

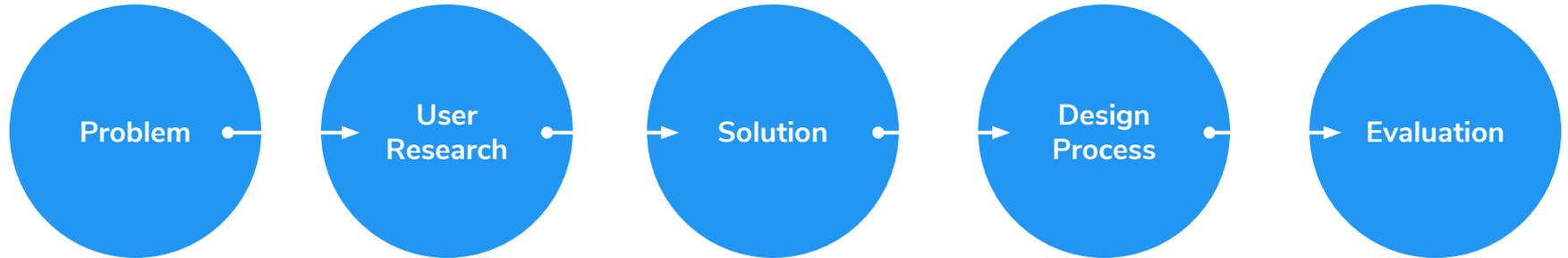


MLB Statistics Visualization

STEVE JONES



PROCESS





1

PROBLEM



BACKGROUND

CS7450 Info Vis

Sports Analytics

- ▶ Sabermetrics
- ▶ Analytics impact team performance





PROBLEM

30

Teams

25

Players/Team

162

Games/Season

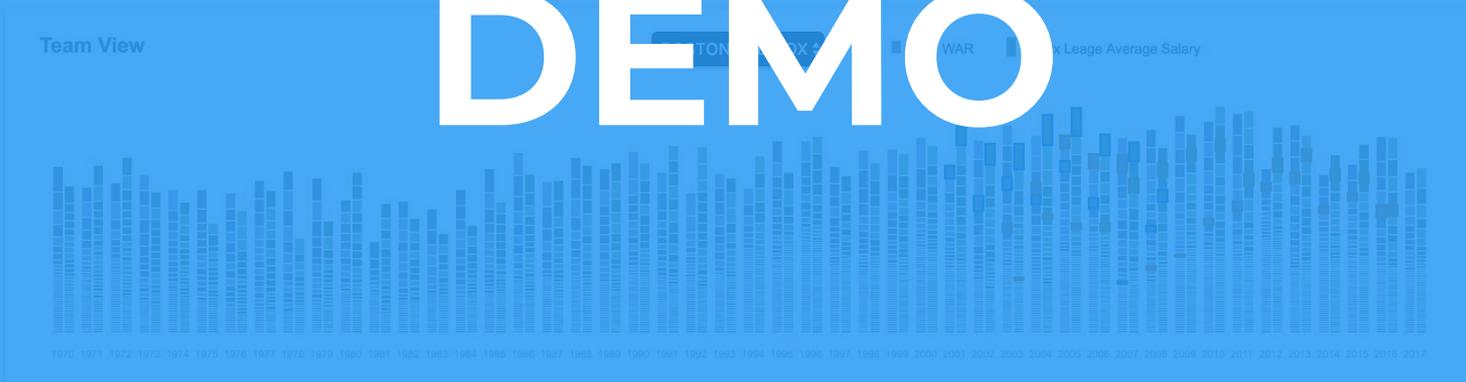
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Common Stats

190,000

Plate Appearances / Season

How can users discover valuable insights?



DEMO

David Ortiz (Hitter)
 Team: BOS
 Salary: \$15,000,000
 WAR: 2.9

WAR	Salary	AVG	HR	OPS
2.9	\$15,000,000	0.263	35	0.873

Manny Ramirez (Hitter)
 Team: BOS
 Salary: \$17,016,381
 WAR: 1.1

WAR	Salary	AVG	HR	OPS
1.1	\$17,016,381	0.296	20	0.881

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**USER
RESEARCH**



USER RESEARCH METHODS

User Interviews

(8 users)

- ▶ User demographics/characteristics?
- ▶ Why users analyze baseball stats?
- ▶ What do they analyze?
- ▶ What tools do they use?
- ▶ How do they use these tools?
- ▶ How an interactive visual tool can improve analysis?



