Data Metrics and User Experience Testing

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Abstract
This submission is a position paper outlining the author's experiences and methodologies performing in-house user experience testing for Volition Inc, a wholly owned subsidiary of THQ.
The case study and research methods discussed in this paper were used to evaluate and improve the AAA titles "Red Faction Armageddon" and "Saints Row: The Third," and are currently being applied to multiple unannounced AAA titles as well.

Keywords
User Experience, Data Metrics, AAA Titles, Mixed Methods Research, Video Game Development

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Human Factors

Introduction
Telemetry analysis, the process of using in-game metrics to provide data about player behavior, is an extremely powerful tool to discover *who* is performing

what action *when* and *where* in your game. Unfortunately, even though telemetry analysis is a powerful technique, it cannot provide you with any reliable information about *why* a player is engaging in specific behaviors or not engaging in others. For a game that is currently in development, *why* can sometimes be the most important question.

At Volition, we have recently developed a powerful telemetry collection software package, versatile enough to provide us with data during game development and reliable enough to provide us with player metrics once the product goes live. In order to supplement the telemetry data with knowledge of *why* users are engaged in particular actions within the game, we integrated the telemetry with existing user research testing practices. This hybrid combination of quantitative and qualitative methodologies will be the subject of this paper. I will use a case study from my work at Volition to give practical examples and discuss results.

A Brief Explanation of GDS

Volition uses a telemetry service developed by THQ known as the Games Data Service (GDS). GDS is based upon a system of events. Each time a significant event occurs (we predetermine which events we consider significant and wish to log), the system creates an entry in a data table in a local database. The data recorded into the table differs for each variable, but each table provides detailed and useful information about the event in question. For example, each time a player dies in *Red Faction Armageddon,* we log a large set of data, including:

1. A unique identification number for that specific death event
2. Player status information
    a. Equipped weapon
    b. Play time
    c. Difficulty level
    d. Current mission
    e. Location (X, Y, Z coordinates)
3. Killer status information
    a. Killer name
    b. Killer's equipped weapon
    c. Killer's location (X,Y, Z coordinates)
    d. Fatal damage type (bullet, melee, explosion, Havok physics object, etc.)

This data collection method allows us to reliably record *who* is performing *what* action *when* and *where.* Determining which items to log and what data should be recorded for each significant event should be the subject of several meetings between User Experience practitioners, the design team, and the production team before logging begins. Each stakeholder should understand how the system works and develop realistic expectations for how the data will be applied.

Mixed Methods Example: Heat Maps

Heat maps are data overlaid onto a map of the game space. For instance, the most useful heat map Volition used on *Red Faction Armageddon* was the Player Death heat map. Using Tableau, we could plot the location on the X and Z axes of each player death, import a map of the game's world, and then quickly and easily show our level designers exactly where clusters of player deaths were occurring. These maps took very little time to create and provided very concrete data on the difficulty balance of scripted combat encounters. If a designer expects only one or two deaths in Mission Three, and sees fourteen, most of which occur in the exact same corridor, the designer can now understand the exact nature of the problem and the exact location of the issue, then make changes accordingly.

This heat map is a diagram of each player death in the first mission of *Red Faction Armageddon* during one of our initial playtests. Each symbol represents a unique player death; the color of the symbol denotes the identity of the character that inflicted the lethal damage and the shape of the symbol denotes the type/source of damage.

Location 1 highlights the most pressing issue revealed in this playtest. This area is the first combat encounter of the game, and the design intention is for players to learn the basic mechanics of combat by engaging enemies in a constructed corridor. However, 11 deaths were recorded by our datalogging system (for only 8 players), indicating that our first combat encounter was inflicting an alarmingly high number of casualties, including one player death that is only 5 meters into the combat encounter (the red cross at the bottom of the outlined area). After showing this diagram to the

