

Portal: The Interactive Textbook

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While I do not hesitate to call *Portal* and its sequel “educational games,” I have had trouble understanding what exactly these games are trying to teach me. I grew up playing educational games that all had a clear teaching goal in mind. One game taught me how to spell, another taught me addition and subtraction. These are the things many teachers and parents expect when they hear the term “educational game”: a game that teaches the player something they would otherwise learn in school. *Portal* is not that type of educational game. The most apparent goal of *Portal* is to simply teach someone how to play *Portal*. However, the way it accomplishes this goal accounts for multiple learning styles and sets the bar for more traditional educational games.

Everything the player needs to understand how to play, from movement to the placement of portals, is contained within the game. Both *Portal* and *Portal 2* introduce their mechanics to the player at a minimal pace. In *Portal*, a new mechanic is introduced one room at a time. These rooms start from the very basics of movement and interaction, progressing slowly to more complicated maneuvers and puzzles. They are much like the chapters in a textbook, slowly becoming more difficult as the student makes their way through.

The player does not even gain access to the portal gun until several rooms into the first game, and it is still several more rooms until they have access to both blue and orange portals. *Portal* is slow and deliberate with how it introduces its mechanics, so as not to overwhelm the player. This continues into the second game, though the mechanics are more spread out as the sequel is much longer than the original and subsequently there are more mechanics to learn.

Sound also plays a role in teaching the player as the mechanics stack up. The voice over of characters like GLaDOS, Wheatley and Cave Johnson not only build the story, but also give context to Aperture's inventions as the player is introduced to them. They tell the player just what purpose a new mechanic performs. This is an effective teaching method that introduces, then reinforces the lesson and allows the player time to master this single step, before adding an additional obstacle and repeating the process over again. Once again, this slow pacing does not overwhelm the player, but gives them enough challenge to keep them learning and solving puzzles.

It is possible to grasp the idea of what you are supposed to do without listening to GLaDOS's instructions because of the thorough visual models each game provides. Although I had already beaten the first game with the sound on several years ago, for the purpose of this research I chose to play again with the sound off. Without sound, it becomes easier to appreciate the other design elements chosen to guide the player. Both *Portal* games use minimalist environment design to outline the learning objectives of each room. At the start of most test chambers, pictographs are placed at the entrance to indicate to the player what challenges the chamber holds. If the test chambers are the chapters of a textbooks, these pictographs would be a chapter's learning objectives.

Once the player is inside a test chamber, pictographs continue to guide the player towards the solution, should they need an extra push. The environment art is also an important guide. The textures of surfaces where portals can be placed stand out against those where they cannot. In the second game, this texture variance extends even further as the player is sent deeper underground to older and more dilapidated sections of the environment. The surfaces that yield the best results for solving puzzles will be cleaner than those around it, or might have an extra coating of paint,

indicating it can and is meant to be used. This trains the player to look for these variances and use them to their advantage.

If the player knows how to spot these hints, the intended solutions become more apparent. While there is always one entrance and one exit, the game provides the player with a bit of leeway when it comes to finding the path. Each test chamber is filled with the tools a player needs, but it is up to them to decide how they want to proceed. Finding the strategies that work best also helps the player in the latter sections of each game. These final sections serve to bring together every lesson into one, so the player can prove what they have learned.

Neither game comes with health or character traits for the player to monitor. There is simply the entrance, exit, obstacles and tools. These are the only things the player needs to be mindful of. This makes feedback quite simple. Reaching the exit means the player has understood the puzzle and its intended solution. Death simply means that they have done something wrong, and should try again. Death is not a significant obstacle as it only sets the player back in time a few moments. Most of the larger rooms even have checkpoints, so very little progress is ever lost. It never feels like the player is punished for failure. In terms of the story, no characters ever remark on a player's mistake or death. Characters only remark if a player is successful, providing positive feedback. If GLaDOS makes a snide remark, that means a player is on the right track.

Another method of feedback provided in *Portal 2* are the sound effects that come when a proper sequence is performed. For example, early levels in *Portal 2* require the strategic use of "aerial faith plates", which propel the player through the air. Usually the solution requires consecutive use of multiple faith plates. As the player is propelled from one plate to the other, the accompanying sound effect grows louder and higher pitched, indicating the player has gone

farther in the sequence. It is a small but interesting addition that I feel adds a level of excitement to the player's progress. It is also another example of the game accounting for players that learn better through both sound and positive feedback.

None of these extensive visual and audible hints would mean anything without a form of assessment. The most obvious form of assessment is the player's own success: reaching the next chamber and the next test of their skills. It is the standard every player must reach to prove to themselves, or to anyone watching else, that they have learned the very basic skills the game is trying to teach. This is one of the most interesting aspects of educational games that other tools for teaching do not have: you can only move forward if you reach this standard of success. In an ordinary textbook, there is nothing to stop the reader from turning the page. Here, in this virtual textbook, if the student fails any assessment they are unable to move forward.

In addition, both games offer achievements for reaching certain moments of the game. Minor moments of exploration can also warrant achievements, which encourages the player to use the portal mechanic in interesting ways. Although my time with *Portal 2* focused primarily on the single player campaign, there are many achievements worth mentioning that are tied to the cooperative campaign. These achievements, such as *Portal Conservation Society* and *Triple Crown* not only test your understanding of the game, but your accuracy, speed and communication with another player. Achievements allow the player to test skills above the usual standard of success.

Portal and *Portal 2* may not teach the player anything practical from an academic perspective, like chemistry or history, but they do teach. They show what educational games are capable of, and what they can accomplish that many traditional classrooms cannot. The *Portal* series uses its environment, soundscape, story and interactivity to engage the player in an

auditory, visual and tactile learning system. It allows the player to choose *how* they wish to learn, giving them the options to find the method that suits them best.

The most important aspect I have not touched upon is that it does all this while still being fun to play. Learning does not necessitate fun, but in educational games it is the cornerstone of a successful system. If a student is not engaged in a textbook, they can simply shut it. The same is true for a game: if it is not fun, the player can turn it off. *Portal* and *Portal 2* succeed as educational games not only because of their careful pacing and options for how to learn, but because players *want* to play them. They want to play, which means that they also want to learn. Perhaps the real lesson of the *Portal* series is how to make a well-rounded and successful educational game.