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ITLS 6310 Term Paper Rough Draft

**Introduction**

 This paper is aimed at assessing how Cognitive Evaluation Theory is geared toward electronic games and how this theory is applied to motivate students to learn through these electronic games. I will describe Cognitive Evaluation Theory and how this theory influences learning. I will discuss how students are influenced by electronic games and how technology aids in students learning and mastering content. I will examine how the world is evolving very rapidly with new technologies being developed exponentially. With these changed in technology, there needs to be more modern ways to teach and assess students. Mentioned will be steps for how to set up a classroom and the learning environment that is conducive to motivating students. Examples of ways electronic games have motivated students will come up and an explanation of each example will better illustrate why and how the Cognitive Evaluation Theory works with motivating students to learn through gaming. I will analyze and distinguish the gaps and potential flaws in the research done. After that I will conclude and make suggestions for any future research.

**Cognitive Evaluation Theory**

Deci (1978) elaborated that Cognitive Evaluation Theory (CET) is a motivational theory that analyzes a couple of areas: 1. when students receive positive feedback, they become more intrinsically motivated, 2. any tangible rewards given to the individual decrease intrinsic motivation, 3.as there are more choices for assignments, such as what type of project to create, the intrinsic motivation is increased (p.161).

 Deci (1978) explained that when students receive positive feedback, they become more intrinsically motivated. As a student gets praised for doing a good job on an assignment, he/she likes receiving that praise and is likely to take that praise and internalize it into his/her character. The student realizes they have potential and they get a better desire for the content. Thus, the student gains more intrinsic motivation.

 Deci (1978) further explains that any tangible rewards given to the individual decreases intrinsic motivation. When a reward is given due to excellent performance, the student will start to link excellent performance to receiving a reward. Receiving a reward because of performance is the classic definition of extrinsic motivation.

 Lastly, Deci (1978) noted as there are more choices for assignments, such as what type of project to create, the intrinsic motivation is increased. The power of choice lets the students take control of what they are doing and what they want to accomplish. If a student chooses the task, they will want to complete that task because they were able to select which option sounds best to them.

 Antoniou (2011) described these same factors for increasing or decreasing motivation through the typical reinforcement, rewards, and punishment (p.265). He continued to say that students who are intrinsically motivated to learn will seek “meaning, critically examine evidence, relate new and old information, and show an active interest” (pg. 265). Developing the desire to learn brings many benefits to the student.

**Importance of Educating Students**

In the United States of America, students have been struggling to learn basic concepts, such as mathematics, science, English, and reading. Nelson-Walker (2013) said the National Assessment for Educational Progress reported that about 40% of those from low-income and minority students in the 4th grade scored above Proficient in math (p. 1). It needs to be possible to educate our students better, especially those low-income, or minority students. Many students go through school and are not motivated to learn these essential subjects. As CET is considered, a better idea on how students can be better motivated becomes more apparent. With an increase in motivation, they begin to see the usefulness of these subjects and gain a desire to learn those concepts.

One major aspect of being motivated is through technology. Students are very likely to have been exposed to a lot of the commercial advances in technology. Bacon (2009) discussed that these advances in technology includes things like laptops, desktop computers, tablets, iPads, smartphones, Internet, video game consoles, TV, etc. Access to technology is ubiquitous. It has become nearly impossible to get away from technology. Because students know and are familiar with technology, it is a universal tool to motivate students.

**Technology in the Classroom**

 Meehan (2016) argued that everyone, including parents, educators, and school administrators, is coming to expect technology being utilized in the classroom. They are realizing the increased use of technology across all professions. Technology is used in a lot of jobs. Using technology and teaching technology use is a key element for students to get a real look at what the workplace is like. “Research has shown a direct correlation of unconscious preferences for items and styles that are more familiar to individuals. Familiarity due to what is known as mere-exposure effects directly influences people’s preferences” (Meehan 2016, p.43). Thus, using technology and being exposed to technology influences the students’ preferences for learning and understanding.

Students are seeing technology wherever they go. For successful teaching to take place, educators can utilize the technology they have to deliver the materials in an effective manner. For a classroom accomplish the course objectives and the outcomes of learning, delivery of the content must exceed anything else. Technology is capable of giving students the best delivery possible. The use of the internet is one way students are able to obtain materials and content of any given course. Students want access to notes and assignments online. They don’t just want teachers reading the notes to them and reading the assignments to them. They are smart enough to do that and they think “it is easier to teach [themselves]” (Meehan 2016, p. 45). Delivery of the materials is key for mastering the course concepts.

Bekebrede (2011) described what students want for their educational experience. They are wanting to transition to “an active, collaborative and technology-rich learning experience” (pg. 1522). One of the methods that fits the description is electronic games. Games, as well as simulations, are gaining traction, attention, and interest in these types of students. They want to learn with methods they have interest in and are familiar with (Petkov 2011). Students are very familiar with electronic games or video games. Bacon (2009) stated that 93% of the K-12 student population in the United States of America play video games in some degree (in abstract). Students relate to electronic games well and it makes sense to use video games in education.