USERS



FANS

(6 users)



MEDIA

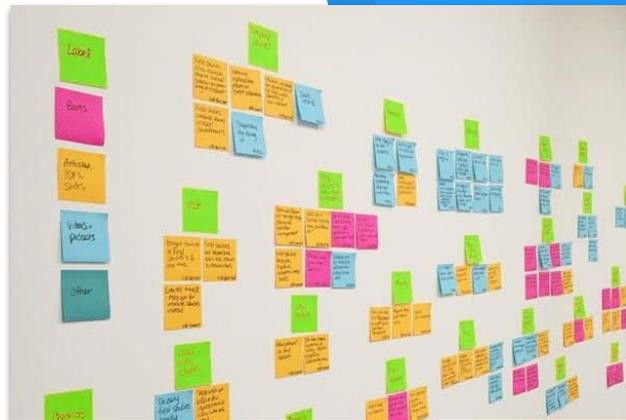
(2 users)



MAPPING USER NEEDS

Top User Needs

- ▶ Quickly understand a player's performance & value
- ▶ Compare multiple players performance / value
- ▶ Avoid browsing tables of thousands of statistical values
- ▶ View trends in performance
- ▶ View advanced sabermetric statistics in context





COMPETITIVE ANALYSIS

1. Baseball-Reference.com

- > Preferred tool used by all participants
- + Has all the stats
- + Simple layout (data tables)
- + Chronological, historical season data
- + Player news
- + One page
- + Salary info
- + Award info
- + League leaders
- + Rank for stats
- + Postseason stats
- + Visual player number & team jersey
- Overwhelming about of data & columns
- Lack of customizaiton / sorting / filtering
- Lacking visualizations
- Difficult to interpret trends

2. ESPN.com

- > Used by all participants but least favorite
- > Used because already on the site
- + Has player news
- + League Leaders
- Too basic, not enough stat info

3. Wikipedia

- > Listed by 2 participants as second favorite
- + Player history
- + Personal info
- + Award info
- Lack of stats

4. Fangraphs

- > Second favorite of 1 participant
- + More sabermetric focused (WoB WRCA+ FIP)
- + Glossary of stat terms (Good learning tool)
- + Visualizations

The screenshot displays the Baseball-Reference.com website interface. At the top, there's a navigation bar with 'BASEBALL' and various menu options. Below that, a search bar and several data tables are visible. The tables contain columns for player names, positions, and various statistical metrics. The layout is dense with text and numbers, typical of a comprehensive sports statistics database. The bottom of the page shows additional sections like 'More of these statistics' and 'Help'.

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SOLUTION



DESIGN REQUIREMENTS

- ▶ Display interface on one-page (desktop)
- ▶ Provide access to statistics of each player for every season 1901-present
- ▶ Enable simple player search functionality
- ▶ Provide simple team & position filtering functions
- ▶ Combine standard statistics tables with visualizations of player and team statistics
- ▶ Display statistics in a temporal plot in order to allow users to recognize trends
- ▶ Display advanced sabermetric statistics, and provide context for users to understand what value represents a good or bad measure
- ▶ Display simple overview of player performance / value
 - ▷ Current/recent performance
 - ▷ Historical performance
 - ▷ Trends in performance (spot or predict drop-off)
 - ▷ Value: player's performance compared to their contract
- ▶ Compare player's performance / value
 - ▷ Compare to other specific player
 - ▷ Compare to rest of league / their era
 - ▷ Compare for historical perspective
 - ▷ Compare to position average
 - ▷ League leaders / ranks



4

DESIGN
PROCESS

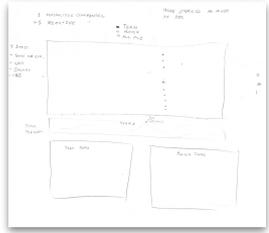


METHOD

- ▶ 5 rounds of iterations
- ▶ Paper prototype → live web app
- ▶ User testing (2-8 users / round)



