Introduction

“The journey to truly superior performance is neither for the faint of heart nor for the impatient. The development of genuine expertise requires struggle, sacrifice, and honest, often painful self-assessment. There are no shortcuts. It will take you at least a decade to achieve expertise, and you will need to invest that time wisely, by engaging in “deliberate” practice – practice that focuses on tasks beyond your current
level of competence and comfort. You will need a well-informed coach not only to guide you through deliberate practice but also to help you learn how to coach yourself. Above all, if you want to achieve top performance as a manager and leader [ed: read “game designer”], you've got to forget the folklore about genius that makes many people think they cannot take a scientific approach to developing expertise. We are here to help you explode those myths."
– The Making of an Expert

Game design is a rapidly maturing discipline, and the design community holds a wealth of knowledge about the practice of design. The purpose of this workgroup was to devise techniques that working designers could use to improve themselves, no matter their level of expertise: to make themselves into Game Design Olympians. The framing statement of the workgroup was: "If you were preparing for the Game Design Olympics, what would your training regimen look like?"

Game designers at all levels of proficiency need to develop their skills in order to maintain their expertise in the field. There are numerous resources available to help beginning designers to get started in design, but relatively few resources for mid-career and veteran designers to improve their practice.

The most common advice given to designers seeking improvement is simply to “make lots of games.” While it’s true that making games and reflecting on the development process is key to improving one’s practice, there must also be a means of developing individual design skills in isolation, in order to facilitate more focused self-reflection and growth. As an example, if someone wanted to become an olympic-level basketball player, the best advice would not simply be “play lots of basketball.” A violinist does not become a virtuoso by only playing concerts. There are specific drills and isolated skills that are deliberately practiced to get to the next level in those disciplines. We went in search of similar methods for game design.

Process

Our workgroup broke down our initial questions—how to measure and improve the quality of a game or of a game designer, and what a designer would need to train for a theoretical Game Design Olympics—into three parts. First, we wanted to understand what skills were involved in these hypothetical Olympics; second, what exercises could cultivate and improve those skills? Finally, we hoped to curate a list of rules of thumb -- particular techniques for exhibiting and developing those skills in the context of real-world problems.

We brainstormed a long hierarchy of design skills (attached in an appendix) and grouped them together under roughly a dozen high-level headings. We collected our own best practices and those of a few other Horseshoe attendees. We intend to continue this work into the future, as well. The drills we have gathered and developed are only the beginning; we tried to exercise most of the skills we found, and we tried to devise ways to evaluate one’s own performance at those routines to enable deliberate practice.

Related Work

“If people knew how hard I had to work to gain my mastery, it would not seem so wonderful at all.”
– Michelangelo

The genesis of our workgroup topic came from the 10,000 hour rule, introduced by Malcolm Gladwell in Outliers: The Story of Success, stating that it takes 10,000 hour of dedicated effort to become an “expert” in a discipline. This concept was later expanded upon by Anders Ericsson et al. in “The Making of an Expert”, which stated that as important as spending the 10,000 hours was spending them correctly by engaging in “deliberate practice.” The article posits that the best way to get great at an activity is not necessarily by
simply performing that activity, but rather by breaking down the activity into smaller tasks and exercises that focus on specific aspects of the skill set required for the activity.

Deliberate practice consist of tasks and exercises that meet the following criteria:

- Designed specifically to improve performance
- Can be repeated a lot
- Feedback on results is continuously available
- Highly demanding mentally
- Isn’t fun (this is a symptom of the task, not an imperative to design it to not be fun!)
- Has process-oriented goals
- Pushes beyond the comfort zone of the practitioner’s skills, but not so far beyond her current skill level that the practitioner is overwhelmed or lost.

**Resources**

**Player Models**

“The 5 Domains of Play”; Jason VandenBerghe; Conference presentation

“An Inclusive View of Player Modeling”; Smith et al.; Conference paper

“Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDs”; Richard Bartle; White paper

“Why We Play Games: Four Keys to More Emotion Without Story”; Nicole Lazzaro; White paper

**Game Models**

“The 400 Project”; Falstein & Barwood; Design rules of thumb database

“Formal Abstract Design Tools”; Doug Church; Gamasutra article

“MDA: A Formal Approach to Game Design and Game Research”; Hunicke, LeBlanc, & Zubek; Conference paper

The Art of Game Design: A Book of Lenses; Jesse Schell; Morgan Kaufmann

Characteristics of Games; Skaff-Elias et al.; The MIT Press

Game Feel: A Game Designer’s Guide to Virtual Sensation; Steve Swink; CRC Press

Game Mechanics: Advanced Game Design; Dormans & Adams; New Riders

Patterns in Game Design; Bjork & HoloPainen; Charles River Media

**Game Design Skills Development**

Board Game Remix Kit, Kevan Davis, Lightning Source UK Ltd

Challenges for Game Designers, Brathwaite & Schreiber, Charles River Media

**Deliberate Practice**


The Art of Learning: An Inner Journey to Optimal Performance, Josh Waitzkin, Free Press

The Little Book of Talent: 52 Tips for Improving Your Skills, Daniel Coyle, Bantam

Outliers: The Story of Success, Malcolm Gladwell, Back Bay Books

Practice Perfect: 42 Rules For Getting Better at Getting Better, Lemov et al., Jossey-Bass

The Talent Code: Greatness Isn’t Born. It’s Grown. Here’s How., Daniel Coyle, Bantam

Talent is Overrated: What Really Separates World Class Performers, Geoff Colvin, Portfolio Trade

**Skills**
These are the high-level skills designers can exercise for the events of the hypothetical Game Design Olympics. A more complete list follows in an appendix.

