Instructional Gaming: A Motivational Case Study

Jessica L Barron, MA

GFDE 502 Motivation in Education

School of Education

Dr. Sarah Peterson

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# Abstract

This case study evaluates the use of gaming in the classroom and the application of several learning theories to support its effectiveness to motivate the learner. The motivation theories featured involve Social Cognitive Theory, Interest and Affect Theory, Intrinsic and Extrinsic Motivation Theory and Adult Motivation in Learning.

The purpose of this case study is to harness the ability to teach in an environment that the learner enjoys by using video games that motive them to use their knowledge in real life settings. This directly impacts a learner’s concept of self-efficacy, which is defined as a “person’s judgment of their capabilities to organize and execute courses of action required to attain designated types of performances” (Schunk, D. H., Pintrich, P. R., & Meece, J. L. 2008)

# Motivation Case Overview

## Learners

College students studying Science, Technology, Engineering and Mathematics (STEM) students in the first year of their schooling

## Learning Context

The class is called City Development. The learners will explore the different aspects of creating and maintaining a community or small city

## Learning Goals

After taking this class, the students will learn the following

* The basics of city development
* How to manage a budget in the city creation process
* Zoning rules and how the effects they have on adjacent areas
* How to analyze problems within the city and develop workable solutions
* The creation and management of transportation systems, power options and public safety. Options must be efficient and economical.
* The creation of entertainment and tourist areas

## Motivational Goals

The goal of the course would be to motive the learner using creative techniques in order to peak the student’s curiosity and encourage them to learn more on their own or in the classroom.

Techniques such as case studies, group projects and gaming will be utilized. Case studies are a proven way to instruct students on topics that are often difficult to understand just using literature (Smith, Vega & McCrickard 2008). Gaming is popular with very young kids to grown adults and has become a serious motivational element in education (Schuurman, De Moor, De Marez & Van Looy 2008).

At the end of the class, the learners should achieve the following motivational goals:

* Enhanced self-efficacy for City Development procedures
* Increased self-regulation skills for completing assigned tasks
* Developed personal interest in City Management
* Improved intrinsic motivation for critical and creative problem solving

## Evidence of Goal Achievement

Using a variety of theories, the instructor will provide an environment that will inspire the learners to use their knowledge in a practical setting. The students will use SimCity to create a city that is governed by their ideas and hopefully prosperous at the same time. The students will learn from their mistakes through trial and error and their peers’ successes and failures as well. Using the theories of Observational learning as stated in the book, Motivation in Education by Schunk, Pintrich, & Meece, simply observing a model in action is not enough for a learner to retain all that they have learned. In order to truly retain their knowledge, they should demonstrate their skills through the following steps: Attention, Retention, Production and Motivation.

## My Learning Goals

* Motivate the learner using creative techniques in order to peak the student’s curiosity
* Encourage students to learn more on their own or in the classroom

# Analysis of Case Using Theory and Research

## Social Cognitive Theory

Social Cognitive Theory is based upon the idea that learners are influenced by the people around them, the situations they observe and the rules, skills and strategies they obtain in the process. Social cognitive theory is different from most learning situations because the performance of the learned behavior may occur days, even years after the learning has taken place.

An example of this theory was demonstrated by a young Norwegian boy, Hans Olsen, who was also an avid player of the Massive Multiplayer Online Role Playing Game (MMORPG) World of Warcraft. Within the game, the player learns different sets of skills depending upon their level and classification. At level 30, a “Hunter” can learn the skill “Feign Death.” The player, when attacked, can pretend they are dead and the enemy will leave them alone. This skill would later save him not only in the game, but in real life. One day, Hans was walking through the woods with his sister when they came upon a hostile moose that began to attack them. Unable to fight back or run away, Hans remembered the technique he learned from his game. Knocked down by the moose, Hans ceased moving and pretended he was dead. The moose lost interest and eventually left (Meland 2007). This is an exceptional example of Social Cognitive Theory in action. Hans used prior knowledge learned in a video game that he enjoyed. Being successful in the game improved Han’s self-efficacy. When placed in a stressful situation, he was able to call upon his previous experiences and effectively utilize them.

