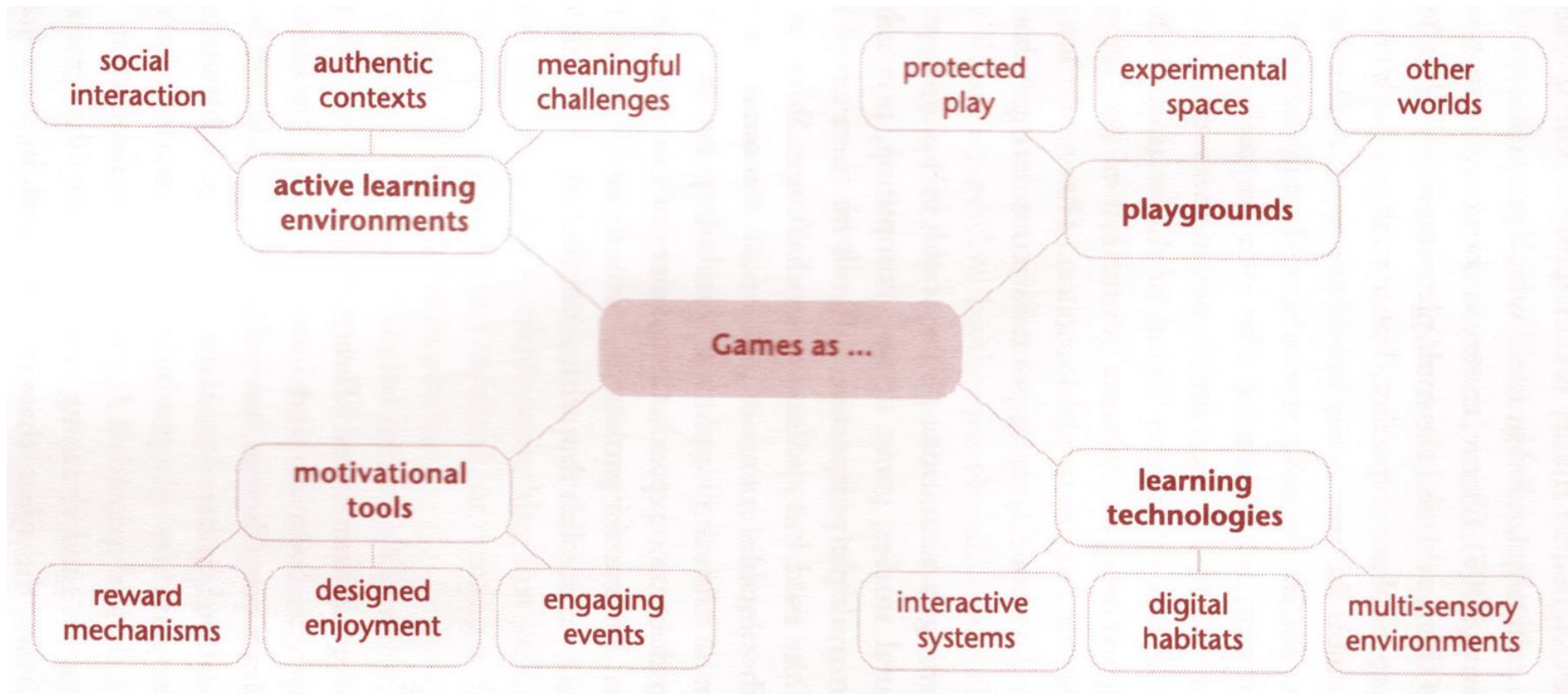


Design elements for game-based learning

Open Discovery Space Summer School 2015
Workshop on Game Based Learning
*“Adding a game-based perspective
to our educational scenarios”*

Games and learning: some things to keep in mind...



Which definition of a game?

Let's keep it simple:

- A challenging activity
- Structured with:
 - Rules
 - Goals
 - Progression
 - Rewards
- Separate from the real world
- Undertaken with a spirit of play
- Often (but not always) played with, or against, other people.

Which approach of 'games and learning'?

- Learning with *entertainment* games
- Learning with *educational* games
- Learning *inspired* by games

- Learning *within* games
- Learning *about* games
- Learning *from* games

- Learning *through* game creation
- Learning within game *communities*

Designing an active learning environment:

- Players learn by doing...
- ...through interaction with the game and the other players
- Active pedagogies:
 - discussion,
 - practice,
 - problem-solving,
 - reflection...