Technology is evolving at an exponential rate. There have been a lot of exciting times to see what new things will come out. People are constantly getting the newest technology. But how has education been with getting the latest and greatest technology? Education hasn’t been able to keep up with the times in terms of technology as well as the average person. With the advancing technology, some teachers have been reluctant to stay informed and learn to apply the newest technology. With the upcoming generation, this can no longer happen. They expect the technology as well as everyone else. The old way of teaching is losing steam.

**Setting up a Motivating Learning Environment**

The learning environment is essential for motivating students to grasp the importance of the content and material. Many things can aid in student learning. When the assignments can easily be related to the real world and real life situations, students make the connection and the learning sticks with them. These school scenarios are a safe place for students to take risks. The students remain engaged with the classes due to the safe scenarios they are put in (Rosario 2009).

Shifting to electronic games, Rosario (2009) has found that certain aspects have aided students in learning. Educational games have helped learners with their understanding of concepts. These games have also been a good source for gaining knowledge. They help students improve their self-efficacy. Better user interfaces help students attempt tasks that are increasing in difficulty. Considering these few points, what can be done to set up a good learning environment using electronic games?

Rosario (2009) listed twelve successful design principles for setting up a learning environment (p. 290). From this list, I have noted three relevant principles for CET.

1. Multiple Routes Principle (p. 290): This principle is based on learners having multiple options for them to progress and learn. There shouldn’t be one right way, but multiple ways to get to the end goal. They need to make decisions on which path to take and problem solve through that choice.
2. Psychosocial Moratorium Principle (p. 291): This principle is based on risk taking and how students can take risks but not have any negative real-world physiological consequences due to their choices in the game.
3. Achievement Principle (p. 292): This principle is based on players getting visible rewards on a regular basis. These rewards help players know what they have done and accomplished and are visually pleasing to get. They are encouraged to continue playing.

Looking at the three principles Rosario (2009) identified, I will analyze how they can be used to create a conducive learning environment for students. First, Psychosocial Moratorium Principle relates to students taking risks in games and failure in the game results in little to no actual negative consequences. This principle applies to CET through the ability to choose. Being able to choose what happens increases intrinsic motivation as Deci (1978) mentioned. Next, the Achievement Principle analyzes how the player gets feedback from the game. The player gets immediate results and is constantly knowing how they are doing. The feedback, especially the positive, leads the student to desiring to learn and to an increase in intrinsic motivation. Deci (1978) mentioned this. Last, the Multiple Routes Principle lets the player choose what they want to do and what they want to accomplish. This has a similar effect as the Psychosocial Moratorium Principle because the students get to choose. Giving players a choice boosts their intrinsic motivation, as was mentioned above.

With these principles in place, learning and assessments could be done through electronic games. As the world is changing, there needs to be an education that matches what is out there. McClarty (2012) quoted Bill Gates saying “Training the workforce of tomorrow with the high schools of today is like trying to teach kids about today’s computers on a 50-year-old mainframe. It’s the wrong tool for the times” (p. 3). McClarty (2012) continued by saying that educators have been reluctant in using any type of game where they teach, but there is interest in making these games a part of the classroom for learning and for assessing students. There are many games that require skills like thinking, planning, learning, and technical skills, the same skills that many employers are searching for in potential employees. Students could learn both the content and the skills needed to be successful.

McClarty (2012) discussed how to games can be used to develop a learning environment aimed to help students learn and internalize the content delivered through the game.

 “Games need to be built on sound learning principles” (McClarty 2012, p. 7) Through games you get the opportunity to analyze about what is going on, process what needs to happen to be successful, then implement what you created. Games have clear goals for the player to work towards and as the player plays, they obtain immediate feedback. This requires them to change their plan at any given time. CET can be applied to this because of the immediate feedback that is given in games. This immediate feedback can increase intrinsic motivation.

“Games provide personalized learning opportunities” (McClarty 2012, p. 7). A lot of electronic games have the ability to provide extra help to aid struggling players. There are also times where the difficulty can be increased or decreased based on the player. These are great ways to scaffold learning. Electronic games allow students to take risks and fail, allowing them to learn from their mistakes. Other methods can be much more detrimental to student’s learning if they get something wrong. CET can be applied to this because the player can choose. The choice increases intrinsic motivation.

“Games provide more engagement for the learner” (McClarty 2012, p. 8). Electronic games will typically have three main elements that aid in engaging the learner. These elements include having clear goals and tasks for students to work towards, reinforcing and immediate feedback helping the students know what needs to happen or how they are doing, and increasing the difficulty as they work and master the content of the game. Students get to control what happens and they choose the path they will take. This also increases their engagement and motivation for the game. CET can be applied to this because students get to choose the path and they get immediate feedback. This increases intrinsic motivation.

