The Magic Circle: An Essential Experience Through Virtual Theatre

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The Magic Circle: 
An Essential Experience Through Virtual Theatre

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by

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ABSTRACT

This thesis explores the similarities of video game design elements within the world of theatrical scenic design. Using my 2019 scenic design of Marc Camoletti’s bedroom farce Boeing Boeing as the backdrop, I discuss the core concepts of game design. I then describe the scenic process of the production and the journey from concept all the way through to a virtual reality recreation of the design. The study of game design in theatre has the potential to open a wide new world of opportunities in the scenic design industry. This paper examines how the theatre can benefit from game design in several areas, such as artist and technical design, economic and financial relief throughout production, performance, and efficiency. But the primary focus is on the dramatic and positive impact that it can have on communication and the way that theatre artists can work together in a collaborative setting. For the theatrical world, game design presents a wide and exciting realm of possibilities in not only design, but for theatre as a whole.
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**Introduction**

Communication. It is without a doubt the most important part of any relationship. It is how we express our thoughts and feelings to others, how we teach and learn, and how we are able to work with others towards a common goal.

In the following pages, I aim to demonstrate a new form of communication for theatrical design as well as the collaborative benefits of game design in theatre.

Using the texts, *The Art of Game Design: A Book of Lenses* by Jesse Schell, *Rules of Play: Game Design Fundamentals* by Katie Salen and Eric Zimmerman, and *Introduction to Game Design, Prototyping, and Development* by Jeremy Gibson Bond, I will discuss core elements of game design and their relation to theatrical design. These elements include:

- The Magic Circle
- The Essential Experience
- The Lusory Attitude
- Ludology
- The Elemental Tetrad

Following this discussion will be a look at my design process for the show *Boeing Boeing*. This will include a detailed explanation of the communication challenges that I faced during this show from the early stages of the design up until the opening of the production.

Finally, I will show a new form of communication for scenic design that I have created through the use of game design. This will include a look at the virtual reality recreation of my design for *Boeing Boeing* as a “game” that I developed after the initial design process was completed.
“All play moves and has its being within a play-ground marked off beforehand either materially or ideally, deliberately or as a matter of course…The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc., are all in form and function play-grounds, i.e., forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. All are temporary worlds within the ordinary world, dedicated to the performance of an act apart.”1

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The Magic Circle

In *The Rules of Play*, a book about game design fundamentals written by Katie Salen and Eric Zimmerman, The Magic Circle is basically described as a boundary in which a game takes place.² We are able to enter and leave it at any given time. Sometimes even key elements of the Magic Circle only exist at certain times. For example, a chess board is made up of a board and 32 individual pieces that represent military units. People sometimes use a chess board as a type of decoration in their homes. As a decoration, the layout of the pieces means nothing. But as soon as two people sit down to “play,” they have suddenly entered into the Magic Circle. The placement of the pieces is extremely important as the game begins. Each piece is limited to a very specific set of rules of movement. The checkered pattern on the board is transformed into the specific paths that each of these pieces must follow during their movement phases. The chess board and its units suddenly are bound to a specific set of rules that have a beginning and an end throughout the course of “play.”

“The fact that the magic circle is just that – a circle – is an important feature of this concept. As a closed circle, the space it circumscribes is enclosed and separate from the real world. As a marker of time, the magic circle is like a clock: it simultaneously represents a path with a beginning and end, but one without beginning and end. The magic circle inscribes a space that is repeatable, a space both limited and limitless. In short, a finite space with infinite possibility.”³

Another interesting aspect about the magic circle is the ability to enter and leave it at will. For example, during the chess game one of the players gets up from the board to make a phone call. They have suddenly stepped out of the circle and back into the real world. The other player may continue to stare at the board and think about their next move, remaining in the circle.

However, they may also check their phone, look back at and study the chess board, check the clock on the wall, look back at the board, send a text, look back at the board, etc., constantly stepping in and out of the magic circle. Depending on the game and its rules, stepping out of the magic circle for too long can have consequences. For example, calling “time out” during a basketball game temporarily freezes the game and the magic circle. Failure to return to the circle and resume play within a certain amount of time results in penalties.

A fascinating thing about theatre is the ability for several magic circles to exist at the same time, layered on top of each other. Jeremy Gibson calls this “The Layered Tetrad.” The layered tetrad is not a description of what a game “is,” but more of a tool to use in order to understand what is needed to design a game and how those elements are impacted during and after the game is played. The three layers of the tetrad are the inscribed layer, the dynamic layer, and the cultural layer. The inscribed layer is basically the game that the designer has made while it is not being played. It is the game with all of its pieces while it sits in a box, or the stage with its set without any actor or audience. I describe this in depth later when I discuss the “Elemental Tetrad.” The dynamic layer is what takes place while the game is being played, or while the actors explore and rehearse on the stage. The cultural layer is how it affects culture and society, or the audience who watches the play. The rules of the theatrical magic circle can also change at any time and as a scenic designer, I am the architect of the “game board,” on which the magic circle exists. I will explain this using my scenic design for Boeing Boeing.

Boeing Boeing was written in 1960 by Marc Camoletti. It is a door farce that is set in 1961 Paris, France. A door farce is generally a comedy that involves several accessible doors.

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with lots of slamming and precise timing. The story revolves around Bernard, an American architect, who has three fiancés, Gloria, Gabriella, and Gretchen. They all work as stewardess’ for different airlines and are unaware of each other. Bernard has a housekeeper name Berta who helps him keep his infidelity a secret. Near the beginning of the play, Bernard’s old college friend, Robert, shows up for a visit. A new super plane built by Boeing is about to become available, which causes all the women be in town at the same time. Bernard, Robert, and Berta struggle to keep the fiancés from discovering one another throughout the rest of the play.

The script specifies seven different entrances: front door, master bedroom, bathroom, courtyard room, guest room, kitchen, and dining room. The living room is where all the central action takes place and is the consistent “pathway” that connects all the different rooms. At this point, the script has already dictated some very specific rules about how the characters, or “game pieces,” will appear onto the set or “game board” for Boeing Boeing.

I refer to the characters in the play as “game pieces” because they are the units that are being moved around the “game board” by the actors. The actors are the “players” in this game. This is one of the theatrical layers of the magic circle. At the beginning of the actors’ rehearsal process, they are working on memorizing their lines, learning who their character is, and developing a relationship with the other characters that are created by the other actors. The parameters of these characters are realized and shaped through the guidance of the director. As the actors “become” and understand their characters more intimately throughout the rehearsal process, they begin to step into the imaginary world of the play. As the actors and director begin to work through different scenes in the play, “moments” begin to happen in which the actors start to “become” these characters.
As the rehearsal process proceeds, so does the design process. As I discuss the design with the director, we begin to make choices about how the “game board” is laid out. As a designer I spend a lot of time imagining and daydreaming about the game world, or “level design.” I research the place, time, and characters. I spend time “getting to know” the characters, trying to determine who they are and what exists in their lives and why. For Boeing Boeing, I spent a lot of time thinking about the character Bernard, the American architect who owns the flat in which the entire play takes place. The more I know Bernard, the easier it is to build the “game board.” To do this, I read the play several times from Bernard’s point of view, creating a character analysis. I also spoke several times with the actor who played Bernard in order to understand his take on the character. I create the game board for Bernard and these characters which creates the inscribed layer of the layered tetrad.
By determining the layout of the rooms, I have given new rules to the actors. They must enter and exit at specific areas and specific times that are detailed in the script, which directly impacts the rules of the game. How and when they get to these locations is something that the actors figure out as they play with their individual “game pieces.” This is where the players have the element of choice in the game. In all games, the players make choices that are driven by the rules, whether it be movement or action. In the rehearsal process, the actors use the game board and the rules to enter the magic circle. As I add furniture, props, and mechanics, I create even more rules and specifics. However, at the same time this is giving the “game pieces” more things to interact with and making the “game board” more “real,” as well as providing more

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6 Photo by Brandon Roye, Boeing Boeing, 2019
choices for the players. The possibilities of this space are explored by the actors and are eventually determined by the director as they create the dynamic layer of the tetrad.

As the set (game board) is completed, the actors move from their rehearsal space into the actual theatre. For *Boeing Boeing*, this was University Theatre at the University of Arkansas. The actors have strengthened their connection with their game pieces and have become familiar with the game board. New elements and mechanics are introduced, such as prop handoffs, assisted door opening, costume changes, curtain moving, moving set pieces, etc., all of which are reliant on the crew. The crew exist mostly off-stage unless they are needed for specific set changes. The magic circle is a little different for the crew. They wait patiently hidden out of sight until they are needed to enhance a character or adjust the game board in order to further the story and game play of the performance. Think of them as a “power-up” for the characters.

Many plays have several locations and thus several scene changes, or “levels.” Other design elements, like lighting and sound help enhance the level design of a game board or change it entirely. *Boeing Boeing* takes place in the same location throughout the entire play. Even though the game board remains the same for this play, the “levels” still change as we pass through time. For example, the play starts early in the morning, while Bernard and Gloria are having breakfast; it ends around 3 a.m. the following morning. Lights and sound are the key factors in expressing the passage of time.

The stage manager is the referee of the play. During the rehearsal process as the characters interact with the game, the stage manager records everything so that it can be recreated later. For example, where the characters enter, when they interact with a prop, which doors open when, etc. These specifics will change several times throughout the rehearsal process as the actors discover problems and solutions to better tell the story of the play. This process
follows the same trial and error testing that goes into designing a good game in order to make sure that the players have an engaging and progressive experience.