Designing a meaningful challenge: what type of problem?

TABLE 3.1 Types of problem that are employed in computer games

<i>Problem type</i>	<i>Description</i>	<i>Game types</i>
Knowledge	Recall of facts and information.	Quiz
Puzzle	Problem designed to test ingenuity in a specific domain, such as logic, verbal skills or spatial reasoning, usually with a single correct answer.	Puzzle, adventure, casual
Strategy	Problems that involve planning, decision-making, manoeuvres, developing tactics.	Strategy, god-games, shooters, action-adventure
Lateral thinking	Problems that involve inventive thinking to combine objects or ideas, and work out ways of achieving original solutions.	Adventure, role-play
Creative	Designing or making new objects that can be aesthetic or functional.	Alternative reality games, game-building
Physical	Problems that involve movement, rhythm, timing and other physical actions.	Fighting, sports, arcade, gesture-based
Social	Challenges that involve other people, such as team working, negotiation and group decision-making.	Online games, MMORPGs
Perseverance	Challenges that take time and energy but are not necessarily hard to do, such as clicking with the mouse.	Social network games

...and which game genre?

TABLE 3.2 Overview of game genres and potential learning areas

<i>Genre</i>	<i>Description</i>	<i>Potential learning areas</i>
Adventure	A series of tasks or puzzles in which the player must interact with a virtual world and storyline, performing actions, talking to characters and manipulating objects in order to achieve the objectives of the game, often to solve some mystery or complete a quest.	Problem-solving, lateral thinking, creativity, empathy, critical thinking.
Platform	Moving a player character through a landscape (usually two-dimensional), jumping up and down between platforms, avoiding obstacles and enemies and picking up treasure, usually with some overall goal in mind and often in the context of a narrative.	Motor skills, problem-solving, spatial skills, planning, strategising.
Puzzle	Problem-solving, usually in a single domain such as verbal, logic, mathematics, visual or spatial.	Literacy, numeracy, logic, memory, application of skills, spelling, spatial awareness.
Quiz	Asking questions and providing feedback on correct answers; can also include various additions and gimmicks such as timers, methods of getting help and question selection.	Facts, recall.
Role playing	Taking on the role of a character in another (usually fantasy-based) world, the player can undertake a range of activities including solving quests, fighting, treasure hunting and interacting with other characters (either other players in the game world or non-player characters).	Decision-making, empathy, critical thinking, attitudes, understanding of complex systems, collaborative and social skills.
Shooter	Have the primary aim of using weapons (or sometimes spells and other special abilities) to defeat opponents, although the action is often embedded within a wider narrative context. They are generally played from a first person viewpoint and are played in real time.	Strategic thinking, working under pressure, timing, dexterity, planning, team working.
Strategy	Involve the player making strategic decisions within a scenario in order to meet the goal of the game, which is usually completing a level or solving a particular problem. They can involve, for example, movements of armies, progression of a group through various stages of development, management of resources or creation of environments to achieve specific purposes.	Time management, planning, strategising, hypothesis-testing, decision-making.

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Social interaction: what kind of competition?

TABLE 5.3 Models of competition in games

<i>Model of competition</i>	<i>Examples</i>
Single player vs. single player	Chess, singles tennis
Pair vs. pair	Doubles tennis
Team vs. team	Football
Single player vs. many	Tag
Every man for himself	<i>Monopoly</i> , running a race
Single player vs. game system	Adventure games, Solitaire
Individual players side by side	Casino blackjack
Group vs. game system	<i>World of Warcraft</i> , <i>Forbidden Island</i>

Designing a game for motivation:

- Motivation to play the game
- Motivation to learn
- **Engagement**, interest, immersion...

