

FROM IDEA TO SHELF

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GAME MECHANICS AND PHYSICAL GAME DEVELOPMENT

- ▶ Designer, Teacher / Lecturer, Entrepreneur
- ▶ Worked as a professional designer for over 10 years for various companies in the private sector and games industry
- ▶ Teach art / game design in art schools, universities, and for private companies
- ▶ CCO / Co-founder of RockHubs: imagine a rock band made up of your extended family, friends, and co-workers.
- ▶ Indie game development, cinematography

WHO AM I

ARASH SAMMANDER

- ▶ **Game Mechanics**

- ▶ Space
- ▶ Time
- ▶ Objects, Attributes, States
- ▶ Actions
- ▶ Rules
- ▶ Skill and Chance
- ▶ Loops

- ▶ **Aesthetics**

- ▶ **Theme / Story**

- ▶ **Retheming**

- ▶ **Medium**

- ▶ **Bartle's Player Types**

- ▶ **Teamwork**

PARTS OF A GAME

LET'S DISCUSS WHAT MAKES UP A GAME

PART 1

GAME MECHANICS

Game mechanics help to create the interactivity for your players which makes your game a game versus just being a linear experience like a movie.

These are all the actions the players can take, the rules, goals, winning and losing conditions, etc.

GAME MECHANICS – WHAT ARE THEY?

PART 1 - GAME MECHANICS

GAME MECHANICS

SPACE

Where can game exists and how do the elements and players exist in relation to that space?

SPACE

PART 1 - GAME MECHANICS

- ▶ Is the space of this game discrete or continuous
- ▶ How many dimensions does it have
- ▶ What are the boundaries
- ▶ Are there spaces and how are they connect
- ▶ Is there a more than one useful way to abstractly model the space of this game

QUESTIONS TO ASK ABOUT WHEN DESIGNING FOR SPACE

How does time exist in relation to the players and the elements of the game?

TIME – DISCRETE VS CONTINUOUS

PART 1 - GAME MECHANICS

GAME MECHANICS

TIME

Time can be manipulated with factors other than a clock. Space, number of elements, rules, players, etc.

TIME – CONTROLLING TIME

PART 1 - GAME MECHANICS

- ▶ What determines the length of my gameplay activities
- ▶ Are players frustrated because the games ends to early; how can I change that?
- ▶ Are players bored because my game goes on to long; how can I change that?
- ▶ Would clocks or races make my gameplay more exciting?
- ▶ Time limits can irritate players; would I be better off without time limits?
- ▶ Would the game do better with short rounds that make up larger play sessions?

QUESTIONS TO ASK WHEN DESIGNING FOR TIME

GAME MECHANICS

OBJECTS, ATTRIBUTES, STATES

Objects are anything that can be manipulated in the game by the game itself or the players (*Characters, props, tokens, board, etc*).

Attributes (*static or dynamic*) are categories of information about an object (*Car has a maximum speed (static), and current speed(dynamic)*).

States are the current values of that attribute (*Current speed = 75 kph*) which can be **public** (face up cards on a table, or **private** hidden cards in a player's hand, or that horde of goblins hidden in the bushes which is known by the game but not by the players).

Tips:

- ▶ If two objects behave the same way they should look the same, and if they behave differently they should look different.
- ▶ Don't communicate every change of state it can become overwhelming

OBJECTS, ATTRIBUTES, STATES

- ▶ What are the objects in my game
- ▶ What are the attributes
- ▶ What are the possible states for each attribute
- ▶ What triggers (things that make them change) the state changes for each attribute?

QUESTIONS TO ASK WHEN DESIGNING OBJECTS, ATTRIBUTES, AND STATES

GAME MECHANICS

ACTIONS

VERBS

The things players can do in the game. Run, jump, climb, roll, move, pick up and place a card, hide, attack, talk, etc. These can be **basic actions** or very **strategic** ones that all eventually lead to accomplishing goals.

ACTIONS

- ▶ What are the basic actions in my game?
- ▶ What are the strategic actions?
- ▶ What strategic actions would I like to see and can I change my game to make these possible?
- ▶ Am I happy with the ratio of strategic to basic actions?
- ▶ What actions do players wish they could do in my game that they can't?
- ▶ Can I somehow enable these, either as basic or strategic actions?

QUESTIONS TO ASK WHEN DESIGNING BASIC AND STRATEGIC ACTIONS

RADICAL CREATIVITY

- ▶ BOLDLY PUSHES FOR FUNDAMENTAL CHANGE
 - ▶ EMPHASIZES THE FLEXIBILITY TO ACT IN A VARIETY OF WAYS
 - ▶ ADAPT ACTIONS ACCORDINGLY TO ACHIEVE GOALS
 - ▶ ENCOURAGES RISK-TAKING
 - ▶ FOSTER EXPLORATION AND EXPERIMENTATION
 - ▶ ALLOWS QUESTIONING AND EMPOWERS DEBATE
 - ▶ SUPPORTS PROCEEDING WITH “NOT-KNOWING”
- ▶ Increase the ratio of basic actions to strategic ones. Be careful not to add too many basic actions!
 - ▶ Allow verbs that can act on many objects. A gun that shoots a lock, break a window, hunt food, pop a car tire, write a message on a wall...
 - ▶ Goals that can be accomplished in many ways, for example shoot the monster, shoot the chandelier to kill the monster, talk him out of his ways in a non violent way.
 - ▶ Add more subjects, ie, more pieces that the player can move and interact with to coordinate and sacrifice.
 - ▶ Side effects that change constraints, for example in chess the pieces can only be occupied by one piece so as the players play they affect the space itself and the choice both players can make.

