Rubric ©
Mapping Planes of Stimulus Appraisal and Motivation Against Learning Objects

OILS 504 SP 2021
Game Critique
Portal 2
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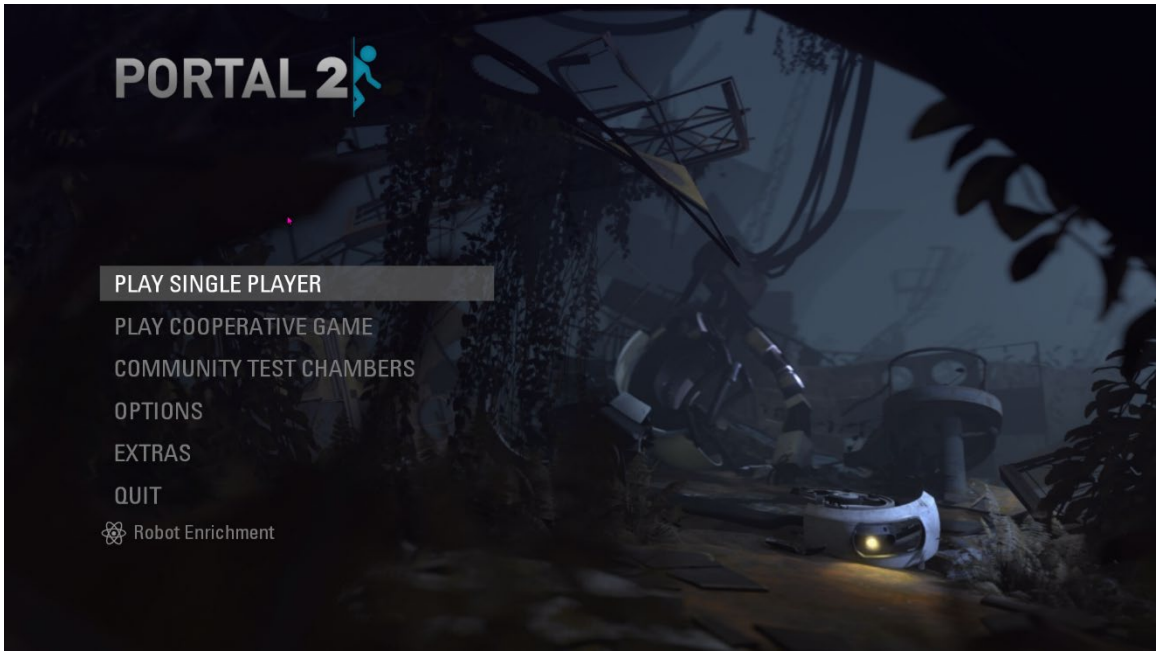
This rubric may be used to assess learning approaches to learning a language or other discipline. If what the cognitive scientists are saying is valid, then we as teachers and designers and theorists should be informed by the findings of cognitive science and assess our teaching plans accordingly. This rubric is derived from the work of John Schumann and Klaus Scherer as well as the findings of cognitive neuroscience. The Schumann/Scherer Model of the Five Planes of Stimulus Appraisal maintains that to motivate learners intrinsically material must be **relevant, support a positive self and social image, be novel, be pleasant, and be within the learner's ability to cope with the task.** These assessments are emotionally based and relate to what the brain does to keep the individual alive and well (homeostats), to allow social interaction (sociostats) and are based on the summative experiences of a life (somatics).

This rubric is a mapping of aspects of instruction against elements of the Schumann/Scherer Planes of Stimulus Appraisal.
The goal is to increase the probability of achieving intrinsic motivation with respect to what is being delivered to and required of the learner.