Using the concepts of social cognitive theory, a variety of techniques can be used in order to motivate the learner. The first technique applies modeling in the classroom by using response facilitation and observational learning**.** The instructor will provide a running example of the game for students to observe. The game SimCity 3000 will be started on their computer when they arrive. When the students see the model, they should show interest and be motivated to duplicate the results shown on the screen. Schunk, Pintrich and Meece claim that models can provide social prompts to the learners and provoke specific responses upon observation. The point of this activity is to intrigue the learners upon seeing the model to open the game on their own computer to see what the game is all about.

The second technique applies model characteristics in the classroom by using models of equal or slightly greater competence than observers.While the class is working on their projects, the instructor will show advanced versions of the game. This will give the learners an idea of what they can accomplish. The examples will also be creatively superior, using methods that require them to think out of the box. This will show the learner what the game is capable of if they work hard. Schunk, Pintrich and Meece use the research of Bandura for this theory. When providing a model that shows the possibilities of learning, the students will then want to explore the game, hopeful that they too will unlock different perks associated with the advanced model (Schunk, Pintrich & Meece, 132).

The third technique in social cognitive theory is having the students serve as their own models and gauge progress. This theory ties into the previous theory described. Schunk, Pintrich and Meece state that being aware of how a student is progressing in comparison to a model is an integral part of learning. In the classroom, the instructor will have thestudent keep a running journal of their progress. They will log the actions they take and what effect it had on their city. The instructor can also gauge their level of participation by reading the journals. If the student appears lackadaisical in their writings, the instructor will know how well the game is motivating them. Also, writing the journal may allow the student to realize the things they accomplished within the game and how they compare with the model’s progress. Sometimes a student may go through the steps of completing a task without reflection. By forcing them to reflect, the instructor is then encouraging the student to motivate themselves (Schunk, Pintrich & Meece, 132).

The fourth technique explains that the instructor should show interest and enthusiasm in the content they are teaching and interact with students in an expressive manner. This technique is crucial to the success of the project. Schunk, Pintrich and Meece refer to a study by Abrami, Leventhal & Perry. It was performed in the classroom and focused on the instructor’s enthusiasm and the reaction of the learners. Attributes such as rapport, dynamism, and charisma were measured and proved to be influential in the student’s interest in the topic and belief that they could accomplish the goals set in the classroom. If the instructor shows interest in the game and what the learners will gain from playing it, the learners will feed off of the good attitude the instructor presents. The interest should not just be in the game itself, but in the cognitive principles being developed. If the instructor does not believe it will be an asset to their lives, the students will not as well.

The fifth technique uses goal setting in the classroom by setting clear a specific goals that are challenging and difficult. Schunk, Pintrich and Meece describe goal setting as establishing qualitative and quantitative standards of performance. Learners must be aware of what they are to achieve. The goals should be at moderate difficulty; they should be challenging, but attainable. When learners perceive that they are accomplishing specific steps towards a goal, their self efficacy is raised. (Schunk, Pintrich and Meece, 142) In the class, a rubric will be used to determine if their progress in the game is accomplishing the goals being set by the instructor. The students are not just graded on a prosperous city; they will be graded upon their decisions, their record keeping in their journal and the observations they make about the city they created. The city itself could turn out to be a success or a disaster; however, if their analysis of the city is correct, they will receive a passing grade.

The sixth technique involves principles of motivated learning in the classroom by making the learning relevant to the student’s life. Schunk, Pintrich and Meece state that if an instructor mentions that material will appear on the test, students will become nervous and stressed if they have had pervious difficulties with test-taking. However, if the skills are made relevant to their life and their success in their career, they will approach the material with a more positive approach. Using this theory, the instructor should directly connect learning and playing the game to City Development, a skill that will aid them in their STEM career. This will motive the learner to participate by making the material relevant and allowing the learners to experiment in a setting that allows for trial and error (Schunk, Pintrich & Meece, 150).