Engagement: find the path to 'Flow'

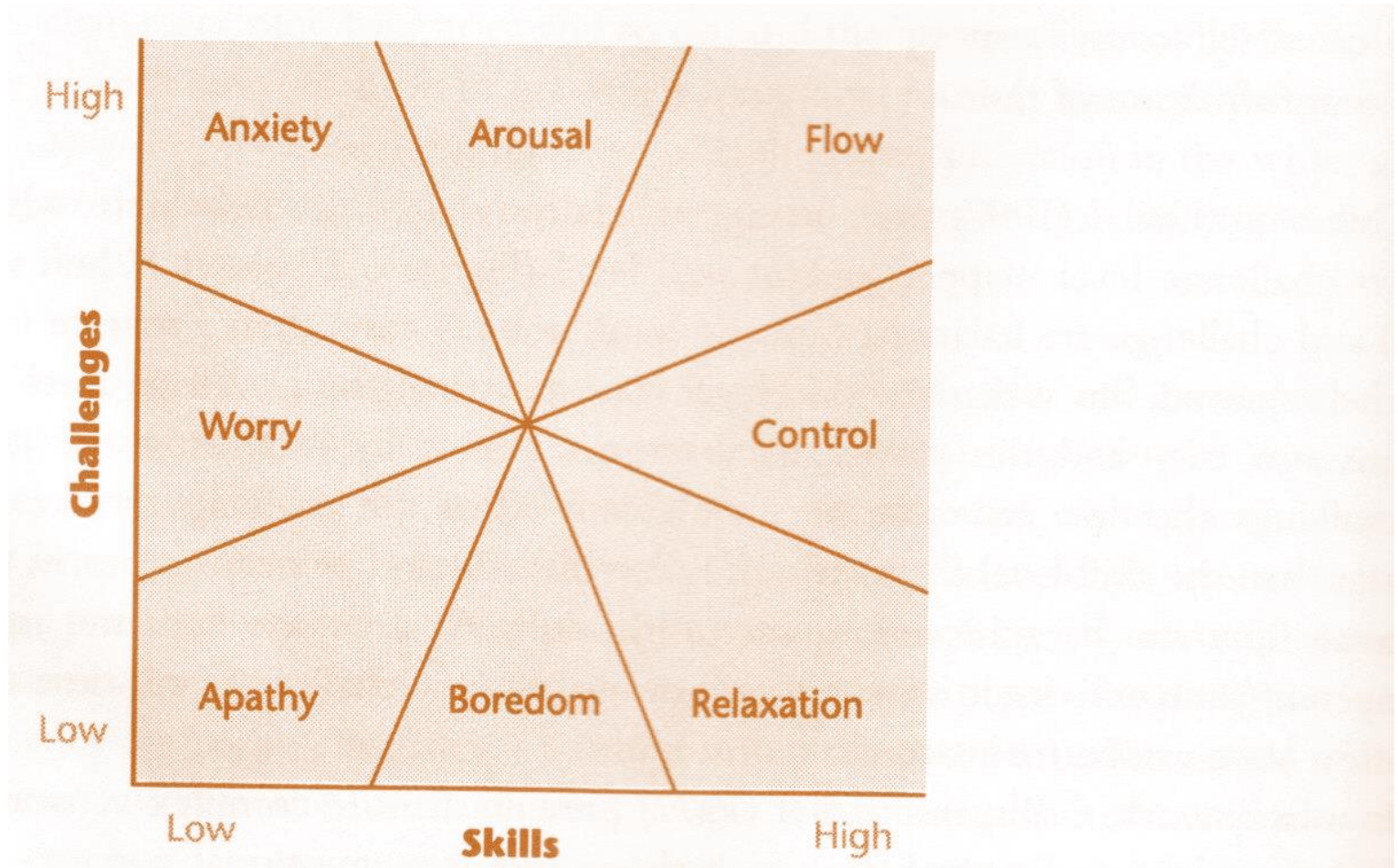


FIGURE 6.3 Quality of experience as a function of the relationship between challenges and skills (from Csíkszentmihályi, 1997)

