

1) Thesis Abstract

2) Introduction

a. Rough Thesis Statement

- i. By using constructive play with professionally created environment pieces, followed by “how to” guided mastery techniques, non-artists in Game Studies will have increased confidence in creating environments.
- ii. Personal experience with undergraduate, professional, and instruction in games.

3) Literature Review, Background, History

a. Summary of the approaches and defined points within outline

i. Constructive Play

- a. **What is "constructive Play"?**- "constructive play (the playful building of something) is always directed toward the goal of creating the object that the player has in mind." Peter Gray Ph.D. The Value of Play I: The Definition of Play Gives Insights <https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>
- b. **Rules for Constructive Play**- "A basic rule of constructive play, for example, is that you must work with the chosen medium in a manner aimed at producing or depicting some specific object or design. You don't just pile up blocks randomly; you arrange them deliberately in accordance with your mental image of what you are trying to make." Peter Gray Ph.D. The Value of Play I: The Definition of Play Gives Insights <https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>
- c. **Creativity and Adaptability**- " Through play the child learns to take charge of the world and not simply respond passively to it. In play the child's mental concept dominates, and the child molds available elements of the physical world to meet that concept." Peter Gray Ph.D. The Value of Play I: The Definition of Play Gives Insights <https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>
- d. **Education is a natural process not what teachers give**- “So we found that education is not what teachers give: education is a

natural process spontaneously carried out by the human individual. “ Maria Montessori The Absorbent Mind

- e. **Extrinsic motivation is inferior to intrinsic-** "When we are not playing, we typically opt for the shortest, least effortful means of achieving our goal. The non-playful, goal-oriented college student, for example, does the least studying in each course that she can in order to get the “A” that she desires, and her studying is focused directly on the goal of doing well on the tests. Any learning not related to that goal is, for her, wasted effort." Peter Gray Ph.D. Freedom to Learn
<https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>
- f. **Play allows intrinsic motivation-** "In play, however, all this is reversed. Play is activity conducted primarily for its own sake. The playful student enjoys studying the subject and cares less about the test. In play, attention is focused on the means, not the ends, and players do not necessarily look for the easiest routes to achieving the ends."
<https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>

ii. **Creativity: Unlocking Ones Creative Mind**

- a. **Play raises immersion level- (Transitional topic)-**"Play involves an active, alert, but non-stressed frame of mind" Peter Gray Ph.D. The Value of Play I: The Definition of Play Gives Insights
<https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>
- b. **Play involves fertile mental grounds for learning (Transitional topic)-** "The alert but unstressed condition of the playful mind is precisely the condition that has been shown repeatedly, in many psychological experiments, to be ideal for creativity and the learning of new skills." Peter Gray Ph.D. The Value of Play I: The Definition of Play Gives Insights
<https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>
- c. **Approaching subjects with a fresh youthful mindset-** “...apply a beginners mind to something you do...” Creative Confidence: Unleashing the Creative Potential Within Us All by Tom Kelley (Author), David Kelley
- d. **Innate creativity is still inside-**“We just need to help people rediscover what they already have: the capacity to imagine—or build upon” (loc179 andr phone Kindle 5%) Confidence:

Unleashing the Creative Potential Within Us All by Tom Kelley (Author), David Kelley