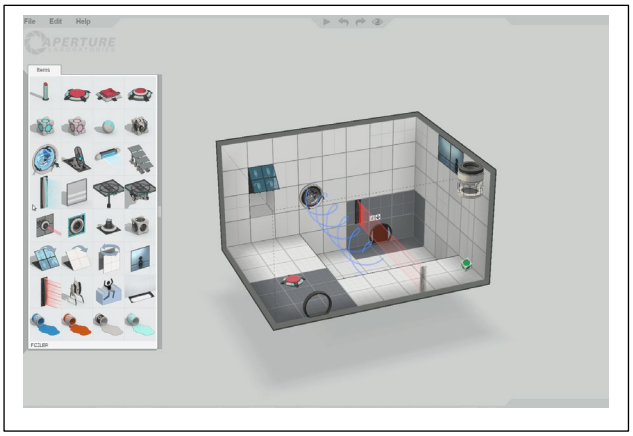
Element of Motivation	Accounted For? Y = Yes N= No NA = Not Applicable ? = Cannot Determine	Comments
Presentation		
Material is **relevant to needs and goals** of the learner Ā	Y	Portal 2 provides a fun way to explore physics concepts in a risk-free virtual environment. The game also has all the story elements required for analysis in an English course, and there is math learning as well. Grades 4-12 (as well as adults) will find opportunities for learning.
Material **offers promise of promoting self and social image** (e.g., learning Chinese will provide a special and needed skill)	Y	Self-image: Yes, solving the puzzles, which grow increasingly difficult, will certainly boost self-esteem and confidence. Two of the three modes of play are social: Single Player, Cooperative Play, and Community Test Chambers. Cooperative Play gives a team of 2 players a whole different set of maps than single players get, and the test chambers are where players create their own maps. This game lends itself well to a classroom setting where 2 or 3 students can share a screen, taking turns controlling the avatar and playing sideline support. The player-created maps made in the test chambers can be shared. There is an active global community of Portal 2 players, modders, and people using Portal 2 in academic settings.
Material and/or presentation/stimulus is **novel, is something new and interesting to the learner**	Y	Absolutely! The game environment is visually pleasing, the non-playing characters (NPCs) are humorous, the story is engaging, and the whole concept

		of "portal guns" and the mind-bending physics is fun and challenging.
Presentation approach is **intrinsically pleasant/interesting/stimulating/ thought provoking**	Y	The 3D environment of Portal 2 is sci-fi futuristic with an interesting blend of industrial, grime, almost-ominous darkness, intrigue, and humor. Each puzzle map throughout the levels is filled with objects and structures that may or may not factor into the puzzle—the player must determine through exploration, experimentation, and reasoning.
Wording, visuals, audio, language is **manageable and useable to the receiving group or individual**	Y	There is a narrator and there are several NPCs who speak. The dialogue is mostly delivering the story, but it also includes subtle hints to the player. Simple line drawing diagram clues appear when a new skill or physics concept are required. These are very simple, vague clues that take some practice understanding.
Practice (Coping)		
Opportunities are provided to develop proficiency in application of the skill, knowledge, ability, or concept	Y	The player begins with learning to navigate the environment, with simple navigational instructions integrated seamlessly into being introduced to the story and the droid character, who serves as a kind of guide for the player.
Practice opportunities appropriate to the objective(s) are provided	Y	Players are free to take as much time as they need to complete each puzzle map. There are no pressures of a timer or attacking mobs.
Practice activities, to include repetition and spiraling, are designed to develop automaticity in responses and execution if appropriate	Y	Each map builds on the physics and the maneuvers practiced in the previous map. Players can play each puzzle map as many times as they want without penalty, so that with practice creating and moving through portals and around the map becomes increasingly easy and smooth.
Practice is relevant to needs and goals of the learner	Y	The more players work on mastering the keyboard/mouse and hand-eye coordination skills the puzzles require, the more they understand the physics of what they are doing (force, acceleration,