 “Games provide an environment for authentic and relevant assessment” (McClarty 2012, p. 8). Electronic games are always assessing the player. Assessments are natural in any given game. These assessments can challenge students to demonstrate strategic thinking and require critical thinking in order to get the task completed. CET can be applied to this because players get feedback and are assessed. When students get positive feedback, intrinsic motivation increases.

**Motivation Through Electronic Games**

Electronic games have been used to help students in many different studies. There are three in particular that have great results to student learning. Each of these cases has a component from CET.

 The first study dealt with pre-service science teachers and were aimed at helping these students engaged in STEM (science, technology, engineering, mathematics) courses (Bellocchi 2012). They were using alternate reality games that presented a problem about STEM classes and the students had to hypothesize what would happen. These students used different web 2.0 ICT technologies, which included wikis, blogs, and screen capture software. The students needed to use the blogs and wikis for discussions in their alternate reality game. The students also needed to present their reality to the problem in the form of a video. Because they were able to choose the problem and how to solve the problem, they had more intrinsic motivation. Overall, these students were able to enhance their STEM knowledge base through these activities, partially due to CET.

 The next study helped students learn mathematics, specifically the standards and objectives from the Common Core (Nelson-Walker 2013). Elementary aged students played a game called NumberShire. This game was designed to match the Common Core State Standards for Mathematics. This game lets these younger students do math problems in a fairytale village. These students choose where they go and what types of problems to do. They also play different mini-games and get feedback on each mini-game. Students were engaged and were able to perform well on the Common Core. Their motivation for learning math was greater through this game because the game allowed them to choose and it game them feedback.

 The last study was used to promote exercise through gaming (Albu 2015). This research had students use the Xbox Kinect system to capture movements on the game “BringItOn”. As the students used this game, they noticed three major benefits to the game: “(1) It promotes proper exercise technique; (2) individualized feedback similar to that received from a personal trainer was viewed as very motivating; (3) the software was ‘game like’, and made exercising fun” (p.244). Receiving feedback helps increase intrinsic motivation, which is part of CET. Students using this were more motivated partly because of this feedback method.

**Gaps in Research**

In terms of intrinsic motivation, women tend to work through an activity and are driven with intrinsic motivation. But when they receive praise for what they are accomplishing, they tend to seek for the praise, and loose intrinsic motivation. Deci (1978) mentioned that women start wanting the praise more than getting the self-gratification of accomplishing the task. It would be worthwhile to take a step in this direction and analyze specifically how women view electronic games with regard to being motivated. Electronic games contain a lot of praise and feedback and seeing how that influences women would be good to check out.

One third of the games implements Q&A dynamics. These types of games correlate with the development of simple thinking skills. These don’t challenge students as well as others (Fabricatore 2012). These basic Q&A games don’t give students a choice, other than what their answer would be. It would be nice to analyze how well these type of games impact learning, especially if the learning is simple skills. Do these simple skills really help students want to learn? Can the simplicity tied to games with basic positive feedback increase intrinsic motivation?

Another aspect that would be interesting to analyze is how CET can be applied to industry. A lot of these studies dealt with students and how learning occurs with adults. This could be applied to different trainings that the employees need to complete or projects that they are working on. It would be interesting to see the results of adding electronic games to these trainings or projects and see how this affects the employees doing their work.

**Conclusion**

The impact of Cognitive Evaluation Theory on learning is monumental, particularly when it is applied to electronic games. Students are able to become more intrinsically motivated through praise, but become more extrinsically motivated with rewards. Students’ intrinsic motivation increases as they are able to make choices on their assignments.

With the technology world evolving at a rapid rate, considerations on how technology is utilized with the students must be analyzed. Educators must teach the students using the medians they know best. One of the best medians they know is electronic games. Fortunately, this median is very applicable to learning and assessment since games are inherently teaching and assessing content. Electronic games provide students with immediate feedback and praise, as well as the electronic games lets students make choices on the tasks they need to complete. This aligns very nicely with Cognitive Evaluation Theory.

Discussed were a few of design principles for successful games (Rosario 2009). Many of these principles aligned with CET and supported this theory. A few examples are the Psychosocial Moratorium Principle, the Achievement Principle, and the Multiple Routes Principle. Elaborated was a description on how to set up a successful learning environment using electronic games.

Many studies have used electronic games and have gotten good results for CET. These studies helped students increase their intrinsic motivation by letting the students choose what the topic and by giving students feedback on what they were learning or doing. The students had a positive experience with this that helped them desire. Because of this, learning was better.

Overall, electronic games can help learners gain more motivation in their learning. Applying these games in the right fashion could be one solution for instructors to help teach their students to learn the content. Students relate well with electronic games. Games can bring a new and enjoyable dynamic to any class.

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