ACTIONS – EMERGENT GAMEPLAY

PART 1 - GAME MECHANICS

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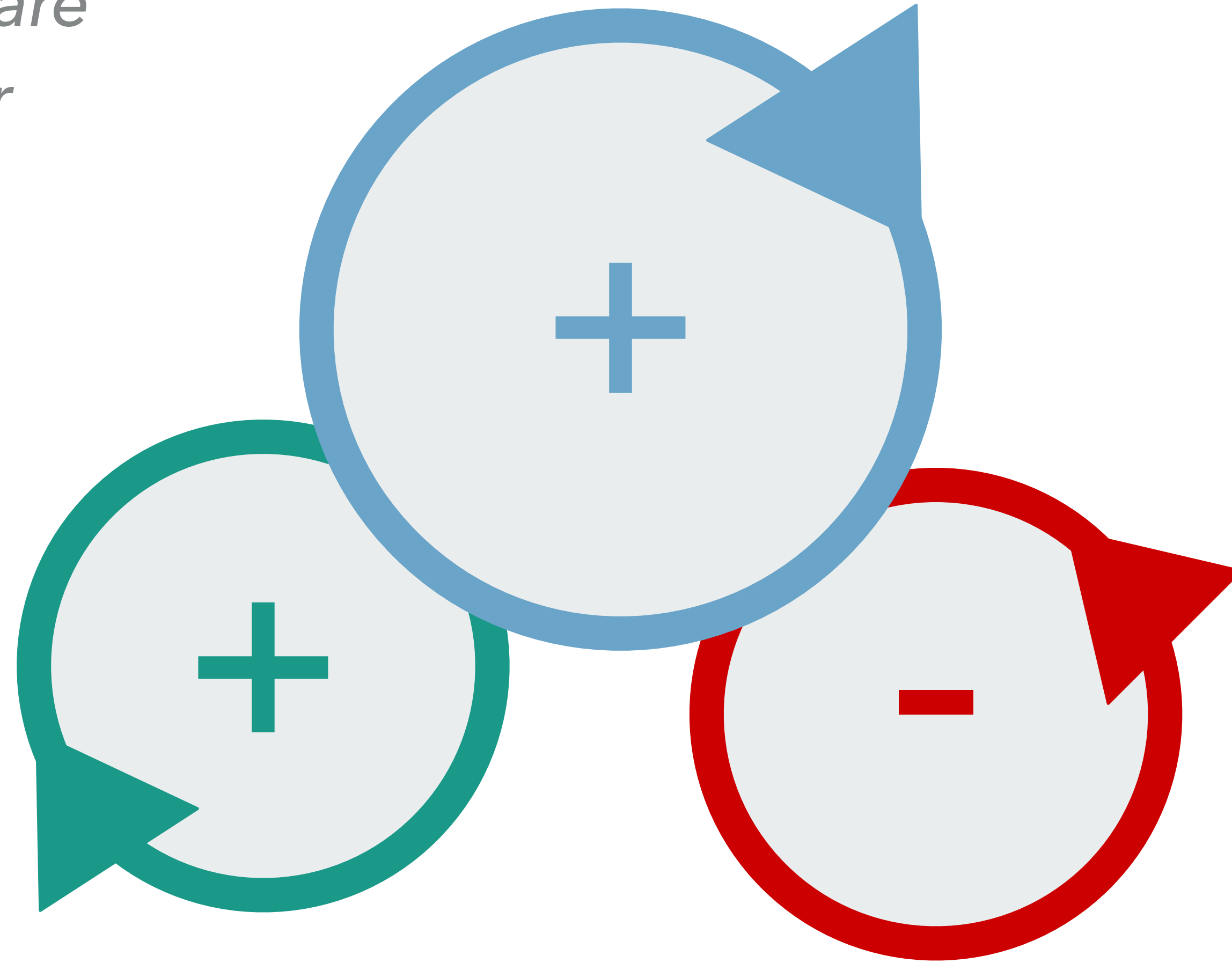
QUESTIONS TO ASK WHEN DESIGNING ACTIONS WITH EMERGENT GAMEPLAY

GAME MECHANICS

LOOPS

Loops are actions that are repeated over and over throughout gameplay.

There are two types of loops **Core** loops and Positive / Negative **Feedback** loops.



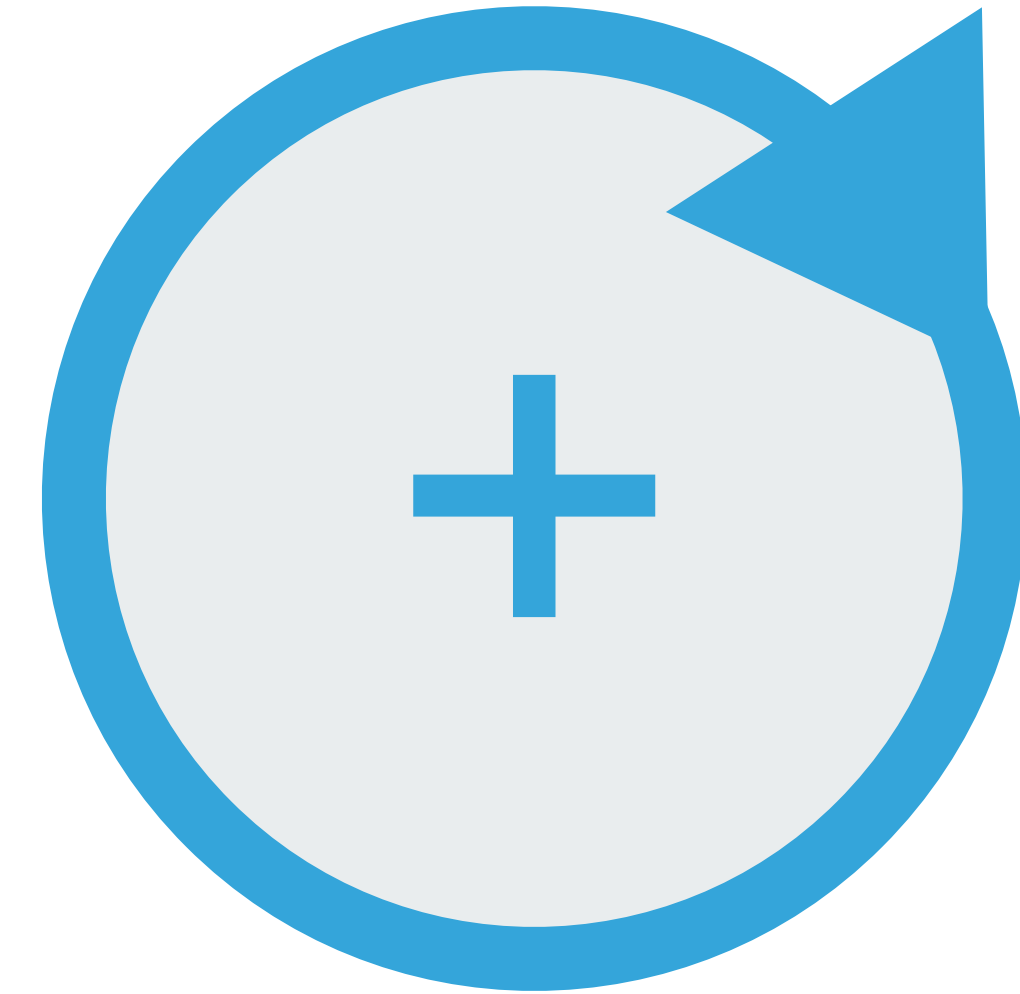
WHAT TYPES OF LOOPS ARE THERE?

LOOPS

Core loops are the main actions that the player repeats over and over to progress towards their goals.

Mario running and jumping without falling into a hole or hitting an enemy until they reach the end of a level.

Secondary or supportive loops could be smashing blocks and stomping enemies to collect coins and power-ups to get more lives or get through the level faster.



CORE LOOPS

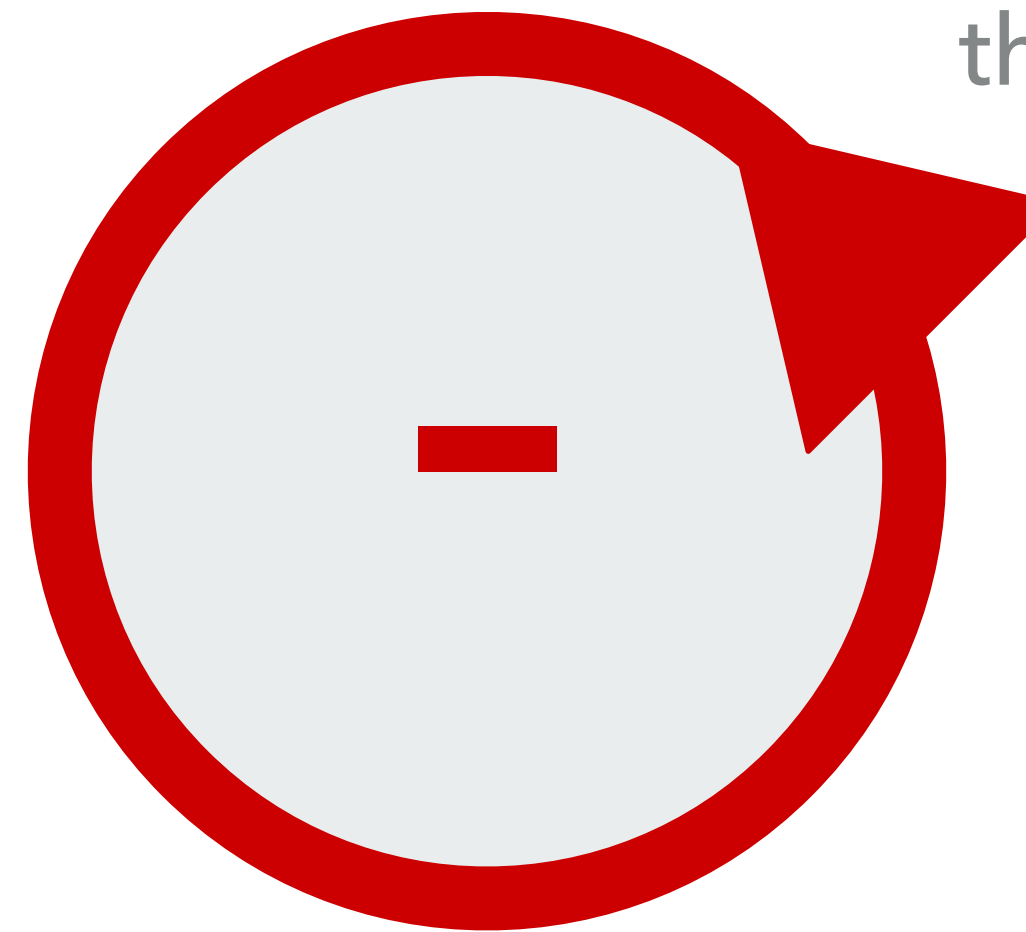
LOOPS

Feedback loops are loops either compound or bring balance.

Positive *feedback loops compound success / failures.*

Kill a monster and then level up, becoming stronger, which would allow them to kill monsters easier and level up faster.

Losing a military unit will make it more likely for the player to lose more units and thus making the game harder.



Negative *feedback loops bring Balance to the overall gameplay.*

In an RPG (Role Playing Game) every time a player levels, it requires more experience points to reach the next level.

In basketball, when a team scores a point, the ball is given to the opposing team.

FEEDBACK LOOPS – POSITIVE VS NEGATIVE

LOOPS

GAME MECHANICS

RULES

Rules define the space, timing, objects, actions, consequences, constraints, and goals.

There are game defined goals, and then there are user defined goals (which are usually secret).

Make sure that rules are concrete, achievable, and rewarding!

Make sure to have short term and also long term goals.

RULES (SET LIMITS AND GIVE US GOALS)

- ▶ Are the rules easy to understand, or is there confusion about them. If so, should I fix it by changing the rules or by explaining them more clearly?
- ▶ What is the ultimate goal of my game and is it clear to the players?
- ▶ Is there a serial of goals and do they understand that?
- ▶ Are different goals related to each other in a meaningful way?
- ▶ Are they concrete, achievable, and rewarding.
- ▶ Do I have a good balance of short and long term goals
- ▶ Do players have a chance to decide on their own goals?

QUESTIONS TO ASK WHEN DESIGNING RULES

GAME MECHANICS

SKILL AND CHANCE

Chance can affect all aspects of game mechanics and gives the players and the game elements the possibility of uncertainty and surprise. When used well it can help to keep players interested and motivated, and smart. When done poorly it can turn players off because things feel random and completely out of their control.

Things to consider when dealing with chance and skill:

- ▶ Estimating chance is a skill
- ▶ Skills have a probability of success
- ▶ Estimating an opponent's skill is a skill
- ▶ Predicting pure chance is an *imagined* skill
- ▶ Controlling pure chance is an *imagined* skill

SKILL AND CHANCE

- ▶ What in my game is truly random? What parts just feel random?
- ▶ Does randomness give players positive feelings of excitement and challenge or negative feelings of hopelessness and lack of control?
- ▶ Do players have the opportunity to take interesting risks in the game?
- ▶ What is the relationship between chance and skill in my game? Are there ways I can make random elements feel more like an exercise of skill and exercising skills feel more like risk taking?

QUESTIONS TO ASK WHEN DESIGNING FOR SKILL AND CHANCE

PART 2

GAME AESTHETICS

- ▶ These are everything that can affect your five senses. Though most digital games concentrate on sight and sound, real-life games like board games and card games orLARPs (Live Action Role-playing games) can also incorporate touch, taste, and smell.
- ▶ Draw the player in - something about the game interests them into playing versus playing something else, it gets them excited to play.
- ▶ Can make the game feel “real”, solid, amazing to experience an “atmosphere”.
- ▶ Will make players want to play and interact with your game, and also overlook certain flaws if it looks beautiful and is enjoyable to interact with.

AESTHETICS – WHAT ARE THEY?

- ▶ Use arts, visuals, textures, feedback, sights, and sounds. Anything that stimulates the senses. Talk about how a player should feel and what they experience during gameplay.
- ▶ Have a balance between art and tech. Let art and visuals be driven by the artists before it is driven by engineers!
- ▶ Don't forget the audio!

AESTHETICS – HOW TO USE THEM

PART 2 - GAME AESTHETICS

- ▶ What types of things can I use to enable more senses to be used?
- ▶ What types of materials or objects can exist to enhance the feeling or experience?
- ▶ What types of things can I do to my game that would require players to use more senses than just sight and touch?
- ▶ How can I use sound in my physical game beyond just talking?
- ▶ Can I make these types of changes without increasing the complexity or cost to create my game?

THINGS TO TAKE INTO ACCOUNT WHEN USING AESTHETICS IN A PHYSICAL MEDIUM

PART 3

THEME / STORY

Though these two are sometimes confused, the **theme** *is what your game is about* and the **story** *is the series of events that happen to different characters*.

Try to think of it from big to small. The theme of your game may be about outer space and science fiction, and the story is about a boy and his trusted friends who go on an adventure to save the universe.

THEME / STORY – WHAT'S THE DIFFERENCE?

Games can be created around **themes** or **game mechanics**. For example in a western cowboy theme is chosen then we may clearly know that there will be game mechanics involving shoots, robbing banks, poker, etc .

On the other hand if we for example have the mechanics of rolling dice, we could then apply that roll, to be a pack of wolves on a board. Once we find a theme that fits the mechanics we can then reverse engineer the remainder of the mechanics from that theme.

THEMATIC VS MECHANIC GAME DESIGN

THEME/STORY

RETHEMING

Good:

- ▶ Easy to get started.
- ▶ Already balanced.
- ▶ Concentrate on creative and visual side of the process.
- ▶ Helps to generate ideas for new mechanics.

Bad:

- ▶ It's only a starting point. Usually can't be used as the final game.
- ▶ Hidden problems with existing game mechanics get carried over without noticing.
- ▶ Players of that genre will quickly realize it's just a copy.

WHY RETHEME?

RETHEMING & TEAM(WORK)

Tips for Success

- ▶ Keep the theme simple and understandable. Sci-fi Robots-> Western Cowboys.
- ▶ Keep existing art and use your imagination when designing.
- ▶ Keep the original game mechanics, rules, and amounts of pieces as long as possible.
- ▶ Only introduce ONE new strong (hook) game mechanic/ change at a time and test it many times.
- ▶ When testing a new mechanic, immediately setup the board to test that specific scenario, don't play from the beginning every time!
- ▶ Fail Fast, Fail Often.
- ▶ Killing your darlings, i.e. dropping/changing a theme (pivoting), idea, mechanic once you realize it's not working.

Tips for Headaches

- ▶ Picks strange themes that require explanation: Alien Hot-dogs from outer space or IPs (Intellectual Properties) you don't have licenses for.
- ▶ Immediately start working on finalized artwork.
- ▶ Change the game mechanics immediately to fit the new theme.
- ▶ Playing the game from the beginning every time when trying to test something new.
- ▶ Falling in love with an idea and not being able to let go because it's been around since the beginning, i.e. sunk cost bias.

HOW TO RETHEME

RETHEMING & TEAM(WORK)

Things to ask when rethemeing around Radical Creativity

- ▶ What themes allow players to make bold choices regardless of not knowing what the outcomes may be?
- ▶ What themes allow players to multiple players that can work with or against one another towards common or individual goals?
- ▶ What types of themes encourage multiple solutions?
- ▶ What themes foster exploration, experimentation, and risk taking?
- ▶ What types of themes allow for debate?

HOW TO RETHEME FOR RADICAL CREATIVITY

RETHEMING & TEAM(WORK)

PART 4

MEDIUM

Medium *is how the game and experience are delivered to the players.*

Is it **digital** (pc, console, handheld, tablet, mobile device, etc.), **“analog”** (tabletop RPGs (Role-playing Games), board games, card games, dice games, etc.), **Mixed** (Virtual, Augmented, or Mixed Reality) or **Live** such as LARPS.

Each type of medium will have an effect on what game mechanics may be used and how they will be implemented.

MEDIUM – HOW IS THE GAME DELIVERED?

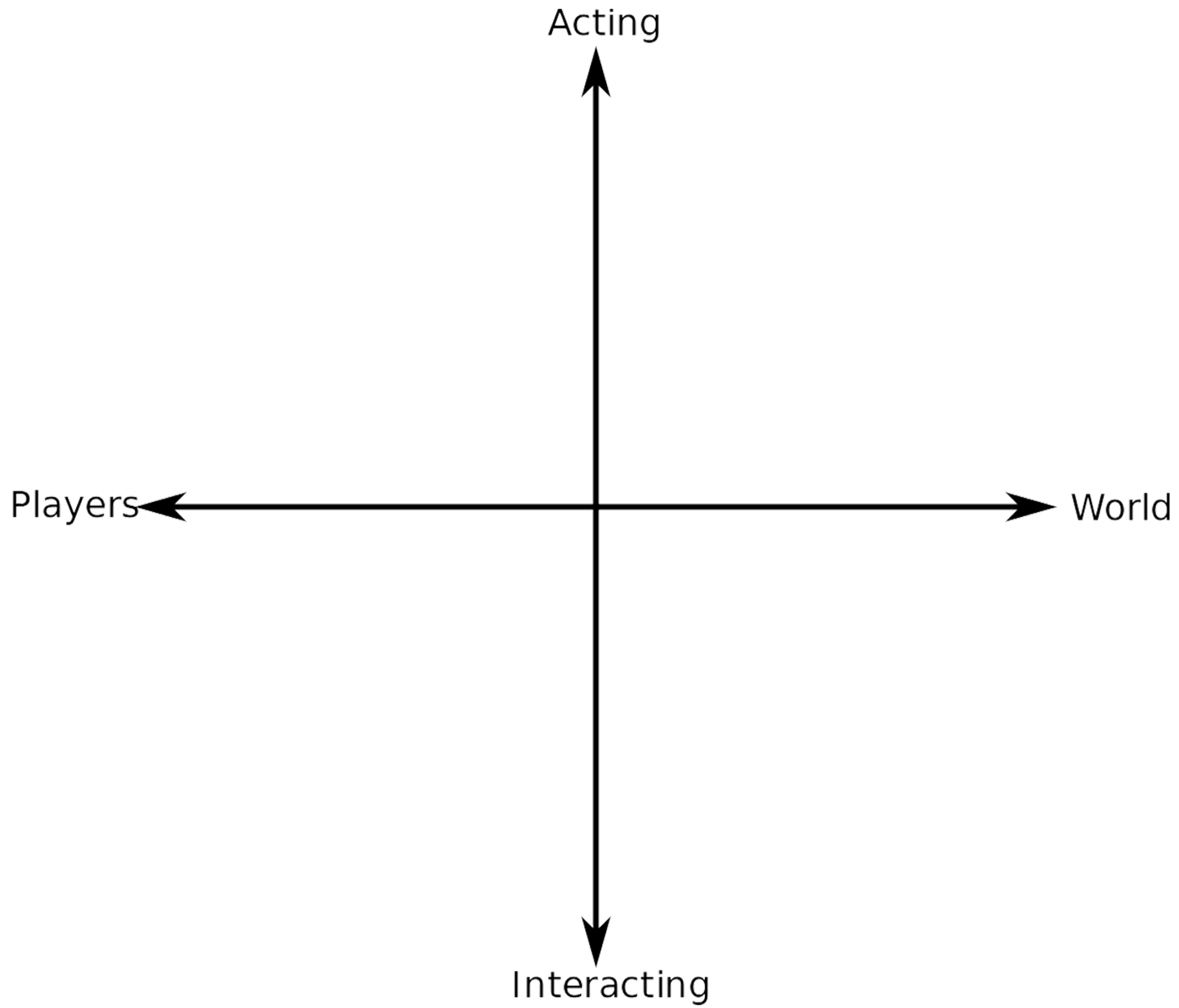
- ▶ How many game pieces are required to play my game? Can I simplify the game or pieces to have less of them?
- ▶ Can I change the way the game works so that certain pieces can be replaced with others?
- ▶ How large are the game pieces, can I make them smaller?
- ▶ What materials are they made of? Can I use a different material?
- ▶ Are the pieces overly complex? Can I simplify them somehow?
- ▶ How much space does my game packaging take up? Can I shrink parts of my game to make it take less place?
- ▶ How different does my game package look? Can I change something to make it stand out amongst other things on the shelf?
- ▶ How much does it cost to reproduce my game? Can I replace items in the game to make it cheaper?

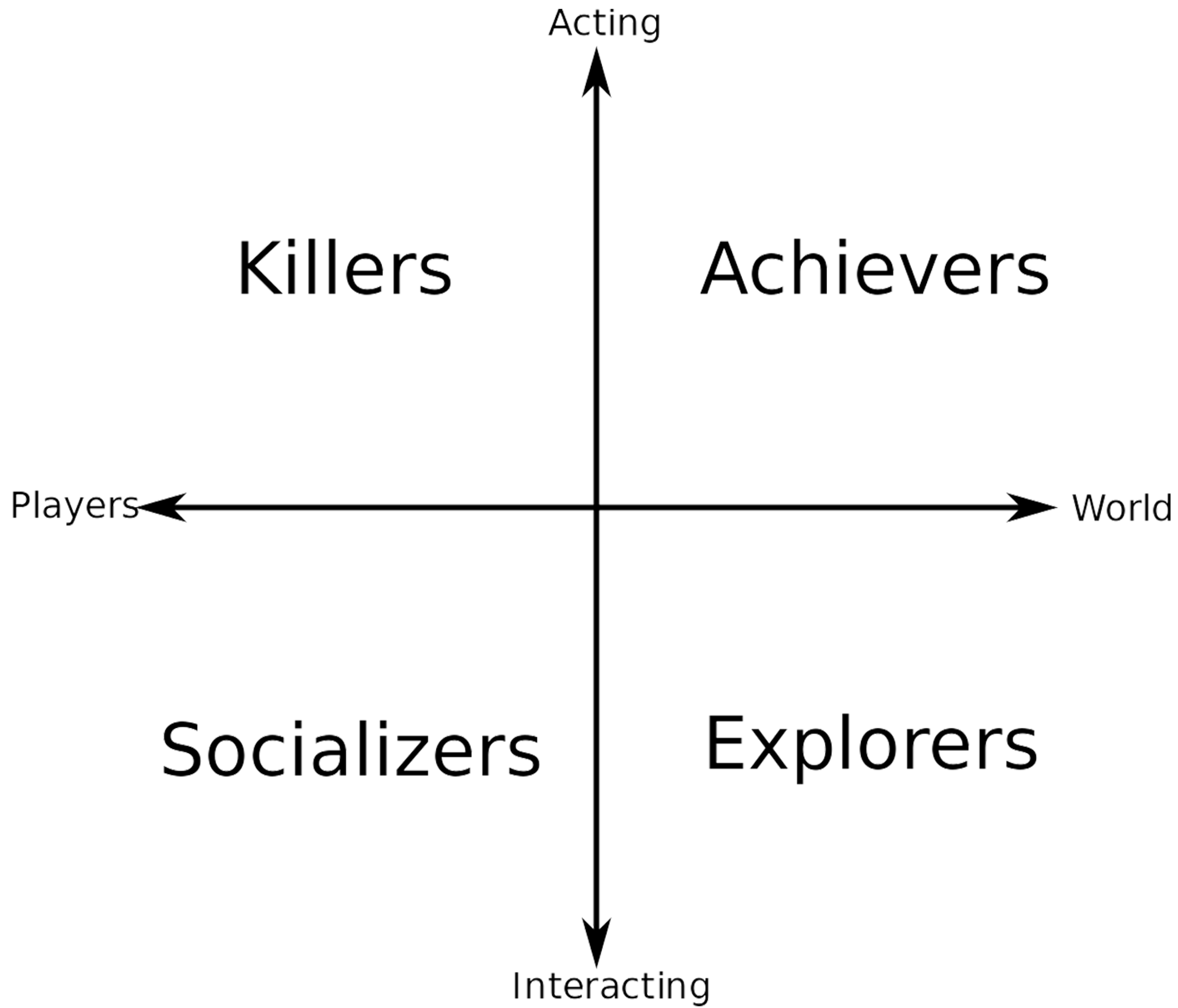
QUESTIONS TO ASK WHEN DESIGNING FOR A PHYSICAL MEDIUM

PART 1 - GAME MECHANICS

PART 6

BARTLE'S PLAYER TYPES



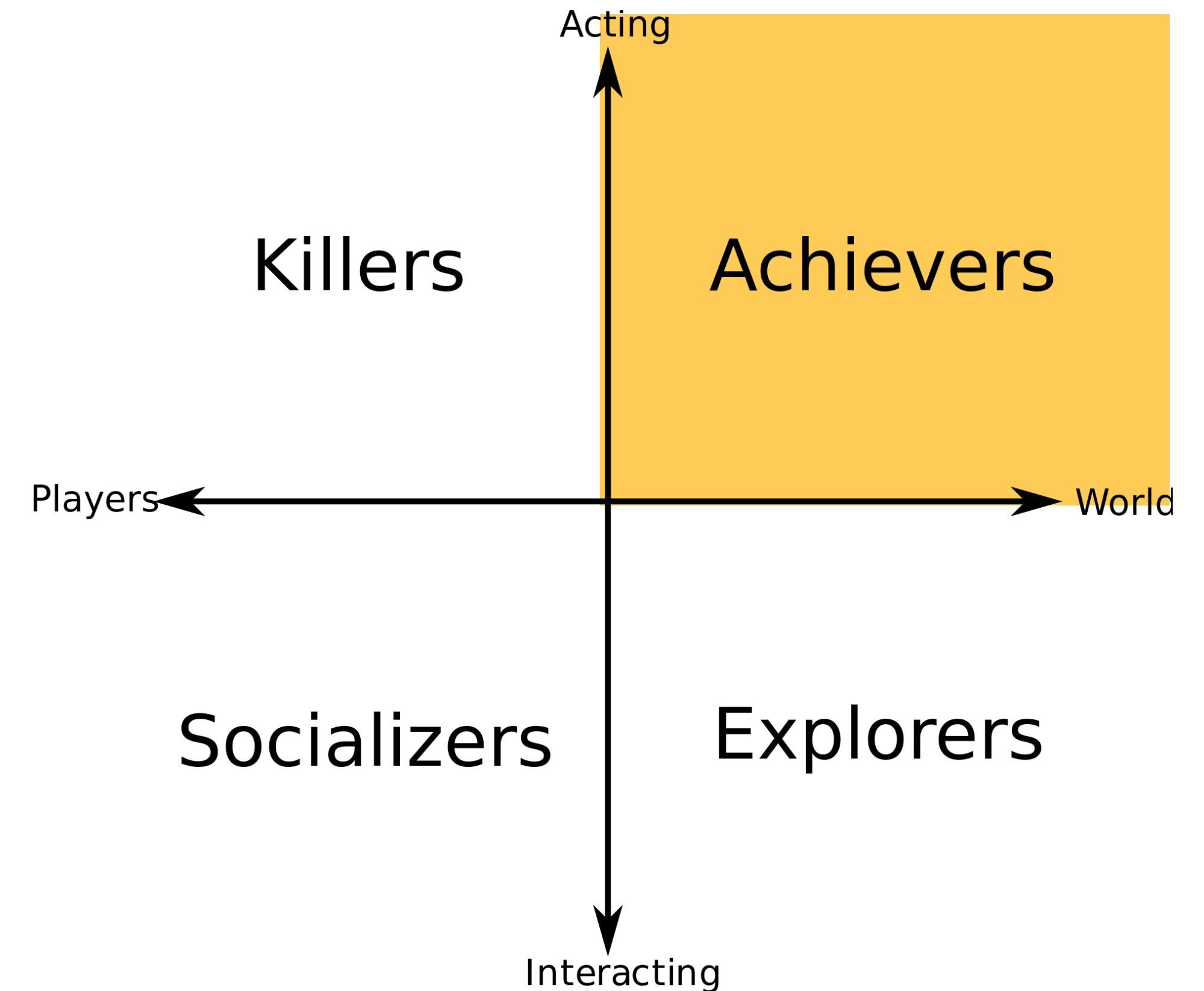


Achievers regard points-gathering and rising in levels as their main goal, and all is ultimately subservient to this.

Exploration is necessary only to find new sources of treasure, or improved ways of wringing points from it.

Socializing is a relaxing method of discovering what other players know about the business of accumulating points, that their knowledge can be applied to the task of gaining riches.

Killing is only necessary to eliminate rivals or people who get in the way, or to gain vast amounts of points (if points are awarded for killing other players).



ACHIEVERS

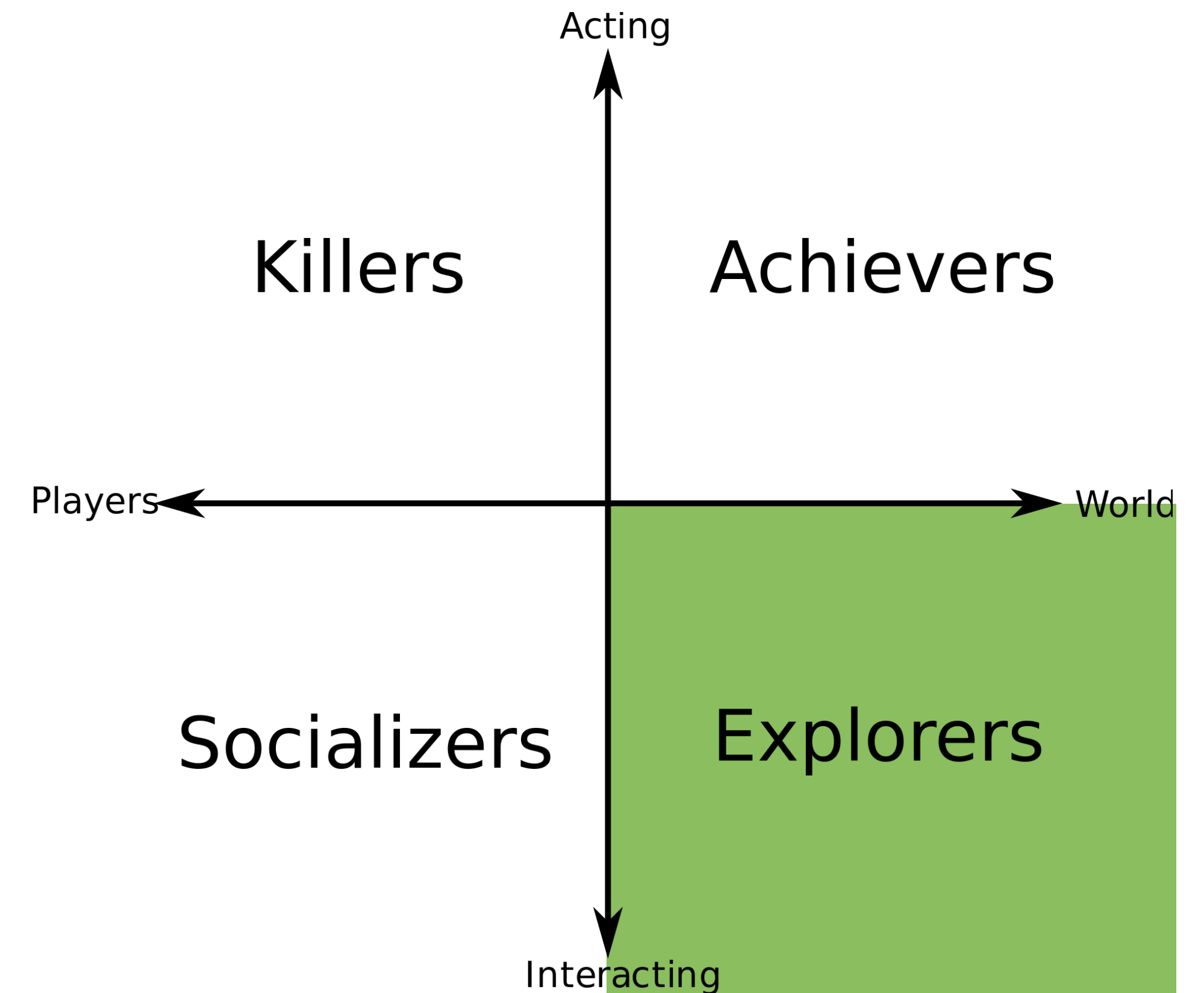
"Sure, I'll help you. What do I get?"
"Only 4211 points to go!"

Explorers delight in having the game expose its internal systems to them. They try progressively strange actions in wild, out-of-the-way places, looking for interesting features (ie. bugs) and figuring out how things work.

Scoring points may be necessary to enter some next phase of exploration, but it's tedious, and anyone with half a brain can do it.

Killing is quicker, and might be a constructive exercise in its own right, but it causes too much hassle in the long run if the deceased return to seek retribution.

Socializing can be informative as a source of new ideas to try out, but most of what people say is irrelevant or old hat. The real fun comes only from discovery, and making the most complete set of maps in existence.



EXPLORERS

BARTLE'S PLAYER TYPES

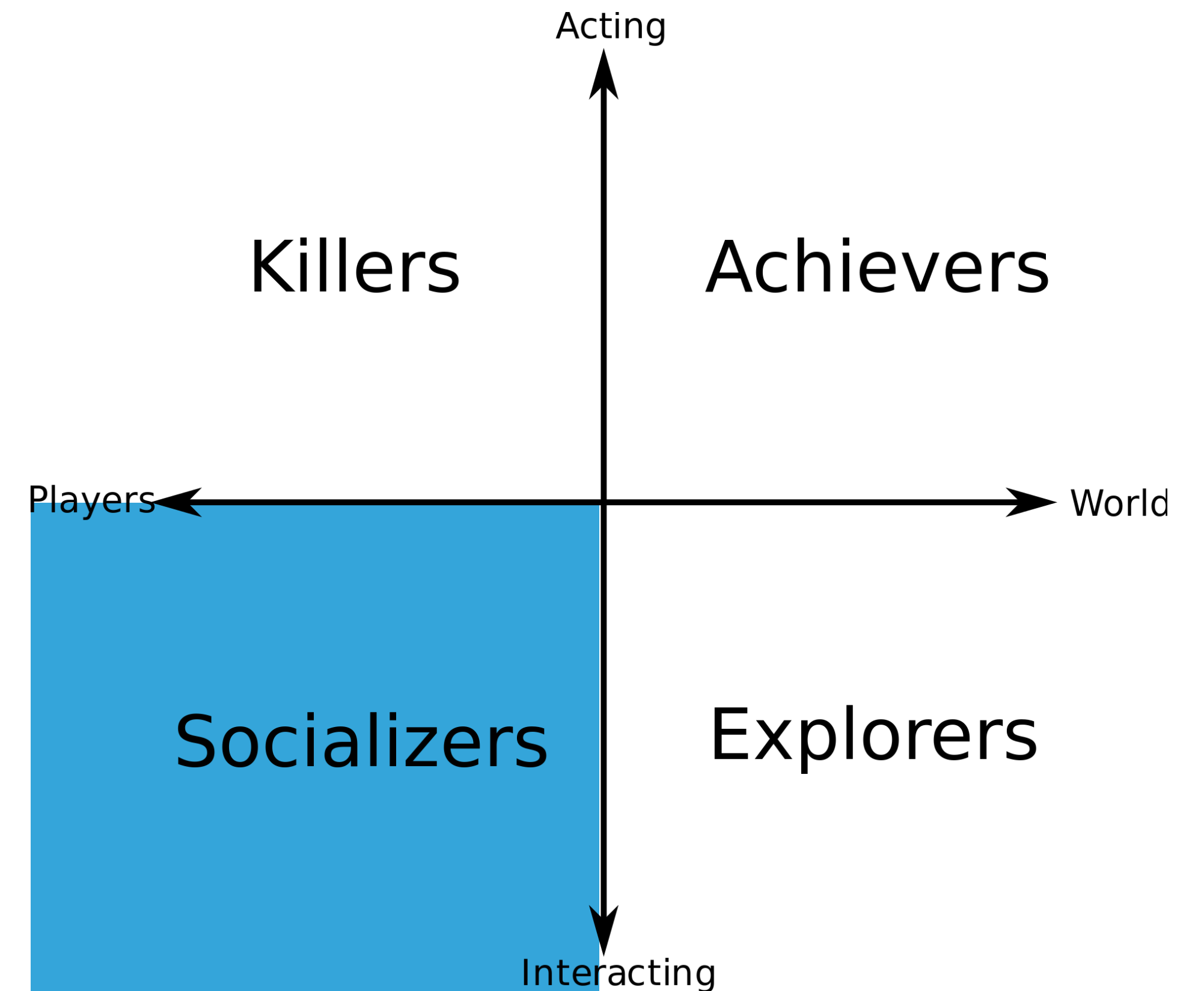
"You mean you don't know the shortest route from <obscure room 1> to <obscure room 2>?"

"I haven't tried that one, what's it do?"

Socialisers are interested in people, and what they have to say. The game is merely a common ground where things happen to players. Inter-player relationships are important: empathizing with people, sympathising, joking, entertaining, listening; even merely observing people play can be rewarding - seeing them grow as individuals, maturing over time.

Some exploration may be necessary so as to understand what everyone else is talking about, and points-scoring could be required to gain access to neat communicative spells available only to higher levels (as well as to obtain a certain status in the community).

Killing, however, is something only ever to be excused if it's a futile, impulsive act of revenge, perpetrated upon someone who has caused intolerable pain to a dear friend. The only ultimately fulfilling thing is not how to rise levels or kill hapless drips; it's getting to know people, to understand them, and to form beautiful, lasting relationships.



SOCIALISERS

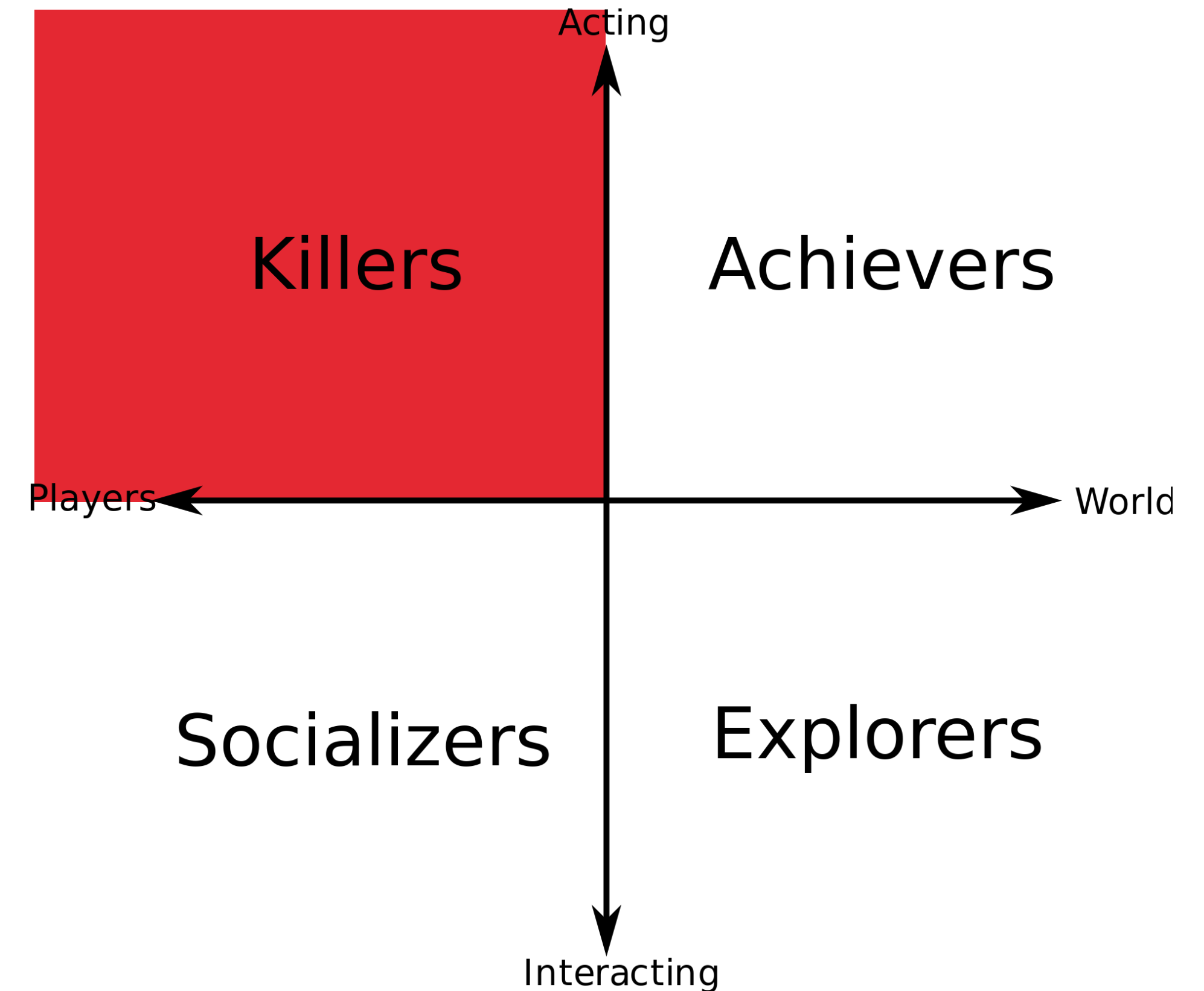
BARTLE'S PLAYER TYPES

***"Yeah, well, I'm having trouble with my boyfriend."
"What happened? I missed it, I was talking."***

Killers get their kicks from imposing themselves on others. Commonly, they attack other players with a view to killing off that player's character. The more massive the distress caused, the greater the killer's joy at having caused it.

Normal points-scoring is usually required so as to become powerful enough to begin causing havoc in earnest, and exploration of a kind is necessary to discover new and ingenious ways to kill people.

Even socializing is sometimes worthwhile beyond taunting a recent victim, for example in finding out someone's playing habits, or discussing tactics with fellow killers. They're all just means to an end, though; only in the knowledge that a real person, somewhere, is very upset by what you've just done, yet can themselves do nothing about it.



KILLERS

BARTLE'S PLAYER TYPES

"Coward!"
"Die!"
"You suck noob."

PART 7

TEAM (WORK)

Tips for Success

- ▶ Have clear roles, even if you share similar responsibilities with others, have one leader to manage everything.
 - ▶ Make a Roadmap of what you need to accomplish before the end of the course.
 - ▶ Review at least after after Sprint Review to make sure your project is on track.
 - ▶ In the case of this project I recommend reviewing every few days because of the limited time.
 - ▶ Run sprints/reviews (every week)
 - ▶ What got accomplished last week?
 - ▶ Why something didn't accomplished and why, and how will you resolve it?
 - ▶ What are you doing next week
 - ▶ How much time do you have left for the project?
 - ▶ Run Dailies (Show up on time, and only speak a few minutes each!)
 - ▶ What did you do yesterday.
 - ▶ What are you working on today.
 - ▶ Are you blocked in any way and how can we help you?
-

WORKING IN AN *AGILE* WAY

RETHEMING & TEAM(WORK)

- ▶ Listen to other team members, they may have knowledge and experiences you don't.
- ▶ Have a team leader and they have final say. Don't vote by committee! Don't do it!
- ▶ Get your work done, in advance. Your team is counting on you to do your part so that they are not blocked in their own work.
- ▶ Show up on time to meetings, and keep meetings short. A meeting longer than 30 minutes is too long.
- ▶ Meetings should have a moderator that keeps a timer, an agenda, and makes sure everyone sticks to it stick to it.
- ▶ KISS (Keep it simple & stupid), don't use complexity to cover for poor game mechanics.
- ▶ Kill your darlings. When in doubt, cut it. I promise, you game will be better for it.
- ▶ Be careful of sunk cost bias, e.g. "But we spent so much time on this, we can't drop it now."
- ▶ Fall in love with the process not the product.
- ▶ Remember to have fun. Life is short.

BE RESPONSIBLE

RETHEMING & TEAM(WORK)

GET TO WORK.

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THANK YOU!