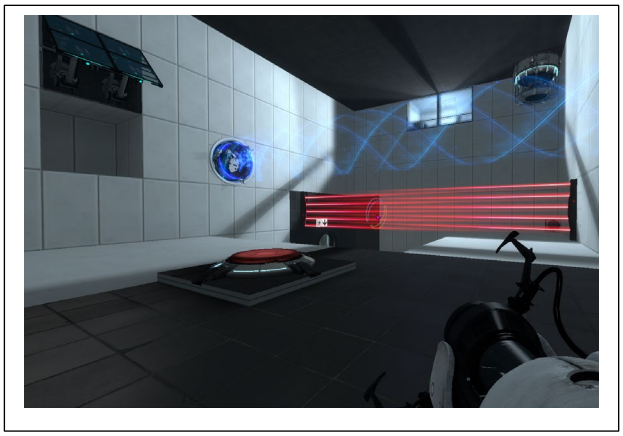
		kinetic energy, gravity, time, position, etc.) If play accompanies instruction in physics, players can gain even more understanding.
Learner can see that skill/competency acquisition is taking place	Y	This is very clear to the learner, because it is easy to recognize that each map is more difficult than the previous map, and figuring it out, getting through the exit, and moving onto the next map is satisfying.
Practice requirements are **within or slightly above learner's competency level**	Y	Each puzzle map is a little bit harder than the previous one, so it is always challenging, but not too frustrating. Although, in the first few harder maps of level 1, I was at a loss after several tries. I looked to see if there was online help and I found walkthrough videos. Watching someone solve the puzzle helped me tremendously. It might seem like cheating, but even though I saw "the answer" it still took a lot of work—the physics work—to accomplish what my virtual mentor so gracefully accomplished. I was able to transfer the learning to other challenges, but I will not refuse the help of walkthroughs either.
Learner is **able to perform practice requirements.**	Y	There is ample opportunity to practice.
Practice is designed to lead to correct response.	Y	Each puzzle is a room, or sometimes a larger area that is a series of corridors and obstacles, but each area is self-contained and the player can only advance to the next puzzle if the current puzzle is solved and the exit door is opened. The environment gives excellent feedback as to how the player is performing.
Practice, while not necessarily pleasant, **generates a feeling of accomplishment.**	Y	Some areas, especially when a new concept is introduced, can be very tricky to solve, and the player might have to work at it for a while, but when the puzzle is solved there is a feeling of accomplishment as well as feedback from the NPCs.

Production and Posting (Coping, Self and Social Image)		
What is produced is informed and scaffolded by practice—may even be concurrent with practice, i.e., repetitive practice may not be part of the learning task such as writing a paper, but the writing is both practice and production at the same time.	Y	The only way I can see that Production and Posting are relevant to Portal 2 is in the Community Test Chambers. There is rich potential in this area, with the ability to create and share custom maps.
Opportunity is provided to apply the skill, knowledge/ability or concept being learned	Y	Creating game maps in the Community Test Chambers would put a player's physics skills to the test! An understanding of why the items in the maps work the way they do would be required to make fun maps—or even logical maps.
Production reinforces practice activities	Y	I only briefly explored the Test Chambers, but clearly exploring this feature in depth would enhance one's gameplay. Instead of playing an expertly designed map, players can play their own flawed designs which will help clarify *why* what works, works.
Whatever is produced by the learner is posted or provided to group for peer view and learning	?	I believe that creators in the Test Chambers have control over which content they share and what they prefer to keep private.
Participation/Collaboration (Coping, Self and Social Image, Novel, Pleasant, Relevance)		
There is opportunity for synchronous or asynchronous review of posted products	Y	Even outside of a classroom, there is an active online community of Portal 2 fans and modders (people who modify games), and maps can be rated by the community.
Teacher and peer feedback promote a Community of Practice/Wisdom/Knowledge	Y	This could certainly be fostered in a classroom setting, and for sure the online Portal 2 is a Community of Practice/Wisdom/Knowledge with numerous forums, wikis, and community sharing sites.

Teacher and cohort can see who is contributing and how they are contributing to knowledge sharing	Y	Again, this could be applied to a classroom or internet gaming community.
Variation in task readiness and ability to contribute is dealt with by group effort to meet goals	?	I don't know how to interpret this, except to say that for Portal 2, like any popular videogame, there is an active online community with many contributors dedicated to sharing tip and making it easy for other players to get started.
Virtual opportunities to meet and collaborate are provided for and if face to face meetings are not feasible and the instruction is online or blended	N	This would be completely up to groups to coordinate themselves. There is nothing inherent in Portal 2 that lends itself to working in groups, other than Cooperative play, so it would be up the learners or instructors or community members to make that happen.