The seventh technique involves teaching learning strategies and showing learners how they have improved as a result. Schunk, Pintrich and Meece point out that “strategy instruction can foster self-efficacy for learning.” This gives the student control in the learning process and outcomes. By using the journaling and observing the results of their decisions in real time, learners will be able to see their improvements immediately (Schunk, Pintrich & Meece, 150).

The last technique involves the instructor providing feedback on progress in learning and link rewards with progress**.** If a reward is tied to accomplishments in the classroom, it is likely to improve the students’ efficacy (Schunk, Pintrich & Meece, 149).The instructor will log into the students computer every day to give critical feedback on the progress of the game. As the students progress in the game, the instructor will unlock specific rewards for the learners. Rewards will include additional in-game money, new building options and unique features.

Using Social Cognitive theory to analyze the benefits of using video games in the classroom to teach simple and complex theories gives insight to how the students will react when properly motivated.

## Interest and Affect

Interest and Affect has been studied and evaluated over the years in many situations. Philosophers such as Dewey and Herbart mused upon the ideas of interest in the classroom but provided very little research to support their claims. Later, Berlyne and Evans tied interest into behaviorism by relating it to curiosity and attitudes towards learning. Eventually three perspectives were developed towards interest in the classroom: Personal interest, interestingness as a contextual factor and interest as a psychological state (Schunk, Pintrich & Meece, 211).

Personal interest can be attributed to the individual and their specific beliefs, disposition, traits and past experiences. Many career tests, such as the Meyer Briggs Personality Test, use the learner’s attitudes, values and interests to determine how well they would perform in particular situations. Using these findings, the test can assign the learner to a career suited to them (Schunk, Pintrich & Meece, 212).

Interestingness as a contextual factor has to do with the concept of situational interest, a theory developed by Krapp. This theory holds the belief that different situations and methods will produce different results depending upon the material being presented and the attitude towards that method (Schunk, Pintrich & Meece, 212).

Interest as a psychological state relies heavily upon how the topic is being presented as well as how it is being perceived. Many researchers have studied the relation between interest and knowledge in a particular topic. Some claim that one must have interest and high knowledge in order to be motivated in a topic. Others researchers like Jetton and Tobias suggest that while low-knowledge and high interest is a rare condition, it is more likely to be seen in a transitional learning state. This can be described as a child seeing a dinosaur for the first time in a museum and wanting to learn more about them because of the generated interest (Schunk, Pintrich & Meece, 213).

Using interest and affect in the classroom ties directly into the concepts of gaming. For example, creating surprise and disequilibrium in the classroom can create a situation that will grab the students’ interest and allow them to think about the class with a different perspective. Most students may have a preconceived notion about City Development and the level of excitement in creating policy. However, if they are able to see the effect of their policy in real time, their level of interest may change when they start to alter their decisions based upon the reactions in the game (Schunk, Pintrich & Meece, 220).

Schunk, Pintrich and Meece explain that by using variety and novelty in the classroom, the instructor will avoid boredom in the classroom. Using a combination of lecture, gaming and case study evaluation in the classroom provides predictable variety for the learners.

In order to further integrate the concept of personal interest into the classroom, the instructor should provide some choice of topics based upon the individual’s personal interest. Giving the students the ability to choose a city, suburb, island in a variety of locations based upon climate will allow the project to be based upon their personal interest in that setting (Schunk, Pintrich & Meece, 212).

The next few techniques involve the concept of test anxiety. The student’s achievement motivation has to do with the effects on their learning and performance. Schunk, Pintrich & Meece quote Ziedner (1998) to explain this concept. “The empirical research on the nagtaive effects of anxiety on academic performance is large and consistent.” Using this theory, the instructor should provide a learning environment that allows more time to complete evaluations, reduce social comparison and public display of scores and lessen the performance-oriented nature of testing situations to focus on mastery and formative assessment purposes. In order to address all three of these concepts, the evaluations for the class will not be a written test. Rather, it will be a project that will encompass the duration of the class. The students will be given time outside of the classroom in order to complete the project. Student’s scores will be shown to them in privacy by the instructor in meetings held throughout the course (Schunk, Pintrich & Meece, 228). During these meetings, the instructor will have the students set individual goals and decide if a change in their approach is necessary. This fosters their locus of control and encourages the student to take responsibility for their actions and reactions (Schunk, Pintrich & Meece, 247).