It is important that the actors recreate the same actions with their characters in order for the other characters to perform their determined actions. This is how most games behave as well. There is a linear story to them. The script of a play is linear and preset, but the actors still must make meaningful choices that will impact how they interact with the game. As more technical elements, such as lights and sound, are added, the stage manager records those as well. Once a production starts, the stage manager “runs” the show. They oversee the “set up” of the game board before the performance, they ensure that all of the game pieces are accounted for, and they begin and end the game calling for every predetermined mechanic and element at its designated time. I will discuss “mechanics” in greater detail later, but for now just know that they are basically “the rules.”

The final element that is added is the audience. Even though the audience is not technically a “player,” they are a vital part of the game. Watching a football game from the sidelines, observing two people playing chess, or sitting on a couch next to someone who is playing a video game are all examples of being an audience, and in each instance being a part of the magic circle. If a fan from the stands cheers or yells at their team, if the chess observer is offering advice to the players, or if the friend on the couch reacts with laughter as something funny happens during the game, they have stepped out of the real world and into the imaginary world of the magic circle. However, it is still a slightly different layer of the magic circle. The audience is identifying with the players but are not actual present in the game. The same goes for

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7 Schell, 51.
the theatre. Here is where the cultural layer of the layered tetrad can really be seen. As the audience gets drawn into the world of the play, they begin to experience feelings towards the characters and their individual stories. Throughout the play, audience members will react, sometimes vocally, to what is happening on stage. There is also a synergy that it shared between the audience and the actors. For example, laughter is contagious. It becomes easy to laugh along with a room full of laughing audience members. The actors are also affected by the engagement of the audience. Games are more meaningful and “fun” if everyone is engaged together.

Before each performance of *Boeing Boeing*, the cast and crew would show up much earlier than the audience. The stage manager and the crew would set up the game board, i.e., set. They would ensure that every prop and costume piece was in place. The crew would mentally run through the shows’ hand-offs, quick changes, and light and sound cues. They entered the magic circle and played through the game with only the elements and mechanics, but with none of the game pieces. At the same time, the actors were preparing in their own way: getting into costume and make-up, vocally warming up, running lines and blocking, and “getting into character.” Here, the actors enter the magic circle and run through the game on their own, familiarizing themselves again with the game board and their game pieces. Usually they even “walk” the game board before the audience comes into the theatre.

Before the theatre house opens to let in the audience, the cast and crew remain mentally in the magic circle of the game that has not even started. As the audience enters the theatre, they see the set and are given the opportunity to observe this game board and begin to familiarize themselves with the world in which the magic circle will exist. The stage manager calls the pieces to their starting places, calls for the elements (such as props and crew) to be set for the first level, and then the stage manager starts the game. The actors are now part of the game as
their characters. They are existing in the imaginary world of the play while observing and interacting with the other characters in the game. The audience is observing, but at the same time part of the magic circle. Since theatre is live, the audience and actors are aware of each other; there is a certain level of interaction and reaction between them. There are also rules that only apply to the audience members. For example, the audience (usually) is never allowed onstage. During a baseball game, whenever a fan runs onto the field the game is frozen until the fan has been escorted out of the play area because they have violated the rules of the game.

As an actor leaves the stage, they have left the magic circle of being part of the game but are now a part of the magic circle off-stage. Here actors and crew still observe the play, change costumes, pick up props, or wait for their next entrance; they are still part of the experience. However, maybe this character never reenters the game for the remainder of the play. At this point the actor may leave the stage and remove themselves from the magic circle and the experience entirely. As actors enter and leave the game board, the audience remains in the magic circle as they continue to experience the play.

Intermission is a “pause” in the gameplay and the magic circle. Everyone in the cast, crew, and audience take a temporary break from the game. During this time, the cast and crew still perform functions in their own magic circle such as character preparation, set changes, and costume and prop presets. The audience, now experiencing the cultural layer of the tetrad, is left to ponder and discuss the experience that they have had so far within the magic circle. After intermission, the play resumes and the game will continue until its conclusion. As the game ends, the actors leave their characters behind and walk out onto the game board to take their bows. Everyone leaves the magic circle together. At this point the audience responds to the game, usually with applause and appreciation to the actors for playing as game pieces in the
magic circle. It is a final moment where cast, crew, and audience all exist together for a moment and acknowledge the experience that they all just shared together.

This is what makes the magic circle become “magic.” It is what creates the Essential Experience.
The Essential Experience

Jesse Schell has written a fascinating book called *The Art of Game Design*.

“Good game design happens when you view your game from as many perspectives as possible. I refer to these perspectives as **lenses**, because each one is a way of viewing your design. They are not blueprints or recipes, but tools for examining your design. …None of the lenses are perfect, and none are complete, but each is useful in one context or another, for each gives a unique perspective on your design.”

There are 113 different lenses that are described, and an argument could be made that every one of them can be applied to theatrical design as well. The first two are the most important to the essential experience. They are titled and summarized in the text as:

- **Lens #1: The Lens of Emotion**

  “People may forget what you said, but they’ll never forget how you made them feel.”
  
  -Maya Angelou

  To make sure the emotions you create are the right ones, ask yourself these questions:
  
  o What emotions would I like my player to experience? Why?
  o What emotions are players (including me) having when they play now? Why?
  o How can I bridge the gap between the emotions players are having and the emotions I’d like them to have?

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8 Schell, xl.
9 Schell, 19.
Figure 3. Lens #2

Audience members seek out entertainment to have fun, whether it be through games, movies, theatre, or other media. But they come back to and continue to seek out these entertainments because of their “experience.”

Within a game, the player can have an experience on their own or with others. The game has set rules and goals. When seeing a movie at the cinema, audience members can have an individual experience as they watch the same film together and each have an individual emotional response. In the theatre, audience members share an experience with the living characters on the stage in front of the them and the unseen crew behind the scenes. What is amazing is that, in each of these forms of entertainment, there is a personal experience that can never be repeated.

The game can be replayed, but never again for the first time. A player will never experience the opening scenes of *The Last of Us* the same as they did the first time. A gamer

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10 Schell, 22.
can drop into their one-millionth battle royal of *Fortnite*\textsuperscript{12} and still never experience the same playthrough twice. Fans of *Madden 20*\textsuperscript{13} can even change history by leading the Dallas Cowboys to an undefeated season and a Super Bowl championship but will still never be able to recreate the same season twice.

Seeing *Avengers: Endgame*\textsuperscript{14} at the cinema on opening day can only be done on opening day. Only one time can audience members see it together for the first time, and they will never see it that way with anyone else. Showing the Blu-ray version to someone who has never seen it before, will be an entirely different experience for the person who has already seen it compared to the person who is now watching it for the first time. Also, audience members who have seen all the previous Marvel movies will have a different connection to story and characters than someone who has never seen anything from the Marvel Cinematic Universe.

These are very intimate shared experiences that the magic circle provides to the player or audience members. The theatre also creates these same experiences, but in a much richer, broader, and chaotic way.

For example, in the game *The Witcher 3*, the main character Geralt comes across an NPC (non-playable character) named Dune. Dune hires Geralt to help him find his brother who has been missing since fighting in a battle two days prior. At this point, Geralt can either follow Dune straight to the battlefield and continue the quest or the player can choose to meet Dune there later. It is important to note that time passes in *The Witcher 3*; there is a day and night cycle, as well as days and weeks in individual months. The player can literally ignore meeting

\textsuperscript{12} *Fortnite Battle Royale*, Microsoft Windows, Epic Games, 2017.
\textsuperscript{13} *Madden NFL 20*, Microsoft Xbox One, Electronic Arts, 2019
Dune for months, but the NPC will continue to wait at the battlefield until Geralt returns and speaks to him. Dune will not just give up and leave, he will not complain about his wait, and he will not die of thirst.\textsuperscript{15} As wonderful of as \textit{The Witcher 3} is, it is basically still just a large “choose your own adventure” book with a linear story and unchanging characters that never forget their lines or have unlimited choices. In theatre, even though the script is set in the same linear fashion, each of the actors still make their own meaningful choices on how they interact with the space and with each other. There are no non-playable characters, but every character is a player.

\textit{Avengers: Endgame} is similar to this. The story will never change. The Avengers will always defeat Thanos. The run time and pace of the movie will always be the same. Certain characters will die and never return.\textsuperscript{16} The characters will never forget their lines, change the story, or do anything different or unexpected.

The theatre is very different, even though it shares several of the same rules. During production, each time a play is performed, the story and characters are the same. The lines do not change, and the set and lighting are the same. Audience members can see the show multiple times with several different audiences and have a different experience each time, just like with games and movies. The big difference is the human and chaotic element, such as actors forgetting lines, or being late on an entrance, stage managers calling a cue too early or too late, or props and set pieces getting broken. This impacts the emergent play that the actors experience during a performance. Actor being aware that anything could go wrong at any moment keeps them engaged and ready to adapt in case the rules suddenly change. Other examples could

\textsuperscript{15} \textit{The Witcher 3: Wild Hunt}, Sony PlayStation 4, CD Projekt, 2015.
include the audience not laughing or responding at all, laughing for extended periods of time, being late to be seated, or intermission running long because of a sold-out show. All these things can cause the run time to change. Chaotic changes are not always due to actors or audience, but many times are also technical. For example, the power may go out, sound cues may not execute properly, or a crew member might forget to remove a chair during a scene change, which the actors now must deal with in the following scene. Any of these creates an entirely different show and an entirely different experience that can also never be recreated. What is so different is that all the elements are experienced together and not just the audience. In the theatre, it is the game, the players, the pieces, and the audience who all have an essential experience together.

In chapter 3 of The Art of Game Design, Jesse Schell speaks specifically to the magic of the theatre:

“There is something magic about theatres… Something magical happens when a crowd focuses on a sequence of events simultaneously. Somehow, we get something from the other people in the audience. I sometimes think we are able to subconsciously sense how others are feeling about the performance, and it helps focus our own feelings. This is probably why so many TV shows feature laugh tracks – there is something about appreciating an experience together that feels very satisfying.”

