Learning Mechanics – Game Mechanics (LM-GM) in a nutshell

What is the LM-GM methodology?

- A framework for identifying and relating the main learning and game mechanics involved in a Serious Game (SG), thus supporting the identification and analysis of emerging serious game mechanics (SGMs).
- Serious Game Mechanics are defined here as the game components that translate a pedagogical practice/pattern into concrete game mechanics directly perceivable by a player's actions.

How to apply the LM-GM for game analysis

A user of the model identifies which LM (represented as nodes in the left side of the template) and GM (represented as nodes in the right side of the template) are used in each game situation (see Figure 1).

Next, the user fills in the description table to express details on the actual implementation of the relationships between the LMs and GMs in the SG. The table has the following structure:

Learning mechanic	Game Mechanic	Implementation	Usage
<LM 1>	<GM 1>	<Implementation>	<Usage>
<LM 2>	<GM 2>	<Implementation>	<Usage>
…	…	…	…

Table 1 – The structure of the description table

- **Learning mechanic:** The name of the learning mechanic found in the game.
- **Game mechanic:** The name of the related game mechanic.
- **Implementation:** How the Serious Game Mechanic (SGM), that is, the translation of a pedagogical practice into concrete game mechanics, is actually implemented in the game.
- **Usage:** How the SGM is used in the game to achieve the intended pedagogical goals.

Next, the user draws a map representing the game flow. Finally, using the list of the LMs and the GMs, the user can freely relate learning and gaming mechanics to describe the gaming situations, using the circles with letters and numbers in the map to refer to the desired mechanics in the LM and GM lists.

The LM and GM nodes (illustrated in Figure 1) are a non-exhaustive list of learning mechanics and game mechanics that have been extracted from previous works on the area. If the user of the model feels that any nodes are missing, he or she can add the nodes to the list as required.

Learning Mechanics

Instructional	Guidance	
Demonstration	Participation	Action / Task
Generalization/ Discrimination	Observation	Feedback
	Question & Answer	
Explore	Identify	Discover
	Plan	Objectify
Hypothesis	Experimentation	
	Repetition	
	Reflect / Discuss	Analyze
	Imitation	Shadowing
Simulation	Modelling	
Tutorial	Assessment	
	Competition	
Motivation	Ownership	Accountability
	Responsibility	Incentive

Game Mechanics

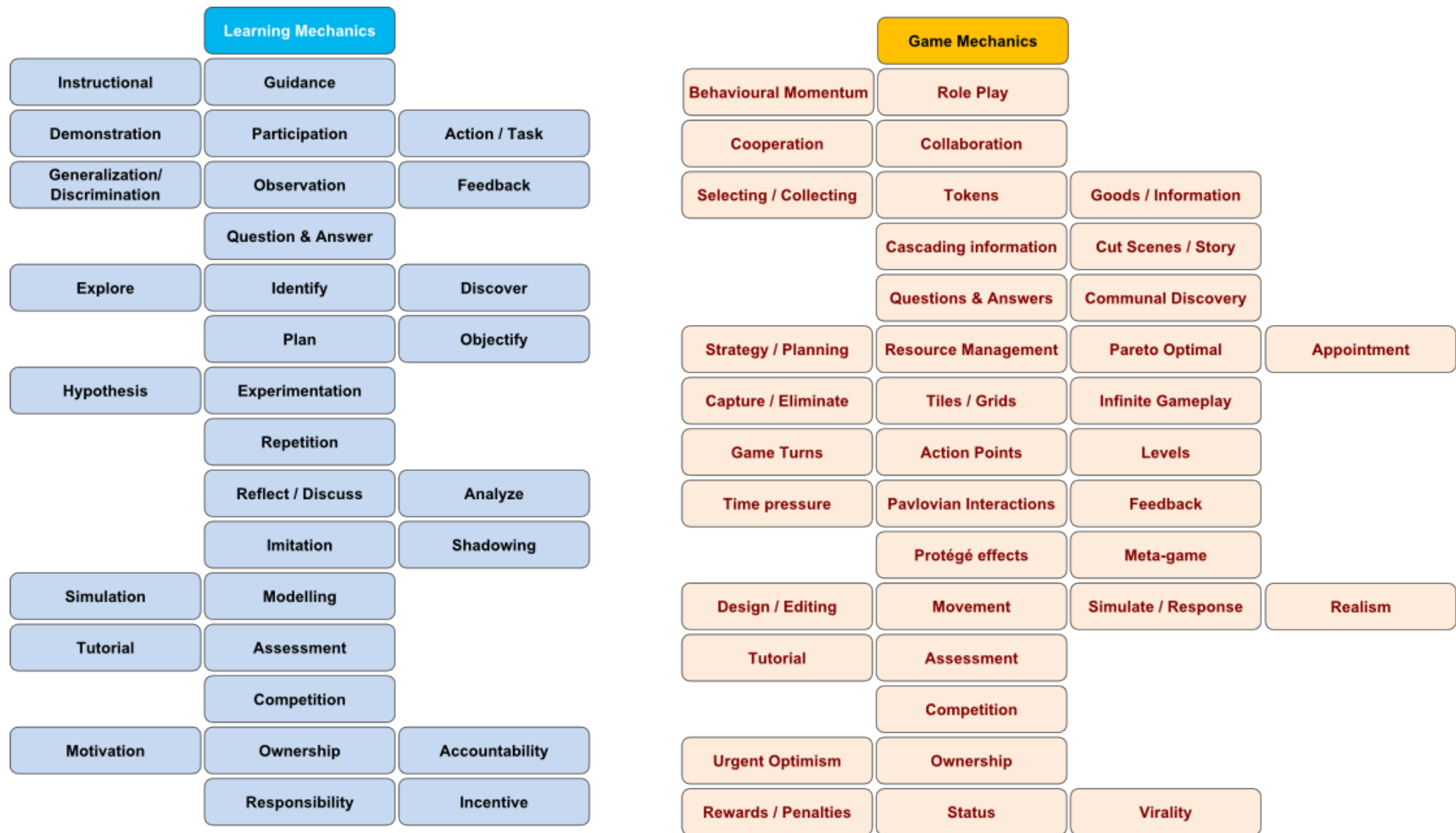|			
Behavioural Momentum	Role Play		
Cooperation	Collaboration		
Selecting / Collecting	Tokens	Goods / Information	
	Cascading information	Cut Scenes / Story	
	Questions & Answers	Communal Discovery	
Strategy / Planning	Resource Management	Pareto Optimal	Appointment
Capture / Eliminate	Tiles / Grids	Infinite Gameplay	
Game Turns	Action Points	Levels	
Time pressure	Pavlovian Interactions	Feedback	
	Protégé effects	Meta-game	
Design / Editing	Movement	Simulate / Response	Realism
Tutorial	Assessment		
	Competition		
Urgent Optimism	Ownership		
Rewards / Penalties	Status	Virality	

Figure 1 – Learning Mechanics and Game Mechanics