Analytics and Data-Driven Game Design in

TRICKY TEMPLE

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About the Game

Tricky Temple is a grid-based memory puzzle game in a tomb raider setting, in which the player must remember a path in order to reach the goal of the level. The path is highlighted at the beginning of the game and then disappears, leaving it to the player to retrace it by moving their character onto the right tiles. If they miss a step or move into a trap, they fail and have to restart the level.

Market Analysis

The mobile market seems to be the best fit for this type of game, since each level in itself is quite short, and the game can be stopped at any point without losing substantial progress. Players of Tricky Temple are motivated mostly by Achievement but can also be found in the Mastery and Action category of the Gamer Motivation Model (Quantic Foundry, no date). Looking at the current mobile market, there is a lot of potential in Memory and Brain Games, as well as in Puzzle Games (Grand View Research, no date). Tricky Temple offers a unique combination of both genres with an appealing Adventure setting that distinguishes it from most competitors and draws in new user groups.



Games And Puzzles Market Size, Share & Trends Analysis Report

For monetization, in-game currency could give players access to hints, skins and new levels. This in-game currency could either be aquired by watching advertising clips or buying them with real money. Players would also earn small amounts of in-game currency for successfully finishing a level.

To keep player retention high, new temples with additional levels and mechanics could be added to the game over time. Also, holiday events and daily challenges would offer time-limited rewards and the chance to earn more in-game currency.

Development of Methodology

I chose to work on the game that I was developing for the "Game Mechanics and System Design" module. Since my analytics were accompanying the development process, my methods had to change over time depending on the state of the prototype. In the beginning I focussed a lot on quantitative research, since I wanted to find out what people liked about the early prototype and what aspects I should focus on.

Later on, when all features were implemented and I could start building final levels, quantitative analysis became more important in order to see if the difficulty curve was working and which levels people got stuck on or stopped playing at.

Whereas the first surveys asked mostly open-ended questions, I tried to make the results more quantifiable by using Likert Scales from the third playtest on. This made the overall analysis of the surveys much easier since I didn't have to read all the answers to get an idea of how a certain aspect of the game was perceived. From this point on, I also included the consent form in the survey and the game build.

I tried not to influence people in their survey answers by changing my physical location in the room if I was on site and assuring them I wouldn't watch them, but results are still expected to be slightly biased since the context of the playtest was quite personal and almost all participants knew me.

For the quantitative analysis in the final build I chose to track the failures per level, causes of failure and failure position. I also counted how often players succeeded, the number of collected pickups and the time needed for the completion of each level.

Implementation of GameAnalytics

Automated data collection is only implemented in the final build, since it was the first one that passed the prototyping stage and had proper level design that data collection could evaluate and help to improve.

Since Unity Analytics had no built-in function to track events based on the level they were tracked in, I decided to use GameAnalytics instead.

After several iterations, I eventually managed to create an event structure that was working for me. With GameAnalytics, it is not possible to have a combined dashboard for different platforms, so I chose to track my data only for WebGL and Android builds, since they were the platforms that I found most easy to share online with other people. I created 22 custom dashboards for each build, including a dashboard for each level.



Final Design Event Structure



Example of Backend Implementation

For tracking the time that it took to complete each level, I needed to prevent too many unique events from being sent, so I decided to create five subcategories to cluster the completion time of each level. I also created some global events, to be able to track the overall causes for failures and the average time it took to complete the levels.



Preventing the creation of too many unique events

Conducted Playtests

All in all, I ran four playtests. The outcomes and analysis, as well as the impact on development of each playtest are outlined below for each individual playtest. For each build except the third prototype, I additionally distributed a WebGL version and the according survey to friends and classmates back home, so I could collect more data.



The first prototype was very basic and only represented the core game mechanic. In this version, players had to press the spacebar at the start of each level in order to show the path and were only allowed to start playing after it disappeared again. I conducted a first playtest, to get people's first reaction to the game and see if the concept had any potential.

Playtest Results

It was good to see, that without a lot of explanation, all playtesters understood and generally enjoyed the game. People liked the premise of the game and especially the simplicity and straightforwardness of the gameplay. There weren't any major complaints, except that the prototype was lacking content and complexity and it was unintuitive to have to press the space bar and wait every time they wanted to start or restart the game.