17 Schell, 29.
The Lusory Attitude

Just accept the rules.

According to *The Rules of Play*, the definition of the lusory attitude is the acceptance of the rules, despite how ridiculous they might be.\(^\text{18}\)

Rules in a game are inefficient. Also, many characters in plays are ignorant and usually foolish. For example, let us discuss a foot race. Imagine that we are in an open field facing north and 50 yards in front of us is a single solitary pine tree. Sitting 10 yards east of where we are standing is a metal trash can. The first one to touch the trash can wins the race. Now, logic dictates that since I want to be the winner of the race, I should immediately take off running at this very second in the direction of the trash can. However, the mechanics (rules) of the game/race need to be explained:

1. There is a starting line – A defined line that both contestants remain behind until the race officially begins.
2. A start of the race – Perhaps a starter pistol fired off by an official, or a bystander yelling, “GO!”
3. The boundaries are determined. The contestants must circle around the pine tree that is 50 yards before they can touch the trash can.
4. Contact – Players cannot interfere with each other. I.e. no pushing, tripping, face punching, etc.
5. Finish – Only after adhering to all the rules, whomever touches the trashcan first wins.

\(^{18}\) Salen, Zimmerman, 574.
The Rules of Play uses the game of golf as another example:

“Suppose I make it my purpose to get a small round object into a hole in the ground as efficiently as possible. Placing it in the hole with my hand would be a natural means to adopt. But surely, I would not take a stick with a piece of metal on one end of it, walk three or four hundred yards away from the hole, and then attempt to propel the ball into the hole with the stick. That would not be technically intelligent. But such an undertaking is an extremely popular game, and the foregoing way of describing it evidently shows how games differ from technical activities.”

In the theatre, the lusory attitude would be referred to as a suspension of disbelief. The audience will sit and quietly look upon a stage while actors pretend to be other people or things as they play out a story. Sometimes the characters that are being portrayed are fantastical creatures, like a dragon or a historical figure that is deceased, as is the case in the Broadway hit musical, *Hamilton*. One of the main rules that all audience members accept is that they do not interfere with the story. These rules are what define the audience’s relation to the magic circle.

During *Boeing Boeing*, there are several instances in which Bernard and Robert have hidden one of Bernard’s girlfriends in one room while at the same time trying to direct another girlfriend into a different room. In reality, any audience member could just shout out, “he’s cheating on you! There’s another girl in that room!” But the audience accepts the lusory assumption that the character does not know that there is an audience. At the same time, the actors pretend to be their characters and accept that there is no audience; however, the actors will sometimes slightly break this rule. If the audience has a reaction, such as laughter, the actors will pause the action until the laughter ends before continuing, so that the audience does not miss any of the dialogue.

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19 Salen, Zimmerman, 97.
During intermission, the cast, crew, and audience all suspend the lusory attitude. The story and world go on a temporary hold. Afterwards, the story continues, as the cast, crew, and audience all accept that they have returned to the magic circle of this story and its world. The audience accepts the set as the world that the characters exist in, they accept changes to the scenery, and most significantly, the audience accepts the passage of time. For example, during *The Winter’s Tale* by William Shakespeare, there is a 16 year passage of time between Acts 3 and 4.\textsuperscript{21} *Boeing Boeing* does not jump that far, but still travels nearly a full 24 hours during its (roughly) two and a half hour run time.

Sometimes a play calls for the actors to break the lusory attitude of the fourth wall and addresses the audience directly. During the play *Peter Pan*, Tinkerbell drinks some poison in order to save Peter. As she is dying, Peter is so determined to save her that he begs the audience for help. Only clapping can bring a fairy back from the verge of death.\textsuperscript{22} He pleads with the audience until they deliver a roaring applause for Tinkerbell. Here, the audience not only is asked to believe in fairies, but also must believe that they can save one. I have personally seen this show several times, and it is moving and exciting every time as the audience comes together to save Tinkerbell. The lusory attitude in this instance creates an emotional and intimate response that greatly affects and enhances the Essential Experience. For *Boeing Boeing*, the experience that I wanted my audience to have was to feel the intensity, chaos, and panic of Bernard and Robert, while at the same time be able to appreciate and enjoy the comedy of the situation that these two characters have found themselves in.

Ludology

“Ludology is the fancy name for the study of games and game design. Over the past decade, ludologists have proposed various analytical frameworks for games to help them understand and discuss the structure and fundamental elements of games and the impact of games on players and society.”23

In the book *Introduction to Game Design, Prototyping, and Development*, Jeremy Gibson Bond describes three common frameworks for ludology.

- **MDA: Mechanics, Dynamics, and Aesthetics** - probably the oldest and most familiar to most professional game designers. It mostly focuses on the variances in which designers and players each approach and view games.
- **Formal, Dramatic, and Dynamic Elements** - a much more “analytical” view of game design and is based strongly on the history of film studies.
- **Elemental Tetrad** - divides games into four elements: mechanics, aesthetics, story, and technology.

*Figure 4. Frameworks of ludology*24

All three are important frameworks when approaching game design. They share several of the same terms but are viewed slightly differently, i.e. mechanics. However, the one that most closely relates to theatre is the Elemental Tetrad. This is the framework that I will focus on.

24 Bond, 20.
The Elemental Tetrad

- **Lens #9: The Lends of the Elemental Tetrad**

  To use this lens, take stock of what your game is truly made of. Consider each element separately and then all of them together as a whole.

  Ask yourself these questions:

  - Is my game design using elements of all four types?
  - Could my design be improved by enhancing elements in one or more of the categories?
  - Are the four elements in harmony, reinforcing each other and working together toward a common theme?

*Figure 5. Lens #9*

“The tetrad is arranged here in a diamond shape not to show any relative importance but only to help illustrate the “visibility gradient,” that is, the fact that technological elements tend to be the least visible to the players, aesthetics are the most visible, and mechanics and story are somewhere in the middle.”

“The important thing to understand about the four elements is that they are all essential. No matter what game you design, you will make important decisions about all four elements. None is more important than the others, and each one powerfully influences each of the others.”

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25 Schell, 53.
26 Schell, 52.
27 Schell, 53.
Each of the elements play a vital role in the overall production of a play. They all have several lenses to look through that help describe their uses. Some are more relevant to design while some are better suited for use by actors and directors. I will discuss each element but focus mainly on the lenses that affect design.

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28 Schell, 51.
• **Mechanics** – These are the rules. The structure that hold the game together. The mechanic that is most influenced by scenic design is **space**.\(^{29}\)

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**Lens #26: The Lens of Functional Space**

To use this lens, think about the space in which your game really takes place when all surface elements are stripped away.

Ask yourself these questions:

- Is the space of this game discrete or continuous?
- How many dimensions does it have?
- What are the boundaries of the space?
- Are there subspaces? How are they connected?
- Is there more than one useful way to abstractly model the space of this game?

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\(^{29}\) Schell, 51.

\(^{30}\) Schell, 163.

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*Figure 7. Lens #26\(^{30}\)*

This lens refers to when I was discussing the magic circle and describing the set as a “game board.” The design dictates to the characters how the world can be used. To name a few examples, characters in *Boeing Boeing* can only enter and exit the stage from seven specific locations, characters can interact with furniture and set decorations, they cannot pass through walls, they must return through the same door that they exit through except after a scene change, etc.
Figure 8. Lens #29

**Lens #29: The Lens of Secrets**

Change who has what information, and you change your game completely.

To use this lens, think about who knows what and why.

Ask yourself these questions:

- What is known by the game only?
- What is known by all players?
- What is known by some or only one player?
- Would changing who knows what information improve my game in some way?

“Gameplaying is decision making. Decisions are made based on information. Deciding the different attributes, their states, and who knows about them is core to the mechanics of your game. Small changes to who knows what information can radically change a game, sometimes for the better, sometimes for the worse. Who knows about what attributes can even change over the course of the game – a great way to create drama in your game is to make an important piece of private information suddenly become public.”

Now, the secrets of the play are mostly based upon what is given to the designer in the story. The secrets are known by the characters, but in individual ways. They each have their own secrets, some are even shared between them, but no character knows all the secrets. Through the scenic design we can help conceal, reveal, or expose these secrets. For example, in *Boeing*. *Boeing* the biggest secret reveal is the portrait (this is explained in more detail in the design

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31 Schell, 170.
32 Schell, 170.
process). Before the show begins, only Bernard and Berta know about it. By the end of the show, everyone except the girlfriends know about it. At the beginning of the play Bernard, Berta, Gloria, Gabriella, and Gretchen all know what is behind each door. Only Robert and the audience are unaware. Once the audience is made aware of this mechanic, they begin to guess how, when, and who may use it next. This is very similar to the guesswork used in video games when players try to apply knowledge that has recently been given to them. For example, in *The Witcher 3*, players can use a skill called “witcher sense,” which allows them to see hidden and interactable objects. Once players are aware of this, they view and explore the game world in a very different way.

This lens is also a very important addition to the Essential Experience of the audience. At the beginning of the play, the audience is unaware of what the characters share and what they keep secret. As the story progresses, they learn more and eventually know everything that the characters know, and sometimes more. Watching a play as an audience member is a constant look through the lens of secrets.

- **Story** – this is the sequence of events that play out in a game. Aesthetics and technology help enhance the story and its design decisions, such as the look of the rooms and furniture, or the use of the periaktoi (a three sided vertical column that is rotated to display three different scenic pictures) to reveal the different portraits. Two helpful lenses to look through as a scenic designer when thinking about story are:

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34 Schell, 52.
Lens #77: The Lens of the Weirdest Thing

Having weird things in your story can help give meaning to unusual game mechanics – it can capture the interest of the player, and it can make your world seem special.