- **Player Projection**
  - Anticipating the behaviors of hypothetical players.

- **System Design**
  - The core relations and behaviors of the game as a mathematical artifact; generating the game’s possibility space. Dynamic systems, feedback loops, procedural content generation, skill atoms and loops, mathematical modeling, etc.

- **Content Design**
  - Controlling the shape of the game rules’ possibility space. Incorporates level design, data design, puzzle design, progression, pacing, etc.

- **Narrative Design**
  - The macro- and micro-level themes, fictions, worlds, and characters of the game.

- **Feedback Design**
  - Presenting the game’s behaviors in such a way that players can form effective mental models and perceive their own agency.

- **Game Feel**
  - The intersection of System, Content, and Feedback Design that produces the experiential surface of the game.
  - “Real-time control of virtual objects in a simulated space, with interactions emphasized by polish, which results in (1) the aesthetic sensation of control, (2) the pleasure of learning, (3) practicing, and mastering a skill, (4) extension of the senses, extension of identity, and (5) interaction with a unique physical reality within the game.” - Game Feel: A Game Designer’s Guide to Virtual Sensation by Steve Swink.

- **Critical Evaluation**
  - The ability to analyze, deconstruct, and clearly articulate analyses to other designers.

- **Distillation**
  - Reducing a game idea or real world system to its minimal, simplest nugget; rapidly and effectively prototyping.

- **Playtesting**
  - Devising and analyzing metrics; conducting and interpreting playtests.

- **Tweaking & Balancing**
  - Making the small, iterative changes to balance the System, Content, and Feedback of a game experience.

- **Research & Outside Interests**
  - Developing as an individual; getting up to speed quickly on new topics and subtopics; cultivating outside interests.

- **Collaborative Communication**
  - Collaborating with other developers; describing a game so that other people can “get it”; being aware of overall consistency with an artistic vision.

- **Creative Direction**
  - Shepherding the game through production; interacting with business and other stakeholders; evangelizing the game.

**Drills**

Here are some examples of exercises and drills that we think could be deliberately practiced to improve very specific design skills.
A note on game jams: While we recognize the value of game jams as an exercise in improving as a designer, jams are more likely to exercise all of our design skills in unison, like a full body workout. The purpose of these drills is to act as more focused exercise similar to isolating a muscle group as part of a workout curriculum. Also, due to the time pressure aspect of jams, they tend to activate “game design muscles” that are already strong for us, and skills we are already good at. The purpose of these exercises is to improve specific skills that we aren’t necessarily great at. So, though game jams are certainly valuable, we do not discuss them in this section.

Thinking About Systems...

**Related Skill:** System Design  
**Requirements:** A video game  
**Drill:** Play a game, choose a specific part of a system and try to reverse engineer the algorithm used to generate the results of that system (for example, “how are they calculating the rate at which I gain gold? Are other stats affecting this?”)  
**How to Measure Improvement:** Best case scenario, contact the designer and find out the real answer and see how your solution measures up to it. In other cases, run test cases on your theory and see how the results compare what is happening in the game.  
**Related Rules of Thumb:** “Round up percentages to conform to player expectations.”

**Related Skill:** System Design  
**Requirements:** A board game you have not played before  
**Drill:** Read the rules of a board game you have never played before, then describe your predicted winning strategies. The intent is to develop a sensitivity to holding a larger macro view of a game in your head and seeing the connections between all the pieces.  
**How to Measure Improvement:** Play the games and see if your strategies are viable; compare against competitive player communities.  
**Related Rules of Thumb:** “The player shouldn’t have to read the same books the designer has read in order to be able to play.”

**Related Skill:** System Design; Content Design; Critical Evaluation  
**Requirements:** In-development game  
**Drill:** Write some procedurally generated rules for objects, enemies, weapons, etc. in your game. This is not with the intention of actually building a procedural content generator, but an exercise to identify shared systems/behaviors/etc across that feature.  
**How to Measure Improvement:** Pay attention to the complexity of your fake procedurally generated rules, which could indicate achieving a level of elegance in the system for which you are doing the exercise.  
**Related Rules of Thumb:** “Decks, not dice.”

Thinking About Content...

**Related Skill:** Level Design; Critical Evaluation  
**Requirement:** Several related video games, drawing materials  
**Drill:** Start with a specific question (“what makes good defense combat?”). Choose 3-4 games that have good setups of that type. Play through said setups and deconstruct them. For example, draw an overhead map of the setup and track things like spawn position, player facing, etc. Now look for commonalities in the setups across the games to identify what aspects they share.  
**How to Measure Improvement:** Compare against strategy guides to test designer-vision. Pay attention to the rate at which you can identify shared attributes when you do this exercise.

