a given problem
  - Contain design knowledge
- Provides a language to talk about design
- Can be used for analysis as well as design

Gameplay Design Patterns

- Application of the design pattern idea to gameplay design

- Attempts to capture recurring game elements and their dependencies

- Adaptable building blocks used for for analysis and design

- Can they be useful for designing collaborative games?

www.gameplaydesignpatterns.org
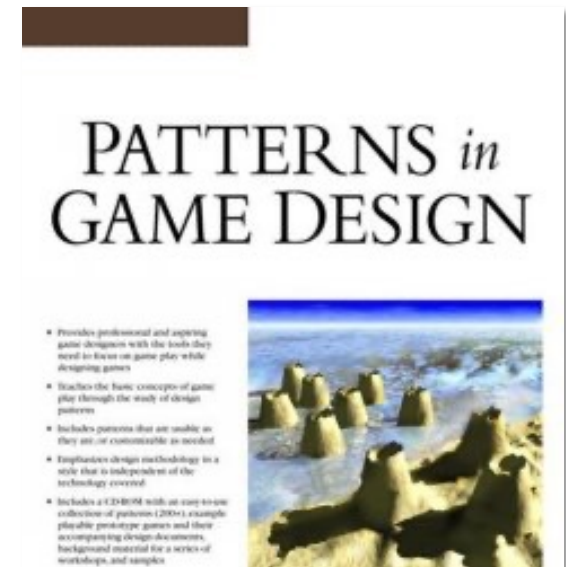
Example – Assymetric Abilities

Players, or game elements, do not all have the same actions available.

- When not all players have the same actions available, they have Asymmetric Abilities. This makes the game more complex in one sense, as more types of actions need to be considered when visualizing future game states, but also makes the experiences of playing the game depend on what role a player has.

- Asymmetric Abilities can also exist between the game elements under a player's control. In this case, the variety of actions available gives players more opportunities to create different tactics and increases the value of each game element as losing all elements that have an ability means that the ability is lost to the player.

Note similarity with lesson from Zagal

Designing for Co-located Collaborative Games

- Presented the
  concept collaborative game

- Presented the concept
  gameplay design pattern

- Look at how gameplay design
  patterns can be
  used to form a design space
  for collaborative games

The CoCe Design Space

Exploring the Design Space for Co-Located Collaborative Games that Use Multi-Display Composition

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ABSTRACT

In this paper, we map out the CoCe design space - a design space for co-located collaborative games that use multi-display composition. The design space grew out of the analysis of game instances based on the 4in1 concept. First, we did a horizontal analysis of 16 game instances with 31 corresponding gameplay design patterns (GDP), followed by a vertical analysis of 89 GDPs occurring in the description of the GDP COOPERATION. Through inductive analysis, we have identified four perspectives with corresponding dimensions that span the CoCe design space. By applying the CoCe design space with game instances, we illustrate how it can be used both as an analytic tool for analysis of games and also as a generative tool in the design or re-design of cooperative games that use multi-display composition.

CCS CONCEPTS

· Human-centered computing → HCI theory, concepts and models.

KEYWORDS

Collaboration; game design; design space; intermediate-level knowledge, gameplay design patterns.