## Intrinsic and Extrinsic Motivation

There is no direct or automatic relation between intrinsic and extrinsic motivation. The different levels between the two directly pertain to the context of the learning environment. Intrinsic motivation can be related to the personal interest of the learner. Extrinsic motivation relies upon outside factors, such as rewards. It is often used as a means to an end. Intrinsic motivation is more enjoyable for the learner and is preferred over extrinsic (Schunk, Pintrich & Meece, 237).

Gaming can provide intrinsic motivation for the learning using curiosity, control and fantasy. Curiosity can be achieved by presenting ideas slightly discrepant from learners’ existing knowledge and beliefs. The instructor should incorporate surprise and incongruity into classroom idea. Students must have a preexisting knowledge base in order for curiosity to exist. In order to create curiosity, the instructor will create several simulations that will fail (sometimes with funny or shocking results). The students will then have to investigate the scenario to find out why each simulation failed. The curiosity is created when the students ask the question, “Why?” (Schunk, Pintrich & Meece, 265).

By giving the students control, the instructor will allow student choices in activities and voice in formulating rules and procedures. This will foster attributions to cause over which they have some control. Allowing students to have control over their city will give them a sense of self efficacy. They will want to work hard when they know their decisions have an impact on their success (Schunk, Pintrich & Meece, 265).

Finally, the idea of engaging students in make-believe activities, games and simulations will satisfy their desire for fantasy in the classroom. Schunk, Pintrich & Meece describe a study performed by Cordova and Lepper in which children participated in computer activities. The found that “children’s cognitive engagement during learning, perceived competence, and intrinsic motivation were enhanced by personalizing the material…” They follow up with the assertion that the instructor must ensure that the motivational embellishments are task relevant and not too distracting.

## Adult Education and Motivation

What is andragogy compared to pedagogy? Adults are more mature and many experiences making them who they are. Because of this, they are responsible and have specific expectations when in a learning environment. In the book “Enhancing Adult Motivation to Learn,” Raymond J. Wlodkowski states that “Adults are highly pragmatic learners” (Wlodkowski 97). They also have characteristics that children may not possess. They are critical about what is being taught and have a desire for information to be pertinent. Because of this, they may be reluctant to learn any information that is not useful to them. They also may be more sensitive and require mutual respect and consideration from their instructors. Lastly, they prefer hands-on learning and seek situations in which they can dynamically test their new found skills (Wlodkowski 99).

There are different levels of adult learning. These levels are integrated and can involve many emotions or feelings from the learner. The lowest level that instructors may observe is success + volition. Next is success + volition + value, with the highest level being success + volition + value + enjoyment. They highest level is where extraordinary teaching is taking place. This is the goal of any instructor and the wish of any student. By integrating Sim City 3000 into the instruction, the students will be able to reach the highest learning level (Wlodkowski 101).

There are four motivational conditions that can cultivate a learning environment that reaches the highest level of adult learning: inclusion, attitude, meaning and competence. Using the following strategies in the class City Development will allow the teacher to effectively engage the learner and reach all of their instructional goals (Wlodkowski 102).

*Establishing Inclusion among Adult Learners.*

Adult learners need to feel engaged in their learning environment. They want to feel included in the learning process, not just bystanders in their future career choice. Therefore, the process of introductions and sharing must be present in the lesson. Towards the beginning of the class, the syllabus will be reviewed and plans for the class will be laid out and discussed. (Wlodkowski 136-152)

Next, the instructor will explain the purpose of taking a class like City Development. Their entire learning schedule will be broken down and the individual pieces will be observed. The learners will witness how developing a city is an integral part to their overall knowledge (Wlodkowski 158). In order to get the students personally involved in how the class works, they will be encouraged to develop a guideline for class participation, grading and behavious expectations. This will create a norm for the classroom that the students will feel directly connected to (Wlodkowski 162).