**Related Skill:** Puzzle Design  
**Requirements:** Puzzle/level editing tool or drawing materials, dice
Drill: Using your normal tools for puzzle editing, randomly generate a puzzle by adding pieces according to a roll of a die. Constrain the random elements so that the resulting puzzle is valid and solvable. Using this random puzzle as a starting point, tune until the puzzle is solvable, reads well, and is fun. The intent is to exercise tuning and editing abilities.

**How to Measure Improvement:** Playtest the puzzles for difficulty, comprehension, and fun factor. Also, refine your heuristics for adding random elements as you repeat the drill.

**Related Rules of Thumb:** "The goal of a puzzle is to be interesting, not necessarily to be hard."

**Related Skill:** Puzzle Design

**Requirements:** drawing materials, paper prototyping materials (optional)

**Drill:** Create a simple puzzle with a 1-step solution. Then extend it to a puzzle that requires 2 steps. Repeat the process, creating progressively more complex puzzles.

**How to Measure Improvement:** Evaluate each puzzle for cohesiveness and difficulty.

**Related Rules of Thumb:** "Design three solutions for every problem."

**Related Skill:** Feedback Design

**Requirements:** A game (board game other video game), not one you are working on/have worked on

**Drill:** Make a tutorial for another game (could be a board game)

**How to Measure Improvement:** Train players on new tutorial versus old; offer new tutorial to other game designer.

**Related Rules of Thumb:** “The interface is the gameplay.”

**Related Skill:** Content Design, Critical Evaluation

**Requirements:** A video game, some development tools similar to the game (mod tools, udk, gamemaker, etc)

**Drill:** Master copy exercise: try to recreate a game segment you enjoyed entirely from memory (using appropriate tools to the original game. If the game has mod tools available for it, try to use those). Compare the results to the original setup and identify how your version differs.

**How to Measure Improvement:** Pay attention to how closely your from-memory example matches the original; does it get closer the more times you do this exercise? Also, you can become quicker at being able to identify places where your copy may have fell short of the original, and then figuring out what contributed to the difference.

**Related Skill:** Content Design (Pacing)

**Requirements:** A video game, drawing materials, stopwatch, an understanding of interest curves

**Drill:** This is an exercise in mapping out the interest curve of a sequence. Choose a specific segment from a game which you feel has good pacing (or one where you feel the pacing is poor). List the top 10 “moments” in the sequence in order of intensity, drawing vertical bars to represent each. Play through again and note the timestamp where each moment occurs. Rearrange the bars into a bar graph showing intensity over time to see the interest curve for the sequence. Make sure your x axis is made up of consistent lengths of time to get an accurate pacing graph. More information.

**How to Measure Improvement:** Occasionally do this exercise for your own games to see if your sensitivity to good pacing has improved.

**Thinking About Players...**

**Related Skill:** Player Projection

**Requirements:** A game (board game or video game), definitions of player types or reference for player archetypes

**Drill:** Identify what sort of player type you are (using Bartle, Big 5, or another player model), then play a game pretending to be a different player type. Vocalize what things the “new you” likes/dislikes about the game. You can also do this exercise with physical impediments to simulate different player skill (for example, making a game for a child who has not developed a lot of dexterity, try playing it with your
How to Measure Improvement: Find a player of that type and observe them (having them also do the vocalization) to see how your perceptions during the role-play match up.

Related Rules of Thumb: “The game shouldn’t have more fun than the player.”

Related Skill: Player Projection
Requirements: Magic the Gathering cards, or any card game with a deck-building component
Drill: Build a Magic the Gathering (or related) deck for someone - real or imagined - with a radically different playstyle than your own.

How to Measure Improvement: Have a person of that playstyle try out the deck and get their feedback.
Related Rules of Thumb: “Make the world work from the player’s perspective.”

Related Skill: Playtesting; Critical Evaluation
Requirements: Playtester, a video game that involves some basic skill mastery
Drill: Predict the performance of a particular player in a situation, e.g. by number of retries for a player to succeed in an activity in a game (min, avg, max) and test.

How to Measure Improvement: Compare actual against expected results.
Related Rules of Thumb: “The player’s field of view expands over time.”

Thinking About Teams...

Related Skill: Collaborative Communication
Requirements: Upfront research and understanding of improv concept of “status” numbers (Impro: Improvisation and the Theatre), a meeting situation with at least two other people (more people is better so you can have a moment to observe)
Drill: During meetings, observe people’s body language and assign them all an improv status number. Notice how the numbers change for the same people in different meetings. This can help you become sensitive to the how your team is interacting and collaborating. Predict how the status numbers will change with new combinations of people.

How to Measure Improvement: See how accurate your predictions are in future meetings.
Related Rules of Thumb: “If you are holding a meeting that involves most but not all of the people sitting near you in a space, send an optional invite to the remaining people.”

Related Skill: Collaborative Communication
Requirements: Another experienced designer, a game (preferred an in-development game that you are both working on)
Drill: “Assistant Designer” activity. Engage with a designer on a game you are very familiar with and ask questions/make suggestions about parts of the game to learn their perspective, and in turn act as a constructive questioner/sounding board for other designers (like a code review, only more to initiate the vocalization of a design to a safe audience).