1 INTRODUCTION

The introduction of touch technology has revolutionized the way we interact with computers, and devices like tablets are gaining increasing popularity in many educational settings. However, the vast majority of applications developed for tablets are targeting one user using the device alone, and tablets are "typically perceived as a personal device, evoking the image of its owner tapping away - silently submerged in their private digital bubble" [40, p. 1405]. One way to break this 'mobile bubble' and use touch technology to support groups of people acting together in a collaborative manner on a common activity could be to instead design for, and make use of, large shared screen displays and tabletop computers. However, a problem with this approach is that tabletop computers are still rather expensive and cannot easily be moved or carried around. Rather the users need to gather in the place where the tabletop happens to be located. As an alternative, we argue that tablets could also be used to create engaging collaborative user experiences instead of being devices used to lock each individual user into his or hers mobile bubble.
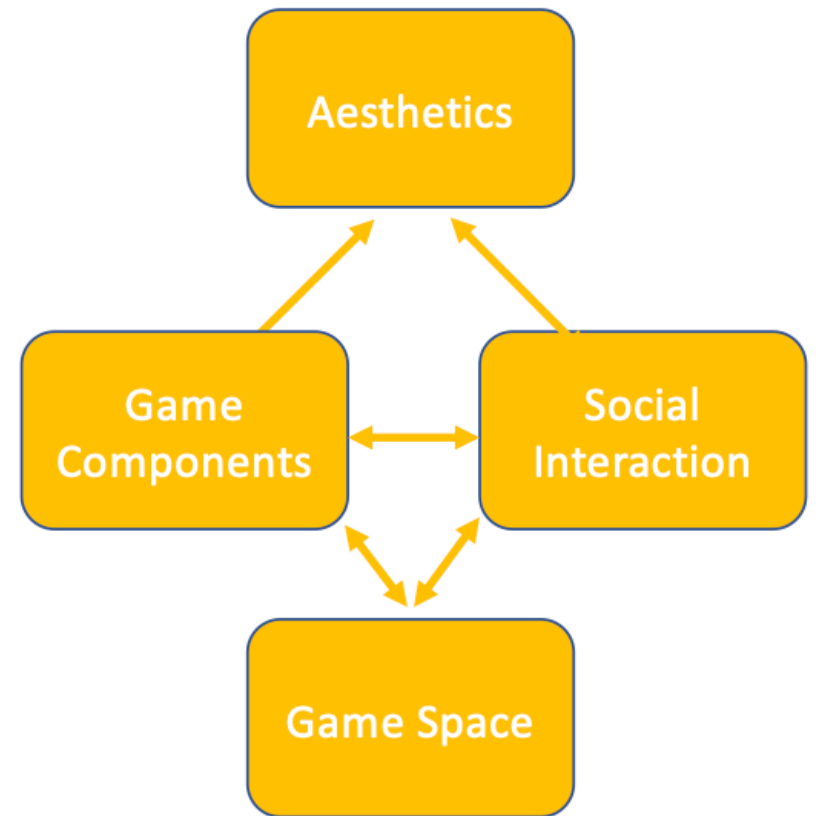
Design Space

- Each potential design can be viewed as point in a multi-dimensional space

- By creating dimensions and values that occur on the axis we can get a description of all potential designs
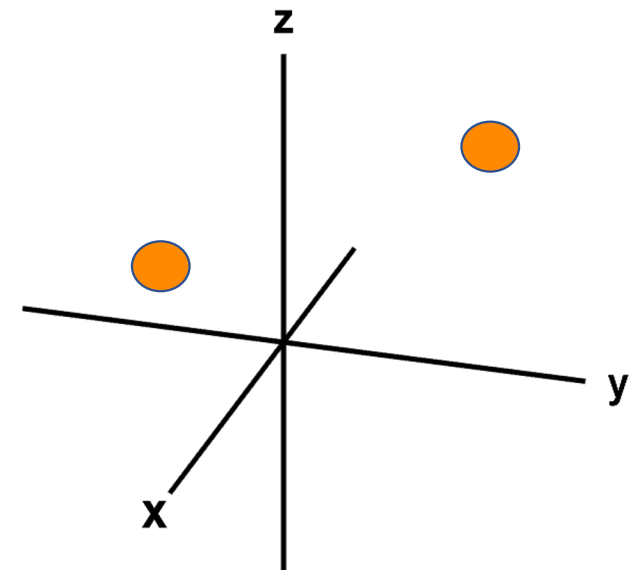
- E.g., the axis can show properties of collaborative games

The CoCe Design Space

- Four perspectives of collaborative games where each perspective has several dimensions

- A design space spanned by gameplay design patterns

- A tool for analysis and design

CoCe Design Space Overview

Perspective

Dimensions

Gameplay design
Patterns (examples)