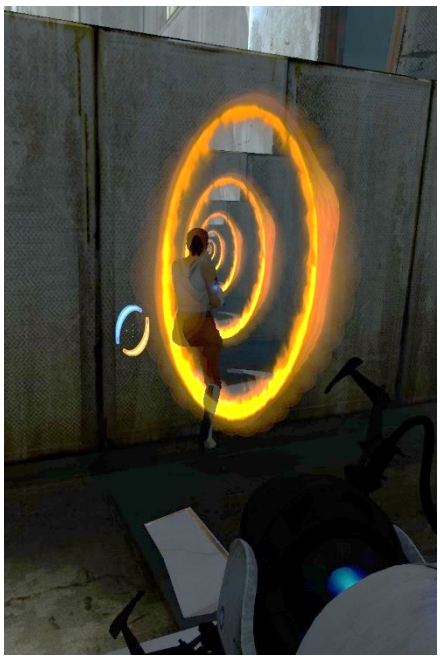
Test Chamber creation



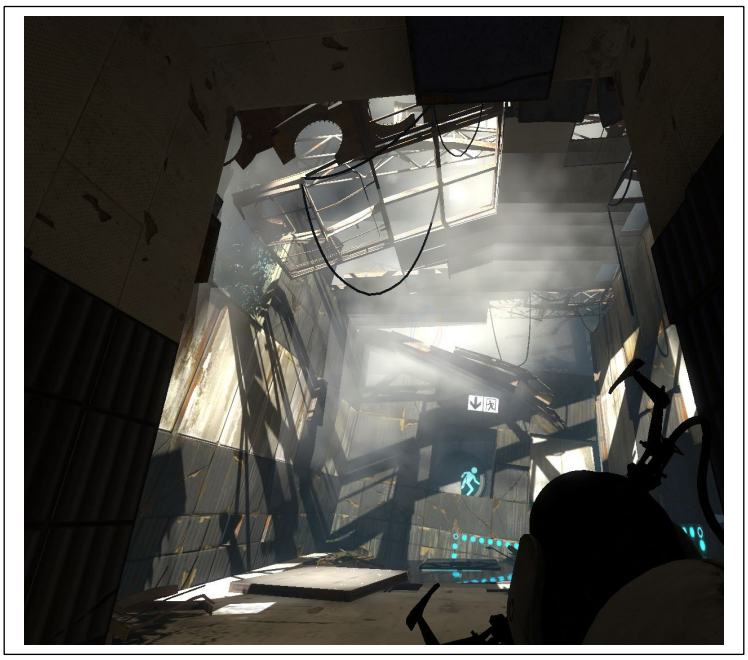
Rendered Test Chamber creation

2. Summarize the play and purpose of the game

Portal 2 is a puzzle-platform game where players navigate multiple puzzle maps per level, using a "portal gun" to create inter-dimensional openings to teleport through. Most portals lead the player back into the dimension they just exited, which can create a "hall of mirrors" effect until an understanding of how to move through time and space with the portals is learned. Players play as Chell, a female avatar, who is unwittingly recruited to help the supercomputer GLaDOS reconstruct the delapidated Aperture Science Enrichment Center wherein the game maps are set. The game is linked to the Half-Life game series, and its complex backstory is integrated into a broader story that expands beyond just Portal 2. The plot of the game is complex, but basically Chell is just trying to escape the Center and prevent the egomaniacal GLaDOS from rebuilding the Center and causing more harm.



Players can create infinite mirror effect portals



Screenshot of map exit

3. List and comment on learning and design theories and strategies being applied in the game. (Behaviorist, Cognitivist, Constructivist, Connectivist, Collaborativist, Other)

Portal 2 incorporates several learning theories. In order to solve the puzzles, players need to be able to navigate the controls and maneuver fluidly in the environment. The puzzles require players to use steering and momentum to maneuver through some of the portals and land in the correct areas of the map. The feedback for incorrect movements is not getting to the map area where you intended to go; it's immediate and non-punitive. This basic level of gameplay demonstrates Behaviorist principles and it is necessary in order to move to the realm of Cognitivism.