How to Measure Improvement: Qualitatively measure the degree of change in your understanding between the beginning of your questioning/suggesting session and the end, or how quickly you achieve a synchronized understanding with your fellow designer (perhaps by the length of conversation it takes to reach “the same page”)
Related Rules of Thumb: "We're wearing the same uniform, stupid!"

Thinking About Thinking...

Related Skill: Critical Evaluation
Requirements: none
Drill: Pick a favorite media object (game, movie, book, etc) and express its value in only 3 words. Repeat for several different objects. Do this activity on a regular basis.

How to Measure Improvement: Test your descriptions on other people familiar with the media object. Be
aware of the level of internal struggle or anxiety you are experiencing during the exercise and if that changes over time.

**Related Rules of Thumb:** “*When looking at several solutions to a design problem, try the easiest one first.*”

**Related Skill:** Critical Evaluation  
**Requirements:** video games you have not played before in the mid-to-low metacritic score range (i.e. 69% aggregate rating or below)  
**Drill:** Every 1-2 weeks, play a game rated in the mid to low metacritic score range for 30 minutes. If you encounter a feature that is innovative, interesting, or otherwise new to you, play for an additional 30 minutes. Identify the best feature you encountered and the worst experience you had playing the game. Write down a clear, succinct explanation of why the feature you encountered was the best and how it did or did not work well with the other features in the game. Also write down a clear, succinct explanation of why the identified worst experience was the worst and exactly what you would specifically change to fix it.

**How to Measure Improvement:** Compare the change over time in the clarity and succinctness of your explanations. Also note any improvements in how quickly you are able to identify hidden gems, new features, and problems for the player experience.

**Related Rules of Thumb:** “*The algorithm for making a good game is: Step 1) Make a bad game; Step 2) Make it better; Step 3) Repeat Step 2.*”

**Related Skill:** Distillation  
**Requirements:** Paper game prototyping materials  
**Drill:** Take a video game that you like and choose one specific experience from it. Make a card or board game in a single night that conveys that experience.

**How to Measure Improvement:** Feedback from players of the original game can give you clues about how well you accomplished the distillation.

**Related Rules of Thumb:** “*Develop a culture of automation and repeatability.*”

**Related Skill:** Critical Evaluation  
**Requirements:** An existing game that you can modify via mod tools, or a copy of a complete game in some modifiable form  
**Drill:** When making a design change, write down your prediction/hypothesis of what will happen before you make the change. Then play the new version and compare the results. This is good to do with mod tools or a board game, where you are starting with a complete working game and can make changes to it to have a better context for what your change has done.

**How to Measure Improvement:** How accurate your hypotheses get over time can mean you are developing a sensitivity to the particular system you are testing.

**Related Rules of Thumb:** “*Start with a written goal for a system before designing or changing it; “Avoid HARKing (Hypothesizing After Results Known).”*”

**Related Skill:** Critical Evaluation  
**Requirements:** Access to pro players in a competitive gaming community (twitch.tv streams, live tournament attendance), familiarity with said competitive game  
**Drill:** Follow the competitive community of a game (one that you are pretty familiar with), watch the crazy fringe techniques of the pro players and note the differences from the mass player base.

**How to Measure Improvement:** Compare notes against actual experts; alternately, analyze a match (in real time) and compare against experts.

**Related Rules of Thumb:** “*90% of the time, a player’s complaint points to a real problem; 90% of the time, their suggested fix is not the best option.*”

**Related Skill:** Critical Evaluation, Playtesting  
**Requirements:** Another experienced designer, a video game  
**Drill:** Have other designers play your game (or any game) and narrate their experience, giving feedback
out loud. Notice what they tune in on that you were not aware of, and use this to create a mental model of that designer to refer to when working. (What would so-and-so hate about this?)

**How to Measure Improvement:** Before the playtest, make predictions about what that designer will tune in on, then compare to their actual feedback.

**Related Rules of Thumb:** “Cultivate the voices in your head.”

**Related Skill:** Research & Outside Interests; Critical Evaluation

**Requirements:** the internet, access to game articles, presentations, etc to cite as sources

**Drill:** Identify a game design belief that you hold. Research and cite sources for why you hold that belief.

**How to Measure Improvement:** Completeness of the lineage of sources or prior art or experience; synthesis of new ideas; awareness of past battles and movements.

**Related Rules of Thumb:** “The only time features or tasks are "easy" in game development are when either 1) you don't understand them; 2) you really want them in the game; or 3) someone else has to do them.”

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**Deep Dive - 3D Action-Game Level Design**

How could we take aspects of game design and break them down to their smallest component pieces, lessons, and exercises to give extremely granular lessons and drills? Here’s a first-pass take on “3D Action-Game Level Design”

**Level 1:** What are the high-level skills that a level designer needs?

- Architecture, Construction, and World-Building
- Combat Design
- 3D Puzzle Design
- Exploration Design
- Platforming Design

**Level 2:** What are the core competencies in each of those high level skills?

Example: Combat Design

- Understanding Your Game (Defensive capability of player in shooters is more important to level design than offensive power, how enemy design and level design intersect, etc.)
- Enemy Introductions
- “Line-of-Scrimmage” (the concept of how lines of cover, enemy placement, and the player relate in shooters)
- Shooting Combat Archetypes (Offensive, Defensive, Sniper, Fixed-Weapon/Turret, etc.)
- Melee Combat Archetypes
- “Special” Archetypes (Healers, Spawners, Suiciders/Exploders, etc.)
- Limits to Player Awareness
- Varying Setup Composition
- Difficulty
- Difficulty vs. Perceived Difficulty/Excitement
- Creating “Feel of Battle”, or “How I Learned to Love Camera Shake”

**Level 3:** In each of these competencies, what is the core concept and what are good tips/rules-of-thumb, examples, and drills/exercises?

