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Can Playing Games Help Students Master Concepts from General Psychology Classes?

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ABSTRACT

As part of a final project for a general psychology course, students were required to play a game, either digital/video or on a board. Students selected their own games, and were asked to identify psychological principles in their game play. Topics included the brain, sensation and perception, human development, learning, motivation, intelligence, personality, and mental disorders. Students successfully applied all topics to game play, but to varying degrees. Student discussions on the brain and intelligence were well covered. Discussions on personality and psychological disorders issues were relatively poor. Students were able to make connections between concepts and their game-play experiences.

KEYWORD

Applied Learning, College Students, Game-Based Learning, Learning, Psychology Class

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1. INTRODUCTION

Playing games has been and continues to be a recommended way to learn. This idea aligns well with constructivism, or student-centered learning. Piaget, Vygotsky, and Montessori have all emphasized the role of play in learning and how it aids children and students with integrating new information into their knowledge base. This led to the question: would playing games in higher education also foster learning for students?

Play has been linked with improved learning in student-centered pedagogy. Games encourage collaboration (Pivec & Pivec, 2011), which is linked with improved learning. Educational games, including card games based on Uno or Crazy Eights, that capitalize on play have been effective in helping students learn minerals (Spandler, 2016), and in encouraging collaboration. Having students watch a biology professor demonstrate a complex process by drinking fake urine fosters an emotional, personal connection for learning (Lujan & DiCarlo, 2016); afterward, students who saw the fake demonstration had better recall and understanding of the biological process than those who did not. In general, playing games is associated with improved learning.

In the college environment, games have proven to be useful learning tools. In a simulation game created specifically for a chemistry course, students built a battery and their processes were recorded (Hou, 2015). Students who were more involved in the activity showed greater reflection and problem-solving actions, and all demonstrated a positive focus even when the final product did not work. Similarly, in a SQL computer language college class, professors created a game for students to learn the language while interacting with non-player characters (NPCs) while tracking down a criminal mastermind (Soflano, Connolly, & Hainey, 2015). Several different methods of interaction with the NPCs were offered, including a picture-oriented option. Students gravitated toward the interaction style that helped them best learn the material and solve the game's problem. Making games personally meaningful for these college courses improved measures of student success.

Student success has also been linked with video games specifically made for educational purposes. One such educational video game that focused on the process of identifying viruses was used as a supplement in a course for medical laboratory students (Fleischmann & Ariel, 2016). Though some complained about the simplicity of the game, 90% of the students reported enjoyment, learning, and acquiring applied knowledge for virus recognition. Engineering students demonstrated project management learning with a video game that required them to work in teams on a construction project (Misfeldt, 2015). The game required students to create companies, identify their strengths and weaknesses, and address obstacles and challenges to completing construction. Student reported having fun playing the game while also providing real-world experiences, emphasizing the importance of collaboration, and being able to think strategically. A role-playing game meant to teach sustainability used with engineering students required them to help people and organizations create green buildings (Dib & Adamo-Villani, 2014). When compared to non-playing peers, those who participated showed high rates of declarative and procedural knowledge about sustainability. Acting individually, students participated in a role-playing game

helping people and organizations create green buildings. In addition to faculty created games, educational games are also linked with improved learning for college students.

Video games can help learning even when the content does not directly relate to class. The engineering simulation game Energy City was repurposed for a college class to help Japanese college students learn English (Franciosi & Mehring, 2015). Students were tasked with building a city that was energy efficient with minimal damage and reported two educational benefits to playing the game. They felt more confident with their use of English and improved their skills at combining multiple information sources with different perspectives. Second Life, an online virtual world that encourages interaction and exploration of the world, has been used supplemental educational tool, specifically in health care management and paramedic training courses (Beaumont, Savin-Baden, Conradi, & Poulton, 2014). Students played out several scenarios, and were graded on some of the simulations. Students said they appreciated playing the game because they could personalize their experience by going at their own pace and through experimenting with different approaches. They also appreciated being able to collaborate with others in the game. Games and play do not need to be directly linked to educational objectives to be effective learning tools.