iii. **Building confidence through incremental accomplishment.**

- a. **Incremental accomplishments are a key for success-** "People who go through Bandura's guided mastery process "ended up having less anxiety about other things in their lives. They tried harder, they persevered longer, and they were more resilient in the face of failure," Creative Confidence: Unleashing the Creative Potential Within Us All by Tom Kelley (Author), David Kelley
- b. **Mastery in key areas effects produces desired results-** "The most effective way of creating a strong sense of efficacy is through mastery experiences." Self-efficacy: The Exercise of Control Bandura, Albert. (quote from: Encyclopedia of mental health. San Diego: Academic Press
<https://www.uky.edu/~eushe2/Bandura/BanEncy.html>)
- c. **Non-Artist needs-** "Non-artists need reassurance...the kind of supportive culture that ignores the quality of their sketches and focuses on the quality of their ideas." (loc860 andr phone Kindle 22%)
- d. **Failure is learning-** "It's Hard to be the best right away, so commit to rapid and continuous improvement" Creative Confidence: Unleashing the Creative Potential Within Us: All by Tom Kelley (Author), David Kelley
- e. **Confidence creates a strong work environment and trust-** "As they become more confident, they eventually adopt a bring-your-whole-self-to-work attitude and allow themselves to be vulnerable in a creative context. This vulnerability and ability to trust the people around you can help to overcome so many of the barriers to creative thinking and constructive behavior." (loc 813) Creative Confidence: Unleashing the Creative Potential Within Us: All by Tom Kelley (Author), David Kelley

iv. **The Viability of Virtual Environments for constructive play.**

- a. **Building aesthetic concepts starts in the mind and in visual medium-** "An architect designing a house is designing a real house. Yet, the architect brings a good deal of imagination to bear in visualizing the house, imagining how people might use it, and matching it with some aesthetic concepts that she has in mind. It is reasonable to say that the architect builds a pretend

house, in her mind and on paper, before it becomes a real one."

Peter Gray Ph.D. Freedom to Learn

<https://www.psychologytoday.com/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights>

- b. **Technology is a tool, a means to an end-** "... technology then becomes an exercise in applying a rapidly improving technology to a very consistent set of goals" Effective Teaching with Technology in Higher Education: Foundations for Success by A. W. Bates

v. **Minimalistic approach to environments:**

- a. **Why Minimalistic Architecture?-** "We need value over quantity." The Not So Big house: A Blueprint for the way we really live Sarah Susanka
- b. **Minimalist Architecture defined:** In minimalist architecture, design elements strive to convey the message of simplicity. The basic geometric forms, elements without decoration, simple materials and the repetitions of structures represent a sense of order and essential quality. The movement of natural light in buildings reveals simple and clean spaces. Ilka Ruby (Author), Andreas Ruby (Author), Angeli Sachs (Author). Minimal Architecture (Architecture in Focus). New York: Prestel, 2003
- c. **Minimalism origins-** "Its basic criteria are derived from American Minimal Art of the 1960s: the use of simple geometric forms, the modular principle" Ilka Ruby (Author), Andreas Ruby (Author), Angeli Sachs (Author). Minimal Architecture (Architecture in Focus). New York: Prestel, 2003
- d. **Artist/Architect review: Tadao Ando Minimalist architect-** a review of work "Church of Light" Minimal Architecture (Architecture in Focus) Paperback – June, 2003 by Ilka Ruby (Author), Andreas Ruby (Author), Angeli Sachs (Author)
- e. "Ando has succeeded in creating one of the most transcendental church spaces in recent architecture." (pg33) Ilka Ruby (Author), Andreas Ruby (Author), Angeli Sachs (Author). Minimal Architecture (Architecture in Focus). New York: Prestel, 2003
- f. **Artist/Architect review: Frank Lloyd Wright Minimalist architecture-** a review of Falling Water.
- g. **Virtual Artist/Architect review: Koola Archviz / Lighting 4-** Review of Project <https://youtu.be/UwEuSxAEXPA>
- h. Stanley Parable creator (Designer) Davey Wreden "I knew how to make hallways" (interviewed in

b. **Game industry career needs for designers and programmers**

i. **The importance of portfolio pieces for Designers**

- a. **Shipping a game is key-** "It can be difficult to know what to put in a design portfolio, as there are no standards for what a good design document is or how a game economy should be laid out. The best possible thing to have in your portfolio is shipped games."
http://www.gamasutra.com/blogs/EthanLevy/20130621/194830/Breaking_into_game_design_Part_2_build_your_portfolio.php
- b. **Simple polished environments are needed-** "making small but completed and polished games that you can build on your own."
http://www.gamasutra.com/blogs/EthanLevy/20130621/194830/Breaking_into_game_design_Part_2_build_your_portfolio.php
- c. **Environments allow a space for housing a game-** "If you really want to shine, then for each piece in your portfolio you should create a 90 second or less video on YouTube."
http://www.gamasutra.com/blogs/EthanLevy/20130621/194830/Breaking_into_game_design_Part_2_build_your_portfolio.php
- d. **"How To" make a hallway may be enough to spark housing a whole game-** The Stanley Parable: Looking at a designer that knew how to make a "hallway"