Example:
Difficulty vs. Perceived Difficulty/Excitement

Concept: You can give the player an intense experience by ramping up the pace and volume of surrounding action, audio, effects, and other tools that give the impression of chaos and danger and the illusion of high-difficulty, while in fact lowering the difficulty greatly. This can create a great heroic finale to an escalating set up.

Tips / Rule of Thumb:

- Players associate visual and auditory intensity with danger. More, bigger, faster, and louder equal “thrill” to players, regardless of the actual difficulty level.
- Tools for increasing perceived difficulty include: (1) increasing the volume and tempo of music and audio, (2) increasing the volume and speed of weather and environmental particle-effects, (3) increased movement and speech by enemies and NPCs, (4) camera-shake, (5) ambient environmental destruction and spectacle, (6) narrative tension, and (7) anything else that creates a sense of change and chaos.

Example: Half-Life 2, Episode 2, “This Vortal Coil” level provides an excellent example of this. In this level, the player defends an unconscious Alyx in a level consisting of five mine shafts. Nine waves of ant-lions, increasing in both enemy-count and the number of mine-shafts they spawn from, build up the intensity to a dramatic and intense finale that appears very dangerous, but is in fact nearly impossible to fail. This evokes a very specific (and almost-guaranteed) experience for the player, in that they’re almost certain to survive what appears to the player to be an unsurvivable situation.

Tools used to create this tension include:

- Changing from the “spooky” soundtrack of all the earlier waves to a pulsing-techno soundtrack, increasing the volume of the music dramatically
- Spawning several Vortigaunt allies just before the last wave, creating more overall motion, significantly more visual and audio effects (their electrical-beam attacks and dialogue)
- Spawning exponentially more Ant-Lion enemies than in previous waves
- Allowing the Vortigaunt allies to constantly refresh the health of the player by giving them auto-use health-packs
- Building the intensity in the mind of the player before the setup has even begun by showing the player “maximum threat alerts” from all the mine-shafts, alerting the player to the fact that exponentially more enemies are about to spawn.

Exercise:

- Preparation: Create a combat setup in several distinct, non-overlapping waves, that ramps up in perceived difficulty while lowering the actual threat to the player.
- Test: Playtest your combat setup, measuring (1) perceived intensity by having your playtester rate each wave based on its intensity from a scale of 1-10 and (2) actual player deaths per wave.
- Objective: Each successive wave has an increased intensity rating from your playtesters and a decreased actual-number-of-deaths. If either of these isn’t true, adjust your level until it is.
- Variation: See which elements create the most perceived-intensity for players by removing specific adjustments and seeing how the intensity ratings change (i.e., is intensity affected more by the removal of the audio or visual effects of random explosions?)

Rules of Thumb

What follows is a list of the rules of thumb that we brainstormed and harvested from our colleagues. Rules
of thumb are, in essence, the solidified lessons that have been learned by previous trailblazers in our field. As such, they offer a wonderful shortcut to achieving better practice of game design in a more timely fashion.

In talking about training for the Game Design Olympics, an example was brought up by a group member describing a school in Russia where professional tennis players go to train. One of the notable features of this school is that a sizeable portion of the curriculum consists of standing in a room and swinging a tennis racket over and over again in slow motion. As the students repeat their swing, an instructor walks around the room, pushing a student’s elbow here, rotating an arm there, and generally adjusting and refining the students’ swings.

Mentors can serve a similar purpose through critique of work in a creative field like game design. However, mentors are difficult to come by and in short supply. Particularly given the mercurial nature of opportunity in our industry, it is not uncommon for a less experienced designer to connect with a mentor, only to have that mentor leave for another company in another state.

Given these conditions, rules of thumb are the next best thing to actually receiving critiques from experienced, successful game designers. They represent the sort of feedback that such mentors would offer and can be integrated into a designer’s training to help see improvements in drills and general work.

**On Game Design in General...**

“*Cultivate the voices in your head.*” - David Sirlin

When you receive a critique of your work from a teacher or mentor, you get a small window into the perspective of someone more experienced in your field. As you continue to get further critiques from a given individual, your brain will be storing them up until, ultimately, you are able to guess what the individual would have had to say about a given piece of work you create. What’s actually happening is that you are building a mental model of the teacher. This is vital to becoming an experienced and accomplished professional, so seek out mentors and teachers and take advantage of their wisdom whenever you can.