GAME SPACE		
Set-up	**Mechanics**	
MULTI-PLAYER GAMES SPLIT SCREEN VIEWS	SYMMETRIC GAMEPLAY ASSYMETRIC GAMEPLAY	
SOCIAL INTERACTION		
Roles & Skills	**Actions**	**Goals & Planning**
TEAMS SOCIAL SKILLS AVATARS ABILITIES	COLLABORATIVE ACTIONS SYMBIOTIC PLAYER RELATIONS ALTRUISTIC ACTIONS	MUTUAL GOALS ASYMMETRIC GOALS TACTICAL PLANNING STIMULATED PLANNING
GAME COMPONENTS		
Roles & Skills	**Actions**	**Goals & Planning**
NEW ABILITIES HANDLES COMPETENCE AREAS	GAME ITEMS FOCUS LOCI MOVEMENT	LEVELS RESOURCES SHARED REWARDS
AESTHETICS		
Game space	**Social Interaction**	**Game Components**
TENSION COMPLEX GAMEPLAY	COMPLMENTARITY REFLECTIVE COMMUNICATION	GAMEPLAY MASTERY

The Game Components Perspective

- 3 dimensions
  - Roles & Skills
  - Actions
  - Goals & Planning

- 28 patterns

GAME COMPONENTS		
Roles & Skills	**Actions**	**Goals & Planning**
		Levels
		Resources
		Shared Resources
		Shared Rewards
		Transferable Items
	Game items	Landmarks
	Focus loci	Geospatial Game Widgets
	Movement	Free Gift Inventories
	Maneuvering	Enemies
Handles	Obstacles - moved	Non-Player Characters
New abilities	Capture	Agents
Improved abilities	Dexterity based actions	Game System Player
Competence areas	Area Control	Algorithmic agents
Team combos	Controllers	Internal conflicts

The Social Interaction Perspective

- 3 dimensions
  - Roles & Skills
  - Actions
  - Goals & Planning

- 24 patterns

SOCIAL INTERACTION		
Roles & Skills	**Actions**	**Goals & Planning**
TEAMS		
FUNCTIONAL ROLES		
AVATARS		
SOCIAL SKILLS		
SYNERGIES BETWEEN ABILITIES		
PARTIES		
SOCIAL ROLES		MUTUAL GOALS
ROLEPLAYING		CONTINUOUS GOALS
CHARACTERS		SUPPORTING GOALS
PRIVELIGED ABILITIES	COLLABORATIVE ACTIONS	ASYMMETRIC GOALS
ENTITLED PLAYERS	ASYNCHRONOUS COLLABORATIVE ACTIONS	STIMULATED PLANNING
COMPANIONS	SYMBIOTIC PLAYER RELATIONS	PREVENTING GOALS
ABILITIES	ALTRUSTIC ACTIONS	TACTICAL PLANNING

Case Study: Co-located Collaborative 4in1 Activities

- A 4in1 activity is defined as an application involving 4 participants that play out on 4 tablets coupled together to form one large display