Engagement: find the path in the 'Flow' channel

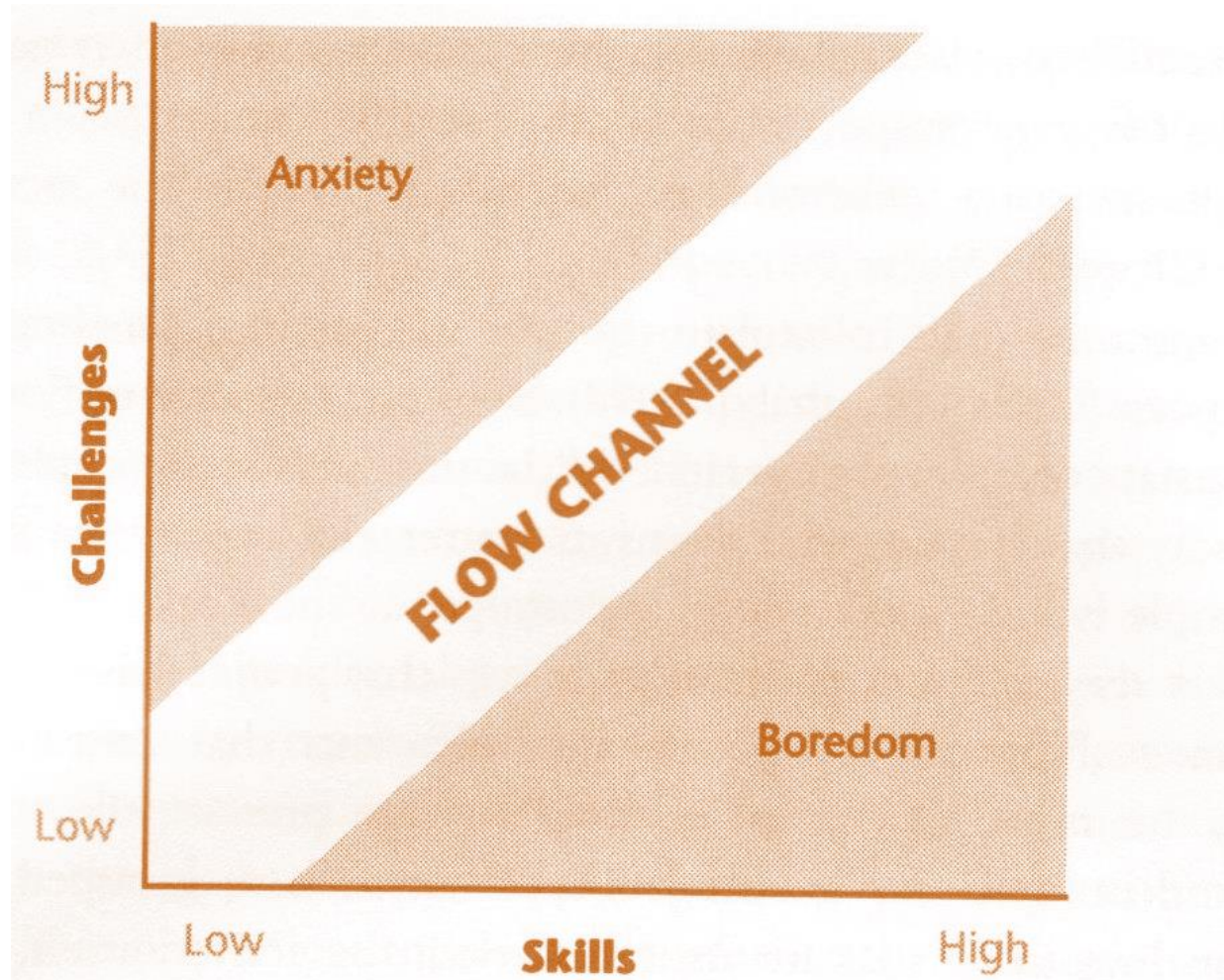


FIGURE 6.2 Flow channel (from Csíkszentmihályi, 2002)

