A Large-Scale, Longitudinal Study of User Profiles in World of Warcraft

Jonathan Bell, Swapneel Sheth, Gail Kaiser
Columbia University, New York, NY USA

enable (vτ): to make possible, practical, or easy

PROGRAMMING SYSTEMS LAB
COLUMBIA UNIVERSITY

http://www.psl.cs.columbia.edu/
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May 14, 2013
Motivation
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• Recently studying *Gamification* of Software Development
• What principles can we carry over from game design to apply it to non-game contexts?
• Why not look to real games?
Game Studies
Game Studies

• Qualitative Research:
  • 100’s-1000’s of samples [Debeuvais; Yee]
  • Personalities, demographics, etc
Game Studies

- Qualitative Research:
  - 100’s-1000’s of samples [Debeuvrais; Yee]
  - Personalities, demographics, etc

- Quantitative Research:
  - 10,000’s-100,000’s of samples [Duchenaout; Lewis]
  - In-game demographics, etc
WoW: Quantitative Data
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• In-game “Demographics”
• Guild, Class, Race, Level
 WoW: Quantitative Data

• In-game “Demographics”
  • Guild, Class, Race, Level
• Quests
WoW: Quantitative Data

- In-game “Demographics”
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- Titles
WoW: Quantitative Data

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  - Guild, Class, Race, Level
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- Professions
- Raids
- Companions
- Mounts
- Titles
- Reputation
Besting the Black Dragonflight (10 player)
Defeat Sartharion the Onyx Guardian in 10-player mode.
<table>
<thead>
<tr>
<th>Reputation</th>
<th>Neutral</th>
<th>Neutral</th>
<th>Revered</th>
<th>Neutral</th>
<th>Honored</th>
<th>Friendly</th>
<th>Hated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avengers of Hyjal</td>
<td>0/3000</td>
<td>1650/3000</td>
<td>9780/21000</td>
<td>0/3000</td>
<td>3984/12000</td>
<td>4680/6000</td>
<td>0/36000</td>
</tr>
</tbody>
</table>
Methodology
Accessing the Data

- Blizzard’s API allows you to retrieve this per-character
- No option to list all characters
- How do we discover the characters?
Character Discovery
Character Discovery

- Blizzard does list characters by guild
Character Discovery

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- Several popular websites have listings of guilds and characters [e.g. WarcraftRealms]
Character Discovery

- Blizzard *does* list characters by guild
- Several popular websites have listings of guilds and characters [e.g. WarcraftRealms]
- Solution: Find all guilds belonging to these characters. And find all members of all identified guilds
Fetching the Data

- Blizzard API is rate-limited per-IP
- Solution: use a cluster of 60+ IPs to crawl the API
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Raw Data

• Found approximately 12 million characters with *basic* information

• Complete data for half of these
Other MMORPG Study Sizes

Sample Size of MMORPG Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size (Log Scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WoW: Debeauvais 2011</td>
<td>~10,000</td>
</tr>
<tr>
<td>EverQuest: Williams [2008]</td>
<td>~100,000</td>
</tr>
<tr>
<td>Everquest, Ultima, Camelot, SW Galaxies: Yee [2006]</td>
<td>~1,000,000</td>
</tr>
<tr>
<td>WoW: Harrison [2011]</td>
<td>~10,000,000</td>
</tr>
<tr>
<td>WoW: Lewis [2010]</td>
<td>~100,000,000</td>
</tr>
<tr>
<td>WoW: Bell [2013] (1)</td>
<td>~1,000,000,000</td>
</tr>
<tr>
<td>WoW: Bell [2013] (2)</td>
<td>~10,000,000,000</td>
</tr>
</tbody>
</table>

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Other MMORPG Study Sizes

Sample Size of MMORPG Studies

- Closest: 136,047

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Closest: 136,047
Us: 6 (12) Million

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Research Questions
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1. Can we cluster characters into profiles based on the type of goals that they complete in game?
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2. Do characters' play profile evolve as they level?
Research Questions

1. Can we cluster characters into profiles based on the type of goals that they complete in game?

2. Do characters' play profile evolve as they level?

3. Do characters with different play profiles play through the game content at different rates?
RQ1: Creating Player Profiles
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- Within WoW, players complete Achievements
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• Our dataset contains each achievement each player earns, with a timestamp
RQ1: Creating Player Profiles

• Within WoW, players complete Achievements

• Our dataset contains each achievement each player earns, with a timestamp

• Profile players based on the types of achievements they complete
Categorizing Achievements

- Draw on motivation categorizations described by Yee

<table>
<thead>
<tr>
<th>Achievement</th>
<th>Social</th>
<th>Immersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advancement</td>
<td>Socializing</td>
<td>Discovery</td>
</tr>
<tr>
<td>Mechanics</td>
<td>Relationship</td>
<td>Role-Playing</td>
</tr>
<tr>
<td>Competition</td>
<td>Teamwork</td>
<td>Customization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Escapism</td>
</tr>
</tbody>
</table>

*Categorization of play motivations, Yee*
Categorizing Achievements
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• 1000 Conquest Points
Categorizing Achievements

- 1000 Conquest Points
  - *Earn 1000 conquest points* -> **Achievement**
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Categorizing Achievements