Play and games are linked with student learning. Research indicates that board games, video games, and virtual worlds are effective learning tools for college students, both with direct and indirect connections to course material. However, since many college students play games outside of class, they already have regular access to a learning tool. This leads to the question: can students learn about and understand course material when playing a game of their choice? To that end, the purpose of this study was to explore how students experience concepts and theories taught in a general psychology course when playing a board or video game of their choice. Students' responses were evaluated to determine whether they were able to connect classroom theory to game play, and how well they were able to do so in several fields of psychological study.

2. METHOD

2.1. Subjects

After approval from IRB, this study used student-submitted final projects for the Fall 2015 and Spring 2016 semesters, for a total of four classes. Students were sent an email requesting permission to use their final projects as part of a research study. If they were willing to let their final project be used in the study, students were instructed to send a return email with their permission for a total of ten final projects.

Of the 115 students enrolled in the course, 42 students were ineligible to participate due to their dual status as high school and college students. Of the remaining 63 students, 43 should have submitted final projects as 14 students were exempt from the final and another six withdrew before the end of the semester. Thirty students submitted final projects connecting psychological principles to game play, and when asked, ten students, four female and six male, gave permission for their final projects

to be used in analysis. No additional demographic information was collected from students who allowed their final projects be used in this study.

As per the final project instructions, students selected their own video or board games, for eight different games in total. Three students reported using "Call of Duty," a first-person shooter video game. Each of the following games were played by one student: Clash of Clans, Club Penguin, FIFA, Hedbandz, League of Legends, Madden 16, and Minecraft. Details on the games can be found in Table 1.

2.2. Procedure

As part of a final project assignment, students were asked to play a game that required collaboration while manipulating a virtual world and discern what role psychological principles had in the game. Students could choose a board or video game, and suggestions were provided. They were informed of final project requirements on the first day of class as they were expected to play their chosen game for the entire semester, and directions were provided in the syllabus and online via Blackboard. The assignment instructions, including the questions to be answered, are listed in the Appendix. The questions focused on key areas in a general psychology course: the brain, sensation and perception, human development, learning, motivation, intelligence, personality, and psychological disorders.

Students were asked to play their selected game weekly for a total of 15 weeks beginning the first week of class. They were all instructed to start playing a game that both requires them to manipulate a play environment where their actions influence another person and involves interactions with others. Students were also advised to start playing and connections would be made throughout the semester to course material. When new material was introduced, class discussion involved how it might relate to

Table 1. Games used for the final project

Title	Game type	Platform	Ratings
Call of Duty – not specified	video	none given	M – Mature, Ages 17+ *
Call of Duty – Black Ops	video	none given	M – Mature, Ages 17+ *
Call of Duty – Modern Warfare 2	video	none given	M – Mature, Ages 17+ *
Clash of Clans	video	none given	none
Club Penguin	video	none given	E – Everyone *
FIFA	video	xBox	E – Everyone *
League of Legends	video	none given	T – Teen *
Madden 16	video	PS4	E – Everyone *
Minecraft	video	none given	E 10+ - Everyone, Ages 10+ *
Hedbandz	board	N/A	

*Entertainment Software Association. (2017). *Entertainment Software Rating Board*. Retrieved from http://esrb.org/

game play. For example, during discussion of the lobes of the cerebral cortex, students were asked what visual skills in game play could they connect to their occipital lobe or what complex motor skills would be wired in the parietal lobe, such as those needed to manipulate a controller. During classes covering classical and operant conditioning, students were asked what sights and sounds during game play indicate a good or bad thing is about to happen, such as in World of Warcraft, or what rewards or punishments come from certain actions, such as buying properties in Monopoly.

2.3. Analysis

Student responses were distributed in a spreadsheet, with each final project question placed in a separate page. Each student's comments were listed in his or her own column on each page, and a consistent order was kept throughout. Analysis of the responses identified concepts and theories covered in class for each question's topic.