Engagement: find the path in the 'Flow' channel

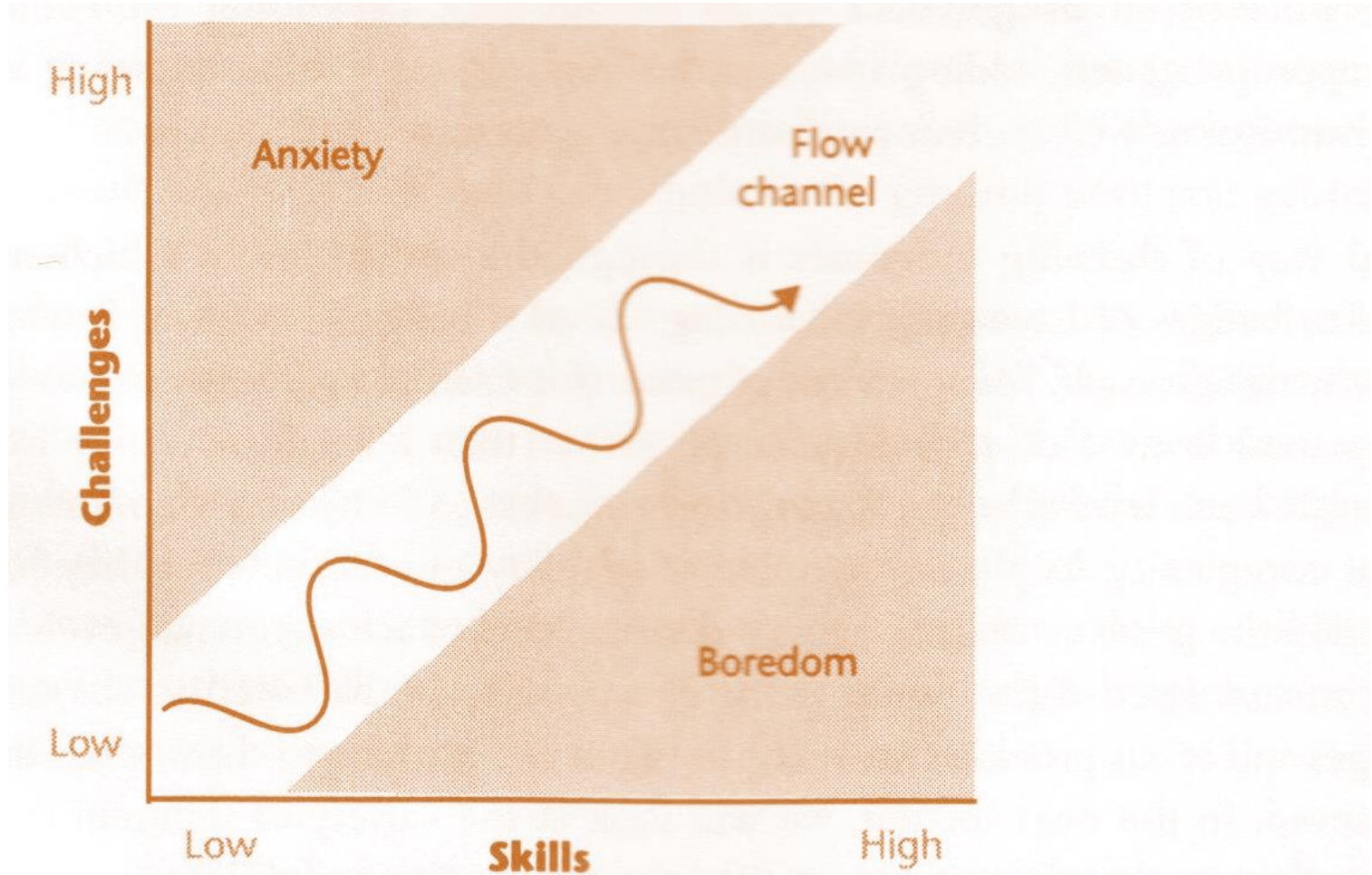


FIGURE 7.2 Cyclical progression through the flow zone (Schell, 2004)

Rules!

TABLE 7.1 Different types of rules (adapted from Parlett, 2005 and Schell, 2008)

<i>Rule type</i>	<i>Description</i>	<i>Example</i>
Operational rules	The explicit rules that describe the set of procedures for playing a game.	Noughts and crosses is played on a 3×3 grid where players alternately take turns to add a 0 or an \times to one of the squares and the aim of the game is to make a line of three in any direction.
Foundational rules	The formal logical and mathematical structures underpinning the game.	The underlying mathematical logic in noughts and crosses.
Behavioural rules	Unwritten rules that are the normal or accepted way of playing the game.	There is a reasonable time limit between making moves in noughts and crosses.
Written rules	Rules that have been formulated in writing.	The rule sheet that is provided with a boxed game, such as <i>Monopoly</i> .
Official rules	Rules that have the status of authority, both prescriptive and proscriptive.	The book of official <i>Scrabble</i> words.
Laws	Explicit rules of behaviour, proprieties, sanctions, corrections.	A person caught cheating will be excluded from the game.
Advisory rules	Rules of strategy, tips to help players play better.	Strategy guides for video games.
House rules	Localised versions of the operational rules that are adapted to make the game more fun.	Modifying <i>Monopoly</i> so that no one can buy a second set of houses until everyone has at least one set, to make it fairer for young children.

What type of reward?