Too many things that are too weird, though, will render your story puzzling and inaccessible. To make sure your story is the good kind of weird, ask yourself these questions:

- What’s the weirdest thing in my story?
- How can I make sure that the weirdest thing doesn’t confuse or alienate the player (audience)?
- If there are multiple weird things, should I maybe get rid of, or coalesce, some of them?
- If there is nothing weird in my story, is the story still interesting?

Figure 9. Lens #77

The scenic design for Boeing Boeing has several “weird” and unique things; monolithic walls that vary in height, bright colored rooms, a giant half circle shelf, huge Picasso paintings of naked women, a kidney couch in a step-down living room, and a giant portrait featuring Bernard and each of his girlfriends. These can all be considered weird, interesting, and dynamic. When audience members first come into the theatre and see the set, the immediately begin to wonder who lives here and what kind of characters exist in the world. They can sit down and wonder, “what kind of a person hangs a 4’ portrait of a couple on the wall?” The audience has several

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36 Schell, 313-314.
minutes to view the set before the show even begins. The portrait is an important part of setting up the story before it even starts, which also helps invite the audience into the magic circle. The play opens with Bernard and Gloria eating breakfast directly below their portrait. The audience immediately recognizes them from the portrait and conclude that they are the ones who live there. These unique elements can help tell the story before it even begins.

- **Lens #82: The Lens of Collusion**

  Characters should fulfill their roles in the game world but, when possible, also serve as the many minions of the game designer, working toward the designer’s ultimate aim, which is to ensure an engaging experience for the player. To make sure your characters are living up to the responsibility, ask yourself these questions:

  - What do I want the player to experience?
  - How can the characters help fulfill this experience, without compromising their goals in the game world?

*Figure 10. Lens #82*37

Once production of a play begins, there is more than one type of player. There are still the actors who are playing and controlling the characters; however, the audience has also become a player who exists and affects the world. The actors are directing the characters towards their goals while interacting with the set to provide the audience players with an experience. Some of the elements that the characters must interact with are dictated by the scenic designer, such as the periaktoi portrait. (This portrait element is described in greater detail later in the design process).

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37 Schell, 334.
However, the story dictates to both the designer and the actors that there must be a portrait that changes. I simply determined the technology to use in order to fulfill the experience which is demanded by the story that the characters must now use.

- Aesthetics – these are the things that affect the senses. The look, feel, sound, smell, and taste of the world. These are the things that will affect the characters and audience the most. It is important to note that the aesthetic of how a space “feels” is different from the mechanic of how the space is “used.” Using the mechanic of space as well as technology can enhance the aesthetics, causing a more immersive experience for those in the magic circle. The art can have a dramatic effect on the atmosphere of the game and on the emotions of the player. The element of aesthetics is so important to the essential experience that in The Art of Game Design, Jesse Schell recommends revisiting 33 of his previously described lenses and using them to look specifically at aesthetics. He then adds one more.

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38 Schell, 52.
• **Lens #94: The Lens of Atmosphere**

Atmosphere is invisible and intangible. But somehow it envelopes us, permeates us, and makes us part of the world. To make sure the atmosphere of your world is properly intoxicating, ask yourself these questions:

- Without using words, how can I describe the atmosphere of my game?
- How can I use artistic content (both visual and audible) to deepen that atmosphere?

*Figure 11. Lens #94*

This is one of the moments when the design of a show becomes a completely collaborative work of art. Aesthetics that are added to the physical set are just one part of the atmosphere. Other parts could include the characters in their costumes existing in the game world of the set, a lighting design that enhances architectural elements while at the same time creating mood and time, or a rich sound design to bring the audience deeper into the game world. Collaborating, the design team creates an atmosphere that brings the art to life, as well as making this production of *Boeing Boeing* different from any that came before or will come after.

“It makes sense to view your game artwork through many lenses, because the key to creating great artwork is your ability to see. Not just to see a salt shaker and say ‘that’s a salt shaker,’ but to really see it – see its shapes, colors, proportions, shadows, reflections, and textures – to see its relationship to its environment and to the people who use it, and to see its function, and to see its meaning.”

- Technology – materials and exchanges that make the game possible.

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39 Schell, 387.
40 Schell, 387.
41 Schell, 52.
“The technology you choose for your game enables it to do certain things and prohibits it from doing other things. The technology is essentially the medium in which the aesthetics take place, in which the mechanics will occur, and through which the story will be told.”

- **Lens #104: The Lens of Technology**

  Make sure you are using the right technologies in the right way, ask yourself these questions:
  
  o What technologies will help deliver the experience I want to create?
  o Am I using these technologies in ways that are foundational or decorational?
  o If I’m not using them foundationally, should I be using them at all?
  o Is this technology as cool as I think it is?
  o Is there a “disruptive technology” I should consider instead?

*Figure 12. Lens #104*

For *Boeing Boeing*, all technology was preexistent and standard for most theatrical designs. Modern carpentry techniques were used to construct the set. Lumber was used to erect the walls which were facing down stage toward the audience. The upstage portion of the walls remained uncovered and exposed. Crown molding was fashioned out of foam. Painting techniques were used to give the illusion of plaster walls. Escape stairs were placed off stage out of the view of audience members to allow cast and crew easy access to all areas of the set from upstage. Curtain legs and borders were installed to help mask sight lines as well as lighting fixtures. Modern lighting instruments and programs were used throughout the performance as well as prerecorded effects and surround sound placement. Examples of contemporary technology include:

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42 Schell, 52.

43 Schell, 459.
technologies that were intentionally not used include elements such as fog, projections, or special effects.

*The Art of Game Design* explains foundational and decorational technologies with the illustration of a cupcake. The cupcake itself is foundational. Icing that is added to the cupcake is decorational. The icing does not change the original technology, it just makes it a little nicer.\(^{44}\)

Much of the technology could be considered decorational. The designers, artists, and carpenters used existing ideas and techniques that were repurposed to fit nicely into the game world that was being created. However, the technology was foundational in the way that it had not been used in this way before. For example, the designs were all original and created a game world that provided unique and exciting experiences.

The periaktoi portrait, which I describe later during the design process, was the disruptive technology of the design. A disruptive technology is one that suddenly replaces an old one. In the script, the portraits of the three girlfriends are swapped out using a picture frame that sits on a table. It is time consuming, and usually only done by Berta since she carries the pictures in her apron pockets. By implementing the scenic device, the periaktoi (one of the oldest scenic elements in the history of theatre) portrait reveal suddenly becomes faster, more dynamic, funnier, and ridiculous (since Bernard built this device into the architecture of the building in order to accommodate his collection of girlfriends), therefore enhancing the comedy, storytelling, and the essential experience.

\(^{44}\) Schell, 451.
The elemental tetrad provides several lenses to view the four elements of design, allowing the opportunity to view the design from differing and essential perspectives. It is an extremely helpful tool to constantly revisit during the journey of the design process.
The Design Process

*(see Appendix A for photographic chronological diary of design process, pgs. 58-80)*

I was assigned the show *Boeing Boeing* at the beginning of the Spring 2019 semester. I was given a production calendar that had scheduled design meetings, production meetings, tech rehearsals, and performance dates. I knew that Kate Frank, a Department of Theatre Instructor, would direct, undergraduate theatre student, Annika Howard, would design lights, and that the University Theatre would be the performance venue.

Before I began thinking about the design, I wanted to talk to the director and get her initial thoughts and vision on the play. Kate said that she wanted to keep the play set in its original time and place. She also wanted to remain relatively realistic with the design world. These were all factors that would directly impact the essential experience that we were now going to create. My first step was to dive into the script. Generally, whenever I design a show, I read through the script several times from several different points of view.

- First, I just read the play. I get to know the characters and their story. I have not begun envisioning design elements yet. It still happens, but I try to focus just on the characters and story at this point.

- The second read through is when I start to explore the world in which the characters live, mainly locations and time. These are broad terms that mean several things. For locations, I am looking for the actual geographic location of the play. For *Boeing Boeing* it is Paris, France. I also look for where the scenes take place. This show only has one location: Bernard’s flat. I pay attention to the entrances and exits that are indicated in the script and take note of them. Since this is a door farce, there were several: front door, bathroom,
master bedroom, courtyard room, guest room, kitchen, and dining room. All of these were shared by the living room where most of the action takes place. A “door farce” is also referred to as a “bedroom” or “sex farce”. These are defined as a type of light comedy, that revolves around the sexual pairings, plot complications, ridiculous situations, broad physical humor, and slamming doors. With Boeing Boeing, this really begins during the second act of the show when all of Bernard’s fiancés are in his flat at the same time. He and Robert are constantly hiding, distracting, and redirecting them in order to keep the women from seeing each other.

- The next step involves several more readings of the play. This is where I go through the play as an actor cast in each part. For example, I read through the play as if I were going to play the part of Bernard, then again as Robert, then again as Berta, etc. As I do this, I take note of each character’s personalities and what I think that they would bring into this world.

- I then created research plates to show the director. These included the time period, the location, architecture of the time, furniture, room set ups, color palettes, and character traits. Kate then looked at them and pointed out which pictures or elements stood out to her, and I made new plates that focused on these favorites.

- Before deciding on all the decorative technology, such as color and texture elements, it was more important to focus on the layout of the set. This is a foundational part that directly shapes the mechanics as well as the experience. Since Boeing Boeing is a door farce, so much of the comedy is dependent on timing. The director and the actors needed to know where everything was going to be by the beginning of the rehearsal period.

45 Wilson, The Theatre Experience, 211.
began making ground plan sketches while working through each scene of the script. The location of each room was critical in order to ensure that no character would encounter another when they were not supposed to. Also, determining where the stair units in to and out of the sunken living room was vital to the movement of the characters and the pathways that they could take. These decisions would directly impact the revelation of information to the characters as well as the flow and pace of the over play.