3. FINDINGS

3.1. Final Project Responses for the Brain

All ten students listed multiple observations about their brains' involvement in game play for a total of 75 responses. Of those, six were incorrect. The errors were with the midbrain being responsible for incorporating audio and visual input (3 students), the parietal lobe being key to visual processing (2 students), and the temporal lobe also being responsible for visual interpretation (1 student).

The most examples of brain involvement were about the frontal lobe. Of the sixteen comments, ten were about the importance of decision-making when playing a game. Another three comments were about the complex emotions that someone feels while playing. Additional comments including being able to manipulate others during game play, knowing when to ask for help, and playing a game that appeals to one's interests. The majority of student comments regarding the frontal lobe encompassed a variety of related issues, such as with the comment

I need to decide what formation I'm going to play with and reason why. I'm starting the players that I am and not give the guy behind them a shot. I need to reason why I don't strangle my brother when he scores a goal on me and abrupt [sic] into excitement, instead go down the field and score my own goal. I would never be able to talk shit and get in the head of my opponent in order to give me the upper hand. Thanks to the frontal lobe I am capable of doing all of this and use it to my advantage.

Fourteen comments were made about the use of the occipital lobe during game play, with nine students making observations. Eight of the comments were about noticing game play and the action of others in order to succeed or win the game. One student simply stated, "Occipital lobe is about vision and you have to watch for when you run out of time." Four other comments were about the use of the occipital lobe to identify colors and patterns of friends and enemies, and another two comments were about being able to read written communication during a game. One game in particular only

used text to communicate, and a student noted," Players need this ability [to read] to be able to receive and give out messages to other fellow penguins in the game.

All students also provided a total of 12 comments, including an incorrect connection, on the use of their temporal lobes. Five comments focused on the importance of a working temporal lobe when communicating during team play, and another four comments focused on listening for and hearing sounds that can indicate danger or success for their game play. One comment noted that sounds associated with certain gaming activities are fun to hear, and another mentioned "The upbeat music in the back also has great dramatic highs and lows as well to keep the hype going with the battle youre [sic] in or the mood of the current setting."

Involvement with the limbic system was mentioned eleven times, with five comments focusing on its key nature in memory. Students described how they needed to remember previous game actions that were successful, both during current game play and earlier experiences. Two comments addressed the basic emotions related to game play, such as getting angry over a loss, and another two were about the instinct to survive even when playing a game. Another comment related to instinct was the desire to get revenge when thwarted by another. One student noted the role of thought organization with "…allows you to think thoroughly about the next question you want to ask so you don't repeat anything."

Each student mentioned the use of the midbrain, but as noted earlier three were incorrect observations. The remaining comments, however, described the importance of being able to get messages from their bodies to the brain for interpretation and the return of action impulses from the brain to the body. They commented on how they can use what they see and hear to guide the actions of their hands during game play because information goes back and forth between the body and brain.

Eight students each had an example of the use of the parietal lobe during game play, but two were incorrect observations of visual activity. All of the comments focused manipulation of their body, mainly their hands. As one student said," Your [sic] showing the noobs whose boss and all that time you don't even realize how many times you've pressed a bunch of different buttons on your remote controller."

One student commented on the importance of the medulla oblongata during game play with "It is responsible for maintaining vital body functions, such as breathing and heartrate, well if I didn't have this, I'd be dead."

3.2. Final Project Responses for Sensation and Perception

All of the students described how sensations and perceptions related to game play with 26 examples, two of which were unfocused. As with their responses to the brain and subsequent questions, students often pointed to more than one concept or theory in their answer. Of the unfocused comments, one student made a generic statement that sensation and perception are needed for any activity, and another pointed out limitations with "It appeals to all senses except taste because, well, the snozzberries don't taste like snozzberries."

Students cited the importance of attention, perceptual set, signal detection theory, motion perception, depth perception, and sensory adaptation when playing their games. Two students said that being able to see in 3D made it easier to play their games. One student noted that being able to see a "bad guy" moving allowed for defensive action, and another pointed out that the background music in the game became less annoying once sensory adaptation allowed them to ignore the noise.