2. **The importance of portfolio pieces for Programmers**

- a. **Get it online-** "Having a web page where recruiters can not only see your work now but can save as a permanent point of call to chart your progress can prove invaluable. Organising an online portfolio is extremely easy; with many free and simple solutions readily available." <http://www.develop-online.net/analysis/jobs-in-games-how-to-build-a-portfolio-for-programmers/0117463>
- b. **Keep it simple-** "We are looking for programming roles, not graphic design roles, so don't try and make your portfolio too fancy." <http://www.develop-online.net/analysis/jobs-in-games-how-to-build-a-portfolio-for-programmers/0117463>
- c. **Have your own personal projects on the go-** " Having your own personal projects demonstrates your true passion for games and technology; as well as demonstrating your willingness to go above and beyond" <http://www.develop-online.net/analysis/jobs-in-games-how-to-build-a-portfolio-for-programmers/0117463>

c. **A look at curriculum and instruction**

i. **What is Curriculum?**

- a. **What a curriculum isn't-** "Curriculum is more than just a body of knowledge, list of subjects to be studied, or a syllabus" (pg2) Curriculum and Instruction Paperback – November 3, 2014 by D.S. Srivastava (Author)
- b. **What a curriculum is-** "(Curriculum) is about all the planned experiences which learners may be exposed to in order to achieve the learning goal." (pg2) Curriculum and Instruction Paperback – November 3, 2014 by D.S. Srivastava (Author)
- c. **Teaching what you have to offer-** "Teachers must be empowered to more effectively design their own curriculum, and move from the position of curriculum conveyer to that of curriculum designer." (pg40) Curriculum and Instruction Paperback – November 3, 2014 by D.S. Srivastava (Author)

2. **Educational Approaches**

a. **Albert Bandura's 4 steps & Jerome Bruner:**

Step 1: Attentional Processes

Must observe the model accurately enough to imitate behavior

Step 2: Retention or Memory Processes

To later imitate behavior, must remember aspects of the behavior

Retain information in 2 ways: Imaginal internal representation: Visual image Ex: Forming a mental picture Verbal system: Verbal description of behavior Ex: Silently rehearsing steps in behavior.

Step 3: Production Processes

Taking imagined and verbal representations and translating into overt behavior- practice behaviors
Receive feedback on accuracy of behavior- how well have you imitated the modeled behavior?

Step 4: Incentive and Motivational Processes

With incentives, observation more quickly becomes action, pay more attention, retain more information
Incentive to learn influenced by anticipated reinforcements

1. **Motivation Matters-** "Teachers know that motivation matters. It is central to student learning; it helps determine how engaged students are in their work, how hard they work, and how well they persevere in the face of

challenges."

<https://www.carnegiefoundation.org/blog/using-new-research-to-improve-student-motivation/>

2. **Challenges of measuring motivation-**

"Motivation is hard to characterize and quantify, and it is influenced by many factors outside the classroom.

<https://www.carnegiefoundation.org/blog/using-new-research-to-improve-student-motivation/>

3. **Problems with extrinsic motivation-** "Money is one such enticement, and research shows that dollars can indeed prompt students to work harder, particularly when the incentives reward engagement in the process rather than performance outcomes. On the downside, research shows that when rewards come to be expected, they can have the effect of undermining motivation in general and intrinsic motivation in particular."

https://www.carnegiefoundation.org/wp-content/uploads/2015/07/Motivation_Matters_July_2015.pdf