- As Kate and I continued to meet, we would go over my sketches together and look at each scene. We would then discuss and make slight changes to the locations.

- After it seemed that we had a very solid working ground plan, I made a “football playbook,” where I printed out a copy of the ground plan on the back of each page of the script. I then used colored pencils to draw out the movement of each character on each page. A different color was assigned to each character and arrows and numbers were used to show their paths movements as well as the order in which they were taken. I would also highlight in the script with the colored pencils where each movement would begin and end. This really helped determine where problem areas were as well as let us know what really worked. This also allowed Kate to already have a lot of the blocking figured out before rehearsals even started so that she could focus more on the character development with her actors.

- My next step was to start making 3D renderings so that Kate could begin to see the world set in the space of University Theatre. This really helped us tweak the sizes and locations of the doors, as well as the walls for each room. This also caused us to do away with some of our original ideas while finding some new ones. For example, the courtyard room was up stage center. Originally, we wanted the door to this room to be open at
times so the audience could see into it revealing a large set of glass French doors with a
terrace and a view of Paris. It was a lovely idea and it looked very pretty in the
renderings. However, as we progressed, we only found one time that we could really use
that “reveal” and it would only be for a very short time. Also, most of the audience would
not even be able to see it. We cut that idea and determined that we now did not want to
see into the outside world at all. This would keep the feeling more intimate, and as the
play got more chaotic the audience would really be able to feel the choking
claustrophobic panic on Bernard as his world crashed in on him, which was more
important to the essential experience that we wanted to create.

- Now that we had a better idea of the layout, I began to spend time on the décor of the
world.

Since the entire play takes place in Bernard’s flat, I focused the most on that character for
much of the world building. Bernard is a wealthy, successful American architect who is living
and working in Paris. He is also engaged to three different stewardesses at the same time. At the
time of the play, a stewardess was the icon of “sexy.” Dating three of them would have made
him seem like a Hugh Hefner personality. He is confident, charismatic, and intelligent enough to
obtain, keep, and schedule three separate lifestyles. Bernard is wealthy and successful enough to
not have to work that often, since he almost always has a girlfriend at home that he is
entertaining.

The year is 1960, and Bernard says that he has not seen Robert since they were in
architectural school after college 10 years ago. This makes Robert and Bernard roughly 35 years
old. Bernard would have been going to architectural school in the late 1940’s, right as World
War II was ending. His family had enough money to send him to college and keep him out of the
war during that time. Half of France sided with the Nazi’s and half with the Allies. So, much of France was damaged during the conflict. France's architectural infrastructural did not pick back up until the 1950s. This puts Bernard right in the middle of his career as a junior architect, making his skill set and talent a highly sought-after commodity. Being a talented and wealthy chauvinist, I imagined that Bernard would want a bachelor pad that was set up to impress any woman that he brought home. He would not have lived in a new building, but rather an old one that had survived the war. Step down living rooms became very popular in the 1950’s and I decided that Bernard would have chosen an old building and renovated it to be slightly more modern. This would allow him to show off his architectural knowledge about the building’s history to anyone that he brought home. His renovations would speak to his wealth as well as his restoration abilities. This would include specific scenic elements such as large crown molding, wainscoting, and plaster textured walls. To further show off his status, I wanted the set to be decorated with furniture that would have been hip and expensive at the time. This included a giant half circle shelving unit near the front entrance, an Eames chair, a Barcelona chair, arc lamps, liquor cabinet, Eames table, media center, art deco globe, snake plant, fold down breakfast table, and a kidney couch. Recreations of famous paintings were also popular and expensive at the time. The play takes place before the rise of artists like Andy Warhol and Jackson Pollock, even though they would soon be discovered. To achieve this, I decided on large Picasso reproductions. Since this is a very “sexualized” show, I picked some of his more provocative works: Les femmes d’Alger and Les Demoiselles d’Avignon.

- Color was the next decision. I wanted something neutral but not bland. It needed to be light but not too reflective. Since there was going to be lots of molding and wainscoting, I wanted something that could be easily contrasting and complementary to those scenic
elements. I spoke with both Kate and Annika Howard, the lighting designer. We decided on a pale green for the walls and a darker olive for all the molding, trim, and wainscoting. At this point, Annika and I also discussed that the crown molding was going to be quite large and protrude a full twelve inches at the top of each wall. I wanted her to be aware of it early on since this would create some lighting challenges for her. Another reason for the lighter neutral color of the walls was to enhance the furniture, props, and costumes. I spoke early on with costume designer, Valerie Lane, about her color palette. The men were going to be in grey while each of the women would have a brighter specific color for their airline uniforms: blue, red, and yellow. A neutral background would really make the costumes and characters “pop,” giving them a more 3-dimensional look. I continued this with the props and furniture. The kidney couch was a rich blue velvet, the fold down breakfast table, Eames table, liquor cabinet, and media cabinet were all cherry wood stained, the Eames chair and Barcelona chair were sleek black leather with chrome and cherry wood frames, a single chrome arc lamp, a colorful 5 bulb arc lamp, a golden globe, and a bright green snake plant. I specifically wanted anything that was handled by the characters to have a significant contrast to the walls so that they would stand out. I also wanted the upper level to also have a hardwood cherry stain look to it. This would let Annika have the option of reflecting light off the floor and onto the walls without causing it to look too shiny. I wanted the carpet in the lower level to be dark with a repeated pattern, something that would look modern and expensive, but without being distracting or causing the furniture to blend into it. I found a charcoal carpet with a diamond pattern that the director and lighting designer both liked. The final decisions were the color
palates for each of the individual rooms. I wanted them to be bright, brilliant, and drastically different from one another. I had three specific reasons for this:

- It would enhance the comedy of the show. Bright colors are fun and light. They would also enhance and compliment the bright colors of the costumes
- There would be a sudden burst of color that jumped out at the audience every time that a character opened a door to one of the rooms.
- It would help the audience remember the name of each room. The master bedroom was red, the bathroom was blue, the courtyard room was purple, the guest room was green, the kitchen was yellow, and the dining room was orange. The front door was never seen, but with a sound a lighting effect, the audience was able to see “daylight” spill down the entryway whenever they heard the front door open. This was to subconsciously give the audience members a visual landmark for each individual room.

Changes were eventually made to some of the rooms, which came about with the creation of the first full color ¼” scale model. Using foam core and 3D printing, I built the theatre, set, and furniture at a ¼” = 1’0” scale. Using photoshop I created textures and patterns that I attached to the walls and floor.

During the next collaborative design meeting, I presented a physical, ¼” = 1’0” scaled model to the design team for feedback and collaboration (App. A, pg. 70). We decided to remove the archway to the dining room as well as the door to the guest room. This meant getting rid of the orange color that represented the dining room and the green for the guest room. This did, however, create new and interesting architecture. The upstage left wall where the guest room had been was pushed further upstage creating a short hallway. This allowed Kate to change some
blocking and create new moments of tension for the audience. She could now have two of the girlfriends be visible without them seeing each other. This added new opportunities for timing and comedy, as well as increasing the drama for the essential experience. Annika was still able to represent the colors of the room with her clever lighting each time that one of the unseen doors was opened off stage.

Other elements, such as the wall height were also discovered and discussed. At this point, every wall was the same height. It was very monolithic and rectangular. To accommodate sight lines for all the doors, the walls sat at abstract angles. This allowed the audience to see each room and it gave a look of a city skyline. I really liked this since I had to cut my Paris drop from the courtyard room. Michael Riha, the Chair of the Department of Theatre, pointed out that the constant horizontal was bland and suggested that it might be much more dynamic if I tried varying the heights of the walls. I agreed with him and set out to experiment with his suggestion. I went back to SketchUp (my preferred 3-dimensional design rendering program) to create some quick 3D renderings. At first, I kept the center courtyard room walls at their original height and began lowering the other walls in 12” intervals as they went downstage. This made a significant difference, but something still was not right. Since the crown molding was exactly 12 inches high, it now looked like a messy blob of olive color at the top of the set. It flattened out the set and was very distracting. I lowered each wall by another 8 inches revealing more of the pale green below the crown molding. This looked great and caused the different depths of the rooms to really stand out. It also enhanced each wall and gave the set the “city skyline” look that I wanted.

The final big discovery that came from the model was the portrait. In the script, there are very specific moments when one of the characters switches out a picture of each girlfriend.
When the next girl is about to show up, the picture is changed out. This becomes more comical when all three girls are hidden throughout the flat. I knew that a black and white standard 8x10 picture would not be visible to most of the audience members. I wanted a much larger, full color portrait of each of the girls. I also wanted Bernard in the picture, as well as a constant Paris landmark in the background. I thought it would be a funny nod at his character for him to take each of the women to the same place to take their engagement photo. Originally, the portraits were all going to be the same set up and pose for each girl and Bernard, but as Kate and I discussed it further, we decided to showcase the different personalities of each girl within each picture. Having already done a character analysis for each girl, I was able to create very personal portraits using photoshop.

- **Gloria – The American.** Red outfit. Looking for money and security. Portrait was done in classic 1950’s couple portrait style. Both characters are facing the camera and showcasing the engagement ring. Print is slightly grainy and fades out into an oval shape.
- **Gabriella – The Italian.** Blue outfit. Looking for love. Portrait was done mimicking the cover of *Gone With the Wind.* Passionate look into each other’s eyes as Bernard dips her back. Print is dreamier with an oil paint look.
- **Gretchen – The German.** Yellow outfit. Looking for romance. Portrait was done to look like the cover of a 1950’s travel magazine. Both characters gazing out into the stars and their future together. Print is bright, sleek, and exciting.