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• Archavon the Stone Watcher
  • *Defeat Archavon the Stone Watcher in 10 player mode* -> **Social**
Categorizing Achievements

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• 1000 Conquest Points
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• Archavon the Stone Watcher
  • *Defeat Archavon the Stone Watcher in 10 player mode* -> **Social**
• It’s Happy Hour Somewhere
  • *Drink 25 different types of beverages* -> **Immersion**
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  • *Defeat Archavon the Stone Watcher in 10 player mode*
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  - Defeat Archavon the Stone Watcher in 10 player mode -> Social
- It’s Happy Hour Somewhere
  - Drink 25 different types of beverages -> Immersion
- Arrested Development
  - Allow all three of Corla’s zealots to evolve, then defeat Corla after slaying the evolved zealots in Blackrock Caverns on Heroic Difficulty -> All three
## Four Distinct Player Profiles

<table>
<thead>
<tr>
<th></th>
<th>Generalists</th>
<th>Achievement</th>
<th>Loners</th>
<th>Socialists</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size (Millions of players)</strong></td>
<td>1.6</td>
<td>1.4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>12% ± 6</td>
<td>7% ± 8</td>
<td>1% ± 3</td>
<td>28% ± 6</td>
</tr>
<tr>
<td><strong>Immersion</strong></td>
<td>38% ± 6</td>
<td>20% ± 7</td>
<td>38% ± 29</td>
<td>31% ± 5</td>
</tr>
<tr>
<td><strong>Achievement</strong></td>
<td>66% ± 4</td>
<td>87% ± 6</td>
<td>35% ± 24</td>
<td>61% ± 4</td>
</tr>
</tbody>
</table>
RQ2: Achievements per level

The graph shows the number of achievements per level, categorized by Achievement, Immersion, and Social. The x-axis represents the levels, ranging from 0-0 to 80-84, while the y-axis represents the number of achievements, ranging from 0 to 180. The graph indicates a significant increase in achievements for the Achievement category in the 70-79 level range.
RQ2: Achievements per level

Mostly get achievements after finishing most game content

Number of Achievements

Level

Achievement
Immersion
Social
RQ2: Achievements per level

Very few do social achievements early on.

Number of Achievements

Level

Very few do social achievements early on.
RQ2: Achievements per level

Number of Achievements vs Level

- Achievement
- Immersion
- Social

Had to be social to progress?
RQ3: Leveling by Primary Motivation

- “Primary” motivation - whatever the player did most
- Look purely at time to reach level 85 (maximum level)
RQ3: Leveling by Primary Motivation

![Bar chart showing total hours to level for different character classifications: Achievement, Immersion, Social, and Overall. Immersion has the highest total hours, followed by Overall, Achievement, and Social.]
RQ3: Leveling by Primary Motivation

Players that “stop to smell the roses”

<table>
<thead>
<tr>
<th>Character Classification</th>
<th>Total Hours to Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>5000</td>
</tr>
<tr>
<td>Immersion</td>
<td>9000</td>
</tr>
<tr>
<td>Social</td>
<td>4000</td>
</tr>
<tr>
<td>Overall</td>
<td>5000</td>
</tr>
</tbody>
</table>

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Bonus RQ: Has Blizzard made the game easier?
Studying Game Difficulty

- Modeled based on how long it takes to level
- Measured in *real-world time*
- Compare time-to-level from before Nov 2011 to post Nov 2011
Leveling by Start Date

Hours between levels

Level

0 500 1000 1500 2000 2500 3000 3500

20 30 40 50 60 70 80 90

Pre-Cataclysm

Post-Cataclysm

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Leveling by Start Date

Abandoned characters

Hours between levels

Level

Pre-Cataclysm
Post-Cataclysm

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Leveling by Start Date

Abandoned characters

Hours between levels

Level

Pre-Cataclysm
Post-Cataclysm

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Leveling by Start Date

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Hours between levels

Level

Pre-Cataclysm
Post-Cataclysm

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And there’s so much more.
What’s the most popular character name?

<table>
<thead>
<tr>
<th>Name</th>
<th>Count (Normalized)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shadow</td>
<td>922</td>
</tr>
<tr>
<td>Nightmare</td>
<td>839</td>
</tr>
<tr>
<td>Nemesis</td>
<td>831</td>
</tr>
<tr>
<td>Loki</td>
<td>772</td>
</tr>
<tr>
<td>Hades</td>
<td>722</td>
</tr>
<tr>
<td>Pandora</td>
<td>707</td>
</tr>
<tr>
<td>Lilith</td>
<td>672</td>
</tr>
<tr>
<td>Lucian</td>
<td>660</td>
</tr>
<tr>
<td>Wolverine</td>
<td>657</td>
</tr>
<tr>
<td>Holycow</td>
<td>656</td>
</tr>
<tr>
<td>Luna</td>
<td>644</td>
</tr>
<tr>
<td>Kratos</td>
<td>642</td>
</tr>
</tbody>
</table>
WoW: Social Data

- Guild
- Achievements (surprise!)
  - Co-completions of group achievements
- Huge network of players
  - Over 100 million edges
Contributions
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