- Can function as a low-cost tabletop solution

Barendregt, W., Börjesson, P., Eriksson, E., & Torgersson, O. (2017). StringForce: A Forced Collaborative Interaction Game for Special Education. In Proceedings of the 2017 Conference on Interaction Design and Children (IDC '17).
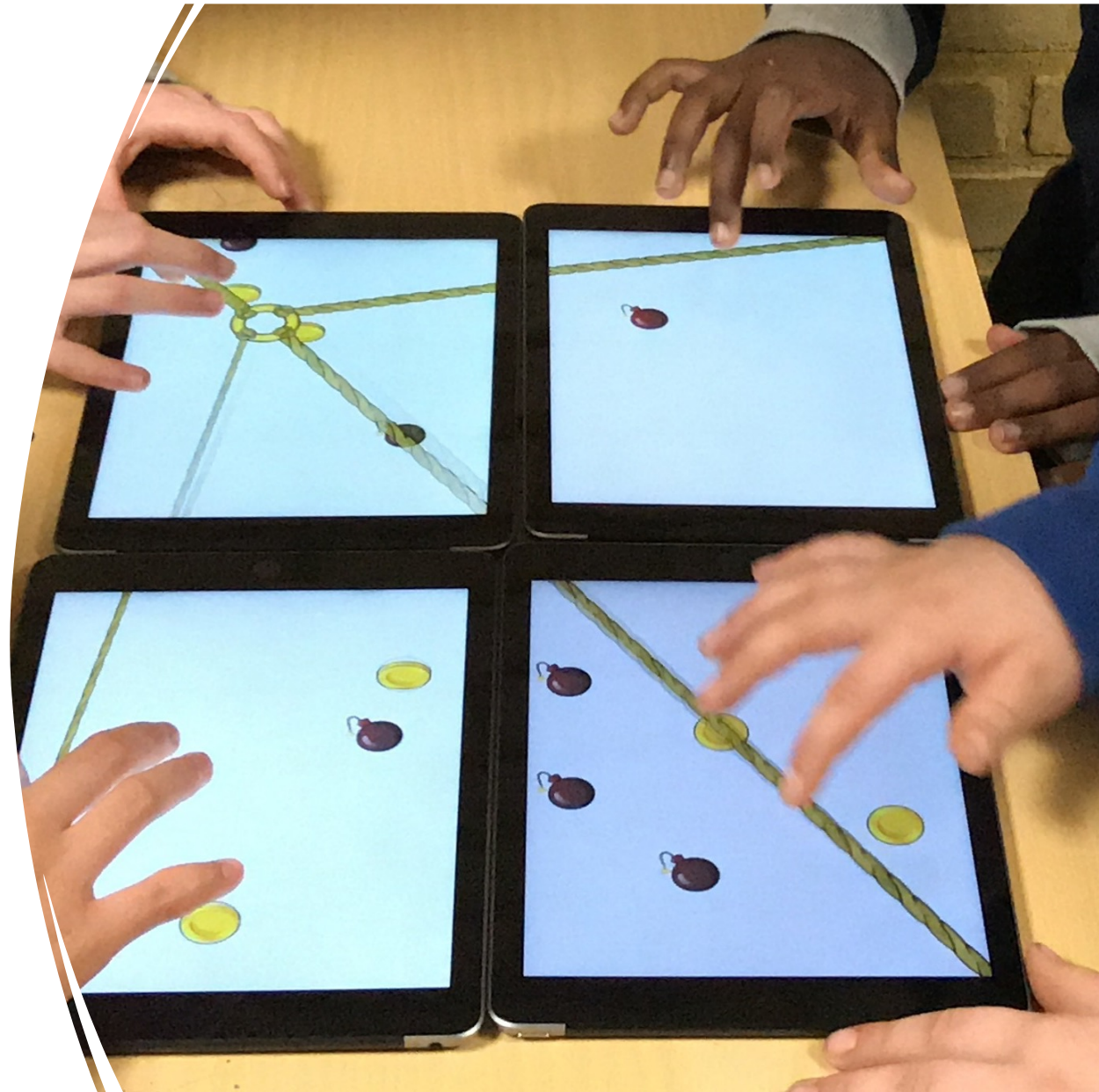
Designing Collaborative 4in1 Games