*(App. A, pgs. 76-77)*

My original idea was that the portrait was attached to the courtyard room wall just above the fold down breakfast table. I wanted the entire frame to slide in track revealing a hidden recess in the wall that housed a large world map and all the world time clocks i.e. London time, Tokyo
time, Paris time, New York time, etc. I thought that this would also show how he kept track of where all the girls were at any given time. The actual frame would be thick enough to house all three portraits which could be pulled out through the side of the frame and then placed in front of whichever girl was no longer around. These ideas were well received, but we soon discovered that they were not practical to the pace of the show. There would only be one or two times when Bernard would need to use the hidden compartment with the time clocks and the moments would have been so fast that sliding the portrait back and forth would have really slowed the frantic moments down. Also, there was no need for a map when we already had a globe on the set.

Changing the portraits would also be difficult to do quickly. At this point, Karl Hermanson, the prop master and scenic charge artist, suggested that all the portraits be connected together at the top and the base creating a “belt” that could then be attached to rollers. A crank could be spun that would wind the portraits around, revealing whichever girl was needed at the time.

Everyone liked this idea at first, but we soon discovered that the crank would have to be removable so that the girlfriends would not see it. This was fine, except that when things got chaotic near the end of the play, it was going to be difficult for different characters to help change the portrait if they also had to hand off this special crank. At this point Head of Design, Shawn Irish suggested the possibility of using a periaktoi, a three-sided vertical column that spins freely on a fixed axis (App. B, pg. 90). I loved this idea and knew that it was the correct answer. The portrait would remain above the fold down breakfast table and be recessed into the courtyard room. A mechanical crank that was operated by a crew member would spin the periaktoi whenever they were cued. An actual button would be placed on the stage left side of the courtyard room wall that would activate a cue light when pressed by the actors. Applying this
feature of technology from the elemental tetrad, allowed the actors to play with the reveal of the portraits and added new possibilities for comedy as the button was eventually pressed rapidly.

To determine the proper size of the portrait, Kate and I walked the actual theatre space together and found the approximate location of where the portrait would live. Using tape measures, we tried different dimensions to see what looked best from the audience. I then used scrap lumber to hold up in place so that we could get an idea of what it would look like. We decided that 3 feet wide and 4 feet high was the perfect size for the portraits.

- My next step was applying these new changes and discoveries. Using Vectorworks, I updated all of the drafting plates (App. B, pgs.81-90), furniture plates (App. C, pgs. 91-94), painter elevations (App. D, pgs. 95-105), created new 3D renderings with SketchUp, and built a new ¼” scale model. I brought all of these to our final design meeting. Minor tweaks were made, but at this point we were ready to move into production.
Throughout the entire design process, I followed and updated the elements of design as laid out in Edwin Wilson’s *The Theatre Experience*. Taken directly from the text, they are:

<table>
<thead>
<tr>
<th>Elements of Design</th>
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<tbody>
<tr>
<td>• Line – The outline or silhouette of elements onstage – for example, predominantly curved lines versus sharply angular lines</td>
</tr>
<tr>
<td>• Mass and Composition – the balance and arrangement of elements: for example, a series of high, heavy platforms or fortress walls versus a bare stage or a stage with one tree on it.</td>
</tr>
<tr>
<td>• Texture – The “feel” projected by surfaces and fabrics: for example, the slickness of chrome or glass versus the roughness of brick or burlap</td>
</tr>
<tr>
<td>• Color – The shadings and contrasts of color combinations</td>
</tr>
<tr>
<td>• Rhythm – That is, “visual rhythm” – the repetition of shape, color, and texture in a regular or irregular pattern in a design.</td>
</tr>
<tr>
<td>• Movement – between scenes and within scenes – the way the action unfolds and the way it progresses from one scene to the next. This may involve rapid scene changes, turntables, and other devices for smooth transitions.</td>
</tr>
</tbody>
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*Figure 13. Elements of Design*46

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46 Wilson, 246.
Challenges

Throughout the design process there were several challenges. Some I have already spoken about such as adjustments to the wall height in order to create a more dynamic city skyline look, the portrait which was resolved with the idea of using a periaktoi, and the location and layout of the doors. However, a last-minute problem that was out of anyone’s control was the carpet for the step-down living room. The original carpet had been ordered early, but after a month, it still had not shipped. In an emergency shopping trip, I went with Alliance Akins, the assistant technical director, to search out a replacement carpet that could be delivered within three days. We were successful and found a carpet that worked even better with the design. Game design deals with similar surprises and unforeseen circumstances. Schell refers to it as “risk mitigation,”47

“Risk management is hard. It means you have to face up to the problems you would most like to avoid and solve them immediately. But if you discipline yourself to do it, you’ll loop more times, and more usefully, and get a better game as a result. It is tempting to ignore potential problems and just work on the parts of your game you feel most confident about. You must resist this temptation and focus on the parts of your game that are in danger.”48

One of the challenges that I was able to “mostly” solve before construction was the sightline issues with the paint treatment on the upstage walls of the rooms. Since I had staggered the heights of the walls by 20 inches as they traveled downstage, the top portion that was directly beneath the crown molding still needed to be pale green. The lower portion needed to be the color of the specific room i.e. blue for the bathroom. I did some angle projections using the section view of my drafting, as well as looking from different angles at my 3D renderings in

47 Schell, 99-102.
48 Schell, 102.
SketchUp. There were only a few adjustments that needed to be made in the red master bedroom and the yellow kitchen. These were easy fixes which did not require much extra time.

My two biggest challenges were ones that I was unable to foresee and solve with the resources that I had available. They were the direction in which the doors opened and closed, and the size of the portraits.

- **Door direction** – From early in the design process, Kate and I had several discussions about which way that the doors would swing. Many options presented themselves, like should they swing on stage or offstage, upstage or downstage, and should they be uniform or could they each swing a different direction. I knew that I wanted a swinging door for the kitchen. This would be more practical for Berta since she would enter and exit through the kitchen frequently with her arms full of props.

  Kate eventually decided that she wanted the doors to all swing offstage and into each of the rooms. She was afraid that if the doors opened out that one of the other characters might “see” it and it would destroy the audience’s belief that all the girlfriends remained unaware of each other.

  The director also wanted the doors to open upstage away from the audience. She believed that this would create some quick and funny moments when a character to easily pop their head out to say something and then immediately disappear back into the room.

  I had no problem with either of these requests. Generally, in realistic layouts of homes the doors open into rooms anyways. Since opening offstage made architectural sense and opening upstage could produce more opportunity for comedic moments, I did not bother to question or look at another point of view. I was wrong. It was not opening
offstage that became a problem, but opening upstage. When the doors opened, they blocked almost all the color in the room. The purple in the courtyard room could be seen because it was center stage and the yellow kitchen was visible because of the swinging door, but only audience members on the house right side of the theatre could see into the red master bedroom and blue bathroom. It was something that I never noticed in my drafting, renderings, or models. I spoke with Kate about changing the direction of the doors, but she was afraid that we were too late into rehearsals and that it would confuse the actors and disrupt their characters. I defaulted to her wishes and concerns but remained frustrated that I had not explored risk mitigation closer in order to have noticed this sooner.

- Size of the portraits – this became one of the biggest discussions and hardest to communicate. As the set was finishing being constructed, just a few weeks before the show opened, Kate stopped by to look at the set. When she saw the 3’ wide by 4’ high hole in the courtyard room wall where the portrait was going to hang, she had a very concerned reaction. She expressed that it was much bigger than what she had agreed upon and that it was going to take attention away from the actors, and that the audience would just be staring at the portrait the whole time. After letting her breathe for a minute, I reminded her that this had been the size on the drafting, the 3D renderings, and on the models. All of which she had approved and gone unchanged for months. Her response was, “yes, but I just couldn’t visualize it.” I then reminded her that we had walked the space together weeks ago and measured out the size together. That I had also cut out a piece of scrape lumber to the proper size and held it up for her to see and that she had approved of it. Again, her response was, “yes, but I just couldn’t visualize it.” I tried my
best to explain how with the height of the walls and the brilliant colors of the costumes and furniture enhanced with Annika’s lighting design, that the portraits would not be a problem or a distraction.

I still was unable to convince her. I said that if we got into tech week and it turned out to be a problem I would come up with a solution, she said that she would trust me, which I greatly appreciated. I then spoke with Annika about Kate’s concerns. Annika said she would make sure that the lighting would keep focus away from the portrait except for when the action of the play called attention to it. Her final lighting design was great, the portraits looked wonderful, the audience loved it, there was never any distraction, and Kate was happy. The periaktoi portrait is still one of my favorite pieces of this design.
Journey from Stage to Virtual Reality

I started work on virtual Boeing Boeing during the fall semester of 2019. This was well after the design process for the show was over and we were getting closer to construction completion and the opening of the production. My original plan was to recreate my scenic design using game development software such as Unity and Blender in order to further my education and skill in the area of level design. It was not until later during game testing a 2D version of the game that I realized how this could have brought my attention to problems, such as the door direction, early enough to have corrected them. And as soon as I walked through the space in virtual reality, I immediately knew that this would have resolved Kate’s concerns about the portrait sizes and shown her a medium that she could visualize.

I began the process with the element of technology from Lens #9: The Elemental Tetrad. 3D components were created in both Blender and SketchUp using the original 3D renderings and 2D drafting as reference. After I had all the architectural elements, I then imported these components into Unity to begin the game building process (App. A, pg. 74). I used invisible colliders to create boundaries around the theatre, set, and furniture to create the mechanic of space for the player. Once the game board was built, I used premade code to create a player unit and assign it different mechanics such as size, movement, speed, and gravity. Then the aesthetics, such as the color and textures, were applied to all the physical elements of the game board. After all the original scenic pieces from the design and the script were in place, I adjusted the sizes of furniture and doors to make sure that the travel paths for the game pieces were clear for them to tell their story.