DESIGN ITERATIONS



1: Paper Prototype

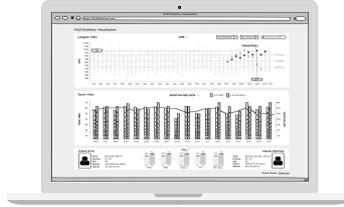
Participatory Design

2 Users



2: Low-Fidelity

5 Users



3: Low-Fidelity

2 Users



4: High-Fidelity

2 Users



5: Web App

8 Users

User Testing: Remote Moderated Think Aloud



5

EVALUATION



EVALUATION METHODS

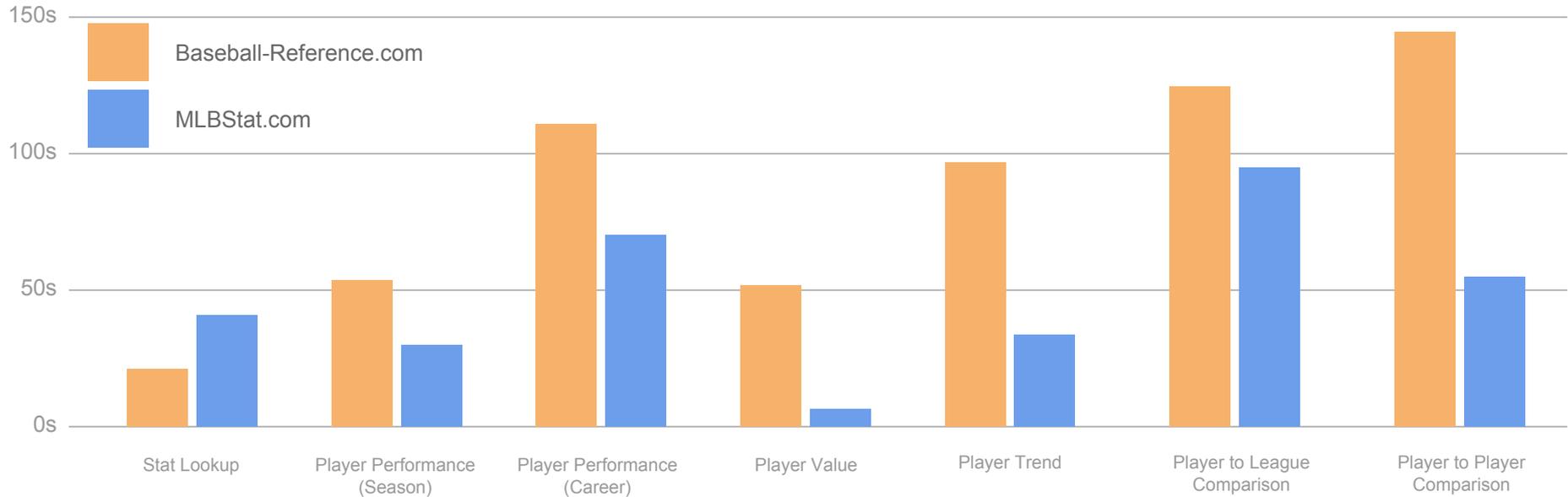
- ▶ Quantitative Comparison Test
- ▶ Qualitative User Testing



QUANTITATIVE COMPARISON

7 Tasks based on user reported tasks

- ▶ 4 Users: BR.com → MLBStat.com
- ▶ 4 Users: MLBStat.com → BR.com





QUALITATIVE INSIGHTS

Positive User Reactions

- ▶ Using WAR statistic because they had context to understand the value
- ▶ All information on one screen
- ▶ See player value in context of team
 - ▶ Users felt more confident with insight

Negative User Reactions

- ▶ Lack of search

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CONCLUSION



EVALUATION ANALYSIS

- ▶ Missing search function had a significant impact on analytic tasks
- ▶ Improved efficiency of analytic discovery for complex insights
- ▶ Improved confidence in conclusions based on statistics



FUTURE WORK

- ▶ Implement all features in web app
- ▶ Evaluation by Baseball R&D Analyst
- ▶ Share in online MLB statistics communities & get feedback



LEARNING OUTCOMES

- ▶ Efficient lean iterative design & testing
- ▶ Avoiding bias in design & user research
- ▶ Compromise between innovative new design & users existing mental models