4. **More problems with extrinsic motivation-** " In a 1999 meta-analysis of 128 research studies, Edward Deci and Richard Ryan of the University of Rochester and Richard Koestner of McGill University found that when the reward is expected and tangible, intrinsic motivation is significantly undermined.¹⁰"

https://www.carnegiefoundation.org/wp-content/uploads/2015/07/Motivation_Matters_July_2015.pdf

5. **Key to motivation is small steps (same idea behind Guided Mastery)-** " Along with

rewarding mastery of skills over performance, incentives are more likely to produce results if they target behaviors that students feel are achievable, if they challenge students enough to maintain their interest but not so much that they undermine confidence, and if the incentive

program is voluntary."

https://www.carnegiefoundation.org/wp-content/uploads/2015/07/Motivation_Matters_July_2015.pdf

- b. **"Jerome Bruner's Spiral Curriculum: Bruner (1960)** explained how this was possible through the concept of the spiral curriculum. This involved information being structured so that complex ideas can be taught at a simplified level first, and then re-visited at more complex levels later on. Therefore, subjects would be taught at levels of gradually increasing difficulty (hence the spiral analogy). Ideally, teaching his way should lead to children being able to solve problems by themselves."
<https://www.simplypsychology.org/bruner.html>
 - c. **Constructivist approach:** "The concept of **discovery learning** implies that students construct their own knowledge for themselves (also known as a constructivist approach)."
<https://www.simplypsychology.org/bruner.html>
 - d. **The Teachers Role:** "The role of the teacher should not be to teach information by rote learning, but instead to facilitate the learning process. This means that a good teacher will design lessons that help student discover the relationship between bits of information. To do this a teacher must give students the information they need, but without organizing for them. The use of the spiral curriculum can aid the process of discovery learning." <https://www.simplypsychology.org/bruner.html>
3. **Using Modern technology for aiding observational learning, and scaffolding-** "In a traditional academic model, the time allotted to learn something is fixed while the comprehension of the concept is variable. Washburne was advocating the opposite. What should be fixed is a high level of comprehension and what should be variable is the amount of time students have to understand a concept." Khan, Salman. The One World Schoolhouse: Education Reimagined. New York, N.Y.: Twelve, 2012.
- a. **With recorded "How To" video lectures students may observe more than once, and have time to go back over concepts:**
"Let's teach for mastery -- not test scores"
https://www.ted.com/talks/sal_khan_let_s_teach_for_mastery_not_test_scores?language=en

4) Framework for analysis Part 1: Class Curriculum:

- i. Introduction to the class: Choosing Creativity (the appeal towards an attitude shift) & Step 1: Attentional Processes (WEEK1)
 1. (Lecture) **Content area philosophy; Choosing Creativity:**
 - a. **Setting your mind to something-** “To be more creative, the first step is to decide you want to make it happen” (loc985) Creative Confidence: Unleashing the Creative Potential Within Us: All by Tom Kelley (Author), David Kelley
 - b. **Approaching environment creation with high expectations-** “We just need to hold out a “reasonable hope of success,” as well as the possibility of a truly epic win.” (loc985) Creative Confidence: Unleashing the Creative Potential Within Us: All by Tom Kelley (Author), David Kelley
 - c. Learning to observe the environment through photography, and environment art through Constructive Play with professionally crafted pieces
 2. (Lecture) **Observation; learning to observe**
 - a. **Approaching photography like a scientist-** “Careful observation of evidence is the heart of modern scientific method; photography has always been valued as an objective technique of observation”
<https://www.nature.com/scitable/spotlight/science-photography-10285104>
 - b. **Using forensic photography techniques-** “capturing photographic evidence can be challenging. An experienced photographer will know to take photos at all stages of the investigation and that it is better to have too many than not enough images.” (pg5)
<http://www.forensicsciencesimplified.org/photo/Photography.pdf>
 - c. **Transcending beyond looks; examining feelings-** “I ask first-year architecture students to collect data about places that make them feel particularly comfortable or uncomfortable. This is also a useful exercise for non-architects who want to better understand how the places that surround us affect us” The Not So Big house: A Blueprint for the way we really live Sarah Susanka (pg 18)
 3. (Lecture) **Building an environment through constructive play.** *This reflects spiral curriculum, starting with simplicity, it also helps the student see there are learning tools out there if self study is needed.*
 - d. **Assignment:** World of Level Design Tutorials- UE4 Fundamentals and UE4 The Corridor. <http://worldofleveldesign.com/> Step 1: Attentional Processes- *Students must actively watch. These*