Once the player has the hang of navigating—a skill that will continue to develop as the task of maneuvering increases in complexity—the player must turn attention toward puzzle-solving. This is where Cognitivism comes into play. Players must examine their surroundings and learn to recognize items and spatial relationships and apply what they have learned about maneuvering to interact with the environment in order to solve the puzzles. For example, after exploring and assessing a new map, the player must create a plan of action, holding the series of imagined steps as a mental image, and then acting upon them. The player will then determine if the steps were incorrect or if the maneuvers were executed poorly, and that, in conjunction with the feedback of failure or success, will indicate what was correct or incorrect about the thought process. There is no punishment for failure. There are no time limits, mobs, or health or hunger stats to manage, so players can focus on solving puzzles, trying and failing as many times as needed to solve the puzzles.

Visual cues to upcoming puzzles seen before entering some maps. Shown here: unrendered player-built map

Portal 2 is a good example of Constructivism. Each puzzle or "room" within each level builds upon the skills learned in the previous level. The scaffolding in the game is excellent. Players learn how to do something, which combines a maneuvering skill with a cognitive skill, such as determining the precise position in which to place a portal and using velocity and gravity to move through the portal arriving in a spot not achievable by simple walking or falling through the portal. Players use each new skill they have learned several times before a new challenge is added. Not only that, but as the player progresses, the story unfolds, and this element in turn plays into the navigation and the puzzles, so the player experiences the building of a foundation and the deliberate, careful spiraling of layers of learning being constructed.

There is definitely an active community of Portal 2 enthusiasts who post on message boards, contribute to forums, share video, and provide help and support to other players, bringing the game into the realm of Connectivism.

To me, the most exciting learning theory I see in action in Portal 2 is what Seymour Papert called "Constructionism" which is a play on blending Constructivism and construction. In his seminal book Mindstorms Papert argues that Constructivism can lead to deep, transferable knowledge is learners create something. Although players are creating a virtual something in the Test Chamber, it is nonetheless a creation, as evidenced by the ability to interact with it. I see Constructionism as the highest-level learning theory, so the fact that Portal 2 fits with this learning theory qualifies it as an excellent learning game.

Screenshot of moving background image in transportation chamber room

4. Does the game apply to an area or issue you are involved in. If so, how and will you use it to deal with that issue. If No, generally comment on your assessment of its value.

Yes, Portal 2 applies to my keen interest in using games to engage learners to support and enhance academic learning. The fact that Portal 2 was designed for fun but proved a valuable learning tool heightens my interest that much more. When I chose the game for this project, I had no idea that it is used in academic settings where its value, especially for learning physics, is widely recognized and utilized. I am generally interested in using games and simulations in—and as— learning environments and one of my key areas of interest is how deeply learning opportunities can be embedded into leisure games—sometimes unintentionally. Although I have never taken a physics class and I would have thought I do not have the requisite knowledge to understand, Portal 2 has piqued my interest in physics and given me the confidence to believe I can probably understand a lot more than I realized I could.

5. Rate the game on a scale of 5 to 1, 5 being the highest rating (Meets All Objectives) and 1 being the lowest (Does Not Contribute to Learning). 4 = Good; 3 = Neutral; 2 = Needs Improvement

I rate this game as a 5. I have not worked through all of the levels yet, but even if I do, there is still the co-op play to explore, and if I were to master both, there is the whole

6. Rate this assignment: 5 = Very Valuable; 4 = Helpful; 3 = OK; 2 = Could be better; 1 = Please don't do this to us again

I rate this assignment as a 5. I created more than twice the amount of work for myself that I needed to, but I am glad I did. Interestingly, Portal 2 and Curse Reverse, the educational game I analyzed with my group, are both classified as "puzzle

platformers", Portal 2 is in a whole other league. The complexity and sophisticated production value are part of its enduring popularity, but this game is truly inspiring for what can be done to make education fun and fun educational. If it were not for this assignment, I may have tried Portal 2 at some point (after I graduate), but I likely would not have recognized the depth and breadth it offers as a learning device.

8. Comments related to Items 4 and 5. If applicable to your assessment, provide suggestions for improvement.
I have nothing to suggest for how Portal 2 might be improved.
7. Suggestion to you as to how to work the assignment. Additional comments as desired
I assume this is not applicable to an individual analysis of a game that is different from the one I am doing with my group.

Sources:

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