Data Analysis & Impact on Design

One major thing that I took from this first playtest was that people needed to be able to choose themselves when to start the level and that the additional input and timer felt restrictive and unnatural.

At this stage, I already saw the potential problem of scaling the difficulty. Making the path longer and harder to remember didn't make the game more fun for people, so there was a definite need for additional mechanics.

Week 5 – Playtest of Prototype 2 Playtest and subsequent survey (22 participants)



The second playtest happened at the AGDS playtest party. The game's mechanic had mostly stayed the same, but I had overhauled the graphics, changed the camera perspective to an isometric view and added ambient sound to find out if the tomb raider setting that I had imagined for the game was appealing to people.

Playtest Results

Again, playtesters didn't have trouble understanding the core mechanics of the game. They generally liked the new art style, atmosphere and simplicity of the game and the progression curve of the five included levels still seemed to work.

While some players who had played the previous prototype thought it was a general improvement over the previous one, some criticised the new camera perspective since it distracted from the readability of the controls. This was also a complaint amongst people who hadn't played the game before. The game was also still too short and lacked additional mechanics.

Data Analysis & Impact on Design

One thing that I knew I needed to improve based on the feedback was the readability of the levels. I changed the camera perspective back to an almost top-down view and additionally decided to not use winding tiles anymore since they led to confusion in connection with the grid-based movement. Instead, I make all of the tiles plain squares.

With the feedback that I had gathered on the general appeal of the mechanic, I now went ahead and included the additional features into the game that I had already planned out, most importantly three new traps and collectible pickups.

Week 10 – Playtest of Prototype 3 Playtest and subsequent survey, manual tracking of failures (8 participants)



Since this was an intermediate build, I only tested it in class and was therefore able to track the failures in each level manually to get some quantitative data on the difficulty curve. In the survey I used Likert scales for the first time, to be able to quantify the outcomes of my questionnaires better. In contrast to previous playtests, I now had more levels and additional mechanics included.

Playtest Results

See Appendix A

Data Analysis & Impact on Design

All in all, the game and new mechanics were received positively. Playtesters thought that the sound effects added to their understanding of the game and the audio was also mentioned by three people as something the liked about the game in the free answers.

The difficulty curve seemed to work, telling from the tracking of player deaths and a general middle rating on the Likert Scale. It also got a positive mention in the free answers.

On the negative side, I noticed while observing the playtest that the current functionality of the pickups didn't add enough purpose to the game or motivation to the players. That's why my probably biggest change in the final build was connecting the pickups to a progression system. Each level now had three optional pickups and collecting them would add to the overall level progression, letting people choose their own goal and difficulty.

Week 12 – Playtest of Final Build Playtest, GameAnalytics and survey (~ 50 participants)



For my final release, I was able to include GameAnalytics into the build and track player progression, as well as the specific design events mentioned in the previous section. I posted the game on social media to get as many people playing as possible which resulted in 51 new users. I additionally created one last survey in which 18 participants took part. For this report, I will be analysing the data from the first 5 days of the release.

Playtest Results

I collected a lot of data from the survey (see <u>Appendix B</u>) as well as from the GameAnalytics of the WebGL Build (see <u>Appendix C</u>). Not as many users played the Android Build (see <u>Appendix D</u>) although I always provided both options. Two players fully completed the game on Android and four on WebGL (meaning they collected all possible pickups in each level).

Data Analysis & Impact on Design

The survey results were very positive (see <u>Appendix B</u>) but reflected the low number of mobile players. I suspect that this mismatch stems from the fact that installing an unknown APK requires changing a setting on your phone, so for the next playtest, I would try to upload my game to Google Play to make it more accessible. I also received some individual feedback for the mobile controls from friends, saying that they were quite hard to manage and often the cause for failure. In a future build, I would like to offer mobile players several control options to choose from, so they can pick the one that works best for them. Nevertheless, the three players from the survey who played on mobile "strongly agreed" it was a good fit for the platform.