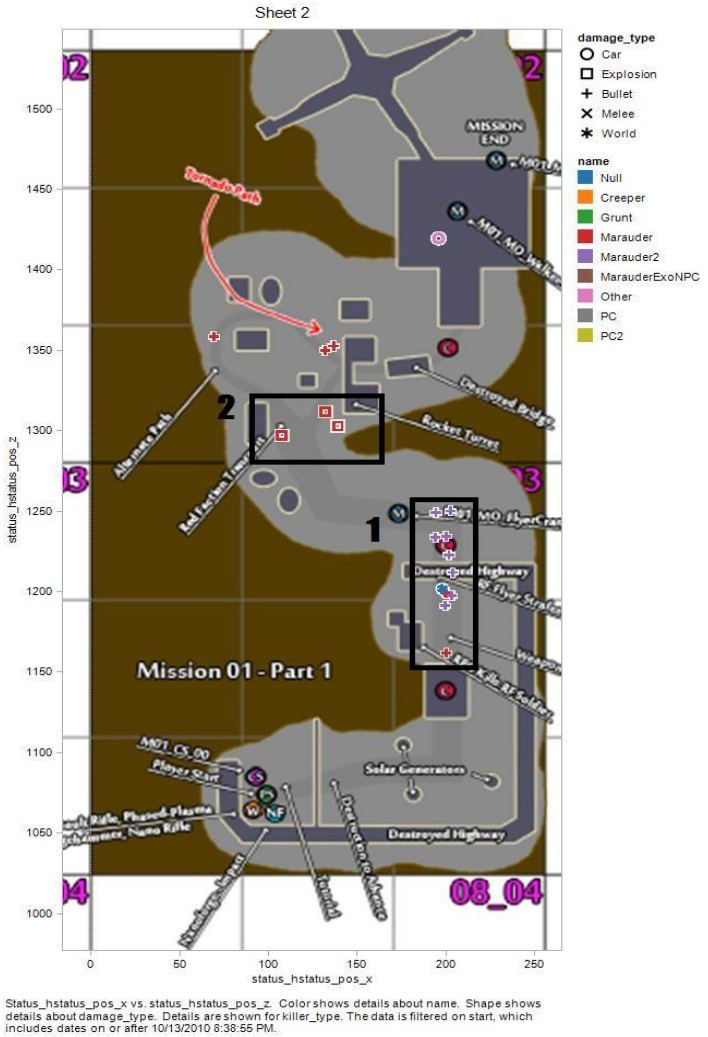

figure 1: Heatmap detailing the locations of all playtester death events in the first mission of *Red Faction Armageddon.*

mission designer, the difficulty was adjusted, enemy type and placement was tweaked, and the number of player casualties in this corridor was reduced to virtually none in future playtests.

Location 2 contains only 3 deaths, which is not an unusually high concentration for this portion of the level. However, the red square denotes an explosive kill from a particular enemy; in this instance, an NPC on a rocket launcher turret. This NPC was not intended to pose a significant challenge to players; therefore, the three deaths depicted here (as well as additional deaths in other playtests) point to an unintentionally high number of casualties in this encounter. Upon further investigation during subsequent playtests, we discovered that players were not targeting this opponent since the turret is located 45 degrees above the player’s line of sight and the game did not provide enough prompting to the player to look up and target the threat. After improving the signaling provided by the level design, players identified the threat more consistently and died with much lower frequency in future playtests.

Mixed Methods Are More Effective

The above heatmap is only one example of the benefits that Volition has enjoyed from the mixed methods approach. During playtesting, the mixed methods approach assisted in balancing Combat, Weapons, AI Behaviors, Economy, and Experience gain. Additionally, the telemetry system proved invaluable to our QA department, our systems designers, and our Technical Artists. There are many more benefits to this systematic integration that cannot fit within the constraints of this submission.

A powerful and incredibly useful tool of a User Researcher, telemetry is an excellent addition to any researcher's repertoire. However, like in many areas of research, the most efficient way to study any human experience cannot be simply quantitative, or rely solely on qualitative methodologies. A mixed methods approach, one that blends the strengths of both powerful technology and the investigation of participants' internal motivations, can provide a robust depiction of the state of a game in development and provide invaluable feedback to the designers and producers working to ensure the quality of that title. By utilizing the full potential of the mixed methods approach, you can begin producing relevant and insightful reports backed by comprehensive data logs, increasing the accuracy of your reports and improving the overall quality of the title.