*Helping Adult Develop Positive Attitudes toward Learning.*

There are four directions in which attitude can be focused: Toward the instructor, the subject, their self-efficacy for learning, the specific learning goal or performance. No matter how interesting or engaging the instructor is, the student will not succeed if they have a negative attitude towards a specific element of the class (Wlodkowski 172). It is important that any negative circumstances involving the class be immediately discussed and removed. An open forum will be held at the beginning of the class to tackle any thoughts, beliefs or expectations held concerning City Development (Wlodkowski177-178).

It is also crucial that during the class, the learners realize that the effort they put into playing Sim City will directly affect the success or failure of their city. A sense of personal control allows them to take responsibility for the knowledge they apply in the classroom (Wlodkowski 189-192). The instructor will provide a variety of models cities for the students to observe. The models should be creative, inviting and diverse. This will show them the different scenarios possible and encourage them to take on different strategies and techniques in their city. (Wlodkowski 196-198, 220).

Starting at the beginning of the class to the final assessment, the learner should be aware of the specific standards and criteria they should be meeting. Timelines for completion of the project should be made out by each student so they are clear in the time and effort expected to complete their city (Wlodkowski 202-203).

*Enhancing Meaning in Learning Activities*

The best way to enhance meaning in the classroom is to provide interest in the topic being presented. The instructor can achieve this by engaging the learners and providing activities that are both challenging and appealing (Wlodkowski 233). Using a simulation or a game allows the learner to apply the skills and knowledge they have acquired in the classroom. Wlodkowski claims that“Simulations allow adults to more deeply learn and practice multiple concepts and skills over a sorter time than in real-life experience.” Games are more and more accessible and allow for a variety of experiences previously unattainable within the confines of a classroom (Wlodkowski. 297)

Sim City provides several scenarios for the learner to tackle. Each scenario has distinct problems to overcome by using specific strategies learned in the theories of City Management. By applying these theories, the learner will realize the benefits of the class within the individual simulations (Wlodkowski 254). Because each simulation is different, the results will vary. This will provide “uncertainty, anticipation, and prediction to the degree that learners enjoy them with a sense of security” (Wlodkowski 259)

*Engendering Competence among Adult Learners:*

* Provide effective feedback
* Provide opportunities for adults to demonstrate their learning in ways that reflect their strengths and multiple sources of knowing
* When necessary use constructive criticism
* Effectively praise and reward learning
* Use incentives to develop and maintain adult motivation in learning activites that are initially unappealing but personally valued
* When learning has natural consequences, help learners to be aware of them and their impact
* Provide positive closure at the end of significant units of learning

# Proposed Revisions

## Social Cognitive Theory

In order to realize the potential of Social Cognitive Theory, I would like to see how group work would affect the outcomes of the project. Using the research featured in the book by Slavin (1983a, 1983b, 1995), cooperative learning has proven to be beneficial for learners. On one side of the argument, I feel that a student needs to improve their self efficacy through complete control of their city and its progress. However, working as a group would open up the opportunity for creative input and encouragement from their peers. In the book *Psychology applied to teaching,* the idea of cooperative learning and how to use it successfully in the classroom is featured in several chapters. In a group setting, learners help each other overcome obstacles and provide support for one another (Snowman, McCown & Biehler 2009). Given the time limit of most classes, I am not sure if I would be able to assign an independent and a group project at the same time. Perhaps if I had an individual city and a city for the entire class to work on (with help from the instructor) this technique might work.