Of the 24 examples provided, eight were given each for both the importance of attention and perceptual set. Students noted the importance of focusing action in the game to win or succeed as well as being able to focus narrowly on relevant information, such as identifying friend or enemy within the game. Students also commented on the importance of a perceptual set so they could know what they needed to do during current game activities, what to prepare for next, and to predict what other players actions might be in order to ready themselves. As one student commented on his selection process for his team when playing with a brother "I always knew what to expect." Another student noted that unexpected events best show when a perceptual set is in use since it "could be disrupted during this game when a player thinks they're in the clear for destroying a tower and then they get ganked."

Students provided four examples of signal detection theory when playing a game. Three noted how being able to identify various aspects of the game, such as differences in jersey color or the movement of trees and plants in the virtual environment, helped them be successful in the game. They were able to determine what is a help or a danger, and play accordingly. One student noted a more general use of signal detection when playing with "When I am playing the game I am fully amerced [sic] into the game play. If my mom shouts downstairs to me that its [sic] dinnertime, I usually don't hear her, she has to text me and tell me."

3.3. Final Project Responses for Human Development

Focusing on developmental issues, six students addressed factors in Piaget's, Freud's, and Erikson's theories. Two students said that developmental concerns are not relevant to their games, which was incorrect. Two other students made vague statements regarding the appropriate ages of players. As one student noted:

COD is for everyone for about ages ten and up. I think anything younger than that won't understand the concept. I play it, I know teenagers who play it, and I also know adults who play it. I don't believe this game is developmentally appropriate for children.

For Piaget's theory, two students noted that a person in concrete operations would do well in the game because they have mastered logic, and two other students focused on formal operations and a person's ability to think abstractly and manipulate information in their heads. Another student, along with one who focused on concrete operations, also noted the importance of Piaget's adaptation during game play. The student noted "Piaget talks about adaptation, which can be used when you need to solve an issue in the game like when your house gets destroyed or when you need to craft a weapon."

One student commented that Freud's psychosexual theory has no relation to playing a game while two others focused on the mature title of their game. Their comments, however, were not related to Freud's mature genital stage, but the age of the player, such as with the comment," M is mature which is 17 and up. And according to Freud it matches well because we are at his last phase at the age, you are all developed and mature. You are in the Mature Genital stage."

As with Freud's theory, one student commented that Erikson's psychosocial theory does not apply to game play either. Two other students commented on Erikson's identity-vs-identity diffusion stage, with one noting that it would be helpful to play a game when determining personal preferences and another noting that having an established identity will make it easier to manage the intensity and challenges when playing.

3.4. Final Project Responses Learning

Observational learning, classical conditioning, and operant conditioning were all mentioned as being involved in game play. Of the 30 descriptions, three examples listed as classical conditioning by the students were incorrect. One student mentioned that classical conditioning came into play when learning from watching others, and the other two mentioned rewards that come from playing the game. Regarding operant conditioning, one student confusingly wrote "Operant conditioning is a simple game and used to show how to do the basics of operant conditioning, but more so about the difficulties in applying it well."

Eight students stated observational learning was important because they learned from others. Their descriptions were split between copying other players' behaviors in order to determine what does and doesn't work and devising a strategy to best other players based on their in-game actions. Of the five students who correctly described classical conditioning in their games, three described how they condition other players to react a certain way based on their characters actions. Of the remaining three examples, students mentioned how they had been conditioned to react to a certain sound or visual cue in the game. One student included with along with a description of associating a red-hazed screen with imminent death this comment "Classical conditioning is the strangest thing we learned all semester in my opinion. It really blew my mind and now looking to see how I am classically conditioned through this game is scary."