“*Test only one change to your game at a time.*” - General Design Wisdom

The more elements of your game that you change between playtests, the harder it becomes to pinpoint exactly which changes had which effects on the players’ experience

“*The algorithm for making a good game is: Step 1) Make a bad game; Step 2) Make it better; Step 3) Repeat Step 2.*” - Eskil Steenberg

It’s easy to fixate on making a good game to the point that one starts rejecting ideas in one’s head without actually playtesting those ideas to see if they have merit. Problematically, however, this tends to lead to an intellectual paralysis where the designer can’t commit to anything because it would be sub-optimal. To escape this potential pitfall, don’t lose sight of the fact that any initial game concept is almost certainly going to be a bad game. Embrace this fact and just get it down in prototype form. Then after playtesting and evaluating, figure out how to fix a limited number of the problems in the game, then playtest it again, and so forth. All good games started out as bad games, initially.

“*The design document is not the game.*” - Jon Selin

The truest documentation of what elements are in the game and how they interact is the game, itself. Write design documentation as quickly as possible and, as soon as possible, move to actual implementation of features. Features that are implemented in the game build will convey
understanding far more widely and accurately than your design documents.

“Vigorous writing is concise. Vigorous game design is concise, too.” - Unknown

Aim for brevity in your designs. Consider applying the principle of “subtractive design” to your game -- find everything you can take away from your design once it has grown even vaguely complicated and cut it out. Elegance is the goal.

On System Design...

“Decks, not dice.” - Josh Lee

Constrain random number generators to avoid weird runs that make the player think the game is out to get them. Each failed roll increases the next roll’s chance of success, so that very long runs of misses don’t happen.

“Double or half values when balancing.” - General System Design Wisdom

When tuning, turn values way up or down so that the resulting changes are very evident. If, for example, a token is too weak, making it slightly stronger usually won’t generate enough of an impact on the overall dynamics of the game to clearly demonstrate what range of values will actually be appropriate. Make a dramatic change to the value instead to better understand how that value impacts the overall game system.

“Round up percentages to conform to player expectations.” - General System Design Wisdom

If a probability is at 80%, the player will expect it to always happen, so round up to 100% to meet that expectation.

“Skill atoms model the interactive process that occurs between the player and the game.” - Dan Cook

Mapping out the skill atoms in your game and the skill tree that defines the player’s interactions with those atoms can be a great way to identify where the fun is coming from in your system and where players are getting lost. More information on Dan Cook’s theory of skill atoms is available in a prior Horseshoe report.

“Start with a written goal for a system before designing or changing it.” - General System Design Wisdom

Beginning with a clearly stated goal for a system or feature will clarify your thinking and lead to a much more focused design.

On Content Design...

“Avoid paradigm shifts in puzzles.” - Jesse Schell

Puzzles that break existing mechanics or mental models are jarring. If a puzzle requires lateral thinking to solve it, some players will simply never make the leap of logic necessary to solve the puzzle. Try to avoid terminating the play experience of a portion of your audience in this way.

“Design three solutions for every problem.” - Warren Spector

Especially in adventure games, having more than one way to solve a problem allows for multiple different playstyles and player types.

“The goal of a puzzle is to be interesting, not necessarily to be hard.” - Jonathan Blow
Convey an *idea* with a puzzle, and regardless of whether it's easy or hard, the player will have more fun if they learn need to learn something in order to solve it.

“**Clearly communicate plot advancement points.**” - Team Game Design Olympics

Let the player know if they’re about to trigger a major plot point and give them a chance to back off and explore some more. (For example, in Diablo 3, there is a confirmation box before going to the next act, in case the player had more to do in the current act.)

“**Don’t make a room into a hallway.**” - Matthew Frederick

Pay attention to the player's view in level design. In particular, avoid placing the exit of a room directly across from the entrance of the room if you want players to explore it, because it can create an artificial hallway effect where the player barrels straight ahead. Place important objects in places where the player is most likely be looking.

“**Make failure interesting.**” - Jesse Schell

Ideally, players learn from failure, which in turn encourages them to try again. If the results of failing are entertaining in and of themselves, the player will enjoy the learning process of mastering the requisite skill much more.

“**Use a standard texture or color for placeholder assets.**” - General Content Design Wisdom

Make it clear to viewers that temporary assets are not final art/text/etc. Use something bright to make it clear to team members that these assets need to be replaced.

**On Interface Design...**

“**The interface is the gameplay.**” - Brenda Romero

In a very real way, UI is the only means by which the game exists for the player. Don’t wait until late in development to figure out what the interface for your features will look like -- start designing the UI from the beginning.

“**Delay reward presentation on an outcome so players can perceive it.**” - General Feedback Design Wisdom

It can be easy to overlook, but you should always make sure that the player has the opportunity to visually register the results of their actions. In general, 2 seconds, or one breath, is a good amount of time to show results.

“**Get confirmation before a non-undoable menu action.**” - Team Game Design Olympics

Always ensure that your user is aware when they are taking an action through your game’s interface that will have permanent effects.

**On Players...**

“**90% of the time, a player’s complaint points to a real problem; 90% of the time, their suggested fix is not the best option.**” - Jeff Pobst

The problem that a player complains about is not necessarily the problem that needs to be solved, but there is almost certainly a problem there. Make sure to apply your experience and knowhow as a designer to solving the problem, though. Players rarely have the perspective to offer a solution that will actually address the problem. That said, don’t automatically discount
suggestions from players -- there will occasionally be really good ones that should not be ignored just because most player suggestions are unhelpful.