I was constantly testing the game in Unity as I was building it; looking for colliders that I had missed or ways to cause the game to crash. Once I felt confident that I had a functioning
game, it was time to implement virtual reality. Under the guidance of Tesseract’s technical director Nicholas Reynolds, and lead software engineer Adam Shoelz, I was able to bring the two-dimensional design into the virtual world using the Oculus Rift VR Headset.

I presented a working prototype of the virtual Boeing Boeing game at the 2019 Fall Juries (App. A, pg. 80). It was very well received and everyone who tried it was excited about the possibilities of where it could go next. Designers, directors, actors, production managers, producers, and technical directors all had a turn in the virtual world and the outcome was quite interesting: they each had a different experience. Even though they all enjoyed their time and had fun, all of them explored it in individual ways and were excited about the different ways it could benefit their specific profession. Tech directors could see the layout both on and off stage, being able to visualize construction time, safety concerns, storage space, and layouts for prop tables and quick-change areas. Directors could see the complete picture and view it both on stage and from the audience, letting them begin to think about blocking. Production managers could see the set as a whole and start to plan out material cost and labor required. Lighting designers could see (roughly) where their electrical line sets were to get an idea of where lights could be hung and potential future issues (such as the large crown molding). Scenic designers could see the actual layout of the theatre which would provide them with the knowledge of possible challenges such as HVAC and catwalk locations or offstage wing space. Actors were excited at the possibility of getting a feel for the space that was not just a ground plan taped out on the floor of a rehearsal room.

When I “walked” through the game version of the design with the Oculus headset, it felt like I was actually in the space of the University Theatre. Boeing Boeing had already been closed for two months before the prototype was working, but it was just like walking the stage again.
The view from the audience, the area on stage, the space in each room, and the upstage crossover all felt like they did when I had walked the actual theatre.

I had already “played” the same game while I was building it, using the WASD keys and mouse for movement and view, and it was still beneficial to me as a scenic designer because I was able to see the sightlines, wing space, and scenic layout. But it was not the same experience as the VR version. When I was immersed and my peripheral vision was filled with the world as I moved my head, it felt real. A three-dimensional version of the game on a monitor would still be something that designers and technicians could use, but it certainly would not have the same impact on most actors, directors, producers, and others whose positions do not involve a lot of technical aspects.
Future Goals

In its current state, virtual Boeing Boeing is a single player walkthrough. Players can explore the space, move through doors into each room, and view sightlines from anywhere in the theatre. It is also only calibrated for use with the Oculus Rift, which requires 4 USB ports to function. This keeps the game single player, as well as limiting the players area of movement.

The next phase I want to take the game is to introduce local multi player. The Oculus Quest is a wireless version of the Rift and functions as a standalone device that will not require a specialized VR ready computer. Once calibrated to the Quest, I would add more player units and code so that the game would allow multiple members from a design team to walk the set together and have discussions about what they are seeing while in the game. Eventually, I would like this to able to be done remotely through a server, so that a team wouldn’t have to be in the same place together, they would just require a VR headset, internet connection, and a copy of the game file. Design meetings and discussions could be held on the set as they work through concerns and ideas.

Much further down the development line, I would like to incorporate Vectorworks and Lightwrite (software programs that are largely used for scenic and lighting design drafting) into the Unity engine. I want lighting designers to have the ability to add lights to the electrics batons and focus them in real time. The lighting and scenic designers can both sit out in the virtual house of the theatre and work through each scene and look of the show. Intensity and angles could be set which automatically update to the lighting plot. This would be a huge benefit to the efficiency of the show. The light crew would be able to hang their electrics much earlier and with fewer adjustments, tech week for a show would start with most of the lighting cues already
written and recorded. This would allow more time for the cast and crew to practice transitions, allowing for a tighter, well-polished show.

Finally, I would want to bring the game into the realm of an MMO (massively multiplayer online game), set up mainly for the actors and director to have virtual rehearsals. Cast members could log in and rehearse together as a full company, work independently of rehearsals on individual scenes with just another actor, or enter the game board as a single player in order to become more familiar with the space and practice a monologue alone. The cast could explore the set long before they enter the actual theatre space, giving them more time to know the world and their characters.
Conclusion

The essential experience that I am trying to create using virtual reality in scenic design, is the ability for designers, directors, producers, stage managers, actors, technical directors, etc., to experience their “future selves.” So many times, during a production, long after the design process has passed, we say to ourselves, “if only I had known this then I would have done that instead.” We can only look back in hindsight and try to learn from shortcomings and mistakes that we can then apply to the next design. But since we will (probably) never get to design the same show again, in the same place, with the same cast and crew, it is highly unlikely that we will get to apply our new wisdom to our original instances.

Instead of wishing to go back and change something, we can jump forward in the design to see what it will be to our “future selves.” The ability to virtually immerse into the magic circle of a future set design allows us to recognize and solve problems before they arise. Designers will not only be able to communicate what they envision but will also be able to show themselves what elements of the design that do not work. Virtual emersion allows for a problem-solving point of view that cannot be matched by drafting, sketches, 3D renderings, or models. It can visually be “the real thing.”

Combining the fundamentals of game design with the elements of theatrical design, and then viewing them through the different perspective lenses has the possibility to not just open up a new form of communication, but to give the theatre world as a whole an experience that it has never known before.
We say that we play games or go to the theatre for several different reasons; for fun, excitement, competition, challenge, to hear a story, to learn, to be entertained, etc. But these are just descriptors of the real reason, the experience. We do them because we have an exciting experience, a compelling narrative experience, or an educational experience. It is what brings us back to the same activities time and time again.

The essential experience is the significant, emotional, and intimate journey which can only be found within the magic circle.

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Schell, 462.
Bibliography


Appendices

Appendix A – Design Process Diary

This is a digital journey of the design process for Boeing Boeing from the first design meeting through the presentation of the virtual reality scenic design.

02.07.19 – Design Meeting #1

I presented research collages that I created based on my readings of the script. I researched the time period of the play, building architecture, floorplans, popular culture and design, furniture, and décor. During the presentation, I took note of Kate’s feedback, her preferences, as well as which elements in each picture stood out to her.
Figure 15. Architecture research plate presented at Design Meeting #1

Top left, bottom left, bottom center

Top center

Top right

Bottom right

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https://www.architecturaldigest.com/gallery/art-deco-paris

51 Enrique Mazzola, *TCEOPERA*, June 12, 2018, accessed February 05, 2019
https://twitter.com/EnriqueMazzola/status/1006435313001037824

52 Bertrand Guay, *Theatre Chaillot*, April 16, 2015, Getty Images accessed February 05, 2019

53 Herve Bry, *Palace of Tokyo*, May 01, 2012, Flickr accessed February 05, 2019
https://www.flickr.com/photos/92092909@N00/7310164232/
Figure 16. Architecture research plate presented at Design Meeting #1

Top left\textsuperscript{54}

Top middle\textsuperscript{55}

Top right\textsuperscript{56}

Bottom\textsuperscript{57}

\textsuperscript{54} Steeve Roache, \textit{The Gardens of the Trocader. Paris}, Adobe Stock accessed February 05, 2019
https://stock.adobe.com/search?as_channel=dpcft&as_source=ft_web&as_campaign=www_interception&as_campclass=brand&as_content=lp_search&k=Palais+de+Chaillot&asset_id=5206430

\textsuperscript{55} Fernand Pouillon, \textit{Meudon la Foret}, 2014, accessed February 05, 2019
https://jeanricher.myportfolio.com/fernand-pouillon-a-meudon-la-foret

\textsuperscript{56} Beau Peregoy, \textit{5 of the Best Art Deco Buildings in Paris}, December 02, 2016, accessed February 05, 2019
https://www.architecturaldigest.com/gallery/art-deco-paris

\textsuperscript{57} Patrick Berger, \textit{View of the Large Foyer}, accessed February 05, 2019
http://durable274.rssing.com/chan-9288313/all_p41.html
Figure 17. Room layout research plate presented at Design Meeting #1

Top left58
Top middle59
Top right60
Bottom left61
Bottom middle62
Bottom right63

58 Francois Halard, Lechner House, accessed February 05, 2019
https://www.1stdibs.com/blogs/the-study/midcentury-modern-living-rooms/
59 Jeni Lee, Ambiente Furniture for a Midcentury Living, 2016, accessed February 05, 2019
60 Tracy Beckmann, Hotel Lautner Unit 4, accessed February 05, 2019
http://tracybeckmann.com/hotel-lautner/
61 Walker Hotels, The Parlour, accessed February 05, 2019
https://www.walkerhotels.com/photos
62 Francois Duhamel, Rules Don’t Apply, 2016, accessed February 05, 2019
63 Pam Kueber, A Look Inside the Rexford – A Quintessential Midcentury Modern Las Vegas Apartment Complex, May 31, 2016, accessed February 05, 2019
https://retrorenovation.com/2016/05/31/the-rexford-las-vegas-apartments/
Figure 18. Primary research plate presented at Design Meeting #1\textsuperscript{64}

\textsuperscript{64} DoctorCheeze, *Don Drapers 60’s Upper East Side Pad*, October 26, 2017, Imgur accessed February 05, 2019
https://imgur.com/t/don_draper/eZ1II
02.14.19

Rough “first sketch” ground plan. Worked through the script with Kate taking note of any problem areas. Using the idea of a “football playbook,” we sketched out possible movement paths of the characters. After discussing issues and our desired changes I began to rework the sketches to prepare for Design Meeting #2.
Figure 20. Example of Football Playbook

Jim Mora, Mora Pass, October 26, 2018, accessed April 20, 2020
https://dailybruin.com/images/2018/10/FOOTBALL.INSERT.TRUCC__morapass.png
03.07.19 – Design Meeting #2

Presented new ground plan sketches. Major changes included adding another step to the lowered living room increasing the overall height of the upstage platform; adjusted angles of upstage walls to run parallel with the living room steps; drastically reduced depth of the upstage; added drop, balcony, and double French doors within the courtyard room; removed the guest room door and replaced it with a hallway; changed all doors (except courtyard) to open outwards; and added the breakfast dining area against the exterior of the courtyard room.