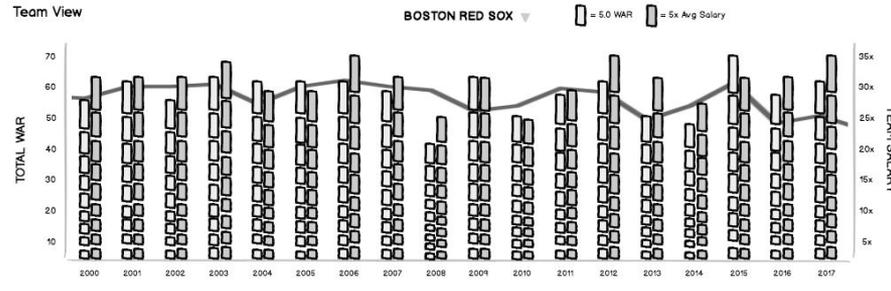
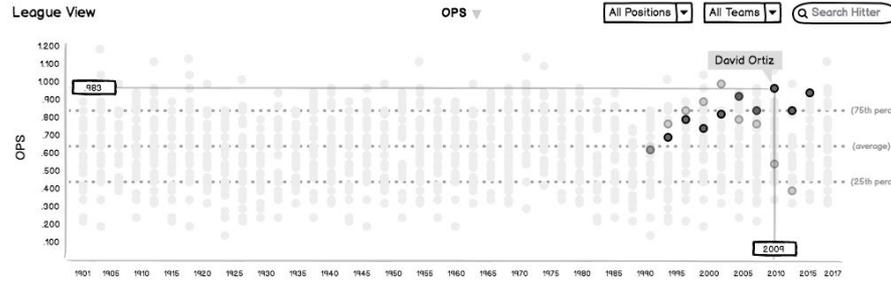
THANK YOU

QUESTIONS?

THANK YOU

QUESTIONS?

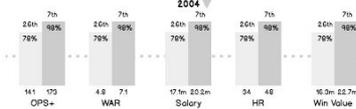
MLB Statistics Visualization



David Ortiz



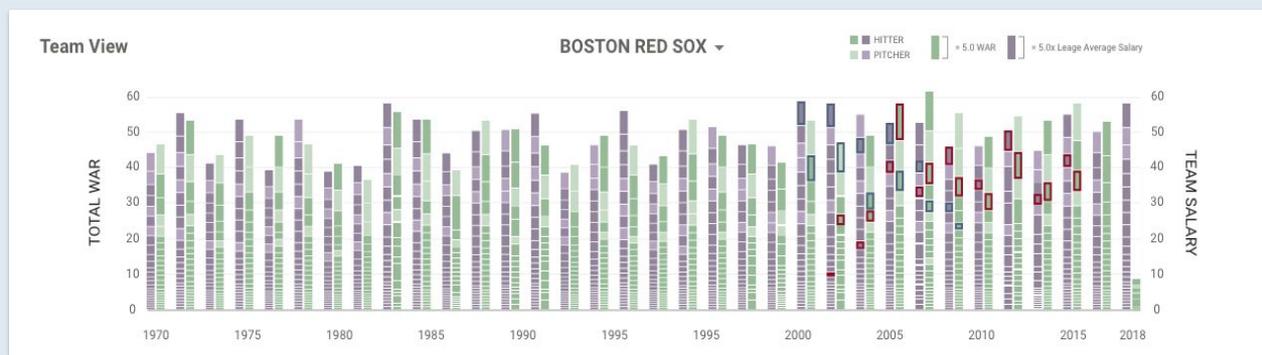
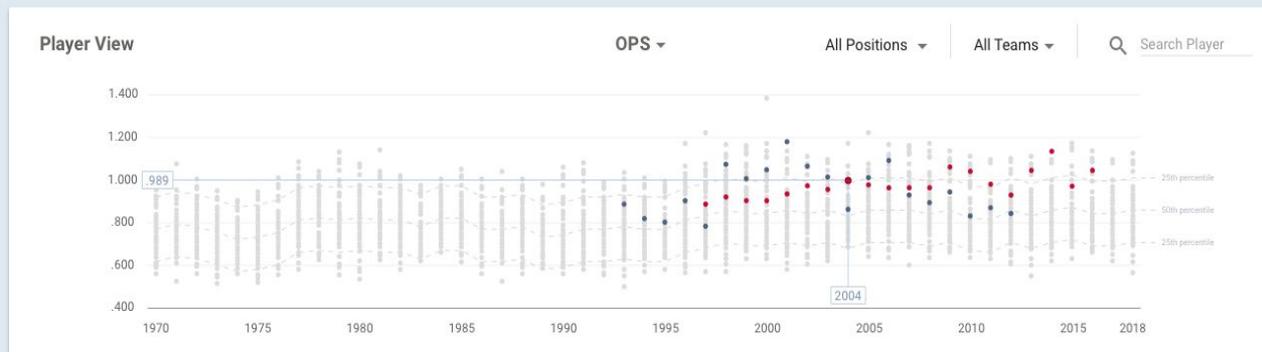
Team: BOS (16), MIN (4)
Position: DH, 1B
Age: 42
Career: 1997-2016 (20 Years)
Awards: AS (10), SS (7)