tutorials are based on Constructive Play; the first video introduces the complete beginner how to get into Unreal and play with placing pre-made assets by Epic's staff. In the second video the author Alex Galuzin shows how to create a complete environment with professionally pre-made blocks, and how to light and record it.

4. **(Lecture)** Students also get in class lecture on creating photo references. *This is a form of Bruner's Scaffolding; while every student will know how to take a picture on their phone, not all will know what, where and why to shoot certain detail certain ways.*
 - e. Assignment: students begin building with real blocks literally. Constructive Play:
 - f. **Assignment**: students create a reference sheet of a real space they find interesting. Reference sheet template is given: [LINK](#) *Bandura's Step 1: Attentional Processes: Developing cognitive processes to pay attention to a model*
- ii. Step 2: Retention or Memory Processes (WEEK2): Building an understanding of aesthetics, an approach to and explanation of
 1. **DUE**: Reference Sheet assignment
 2. **(Lecture) What is Beauty (or Aesthetics)?**
 - a. **Scientific research on beauty**- "An object's beauty may not be universal, but the neural basis for appreciating beauty probably is."
http://seedmagazine.com/content/article/beauty_and_the_brain/
 - b. **Empirical physical reaction to beauty**- "When the human nervous system experiences beauty, certain parts of the brain consistently light up. It seems that, to some extent, humans can be taught what beauty means. Again, culture and experience may have a significant role. Yet, there are thought to be certain qualities that are constantly found regardless of culture or experience"
<http://marialorenalehman.com/post/understanding-beauty-in-architecture-guiding-neuroaesthetics>
 - c. **Identifying beauty through emotional responses**- "Notice what constitutes the spaces that feel good to you. Try to determine if they appeal on an emotional level or in a physical way. And try to articulate why." (pg 18) *The Not So Big house: A Blueprint for the way we really live* Sarah Susanka
 3. **(Lecture) Architectural Periods; looking at environments.**
 - d. **(In Class Assignment)**: Students form visual images of a place that is beautiful to them, referencing game environments they

felt immersed in. Step 2: Retention or Memory Processes:
Taking imaginal and verbal representations and translating into overt behavior- practice behaviors

- e. **(In Class Assignment):** Students pick 3 favorite pieces of architecture for a study. Step 2: Retention or Memory Processes: *Taking imaginal and verbal representations and translating into overt behavior- practice behaviors*
- f. **(In Class Assignment):** Students pull up examples of their beautiful space: Step 2: Retention or Memory Processes: *Taking imaginal and verbal representations and translating into overt behavior- practice behaviors*
- g. **(In Class Assignment):** Assignment: Students talk about their beautiful place, and present their pick of an architectural period (making sure all periods are unique) Step 3: Production Processes: *Verbal system: Verbal description of behavior Ex: Silently rehearsing steps in behavior.*
- h. **Assignment:** Students research and write about an architecture period they find interesting, which they will report on next class. Step 1: Attentional Processes- *Students must actively look for periods they find interesting, documenting through observation how things are constructed. Bruner's Discovery Learning (AKA constructivist approach) is being built on as well.*
- i. **Assignment (continued):** World of Level Design Tutorials- UE4 Fundamentals and UE4 The Corridor.
<http://worldofleveldesign.com/>

iii. Step 3: Production Processes (WEEK3):