## Interest and AffectIntrinsic and Extrinsic Motivation

In Chapter 5, Schunk, Pintrich & Meece (184) cover Goal Orientation Theories. It is defined as “the purpose or reason for achievement behavior.” There are two different goal orientations; mastery and performance. Mastery is focused on learning and perfecting a task. Performance goals rely upon the demonstration of the learned task and how well it is performed. I realize that this motivational theory can serve as a basis for interest and affect and intrinsic and extrinsic motivation. The instructor should cover the affective, cognitive and behavioral outcomes for the class in order to provide better motivational and cognitive outcomes (Schunk, Pintrich & Meece 200).

## Adult Education and Motivation

# Reflection on beliefs

## Social Cognitive Theory

Before analyzing my case using this motivation theory, I used to believe that simply the entertainment value of the game would keep the learners motivated. As a result of my new learning, I now know that motivation is influenced by a number of elements, most of them being intrinsic. I know this because of the research I have done on Social Cognitive Theory and cooperative learning. In the article Overview of Social Cognitive Theory and of Self-Efficacy, Pajares uses a model by Bandura. Bandura explains that humans are self regulating and rely upon intrinsic motivations more than extrinsic. He also overviews the concept of reciprocal determinism, which is explains as the following:

“…the view that (a) personal factors in the form of cognition, affect, and biological events, (b) behavior, and (c) environmental influences create interactions that result in a triadic reciprocality. Bandura altered the label of his theory from social learning to social "cognitive" both to distance it from prevalent social learning theories of the day and to emphasize that cognition plays a critical role in people's capability to construct reality, self-regulate, encode information, and perform behaviors” (Pajares 2002).

Because of my change in beliefs, I now understand that motivation is a complicated and intricate process. I must focus on all aspects of the classroom and determine how they are affecting my students’ progress.

## Interest and AffectIntrinsic and Extrinsic Motivation

Before analyzing my case using Interest and Affect and Intrinsic and Extrinsic Motivation theory, I used to believe that interest in a topic was a one-sided concept. As a result of my new learning, I now know that interest can be affected by many different variables that I as an instructor must anticipate. I also know that intrinsic motivation is more favorable over extrinsic. I often used techniques in the classroom that encouraged a student’s capacity to “care” about what they are learning. Now I realize the important connection between the two motivations.

I know this because of the multitude of research performed upon interest and affect in the classroom. Many different scales have been developed to measure interest, including the Experience Sampling Method (ESM) developed by Csikszentmihalyi in 1982. Wild, Krapp, Schreyer and Lewalter used the ESM test in order to evaluate how interested a student was in different activities, such as work or play. Later, observational tests were developed in order to gather data without asking the learner for their feedback. Situational interest researchers developed questionnaires for the learners to gather qualitative data to analyze. All of these tests proved that there is a link between interest and motivation; however, the context of the learning was the ever changing variable (Schunk, Pintrich & Meece, 215).

Intrinsic and Extrinsic motivation has been studied on different levels as well. Harter created a model of effectance that described the negative and positive outcomes of reinforcement in learning situations (Schunk, Pintrich & Meece, 241). Rotter described the importance of locus of control in a student (Schunk, Pintrich & Meece, 245). If a student had an internal locus of control, which relates to intrinsic motivation, they will be more likely to succeed in their efforts.

Using these theories in this case study will create a motivational model that integrates video games into the classroom in a way that promotes effective learning.

## Adult Education and Motivation

Before analyzing my case using “Enhancing Adult Motivation to Learn,” I was proficient in andragogy and the theories that support the different techniques when teaching adult learners. Now that I have furthered my studies on this topic and observed the very similar theories between the two books I have examined, my beliefs on andragogy have been reinforced. In my years of teaching and training adults, I have always tried to create a positive and welcoming atmosphere in my classroom. I truly cared about their feelings and tried to instill meaning and relevance into the lessons I taught. Lastly, I tried to evaluate the learning using assessments that made sense. I was always against the idea of testing for the sake of testing.

I know these techniques work because of the research and personal experience. Teaching adults is a wonderful experience, but can be difficult if the learner’s needs are not being met. Using instructional gaming in the classroom provides solutions for the many suggestions made in the book, “Enhancing Adult Motivation to Learn.”

# Conclusion

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