Manny Ramirez



Team: BOS (8), CLE (8), LAD (9)
Position: OF, DH
Age: 45
Career: 1993-2011 (19 Years)
Awards: AS (12), SS (4)



David Ortiz - DH, 1B

	WAR	Salary	BA	HR	OPS
Team BOS (16), MIN (4)	2004 4.2	\$4.6m	.301	41	.983
Career 1997-2016 (20)	Rank 35th	-	35th	8th	12th
Age 42	Career 55.4	\$159.5m	.286	541	.931
Awards AS (10), SS (7)	Rank 145th	24th	473rd	17th	35th

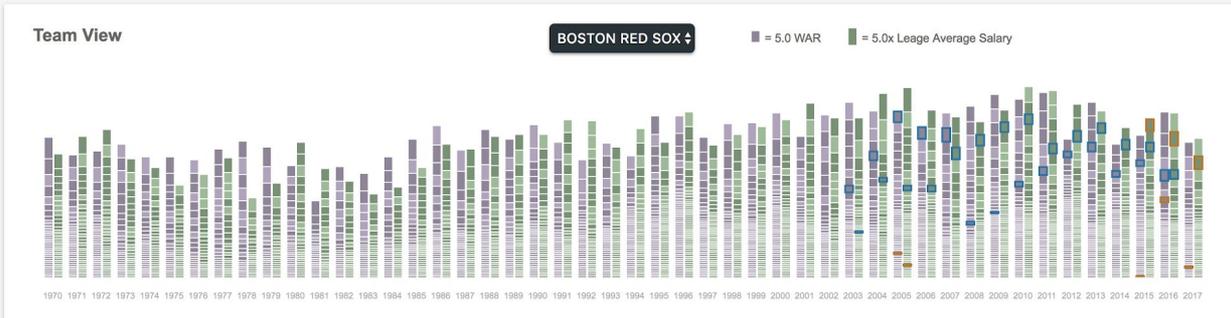
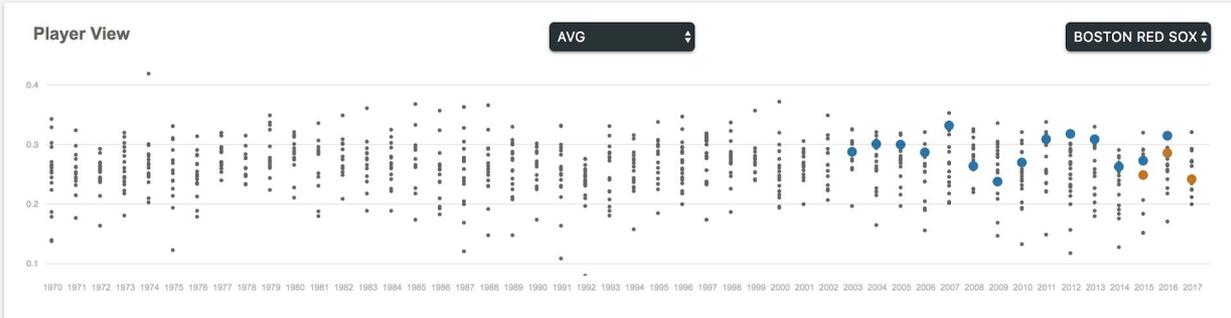
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Manny Ramirez - OF, DH

	WAR	Salary	BA	HR	OPS
Team BOS (8), CLE (8), LAD (3)	2004 4.2	\$4.6m	.301	41	.983
Career 1993-2011 (19)	Rank 35th	-	35th	8th	12th
Age 45	Career 55.4	\$159.5m	.286	541	.931
Awards AS (12), SS (9)	Rank 145th	24th	473rd	17th	35th

✕

MLB Statistics Visualization





Hanley Ramirez (Hitter)
 Team: BOS
 Salary: \$22,750,000
 WAR: -0.3

WAR	Salary	AVG	HR	OPS
-0.3	\$22,750,000	0.242	23	0.75



David Ortiz (Hitter)
 Team: BOS
 Salary: \$14,000,000
 WAR: 4.4

AVG	HR/PA	BB/PA	SO/PA	SB/PA
0.242	0.015	0.035	0.025	0.005