1. **DUE:** Present Architecture report
2. **(Lecture) Minimalistic Approach**
 - a. **Support for Spiral Curriculum and Minimalistic approach-** "It's hard to be "best" right away, so commit to rapid and continuous improvements." (loc1597) Creative Confidence: Unleashing the Creative Potential Within Us: All by Tom Kelley (Author), David Kelley
 - b. **Minimalistic approach introduces constraints-** "USE CONSTRAINT TO FUEL CREATIVE" (loc1654) Creative Confidence: Unleashing the Creative Potential Within Us: All by Tom Kelley (Author), David Kelley
 - c. **"Less is More"-** "Ludwig Mies van der Rohe (27 March 1886 – 17 August 1969) is one of the most influential architects of the 20th century, known for his role in the development of the most enduring architectural style of the era: modernism. Born in Aachen, Germany, Mies' career began in the influential studio of

Peter Behrens, where Mies worked alongside other two other titans of modernism, Walter Gropius and Le Corbusier. For almost a century, Mies' minimalist style has proved very popular; his famous aphorism "less is more" is still widely used, even by those who are unaware of its origins."

<http://www.archdaily.com/tag/mies-van-der-rohe>

3. (In Class Assignment) Presentation: Verbally the research from last week: *Step 3: Production Processes: Taking imaginal and verbal representations and translating into overt behavior- practice behaviors*
4. Students must continue creating the intro constructive play environment to master the tools. They are encouraged to add to the environment if they want.
 - a. **Assignment (continued):** World of Level Design Tutorials- UE4 Fundamentals and UE4 The Corridor. Tutorials: <http://worldofleveldesign.com/> *Keeping with the idea of creativity and play, students may build more as they wish. "you arrange them deliberately in accordance with your mental image of what you are trying to make." Peter Gray Ph.D*
- iv. **Step 4: Incentive and Motivational Processes (WEEK 4):** Students are motivated by having a lab day where they can work on finishing the first stage of constructive play, having the instructor able to help each student individually.
 1. **DUE:** [WoLD ue4 the corridor project-part 1of2](#)
 2. **Assignment (continued):** World of Level Design Tutorials- UE4 Fundamentals and UE4 The Corridor. Tutorials: <http://worldofleveldesign.com/> *Keeping with the idea of creativity and play, students may build more as they wish. "you arrange them deliberately in accordance with your mental image of what you are trying to make." Peter Gray Ph.D*
- v. **Bruner's Discovery Learning (WEEK 5):** implies that students construct their own knowledge for themselves <https://www.simplypsychology.org/bruner.html>
 1. **DUE:** [WoLD ue4 the corridor project-part 2of2](#)
 2. Students are introduced to creating their own blocks in Maya. For some Maya is new, so fundamentals are covered. [LINK](#) to tutorials
 - a. **Assignment:** Work through the video's listed in document. *Guided Mastery, small steps to procedural texturing and environment building; Scaffolding; Spiral Curriculum (harder lesson than last, less familiar)*
 - b. **Assignment:** Complete working through introduction to texturing in Photoshop tutorials: [01](#) & [02](#) *Guided Mastery, small steps to procedural texturing and environment building; Scaffolding; Spiral Curriculum (harder lesson than last, less familiar)*