Games where a team win or loose together

All members needed

Need to plan and perform as a team

Suitable for designing for collaboration

Quite a few 4in1 examples

Collaborative 4in1 Games

Inspiration for CoCe

Table 1. Overview of all 4in1 collaborative games developed by either students or researchers.
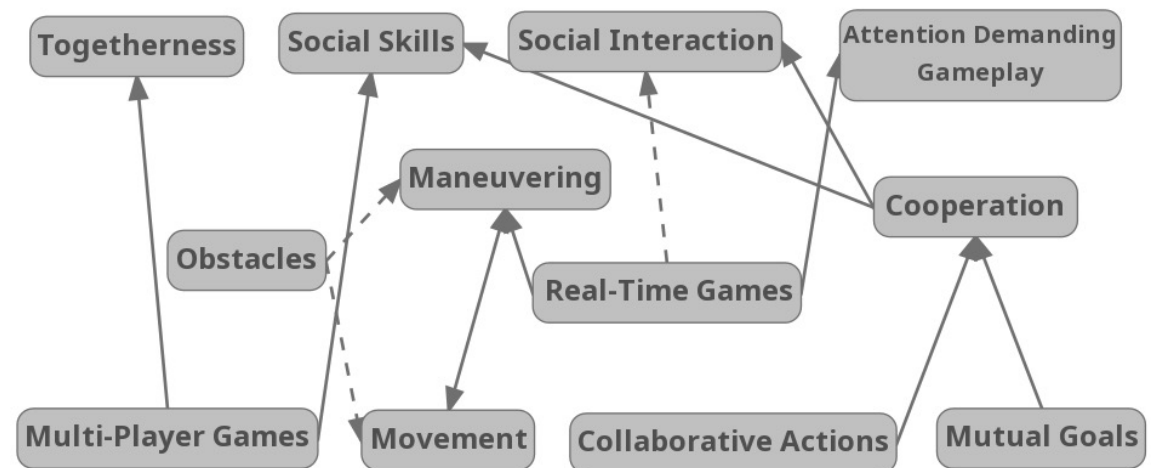
StringForce

Symmetric forced interaction
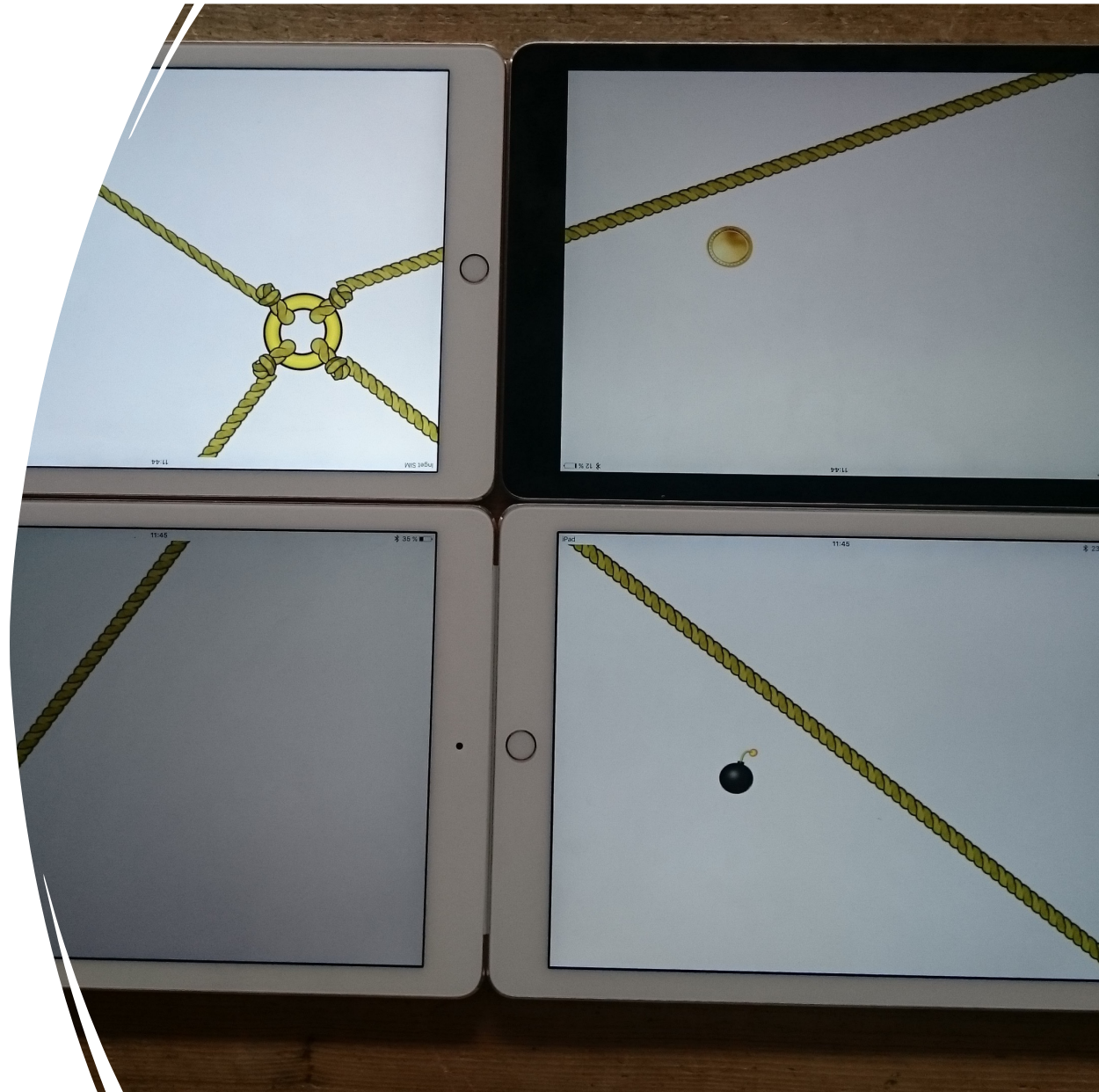
StringForce Analysis