Looking at the general design event overview, I noticed that most people took longer than five minutes to solve the levels, but also mostly collected all three diamond pickups on their run, meaning they were clearly incentivised to fully complete the levels instead of taking an easy path. I picked the wrong timespans for my subcategories since I now have no details on how many minutes players actually took as soon as they hit the five-minute mark. Overall, the difficulty curve seems to work and doesn't fail to give players small breathing times in between.

As an example of how to dig deeper into this data, I took a closer look at Level 9 of the WebGL build (see <u>Appendix E</u>) and Level 15 of the Android build (see <u>Appendix F</u>), since they stuck out in the overall numbers of failure. I looked into their individual dashboards and made heatmaps by pasting in the tracked fail positions from GameAnalytics to investigate.

The heatmap of level 9 reveals that players mostly die on falling tiles when trying to collect diamonds. While this might mean that the delay of the falling tiles should be tweaked, failures mostly happen while performing an optional task, so player choose the extra difficulty.

In contrast, the heatmap of level 15 shows that most players die at one specific spot which lies on the main path of the level and cannot be circumvented. This specific part of the level should definitely be looked into and optimized in future builds.

Looking at the funnel of the WebGL build (see <u>Appendix C</u>) a user drop-off usually happens within the first few levels, but after that, people keep playing. In the Android build, a drop-off happens after level 9 (see <u>Appendix D</u>). Level 9 consists mainly of falling tiles, meaning that in large numbers they might be too hard to manage on mobile for players to enjoy them. Once users reached that point, they will usually play through the rest of the levels. In general, it might help retention to introduce more variety into the gameplay sooner, so people see from the beginning that there's more to the game than just the memory aspect.

Conclusion

All in all, the frequent playtests and data collection helped me massively with the development of the game, even if it was sometimes just a positive confirmation that I was on the right track. Working with GameAnalytics turned out to create some really interesting results, but it also took a lot of effort to implement and might not be the first tool to go for when doing playtesting on a smaller scale. I always intend to do more playtesting for my semester projects back home, but it takes some effort to show your game in an unfinished state and ask for feedback. This module helped me overcome these reservations and I am certain that my final outcome profited a lot from the constant iterations and playtests.

Appendices

Appendix A

Extract from Survey Results (Week 10)

I easily understood how the game worked.



The soundeffects helped me to better understand what was happening.



I enjoyed playing the game.



I think mobile is a good fit for this type of game.



Collecting the diamonds added to my motivation.



How would you rate the difficulty of the game?



Extract of survey results (1 = Strongly Agree, 5 = Strongly Disagree) (For difficulty: 1 = Too Easy, 5 = Too Hard)



Player deaths in each level

Appendix B Extract from Survey Results (Week <u>12)</u>





I easily understood how the game worked. 18 responses



I think mobile is a good fit for this type of game.

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I liked the progression mechanic.

18 responses



The additional mechanics (falling tiles, spikes, fireballs) added to the gameplay.



The controls were intuitive



I enjoyed playing the game.



The soundeffects added to the game experience.





Collecting the diamonds added to my motivation.



How would you rate the difficulty of the game?



Extract of survey results (1 = Strongly Agree, 5 = Strongly Disagree) (For difficulty: 1 = Too Easy, 5 = Too Hard)

Appendix C

GameAnalytics Data (WebGL Build)



New Users and Session Length (WebGL)



Design Event Overview (WebGL)



Appendix D

GameAnalytics Data (Android Build)



New Users and Session Length (Android)



Design Event Overview (Android)



Appendix E GameAnalytics Data for Level 9 (WebGL Build)



Level 9 Overview (WebGL)



Level 9 Heatmap (WebGL)

Appendix F GameAnalytics Data for Level 15 (Android Build)



Level 15 Overview (Android)



Level 15 Heatmap (Android)

References

Grand View Research (no date), *Games And Puzzles Market Size, Share & Trends Analysis Report*. Available at: <u>https://www.grandviewresearch.com/industry-analysis/games-puzzles-market</u>

Quantic Foundry (no date), *Gamer Motivation Model*. Available at: <u>https://quanticfoundry.com/#motivation-model</u>