# How can games aid players in solving problems without giving away the solution?

Games empower players through rewards; stronger weapons, more points. Equally gratifying is the feeling of competency induced when solving a difficult puzzle. "Fun from games arises out of mastery. It arises out of comprehension. It is the act of solving puzzles that makes games fun", argues Raph Koster (2005, p.40), implying that enlightenment, also known as "insight" (Stuyck, 2021), is a reward. Game developer Erin Hoffman coined the term *sophia*, describing the moment in which players "convert fear into happiness through surprise" (2015), or in other words, turn chaos into order by grasping a given situation. Puzzle games are not the only types of games able to conjure this emotion in players, as most games contain "*sophia* moments" (Hoffman, 2015) in which players grasp skills or identify tactics. Yet, in fear of losing players to high difficulty, many games rob players of the chance to gain insight through overly conspicuous tutorials and user interface (UI) or by blatantly giving away the answers. It is thus worth exploring how game designers can help players solve problems in their games without exposing solutions prematurely. The tactics of designing isolated learning spaces, displaying transferrable behaviour, and taking a quantitive approach to relaying information will be examined in this paper.

Game designer Jolie Menzel stated that small levels can "teach concepts quickly and cleanly" (2017). It appears that concisely designed games or levels serve as great tutorial spaces in which players can learn intuitively and without much guidance or "hand-holding" (Menzel, 2016). In *Legend of Zelda: Breath of the Wild* (Nintendo EPD, 2017), new mechanics are taught through small puzzles contained in isolated spaces called shrines. Their detachment from the otherwise open world allows players to test the newly acquired mechanic in a vacuum-like space, making the uses and consequences of the mechanics abundantly obvious. In one shrine, players may learn to use "magnesis" (Nintendo EPD, 2017), a skill that allows the moving of heavy objects, as a ranged attack instead of exclusively using it to clear paths. Because shrines are isolated and possibilities are limited, players are more likely to have a s*ophia* moment by overcoming functional fixedness, which is when a "problem solver cannot think of using an object in a new function" (Mayer, 2012). Similarly, *The Gardens Between* (The Voxel Agents, 2018) helps players solve problems using small levels in which they can clearly identify what consequences their actions have. Stepping on a dial pad changes a printer's setting– a detail that may have been missed in a larger level and may have needed explanation or indiscrete UI to be noticed. Hence, designing small environments allows players to solve puzzles on their own, granting them the opportunity to feel contented.

Certain games make players feel satisfied by their own discoveries even when the solution is actually presented to them. This tactic is less frequently used as a guide for puzzles. Rather, it is employed when teaching players skills or strategies and requires players to learn from a behaviour that is displayed elsewhere in the game. In *Super Mario Odyssey* (Nintendo EPD, 2017), surveying enemy behaviour gives players clues about what they can achieve when taking possession of the enemy. To solve problems and reach rewards, players must thus gain insight through observation rather than explanation. Similarly, the mobile puzzle game *Monument Valley* (Ustwo Games, 2014) uses enemies to show players how to navigate the isometric world. More complex variations of this indirect tutorial technique can be found in the puzzle game *Gorogoa* (Roberts, 2017), in which players manipulate illustrations to uncover a story. When players observe beads dropping inside a moving image, they realize that aligning images creates a track for the beads, which will then break a glass and progress the narrative. Displaying patterns that require transferral of knowledge, which may be a type of puzzle in itself, is hence a discrete but effective method for helping players solve problems.

Lastly, some games do give away the answer to puzzles quite indiscreetly whilst still giving players agency in solving them. These games are typically large and contain open worlds or complex narratives. Jolie Menzel argues that noncomplex puzzles can still appear difficult when the "time between feedback", meaning the time gap between the puzzle's stages, is significant (2017). The point-and-click adventure game *Syberia* (Sokal, 2002) makes players solve various interconnected puzzles on a train journey. When the train breaks down, players find a boat whose passengers offer to tow the train for money. The solution to the problem is evident: Players need money, the characters said so, but because the levels can be explored freely and thus non-linearly, players may not have uncovered the way to attain money yet. They may even forget what they need while solving a different problem. *Syberia* thus takes a quantitative approach to its puzzle design by giving players several puzzles with multiple steps to solve simultaneously and widening the time between feedback for each individual puzzle. The so*phia* moments arise when players connect the right dots, not when they find the dots. The archaeological adventure game *Heaven's Vault* (Inkle, 2019) also approaches puzzles quantitatively with its language-deciphering mechanic. For each newly encountered word, players can only choose between three possible definitions. Often, in the context of the given sentence, one answer appears undoubtedly correct, but when the word is encountered repeatedly in different sentences, players may become less certain of their choice. The quantity and interconnectivity of data in *Heaven's Vault* is thereby the problem and the tutorial, as it develops context which can both lead astray and clarify. By generating large amounts of possibilities, games can thus give players direct answers without depriving them of the fun that ensues after solving a puzzle.

Games contain problems that are satisfying to solve and spaces in which players can freely exercise their intelligence. Game designers can turn any part of their game into a challenging problem for players using many creative and subtle methods such as the ones examined. Designers who sacrifice some of their control over players' problem-solving processes create room for s*ophia* moments, which ultimately keep players motivated to continue wanting to be challenged. Jolie Menzel defines a good puzzle as one through which "the player feels a sense of trust and respect from the designer" (2017). This suggests that problem-solving in general should contribute to players feeling that their resourcefulness and creativity are not belittled but recognised, playing into people's natural desire to learn.

(Word Count: 1081 )

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