Students offered twelve examples of operant conditioning in game play, which includes the confusing statement mentioned earlier. Seven of the eleven on-target descriptions focused on reinforcement, with all but one positive reinforcement. Students described how certain actions that got them rewards, such as longer hiding times or better skill levels, were repeated over and over during game play. One student highlighted negative reinforcement by describing how to escape from the unpleasantness of certain loss by taking a risky chance to score a goal and win. Positive and negative punishments were also mentioned, three times and once respectively. Negative punishment during a game came when the player had to wait and miss out on

game activity after being killed. Positive punishment examples focused on undesired consequences to actions that lead to the students learning to not repeat a behavior. As one student described:

Another one is it's your fist time playing Black Ops and one of your teammates recommend holding a grenade for 10 seconds because it's a hack that will level you up by 50 levels. After 5 seconds you explode and die. Next time you know better than to hold the grenade for more than 5 seconds.

3.5. Final Project Responses Motivation

All 10 students gave 15 examples of the connection between a motivation theory and game play. The evolutionary and optimum drive theories were the two general theories mentioned, and self-determination, self-regulation, Maslow's hierarchy of needs, and intrinsic and extrinsic motivation were the individualized theories selected. One student who mentioned evolutionary theory pointed to the instinct to compete to win "over a measly video game." Optimum drive theory was mentioned by three students as being related because they experience a moderate level of arousal when playing. One student prefers the game used for the final project because "I tried multiple games…but I felt like nothing gave me the arousal that this game did. I enjoyed every bit of this game."

One student focused on Maslow's theory, pointing out the feelings of esteem that increase when successful and the challenges to playing when love and belongingness is threatened by a family member's bad sportsmanship. Three other students focused on various aspects of self-determination. One student discussed autonomy and how playing as a character in a game means being able to design and control your character's life. The other two mentioned feelings of accomplishment associated with playing their games. As one student noted "When I complete a mission or ultimately beat the game the feeling of accomplishment is great."

Two students mentioned self-regulation with the importance of feedback from others in order to adjust game play and achieve goals during a game. Four students provided examples for intrinsic and extrinsic motivation. One student briefly described how someone will play a game to achieve the rewards within it. Three students said that they played their games because they found them to be personally satisfying, both during cooperative and solo games.

3.6. Final Project Responses Intelligence

When asked to identify how their game connects to intelligence, all ten students focused solely on Gardner's theory of multiple intelligences. Nine of Gardner's intelligences were used, which included intrapersonal, interpersonal, visual-spatial, existential, musical, body-kinesthetic, verbal, mathematical, and naturalist. All students commented directly or indirectly mentioned the importance of being able to solve problems in order to be successful in their game.

Of the 34 intelligence examples, 25 of the comments discussed how the intelligence was used in the game. Seven intelligences were identified as not needed, and two

types of intelligence were used incorrectly. One of the errors confused naturalistic and spatial intelligences, focusing on being able to interpret what is seen in a game. The second error is a typical confusion of intrapersonal intelligence and mentioned being about to interact effectively with others instead of internal awareness.

The majority of comments about a needed intelligence was with visual-spatial awareness with thirteen comments from nine students. They recognized the importance of being able to see what is happening around them in the game as well as using depth and motion perception to win. One student commented "Also visual is crucial because the game is changing every second so you need to adapt." Another student further described," It would be easier for somebody like that to be able to control the play in procession of the ball and know where the rest of the team is and defenders too."

Comments for interpersonal, mathematical, and verbal intelligences all focused on how having the skills can help someone succeed in a game. Two intelligences, specifically body-kinesthetic and musical, were mentioned as being needed for some and unnecessary by others. For body-kinesthetic, two students commented on the importance of knowing how to manipulate a controller while another student said the intelligence is useless when playing an app game. Similarly, with musical intelligence, one student repeatedly mentioned the importance of being able to hear and recognize sounds in order to avoid danger and be safe. Another student said," Musical intelligence is one of the intelligences that is not needed to play this game. It's sports, not Guitar Hero!"

Gardner's naturalistic and existential intelligences were mentioned as useless in game play three and two times respectfully. Understanding the natural world was dismissed as needed to play a game, and understanding one's role or the purpose of game play in the universe was also viewed as irrelevant to success.