- vi. ***Bruner's Spiral Curriculum (WEEK 6):*** Coming back to texturing in Photoshop again (Spiral) students are guided through creating a tiled texture.
 1. **DUE:** Leaf alpha texture, example scene of completed Maya tutorial.
 2. Students learn the fundamental Photoshop technique of creating a tiled texture in order to create custom pieces if necessary.
 - a. **Assignment:** Create a tiled brick texture in Photoshop. In class recording ("How to" walk through): [Brick 01](#), [Brick 02](#), [Brick 03](#), [Brick 04](#). [Brick Textures](#) for Assignment *Guided Mastery, small steps to procedural texturing and environment building; Scaffolding; Spiral Curriculum (harder lesson than last, less familiar)*
 - b. **Assignment:** Create a level in Unreal apply brick texture to BSP or Primitive. (This information is covered in UE4 Fundamentals.) *Step 3: Production Processes- "overt behavior- practice behaviors." Spiral Curriculum- revisiting and combining two lessons into a more complex result.*
- vii. **Texturing in Bitmap 2 Material and Substance Designer (WEEK 7):** A Procedural approach. *Spiraling up in techniques*
 1. Coming off of the fundamentals in week 6 of hand tiled textures, post processing and alpha maps, now we'll look at one more Photoshop lesson and then procedural methods of texturing. This week ramps up difficulty by asking much more production and learning from the students.
 - a. **Assignment:** Watch and follow "How To" create a bump map for the Lily Pad *Step 3: Production Processes- "overt behavior- practice behaviors." Spiral Curriculum- revisiting and combining two lessons into a more complex result.*
 - b. **Assignment:** Watch and follow "How To" use Bitmap 2 Material to output leaf textures. *scaffolding and Observational learning.*
 - c. **Assignment:** Watch and follow "How To" intro to Substance Designer *Scaffolding and Observational learning.*
 - d. **Assignment:** Watch and follow "How To" create a brick texture procedurally in Substance Designer, *Constructive Play is encouraged in this tutorial as putting different inputs into the graph will yield unique results. Also scaffolding and Observational learning.*
- viii. **Minimalistic Modeling I (WEEK 8)**
 1. **DUE:** Finished leaf texture from B2M, Finished Procedural Brick
 2. **Assignment:** Maya Foundations: Working with objects, Arched Doorway. [LINK](#) to videos *Scaffolding and Observational learning.*
- ix. **Culmination of early learning: Alternate Texture Set for Corridor Pieces. (WEEK 9)** *This lesson is where the Bruner Scaffolding comes off and the "spiral" runs full*

circle. The students will apply all of the knowledge gained thus far and create their own variation of the environment, or an entirely new environment from the simple approach learned from the minimalistic professional pieces they played with for the first third of the class.

1. **DUE:** Maya Foundations: Working with objects, Arched Doorway.
 2. **Assignment:** Alternate Texture Set for Corridor Pieces. *Removed Scaffolding and Spiral Curriculum.*
- x. **Minimalistic Modeling II (WEEK 10)**
1. **LAB-DUE (at end of class):** Alternate Texture Set for Corridor Pieces.
 2. **Assignment:** This week go through World of Level Design Videos: 3DEnvMdlFoundationMayaLT-Module03-1of2
- xi. **Building a Simple Plant (WEEK 11)**
1. Coming back to more advanced but not a jump into the complete unknown, we revisit the cube and the plant texture and add curves and planes to create an entire plant; Cube + Curve = plant stem, & Plane + Texture = Foliage
 - a. **Assignment:** Students will create a Plant from a cube and curves, plus adding their plant texture to cards for foliage. Video Links: [01](#), [02](#), [03](#) PDF Link: https://drive.google.com/file/d/0Bz68_Dkwl4abVFFJVTNEN24xcm/view?usp=sharing Building on previous lessons using a primitive students will be introduced to a simple yet effective way to create plants from a box and curves. (Technique was learned through Paul Liaw's [course on Uartsy](#), Project 4 : Modeling Organic Environments. [Paul Liaw](#) has worked for ILM on many titles including Transformers and he modeled the [mosasaurus](#) seen at the end of Jurassic World.
- xii. **ZBrush Play, then Rock (WEEK 12)**
1. **DUE:** Maya WoLD videos: Module03 2 of 2
 2. **(In Class Assignment)** Students are encouraged to open Zbrush and given simple guidance into the interface and "how to" use fundamental brushes on a subdivided mesh. *Lesson is kept simple and playful, no desired outcome other than play.*
 - a. drawing a primitive to canvas
 - b. Brushes are introduced (including stroke type and alphas)
 - c. Adding and Subtracting
 - d. masking
 - e. subdividing mesh
 - f. mirroring and radial array
 - g. subtools
 3. A recorded lesson on creating a simple rock in Zbrush. This assignment walks the student through a complete asset workflow with intentions of

using this asset in an environment. Link to Videos:

https://drive.google.com/drive/folders/OBz68_DkwI4abV2FzOHhUS3Vib3M?usp=sharing This reflects spiral curriculum, starting with simplicity; guided mastery is also used to walk the student through a small step towards completing a custom object.