"Attempt to integrate player behavior before you try to regulate it." - Reynir Hardarson

If you discover an exploit or flaw in the design of a live game that players are already playing, your might have the impulse to quickly change the rules so that the players cannot take advantage of it. If your players have discovered it, however, they are probably having fun, feeling smart for figuring the exploit out. Rather than follow your instinct to immediately eradicate the problem, consider first whether there is a way to tweak other aspects of your rules to bring the flaw into balance. This will preserve the enjoyment of your discerning players and fix the problem while not punishing your players for exercising their intelligence.

"Make the world work from the player's perspective." - Reynir Hardarson

If players are doing something “wrong,” see if you can change your game to make it the “right” way to do it.

"If the player is having difficulty, throw them a bone." - Patricia Pizer

The goal of game design is not to “beat” the player, but to create an enjoyable experience. Challenge should scale relative to the player’s ability to overcome it, not ramp up in such a way as to prove how smart you are as the designer. Finding a way to help a player beat a challenge they are struggling with so that they feel mastery over the problem will go a long way towards engendering love for your game.

"The player's field of view expands over time." - Unknown

The player is able to notice more and understand more of what’s going on as they become familiar with the game. At first, they are “blind” to some things, sometimes from being overwhelmed. The player’s “field of view” is also sometimes known as the game’s "experiential surface area" or the player’s "game sense". Make sure that your design takes the player’s field of view into account and slowly introduces new elements over time rather than forcing the player to learn everything all at once.

"Design for beginners and experts, not the ‘average’ user." - Unknown

If experts aren’t happy, you game is not going to last. If beginners aren’t happy, they won’t stay around. Focus your design efforts on these extremes rather than a theoretical “average user.”

"The game shouldn't have more fun than the player." - Sid Meier

It can be tempting to get very involved with the technical details of your game design -- striving for ever more veracity in modeling a real world system, for example -- but unless those details are having a concrete, beneficial impact on the player’s experience, you are ultimately wasting your time.

"The player shouldn't have to read the same books the designer has read in order to be able to play." - Sid Meier

Invite your player into your game and make sure you convey all the information necessary to enjoy it. It’s easy to nerd out on research, but make sure that research serves a purpose and that you’re packaging it in a way that your players will enjoy consuming.

“Never assume interest.” - Joseph Osborn
As designers, it is all too easy to decide that players will or won’t react to stimuli in a given manner, or that players will or won’t enjoy a given activity. These assumptions are only useful for a very brief time as a starting place, however. Always check your assumptions and use focused playtesting to find the difference between your assumptions and the actual behavior and interest of the players.

“Players want love and attention from creators.” - Unknown

Just acknowledging players—answering them on forums for example—gets them excited and can engender positive feelings for your game. Even complaints can really be attention-seeking in disguise.

“Sports happen in the stands, not on the field.” - Keli Oskarsson

The amazing thing about professional sports aren’t the wins and losses that happen down on the field -- it’s the impact those ups and down have on the fans and the interactions they have between themselves as they discuss their teams. Games can be a lot like that. Don’t forget that it’s as important to think about the player community that will revolve around your game as it is to think about the game itself.

“Watch the player, not the screen.” - Jesse Schell

By the time you’re conducting focused playtesting of your game, you should be well familiar with the game’s content. The real goal of the playtest, then, is to observe the player’s reactions. Interviewing players is absolutely something you should do, but there will be a lot of information about their reactions that they are not consciously aware of which can be gleaned from watching how their facial expressions change in reaction to the game and also how their hands move in reaction to the game.

On Rapid Design...

“Develop a culture of automation and repeatability.” - Joseph Osborn

Whenever possible, don’t brute force the problems you have as a designer. As soon as you have to perform a task twice, figure out how to create a tool that can speed up that process. Stay appraised not only of what game features technology can make possible, but also how technology can streamline the process of game design.

“Fail fast and follow the fun.” - Mark LeBlanc

Game design is inherently uncertain work. As such, rapid iteration is the key to successfully creating a truly enjoyable game with the resources available. Find every means available to fail faster and focus your efforts on chasing the crumbs of fun that your failures yield.

“No meetings without an agenda and a timeframe (and usually action items).” - Link Hughes

Game development is difficult, uncertain work. Resist wasting your time in meetings that ultimately serve no purpose other than to “check in” or are otherwise not planned with an agenda in such a way as to actually accomplish something. Also avoid meetings where time will be wasted by some participants dominating the floor with content that would be better served by a private email thread. Remember that email can accomplish a lot of the purposes for which meetings are commonly scheduled.

“Set an idea goal for your brainstorms.” - Unknown
The goal of brainstorming is to generate both an inventory of expected responses to a topic as well as to generate lateral thinking on that topic as quickly as possible. In service of this, establish a time limit for brainstorming on a given topic and an ambitious goal number of ideas to generate. Your participants won’t find the added pressure comfortable, but they will unconsciously treat it as a game they will try their best to win. This may lead to some joking, but that’s natural in a brainstorming situation. You’ll also find that groups will generally exceed your stated goal.