Figure 21. Ground plan presented at Design Meeting #2
03.19.19

Revised ground plan. New changes included: removing built in sofas in exchange for a single free standing sofa; removed side stair units into lower living room; reduced size of dining area and changed table to a built in fold-down breakfast table; adjusted angles of bathroom and kitchen further upstage; and reduced depth of all rooms and hallways.

Figure 22. Revised ground plan
03.19.19 – First White Model

Created rough 3D rendered model using SketchUp to explore wall height, traffic patterns, and furniture placement.

*Figure 23. First 3D rendered “white model”*
A more finalized ground plan. Major changes include: removing center stair unit and replacing it with two units in each corner of the lower living room to ease traffic flow; all doors now open inwards and upstage (kitchen remains a swinging door); furniture placement; bathroom and kitchen walls now run at same angle as their adjacent rooms; room and hallway depths adjusted; and dining room door has been removed.

Kate wanted to see a 3D rendering of the courtyard with a look of a double door as well as a single door. She was concerned that the double door would cause blocking issues.
Kate preferred the look of the single door into the courtyard room. I then began construction of a full color ¼” scale model.

Figure 25. 3D rendering of single door courtyard room in perspective view

Figure 26. 3D rendering of double door courtyard room in parallel projection view
04.10.19 – 3rd Design Meeting

Presented scale model. Got feedback from the design team. We decided to do away with the Paris drop all together. Carpet needed to be lightened in color. Wall heights would be adjusted to be more dramatic. Ground plan was basically solidified.

Started work on new 3D renderings to include discussed changes.

Figure 27. First full color ¼” = 1’0” scale model presented at Design Meeting #366

66 Photo by Brandon Roye, Boeing Boeing Model, 2019
04.23.19 – 4th Design Meeting

Presented final 3D renderings and furniture plates (*App. C, pg. 91*). We discussed the portrait reveal at length and it was decided that a periaktoi would be inset into courtyard room wall. Minor adjustments to the ground plan and walls were discussed.

I started work on a new model, 3D rendering that included paint and periaktoi, final drafting plates with elevation changes (*App. B, pg. 81*), and paint elevations (*App. D, pg. 95*).
Presented final 3D renderings, paint elevations (*App. D, pg. 95*), and full color 1/4” scale model.

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*Figure 30. Final full color ¼” = 1’0” scale model presented at Production Meeting #1*^67_

*Figure 31. Final full color 3D rendering in perspective view presented at Production Meeting #1*

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^67 Photo by Brandon Roye, *Boeing Boeing Model*, 2019
09.13.19 – Construction update.

Upper platform and stair units complete.

Walls assemble, painted, and installed.

Doors Installed.

Door, baseboard, chair rail, and wainscot molding installed.

Periaktoi installed.

Figure 32. Set under construction$^{68}$

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$^{68}$ Photo by Brandon Roye, *Boeing Boeing*, 2019
09.16.19 – Continued reconstruction of scenic design using 3D graphics software, Blender.

Started the process of constructing and uploading 3D rendering of UofA UT Theatre into game design software, Unity.

Figure 33. Rebuilding scenic design in Blender

Figure 34. Building University Theatre in Unity

69 Brandon Roye, Boeing Boeing in Blender, 2019, Screenshot
70 Brandon Roye, Boeing Boeing in Unity, 2019, Screenshot
09.18.19 – Construction update.

Crown molding installed.

Furniture construction and installation underway.

Figure 35. Set under construction\textsuperscript{71}

\textsuperscript{71} Photo by Brandon Roye, Boeing Boeing, 2019
As described in the design process, a portrait was designed for each of the three girlfriends.

- **Gloria – The American.** Red outfit. Looking for money and security. Portrait was done in classic 50’s couple portrait style. Both characters are facing the camera and showcasing the engagement ring. Slightly grainy and fades out into an oval shape.

- **Gabriella – The Italian.** Blue outfit. Looking for love. Portrait was done mimicking the cover of *Gone With the Wind.* Passionate look into each other’s eyes as Bernard “dips” her back. Print is dreamier with an oil paint look.

- **Gretchen – The German.** Yellow outfit. Looking for romance. Portrait was done to look like the cover of a 1950’s travel magazine. Both characters gazing out into the stars and their future together. Print is bright, sleek, and exciting.

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76 Photo by Jenée Childers, *Boeing Boeing*, 2019

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72 Photo by Jenée Childers, *Boeing Boeing*, 2019
Figure 37. Gabriella portrait

Figure 38. Gretchen portrait

73 Photo by Jenée Childers, Boeing Boeing, 2019
74 Photo by Jenée Childers, Boeing Boeing, 2019

Figure 39. Boeing Boeing production. Lighting Design by Annika Howard. Costume Design by Valerie Lane.75

Figure 40. Boeing Boeing production. Lighting Design by Annika Howard. Costume Design by Valerie Lane.76

75 Photo by Brandon Roye, Boeing Boeing, 2019
76 Uark Theatre, Boeing Boeing, October 12, 2019, Flickr accessed December 14, 2019
https://www.flickr.com/photos/uarktheatre/49158685428/in/album-72157712032345092/
12.14.19

Final testing of *VR Boeing Boeing*.

Made adjustments to user interface.

 Finished applying color.

*Figure 41. View of Boeing Boeing design in Unity in its final stages*\(^{77}\)

\(^{77}\) Brandon Roye, *Boeing Boeing in Unity*, 2019, Screenshot
Presented and demonstrated working *VR Boeing Boeing*.

*Figure 42. Virtual reality view of Boeing Boeing design presented at 2019 Fall Juries*  

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78 Brandon Roye, *Boeing Boeing in Unity*, 2019, Screenshot
Appendix B – Drafting Plates

The drafting plates are the literal blueprints of the design. Each page, or “plate,” details out the measurements and locations for all the scenic pieces. In the bottom right corner of each plate is a title block that indicates the scenic pieces on display as well as the scale measurements. Note: these images are not to scale but are replicated reference photos.

Figure 43. Ground plan
Figure 44. Ground plan featuring sight lines

Figure 45. Front elevation
Figure 46. Section

Figure 47. Platform
Figure 48. Platform stairs

Figure 49. Door units
Figure 50. Wall units

Figure 51. Wall units
Figure 52. Wall units

Figure 53. Wall units
Figure 54. Wall units

Figure 55. Wall units
Figure 56. Wainscot application

Figure 57. Wainscot application
Figure 58. Wall units

Figure 59. Wall units
Figure 60. Round shelf, periaktoi, and fold down table
Appendix C – Furniture Plates

I made research image plates from each of the major furniture and décor elements that would be needed to decorate the set. These included 5 bulb arc lamp, arc lamp, Breuer Cesca chair, Eames coffee table, kidney sofa, fold out liquor cabinet, floor globe, Eames chair, and Barcelona chair. Several reference photos as well as possible purchase locations were provided to prop master, Karl Hermanson.

Figure 61. Eames table

Top left, top right\textsuperscript{79}

Bottom right\textsuperscript{80}

\textsuperscript{79} Vitra, *Eames ETR “Surfboard” Coffee Table*, Heal.com accessed April 10, 2019
https://www.heals.com/eames-etr-table.html

\textsuperscript{80} Herman Miller, *Eames Elliptical Table*, dwr.com April 11, 2019
Figure 62. Kidney couch

Top\textsuperscript{81}

Bottom\textsuperscript{82}

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\textsuperscript{81} Frederico Munari, *Grand Curved Sofa Blue Velvet*, 1stdibs.com accessed April 10, 2019
https://www.1stdibs.com/furniture/seating/sofas/frederico-munari-grand-curved-sofa-blue-velvet/id-f_131442321/

\textsuperscript{82} Bourgeois Boheme Atelier, *Arc Sofa*, 2018, bobointeriors.com accessed April 23, 2019
https://bobointeriors.com/shop/arc-sofa/?wpp_export=print
Figure 63. Eames chair

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83 Herman Miller, *Eames Lounge Chair and Ottoman*, dwr.com accessed April 23, 2019
Figure 64. Barcelona chair\textsuperscript{84}

\textsuperscript{84} Knoll, Barcelona Chair, dwr.com accessed April 23, 2019
Appendix D – Painters Elevations

Recreations of the front elevation views of the walls from the drafting packet. Detailed instruction is given for the color, location, and texture of paint treatment to the set.

Figure 65. Wall A

Top right

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Figure 66. Wall B

Figure 67. Wall C
Figure 68. Wall D

Figure 69. Wall E
Figure 70. Wall F

Figure 71. Wall G
Figure 72. Wall H

Figure 73. Wall I
Figure 74. Wall J

Figure 75. Wall K
Figure 76. Wall L

Figure 77. Wall M
Figure 78. Wall N

Figure 79. Wall O
Figure 80. Wall P

Figure 81. Round shelf unit
Figure 82. Platform and stair units

Figure 83. Stair unit facings
Figure 84. Lower level carpet

Top right\textsuperscript{86}

\textsuperscript{86} Stainmaster, Stainmaster Signature Plentitude-Night Shade 12-ft Pattern Night Shade Interior Carpet, lowes.com accessed May 30, 2019
https://www.lowes.com/pd/STAINMASTER-Signature-Plentitude-Night-Shade-12-ft-Pattern-Night-Shade-Interior-Carpet/1000338903