3.7. Final Project Responses Personality

In their final projects, the students provided eighteen examples of how personality theory applied to their games. The theories covered included Freud's theory of mind and a defense mechanism, Horney's theory, reciprocal determinism, Maslow's self-actualization, and the five-factor trait model of personality. All of the examples related to Maslow's stage were off-target. Students linked Maslow's highest stage with the need to have fun or to appear a certain way to others along with finding a game that appeals to someone on a personal level.

Three of the four examples for openness in the five-factor model were used incorrectly. Students described friendliness and cooperation as related to openness; one student did mention the importance of being a creative and flexible thinker when playing a game. The remaining two examples for the five-factor model were about extroversion, and were correctly identified as such. Both pointed to being social and gregarious can help game play because others helped them back. Two students provided three examples of reciprocal determinism in gaming. Both students described how their personal interests and attitudes influenced their game choice, such as previously playing a sport in real-life. One student also connected in-game opportunities driving

behavior and appealing to personal desires with "If there's a tournament going on and bragging rights are at stake, my environment is influencing me to want to play this game more so I can prove I'm the best player."

For Horney's theory, one student said that the people one regularly plays with in a game become family that can foster safety and security within a person. Another student also mentioned Freud's regression during game play because "I am acting like I was a young kid playing a silly game." With Freud's theory of mind, one student provided two examples of the id and another of the ego. As described, the ego allows for balance between playing the game and meeting other life responsibilities. The id examples were about the immediate good feelings that come from meeting goals. The student mentioned "The idea of the game is to win, to eat someone else. If you have a very id personality, you probably enjoy beating other people and winning."

3.8. Final Project Responses Psychological Disorders

One student did not provide any examples regarding the usefulness of playing a game for someone with a psychological disorder. The other nine, however, made suggestions for who could be helped through game play. Of the 27 examples, two were recommendations to avoid play. For a first-person shooter game, one student suggested that anyone with PTSD due to an experience with violence, specifically shooting, should not play the game. Another recommended avoiding a sports game with a mood disorder given that the frustration from game play could cause an aggressive reaction.

Of the remaining examples, students pointed to the usefulness of games for individuals with anxiety disorders, mood disorders, autism, a neurocognitive disorder, a traumatic brain injury (TBI), and a histrionic personality disorder. The suggestions for people with a neurocognitive disorder and TBI were focused on repetition of information to foster memory. The student who mentioned narcissistic personality disorder focused on how being the center of attention when playing with others could feed into the problem instead of helping a person cope.

Ten of the suggested helpful uses of game play were for individuals with mood disorders. For both major depressive and bipolar disorders, students recommended playing a game someone could feel successful and accomplished. Some reported more general advice, such as:

[It] help them by taking their anger out on the game and not having to keep it in. It may also make them feel better about themselves when they do good in the game or maybe just playing the game in general can make them feel better.

Others made more personal observations regarding game play and coping with mood concerns with "I've never experienced depression but anything I've been feeling low spirited I just try to stay busy because it always seems to do the trick" or "Sometimes that's what I do to get away."

Five students pointed to advantages in game play for individuals with an autism diagnosis, and generated nine examples. All five mentioned the game as providing an

opportunity to interact with others and learn social skills. Students also pointed out the potential benefits of practicing fine motor skills, feeling successful in an activity, refining focus and attention, and teaching "to cooperate with others by maybe building or finding something the group needs, like food."

Two students mentioned the usefulness of game play for anxiety disorders. One commented that playing a game can be relaxing and, therefore, reduce anxiety. The other focused specifically on social anxiety disorder and the advantage of being able to practice interactions in an environment where other people are distant strangers.

4. DISCUSSION

When asked to apply psychological principles while playing a game, students in a general psychology class considered factors related to the brain, sensation and perception, human development, learning, motivation, intelligence, personality, and psychological disorders. While some topics were better understood than others, all students attempted to apply various theories to their games. The two topics best applied by students were those related to the brain and motivation. The results indicate that play can be an effective learning tool in applying general psychology concepts and theories.

Students clearly reported the most connections with brain activity during game play. They were able to link sensory experiences with the brain lobes along with other lobe-related skills. Motivation was another area where students did well since all of their examples were on-topic. The only drawback to the motivation examples is the smaller number of examples compared to other topics, including the brain.