TABLE 8.1 Types of reward (from Schell, 2008, mapped against Hallford & Hallford's, 2001, categories of reward)

<i>Type of reward</i>	<i>Description</i>	<i>Category</i>
Praise	The game telling you that you have done well, through words, sounds or an in-game character talking.	Rewards of glory
Points	Either as a measurement of success, or as a pathway to other rewards.	Rewards of glory/ sustenance/access/ facility
Prolonged play	The ability to play longer by providing increased play time, extra health or an extra life.	Rewards of sustenance
A gateway	Entry to new parts of the game that can be explored.	Rewards of access
Spectacle	Beautiful or interesting music, animation or sight.	Rewards of glory/ access
Expression	The ability for the player to make a mark on the world, through access to special clothes or items.	Rewards of glory
Powers	New or improved skills or abilities that allow the player to achieve things in new and better ways.	Rewards of facility
Resources	Virtual resources that can be used in the game, or virtual money that can be spent.	Rewards of sustenance/facility
Completion	The feeling of closure gained from completing the game.	Rewards of glory

...and always remember
the 'fun' element

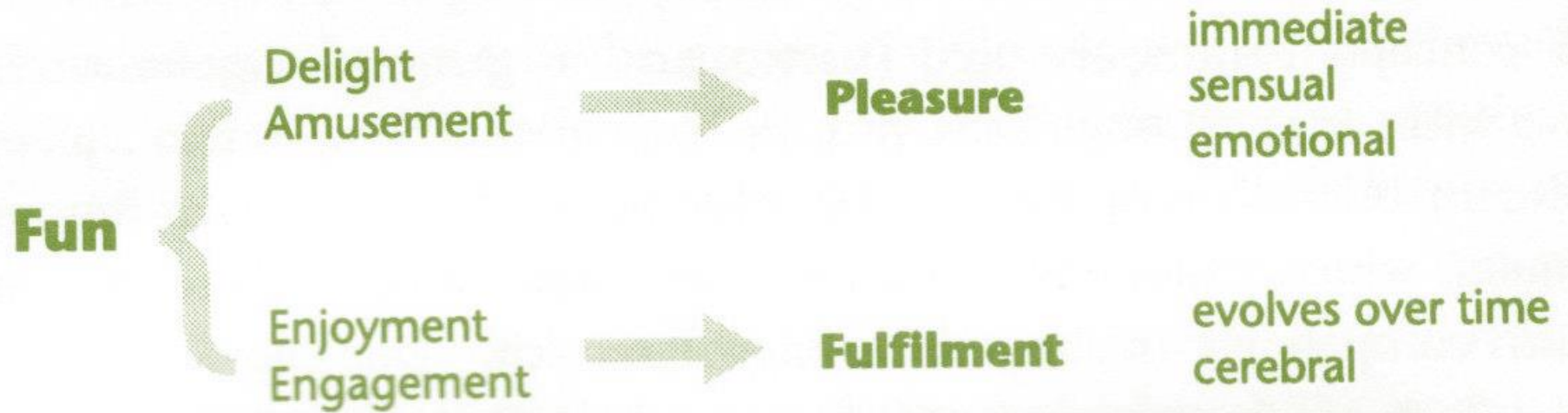


FIGURE 9.1 A synthesis and summary of aspects of fun

Types pleasure and 'fun'

TABLE 9.2 Categories of pleasure in video games (from Järvinen, 2009).

<i>Pleasure</i>	<i>Description</i>	<i>Example</i>
Curiosity	Learning something previously unknown.	Exploration of unknown game environments in <i>Halo</i> (a first-person shooter).
Virtuosity	Doing something well.	Showing motor and auditory skills in <i>Guitar Hero</i> (where the interface is a 'real' guitar that can be played).
Nurture	Taking care of living things.	Nurturing characters in <i>Animal Crossing</i> (where the player takes care of a virtual village of small animals).
Sociability	Belonging to a social group.	Guilds in <i>World of Warcraft</i> (a massively multiplayer online role-playing game).
Suffering	Negative pleasures arising from 'mundane' psychological pains, such as shame or guilt, or 'existential' pains, such as fear of death.	Creating empathy with refugees, and the associated guilt and unease, in <i>Darfur is Dying</i> (a simulation game).