4. Texturing Rocks in Substance Painter.
- xiii. **Introduction to Group Project: ARK (WEEK 13)**
 1. **DUE:** Finished Plants
 2. **Assignment:** Take assigned concept art and begin building pieces for final
- xiv. **LAB (WEEK 14)**
 1. **DUE:** Sculpted Rock
- xv. **Final Presentations of ARK assets. (WEEK 15)**
 1. **DUE:** Final Presentation of custom simple ARK assets.
- xvi. This concludes the minimalistic training for the semester. As students finish this module they will have the knowledge to completely recreate the structures they played with in the beginning of the quarter, and more.

5) Framework for Analysis Part 2: Visual Component

- a. **Introduction**
 - i. 111 West Washington Street Chicago Illinois: Lobby
- b. **Reference and Research**
 - i. Photography
 - ii. Houdini Digital Assets
 - iii. Substance's Bitmap 2 Material
 - iv. Unreal Engine 4
- c. **Computer Roughs**
 - i. Early Stages: Basic Technique
 - ii. Advanced Techniques
- d. **Analysis**
 - i. Interactive Adjustments
 - ii. Troubleshooting problems
- e. **Conclusion**
 - i. Method Viability
 1. Advantages
 2. Disadvantages
- f. **Final Renders**

6) Methods

- a. **Validity of self Evaluation:** "These cognitive self-evaluations influence all manner of human experience, including the goals for which people strive, the amount of energy expended toward goal achievement, and likelihood of attaining particular levels of behavioral performance." <http://www.apa.org/pi/aids/resources/education/self-efficacy.aspx>

- b. At the beginning of the class a survey will be taken to get an idea of the previous experience of all of the students, particular attention will be spent on determining if they were artists or not. The qualification of students being an artist is based on the last question of the questionnaire: "I have done visual conceptualization on paper or in a simulated environment in some form before (I have created concept art or designs?)" Anyone who answered a "4" which included the text: "(4) I practice it often" is considered an artist. The reasoning behind this decision was to eliminate those who may have practiced artistic endeavors but only due to assignments, and not necessarily on a regular basis.
- c. Observation of three formal dependent variables, which will be assessed via surveys that measure the individual progress of each student in class based on their subjective self-evaluation. With clearly defined goals and "how to" documentation, it is expected students will a) exceed the level they feel they are capable of, b) not be intimidated by creating level art, and c) feel empowered to drive forward in their pursuit of working in the game industry.

7) Results

- a. Initial survey
 - i. One student practiced artistic endeavors on a regular basis,
 - ii. fifteen did not.
- b. Final Survey
 - i. Q1-I feel more confident in my ability to create environments for games since the beginning of the semester?
 - 1. All 16 answered "yes, I am more confident"
 - ii. Q2- In the topic of Environment creation I have exceeded the level I thought I was capable of.
 - 1. 12 answered: "Yes, I have exceeded the level I thought capable for myself"
 - 2. 4 answered: "not really"
 - iii. Q3- In respect to my new knowledge about environment creation, I feel empowered to drive forward in pursuit of the game industry.
 - 1. 15 answered "Definitely",
 - 2. 1 answered: "Not really"
 - iv. Work Samples from students.
 - v. Notable growth.

8) Discussion , Analysis and Conclusion

- a. Small steps as described by Bandura worked the best.
- b. Many students enjoyed adding more area to the original assignment UE4 Corridor (Constructive Play).
- c. Every student seemed capable of at least finishing their assignments, but level of aesthetic detail varied greatly especially with the Zbrush and final assignment.
- d. Large leaps towards the end of curriculum led many students seemingly checking out as attendance and assignments suffered.

- e. In the future David Kelley's suggestion: "It's hard to be "best" right away, so commit to rapid and continuous improvements." will be put to practice. Using small steps, might be the way to get more mastery without students checking out.
- f. stopping at the foliage/plant stage and beginning to make many more minimal environments
- g. Results were successful. Future iterations could be even more so.

9) Annotated Bibliography