Sensation and perception concepts were also identified by students correctly, especially attention, perceptual set, and signal detection. Other sensation and perception topics, such as motion and depth perception along with adaptation and the sensory thresholds, were not recognized as often if at all. Students were also able to connect various types of intelligence as defined by Gardner to game play. While it is useful that students were able to identify different types of intelligences as helping or ineffective, other theories and issues related to intelligence were ignored.

Issues related to human development and learning in game play were applied with mixed results. For human development, students were able to correctly apply Piaget's theory to play, but often made errors with Freud's and Erikson's theories. One student commenting that human development does not apply to play is illuminating. Operant conditioning concepts in learning were correctly identified by students along with observational learning. However, examples using classical conditioning contained a lot of errors usually found with students understanding of the theory.

Of all of the topics, students made the fewest connections between game play and personality and psychological disorders. Perhaps due to the topic being covered at the end of the semester, students' examples indicated that some did not understand the relationship between the concepts and game play. While students did provide some decent examples for personality, most students only focused on one approach, which is

unusual compared to multiple examples for other topics. Additionally, some students used the wrong definitions in their application. For psychological disorders, though many different problems were discussed, most of the responses were superficial. It seemed that students tried to make the connection between disorder and game play but that it proved too big of a leap in thinking.

4.1. Recommendations for Practice

Even with the mixed results, students seem to enjoy the assignment to play a game while learning from it. If students enjoy their assignments, they are engaged in class and learning can happen. As one student commented at the end of the final project:

This final was different then [sic] any other that I have taken, but I really enjoyed it. I also really enjoyed this class. At first when I learned that I had to take psychology for my degree I wasn't thrilled, but Dr Zielinski made the class very easy and make me like psychology.

If game play is adopted into a course to illustrate concepts, certain psychology topics need to be clarified for students. The limited application of personality theory and psychological disorders to game play indicate that more discussion regarding the relationship of play with patterns of behavior and abnormal behavior. Additionally, reminders about age-appropriate game activities might help increase the association of play to human development concepts. Using the findings of previous students' finals, providing specific examples of how a concept relates to game play are given during the regular class lesson as well as during a brief review after each test.

Finding a way to play in the college classroom is something students like and it appears that it can help them apply psychological concepts and theories to an everyday activity.

4.2. Recommendations for Further Research

Future research could explore the use of game play in understanding psychological principles by having students all play the same game. A game lab could be set up to accompany general psychology classes similar to computer labs for computer science and English writing where students log into and play a game. While the costs could be high for paid games, several free options exist to download or play online. Additionally, students could be assigned to groups for cooperative or competitive play, which could further enhance their understanding by providing opportunities to collaborate with teammates.

Specific psychology courses could also employ games as part of their curriculum. The game, Her Story, could be used in a forensic psychology class. The game is a series of seven interviews of a woman who was a witness to a crime along with supporting documents. Students can review what they see, hear, and read from the point of view of a witness, police officer, attorney, and other legal participants as an application of forensic psychology principles. Cognitive psychology courses could

use problem-solving games to illustrate various concepts. The classic game, Beyond Zork: The Coconut of Quendor, requires game players to make decisions that can lead to beneficial outcomes or death. Moreover, many classic games are available for free downloads. The game of Smite, which pits groups of gods against each other, could be used in a social psychology class. Students could work in groups or teams against other class teams as an example of the influences of a group on a person's actions. With the variety of games that exist, one could be found for many fields of study in psychology.

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APPENDIX: GENERAL PSYCHOLOGY FINAL PROJECT ASSIGNMENT INSTRUCTIONS

The final project for this semester is to apply various principles of psychology to game play, specifically multi-player online games or board games. Your assignment is to delve under the "only for fun" surface to find out what is happening from the psychological perspective.

This is a semester long project, so start thinking about what game you want to play. Please plan on spending at least 30-60 minutes a week in game play. If you wait until after the mid-term point to start playing and thinking about the game, it will adversely impact your final project and, ultimately, your final grade.