Types pleasure and 'fun'

TABLE 9.1 Types of fun (Hunicke et al., 2004)

<i>Type</i>	<i>Description</i>	<i>Example game genres</i>
Sensation	Game as sense-pleasure	Physical games, sports
Fantasy	Game as make-believe	Role play
Narrative	Game as drama	Adventure, role-playing games
Challenge	Game as obstacle course	Shooters, platform games
Fellowship	Game as social framework	Social network games, board games
Discovery	Game as uncharted territory	Adventure, simulation
Expression	Game as self-discovery	Game building, sandbox games
Submission	Game as pastime	Casual games

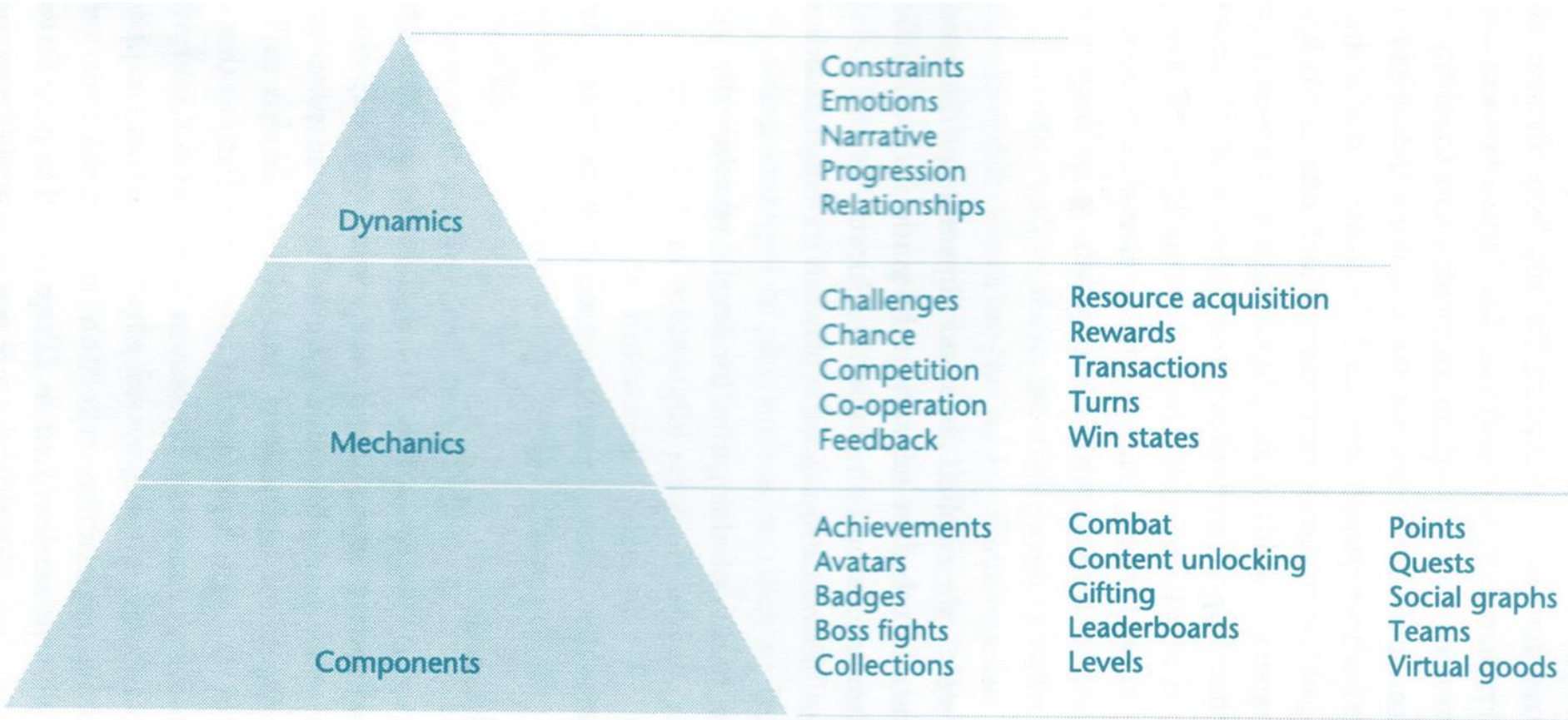


FIGURE 7.1 Game element hierarchy (from Werbach & Hunter, 2012)

For tables and figures in this presentation, thanks to:

