# Exploratory Testing for Agile Projects

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## Designing an Agile Game

Your task is to create a game that illustrates some aspect of Agility. You could, for example, design a game that demonstrates how test-first programming results in faster progress over all even if it appears to decrease speed initially. Or you might design a game that demonstrates the effects of a long lag time between an activity and feedback on that activity.

### What's in Your Team Kit

Each team receives a kit containing:

- A laminated game board with 2 sides
- A laminated spinner
- Washable markers for writing on the game board and spinner
- Dice
- Tiddlywinks
- A timer
- Player markers
- Play money
- A notepad for scoring
- A rule sheet for documenting your game

*Please do not permanently damage the contents of the kit.*

In addition, we have a common store of supplies such as scissors, tape, 3x5 cards, pens, post-it notes, and stickers that can be used on the game board and spinner.

You may use any combination of these items as well as anything you happen to have with you to create your game.

### Creating Your Game

**Step 0**: Decide who on your team will represent the Customer.

**Step 1**: *Planning*. The Customer chooses an aspect of agility the game should illustrate and works with the Programmers to create the game stories. As in the real world, the Customer may have strong views on design elements or may leave those choices up to the Programmers.

**Step 2**: *Programming*. The Programmers implement the game and document the rules, working with the Customer to elaborate the stories.

**Step 3: *Exploratory Testing***. As a team, play the game using the exploratory testing techniques discussed to explore the dynamics of the game and discover situations in which players will and will not uncover the lessons the Customer had hoped.

## *Elements of Game Design*

There are numerous design elements you might use.  Consider:

| | | | |
|---|---|---|---|
| *Mechanisms* | *Competition* | *Secrecy* | *Time* |
| *Strategy* | *Interference* | *Visibility* | *Knowledge* |
| *Chance* | *Scalability* | *Scoring* | *Roles* |
| *Choice* | *Balance* | *Ending* | *Turns* |
| *Collaboration* | *Complexity* | *Winning* | |

(These are all described in the following pages.)

Remember that in this workshop it's more important to design a game that meets your goal for giving players learning opportunities than to design a game that would be fun to play on its own.  You might find you need to break "traditional" game design rules in order to create a game in which players have the opportunity to gain the insights you wish.

For example, if you want to illustrate a snowball effect of small decisions leading to big inefficiencies, you might create a game that lacks **balance**, where a small initial disadvantage causes a player to fall farther and farther behind no matter how much he struggles to keep up.  A few more ideas for using game design elements to teach specific lessons:

| *If you want your game to teach lessons about…* | *Consider designing a game in which this element is either present or noticeably absent…* |
|---|---|
| Teamwork | Collaboration |
| Team size | Scalability |
| Scarce resources | Interference |
| Risk | Chance |
| System effects | Balance |
| Cost of change | Scoring |
| Feedback | Scoring and Time |
| Serial versus parallel work | Turns |
| Metrics | Scoring |
| Speed | Time |
| Integration | Collaboration and Chance |
| Communication | Visibility and Secrecy |
| Experience | Knowledge |
| Self-determination | Choice |
| Leadership | Roles |
| Schedules | Time |

# Game Design Elements

## *Mechanisms*

How will players interact with the game?  What tangible tokens will they have to maneuver?  How will everyone playing see the state of the game?

Common choices include:

- Manipulating cards as in Poker, Bridge, or Solitaire

- Placing tokens on a board as in Scrabble

- Moving pieces on a board as in Chess, Checkers, or Backgammon

- Moving single markers representing individual players on a board as in Monopoly, Chutes and Ladders, Candy Land, and Life

## *Strategy and Chance*

In strategic games like chess, there is no element of chance.  The outcome of the game depends entirely on the actions of the players.  Risk—whether through rolling dice, flipping coins, drawing cards, spinning a wheel, etc.—can level the playing field.  Not surprisingly, some people love strategy games while others prefer to have some element of chance in their games.

Elements of chance need not make the outcome entirely random, however.  You can increase the strategic aspect of any game by giving players more choices.

## *Choice*

Giving players a variety of choices on each turn increases the strategic nature of a game, even when using elements of chance.

Backgammon is a good example of a strategic game that involves dice.  Players roll to see how far they can move, so it would seem that it's a game of chance.  However several aspects of the game provide opportunity for savvy players to do consistently better than novices.

A seasoned Backgammon player can make choices that will increase his chance of winning such as avoiding "blots" (a piece that occupies a point by itself) when his opponent could hit it onto the "bar" (back to start) or using probability to his advantage when "bearing off" (moving his pieces off the board in the end game).

Note that the more choices players have, the longer it will take them to figure out how to play the game well.

## *Collaboration, Competition, and Interference*

In a game like Bridge, players compete in pairs.  The collaboration between partners is as critical to the game as the competition with their partners.  By contrast, Chess is all about competition.