Only certain video games apply to this final project. The video game has to allow for online play, whether it be through a computer or gaming console (xBox, PS4, etc). As you can see from the examples below, each game has to:

1. Require you, the player, to interact with the virtual world, whether it be online or in a board game. You must be an active participant in the game world by moving, picking up things, cooperative/competitive games with others players and NPCs, etc.
2. Allow for communication between players, whether they are recognized "friends" or not. Chat windows and crowd-speak offer this communication opportunity in video games/

Games that do not have a virtual world but allow interaction, such as Words With Friends or Hearthstone, do not qualify.

If you already play one of these games, keep playing it. If anyone is willing to be an "expert" friend for your classmates and allow me to put your information up in a Blackboard announcement, please let me know via email.

If you can think of another video game that you would like to play that is not listed but you believe qualifies, please ask me before September 30. This is a semester long project, and requires enough time for you to play and consider how the psychological principles relate to what you are doing.

Most board games already require interacting with the virtual world (the board) and other players. If you have questions about whether a board game qualifies, please ask.

Once you have found your game, start playing. Take notes as you go along based on the questions listed below.

The Final Project Questions

1. What Did You Choose?

What is the game's name? Describe and summarize the multi-player online game you chose to use for your final project. Some questions/concerns you could address include:

- What is the back-story?
- What is your in-game goal(s) when playing?
- Describe your character and what he/she/it does during game play?

2. Brain Involvement

Think about how your brain was engaged in game play. How was each part involved? Describe what each part contributed to your game play, including:

- midbrain
- limbic system
- occipital lobe
- temporal lobe
- frontal lobe
- parietal lobe

3. Sensation and Perception

You experienced and interpreted many things while playing your game. Which concepts from the sensation and perception outline were involved in your game play? Did perceptual sets impact anything that you did? Any of the visual-only concepts relate to your play? Did you experience any changes with your sensation and perception capabilities, such as improved detection related to signal detection theory?

4. Human Development

Don't look at the game rating. What age group is your game targeting? Is it developmentally appropriate? Use Piaget's, Freud's, and Erikson's theories to explain why you think your game is on target or missed the mark for a developmentally appropriate experience.

5. Learning

Your game uses behavioral principals! You have learned through association, rewards and punishment, and just watching. Describe the role that classical conditioning, operant conditioning, and observational learning has in game play.

6. Motivation

So, why would you want to play this game – beyond the whole final project assignment requirements for this class? Or why would you NOT want to play this game? Use one of the motivation theories under "Motivation in the Everyday" to explain why someone would **and** would not want to play your game.

7. Intelligence

First, define intelligence. You need it to successfully play your game. Now that you've defined intelligence, consider Gardner's theory of multiple intelligences. Which ones of his intelligences would make someone very good at your game and why? Which

ones of his intelligences would definitely not be need or be an active barrier to being good at this game and why?

8. Personality

There is an interaction between your pattern of behaviors and responses (personality) and your game. Considering all of the different perspectives for personality, which one do you think would best explain why someone would want to play a multi-player online game?

9. Psychological Disorders

Many games have been deliberately created to help people with disorders. However, many games created for play have also helped people with disorders. Describe how do you think your game might help someone with a psychological disorder. Even though we did not cover all of these in class, some disorders to consider for your game include:

- autism (spectrum including Asperger's)
- depression
- bipolar
- anxiety disorders (phobias, OCD, GAD, PTSD, etc)
- dementia and/or Alzhiemer's and/or memory disorders
- traumatic brain injuries (rehabilitative therapy?)

Dianne Zielinski received her EdD in Educational Leadership in Higher Education from Argosy University in 2015, and her MS in Educational Psychology and Statistics in 1996. She has taught students from pre-K through master's level, teaching psychology, educational psychology, and human services courses in college for past several years. She currently teaches for a 2-year community college, a 4-year private college, and a medical college through face-to-face, distance learning, and online courses. She continues to explore how games can help college students learn, and is currently investigating the potential learning relationship between games and humor, music, and superheroes.