- Structural analysis made through inspection of the game
    - Collaborative Actions
    - Mutual Goals
    - Attention Demanding Gameplay
    - Social Interaction
    - Social Skills

- Contributes to collaboration

More Games

	StringForce	Cirkva	Quadropong
GAME SPACE			
Set-up	Multi-player games Real Time Games	Multi-player Games	Multi-player Games Real Time Games
Mechanics	Mediated Gameplay PvE Symmetric gameplay Attention-Demanding--Gameplay Experimenting	Mediated gameplay Symmetric Gameplay	Assymmetric Gameplay Mediated Gameplay PvE Attention-Demanding--Gameplay Experimenting Symmetric Gameplay
SOCIAL INTERACTION			
Roles & Skills	Teams Abilities Characters Avatars Social Skills	Teams Abilities Social Skills Avatars	Teams Abilities Functional Roles Synergies Between Abilities
Actions	Collaborative Actions		Collaborative Actions Asynchronous-Collaborative--Actions
Goals & Planning	Mutual Goals Tactical Planning	Mutual Goals Stimulated Planning	Mutual Goals Continuos Goals Supporting Goals Asymmetric Goals Tactical Planning Stimulated Planning
GAME COMPONENTS			
Roles & Skills			New Abilities
Actions	Game Items Focus Loci Movement Maneuvering Capture	Game Items Focus Loci Movement	Game Items Movement Maneuvering Dexterity-Based Actions
Goals & Planning	Levels Enemies Shared Rewards Obstacles	Levels Transferable Items Obstacles	Levels Transferable Items Obstacles Shared Resources
AESTHETICS			
Game Space	Tension	Challenging Gameplay	Challenging Gameplay
Social Interaction			Complementarity
Game Components			Gameplay Mastery

Why is CoCe Useful

- CoCe captures design knowledge about co-located collaborative games
- The different perspectives and dimensions present patterns that can be useful
  - There are houndreds of patterns so starting points are relevant
- Complements ideas like those from Zagal with suggestions for concrete patterns to use
- Also a tool for analysis
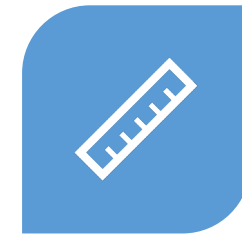
Design & Development Approach

GAMEPLAY DESIGN PATTERNS   EXPLORATION   SELECTION   DESIGN

Summary

- Traditionally competitive and cooperative games

- Third category collaborative games

- Win and lose as a team

- Looked at lessons and pitfalls

- Design patterns

- Gameplay design patterns

- CoCe design space
  - Analysis and design

- 4in1 example game

- Endless possibilities

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Thanks for listening