Some competitive games require players to vie for the same resources.  Monopoly, for example, hinges on players snagging complete color groups of properties (a "monopoly")

so they can charge their fellow players more rent. Players can interfere with each other by acquiring properties in a color group for the sole purpose of blocking others from gaining the monopolistic advantage. Games in which players compete against each other using the same resources set up a situation where in order for one player to win, another must lose. This is a **zero-sum** game.

In other competitive games, like The Farming Game (somewhat obscure), players amass assets—orchards, livestock, and the like—independently of each other.

Some business simulations play off the dynamic between collaboration and competition. The Prisoner's Dilemma, for example, involves two players. The two players are co-conspirators in a crime and are being interrogated in separate rooms. They are each given a choice to confess or remain silent.

- If they both remain silent (collaborate), they receive 1 year sentences.
- If one prisoner confesses and the other doesn't, the one who confesses is let go and the other one receives a 10 year sentence.
- If both prisoners confess, they receive 5 year sentences.

Both prisoners typically confess, earning themselves 5 year sentences. There's a delicate balance in the incentive structure that deserves further exploration. We'll pick this topic up again in the Scoring section.

## Scalability

How many players should be able to play your game? Only two can play checkers at once. On the other hand, Poker can accommodate a variable number of players.

## Balance

In the traditional game of Mill (also known as Nine Mens Morris), players move marbles to create "mills" (three in a row). When a player successfully completes a mill, she may remove one of the other player's marbles. If a player is able to set up her marbles just right, she'll make a mill on every turn, and the other player is soon decimated. At this point the game is unbalanced: it's impossible for the other player to recover.

## Secrecy and Visibility

Part of the fun of Poker is that you can only guess at what cards the other players might be holding. By contrast, everything in Backgammon or Chess is out on the table for the world to see.

## Roles

In Checkers, both players have the same role. In Monopoly, one player takes on a special role: "banker." In Mastermind, a strategy game in which one player must recreate a pattern of colors designed by another player, the two players have very different roles.

## Turns

Although the most common game design involves players taking turns, that's a game design choice. In some games, like Spit, players make their moves simultaneously.

Taking turns makes the game more orderly while simultaneous play makes the game faster and chaotic. In still other games, players take turns, but there are actions—such as playing special cards—that other players can take out of turn.

## *Knowledge*

In Trivial Pursuit, players who have little knowledge of trivia are at a significant disadvantage. In Backgammon, players who understand something about dice and probability will do better than players who lack that understanding. The kids' party game, Twister, on the other hand, requires no specialized knowledge and very little explanation.

## *Scoring*

How will players know how well they did at the game? In Backgammon, you receive points on a per-game basis. In Scrabble, you get points for every move you make. In Monopoly, you accumulate or pay money for every transaction.

You might keep score with points, money, chips, pips, or something else. However you track the score, scoring is the primary feedback mechanism for players to tell them how well they're doing. In designing your game, think about:

- The **frequency** with which points are awarded
- Whether the game is **zero-sum**: in order for another player to get ahead another must fall behind
- What **behavior** you want the scoring mechanism to encourage in players

For an example of how a scoring mechanism can encourage particular behavior in the players, let's revisit the Prisoner's Dilemma. The incentive structure has a delicate balance that discourages collaboration.

Imagine Fran and Benny are playing the game. Fran may think:

> "We talked about this. I know Benny will remain silent because he promised. So if I confess I'll be let go. On the other hand, if I'm wrong about Benny, and I stay silent, I'll get 10 years in prison!"

Benny is thinking the same thing. Hi might even go so far as to create a decision tree of the possible outcomes:

| | | |
|---|---|---|
| If I confess and… | …Fran stays silent | I win big – 0 years! Yippee! |
| | …Fran confesses | We both lose a little with 5 years |
| If I stay silent and… | …Fran stays silent | We both win a little with 1 year. |
| | …Fran confesses | I lose big – 10 years! No way! |

The only logical choice is to confess unless you have unshakable trust in the other player and care about his or her well being.

## Time

You can incorporate time into a game in a variety of ways.

- **Turns**: in the kids' game Operation, the player must complete her turn before time runs out.

- **Scoring**: in the Windows version of Solitaire, time can affect scoring (the faster you play the more you score).

- **Winning**: in one variation on Monopoly, play stops at a pre-specified time and the winner is the one with the most money.

## Ending and Winning

The game ends when the exit criteria have been met. In Backgammon, the game is over when one of the players bears off all his pieces. In Solitaire, the game is over when there are no more moves (either because the player won or because the player is stuck). Sometimes the condition that ends the game is simply amount of time passed.

In most games a single winner is determined by the score—either lowest or highest. But you could choose to create a game in which everyone wins or everyone loses depending on some condition. In one somewhat obscure board game version of Dungeons and Dragons, all players win if their characters all escape the dungeon before the dragon kills them. If any player is left behind, the entire team loses.

## Complexity

It's tempting to make game rules complex. Resist the temptation for this exercise. Complex games like those published by Avalon Hill are wonderful if you have a lot of time to learn them and a full day to play them. Remember that each round of these games must be completed in 5 minutes.