“Try Random before AI.” - Joseph Osborn

Sometimes, pure random is good enough. Start with a simple random function when first adding AI to a game, and then playtest it. If the players notice that the AI’s responses are too random, start implementing more advanced AI heuristics and then test again. If the players don’t notice that the AI is acting totally randomly, then don’t waste any further time and just stick with the random AI.

“When looking at several solutions to a design problem, try the easiest one first.” - Unknown

Game designers are always working with finite resources. Because of this, it is always smart to initially try whichever option from brainstorming will be the easiest to implement.

On Communication...

“Aim for brevity in communication.” - Jon Selin

Game designers -- and people in general -- are prone to embellishment and providing anecdotal evidence when discussing things with others. Often, however, other developers will have the gist of a point that you are making by the end of your first sentence on the topic. Out of respect for your peers’ time, fight the urge to embellish and keep anecdotes short and sweet. This will give your collaborators the chance to actually collaborate with you instead of waiting for you to finish unnecessarily reiterating your point.

“Answer praise directly; answer criticism generally.” - Unknown

Players like to connect with developers, so let them, but do your best to condition them to making positive contributions. When someone praises your game, thank that person directly. When someone criticizes the game, however, respond to the criticism, not the person.

“Avoid HARKing (Hypothesizing After Results Known).” - Unknown

Hindsight is 20/20 and it’s all too easy to retroactively begin creating theories based on playtest data. Instead, work to be a designer who hypothesizes before testing and then honestly compares hypotheses to test data. This practice will make you a more accurate prognosticator with time.

“If you are holding a meeting that involves most but not all of the people sitting near you in a space, send an optional invite to the remaining people.” - Andy Megowan

It sucks to be left behind at your desk when everyone around you is going to a meeting. Chances are, if someone sits near you, they may have something to contribute to a discussion that involves almost everyone else in the area. If not, it will still be better for team morale for them to feel optionally included than for them to be left sitting at their desk while everyone around them disappears behind a closed door.
“The only time features or tasks are "easy" in game development are when either 1) you don’t understand them; 2) you really want them in the game; or 3) someone else has to do them.” - Robin Hunicke

It’s all too easy to assume that a task should be “easy,” but game development is complicated work and tasks are rarely so simple. If you hear yourself or someone else describing a task as “easy,” take a moment to stop and consider whether or not it might fall into one of the above categories and, if so, suggest a revision to the statement accordingly.

"We're wearing the same uniform, stupid!" - Robin Hunicke

It’s all too easy to assume the worst about the motivations or skill level of your co-workers -- particularly if your colleagues work outside the office. Office politics and ego can also get in the way of effective collaboration. No matter what, don’t forget that the other developers you work with ultimately want the same thing you do -- to make a great game.

**Conclusion and Future Work**

In conclusion, we feel that it is possible to frame our work as designers in a way that can be deliberately practiced to achieve the next level of mastery beyond just making more games. By identifying specific skills to improve and drilling them with the support of industry rules of thumb as a form of guidance, we can sharpen our designer blades and work towards becoming game design Olympians.

The next steps will be to put some of these drills into practice with the intent of measuring improvement on individual skills. Some members of the team are planning an experiment of creating a training regimen out of our drills and tracking progress over time. Also, our drill ideas are certainly not an all-encompassing list. We will continue to expand and specify drills, as we experiment with them and through consulting with industry veterans for drill and rule of thumb suggestions.

**Appendix: Full Skill Hierarchy**

- **Player Projection**
  - Psychology
  - Empathy
  - Behavioral Economics
  - Motivations
  - Incentives

- **System Design**
  - Dynamic Systems (Control theory/feedback loops)
  - Systems Design
  - Procedural Content
  - Mathematical Modeling
  - Gameplay Loops
  - Predicting Outcomes
  - Aesthetic Communication (MDA)
    - Selecting aesthetics; selecting dynamics to achieve them

- **Content Design**
  - Level Design
  - Puzzle Design
  - Progression Balancing
  - Difficulty Balancing
- Data Design
  - Pacing
  - Player View/Camera Design (mise-en-scene)
- Feedback Design
  - UI
  - UX/Interaction Design
  - Tutorial Design
  - Juiciness
  - Sound Design
  - Human factors?
- Narrative Design
  - World-building
  - Micronarrative
- General Design
  - Game Feel
  - Tweaking & Balancing
    - Parameterizing Mechanics
- Critical Evaluation
  - Analysis
  - Articulation
  - Deconstruction
  - Gestalt Understanding
    - Edge case detection
    - Predicting results of changes
- Distillation
  - Simplification (Minimal complexity version of design)
  - Subtractive Design
    - Darling-Killing
  - Rapid Prototyping
  - Taking Criticism
- Playtesting
  - Selecting Metrics
  - Conducting Playtests
  - Analyzing Playtests
  - Understanding Player Feedback
- Research & Outside Interests
  - Games Knowledge
  - Specific subjects, e.g. history, chemistry, macramé...
  - Hobbies
  - Emotional Maturity
- Collaborative Communication
  - Interacting with teammates
    - Art
    - Audio
    - Other Designers
    - Programming
    - QA
  - Documentation
  - Situational Awareness of Team Activity
  - Pitching
  - Protecting/Promulgating the Vision
- Creative Direction
○ Championing the Cause
○ Interacting with Business/Other Stakeholders