

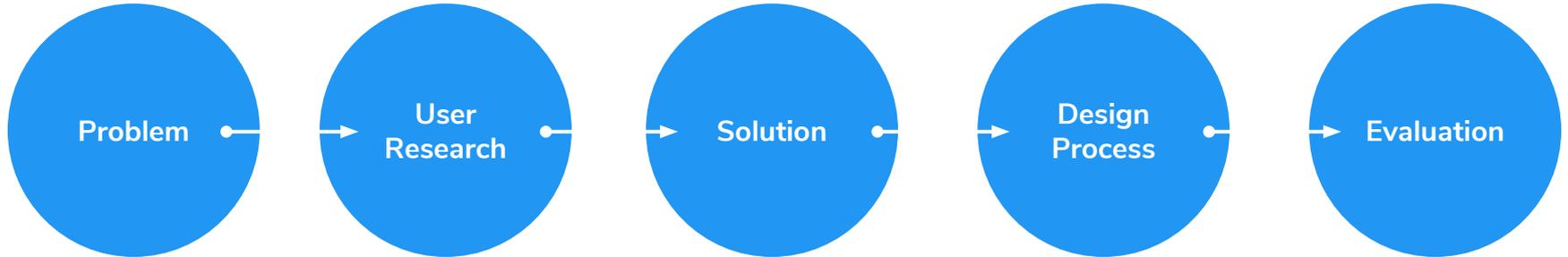


MLB Statistics Visualization

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

90

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

X

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

X

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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

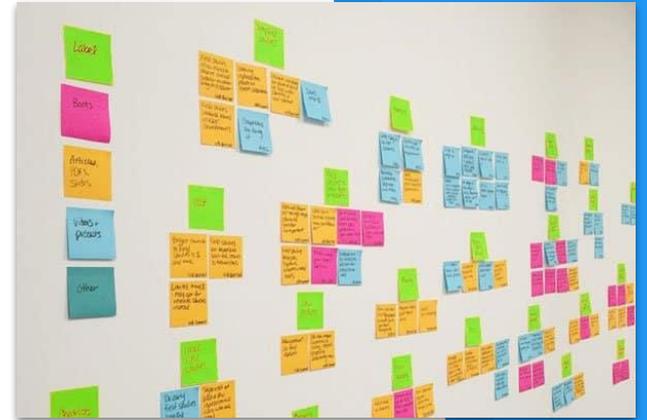
(2 users)



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 interface. At the top, there's a navigation bar with 'BASEBALL' and various menu options. Below that, a search bar and filters are visible. The main content area is dominated by a large table of player statistics, with columns for various metrics like batting average, home runs, and RBI. The table is organized into sections for different teams or players. The layout is dense with data, reflecting the 'overwhelming about of data & columns' mentioned in the text.

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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



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DESIGN
PROCESS

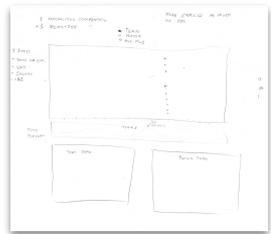


METHOD

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



DESIGN ITERATIONS



1: Paper Prototype

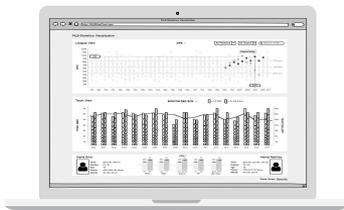
Participatory Design

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

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EVALUATION



EVALUATION METHODS

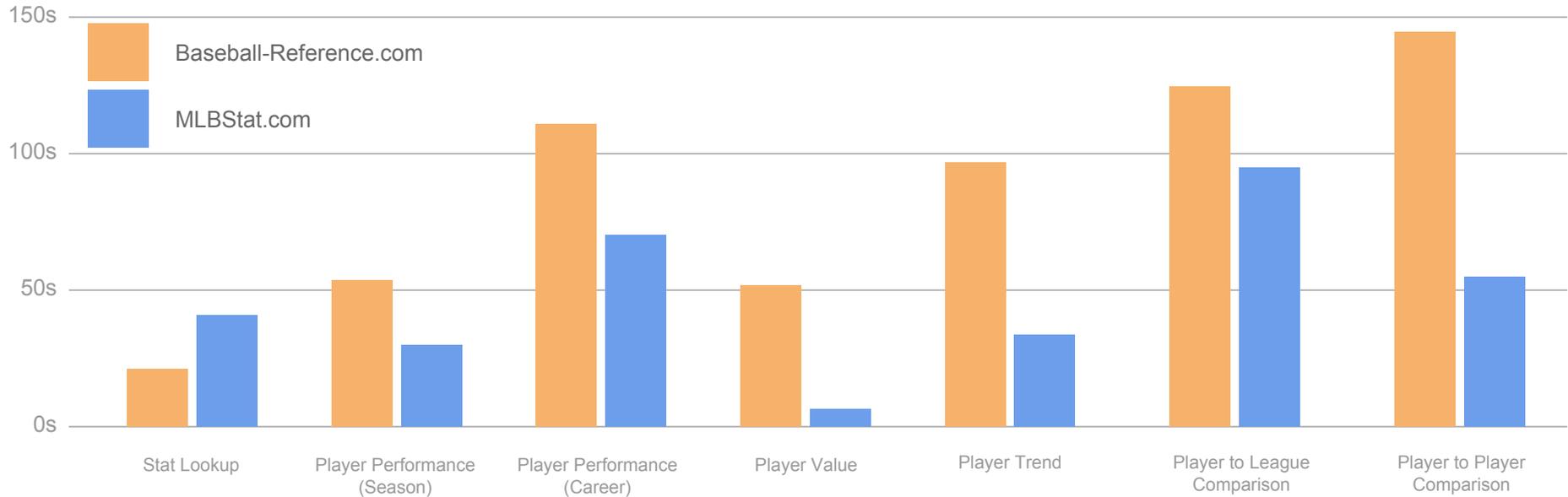
- ▶ Quantitative Comparison Test
- ▶ Qualitative User Testing



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

League View

OPS

All Positions

All Teams

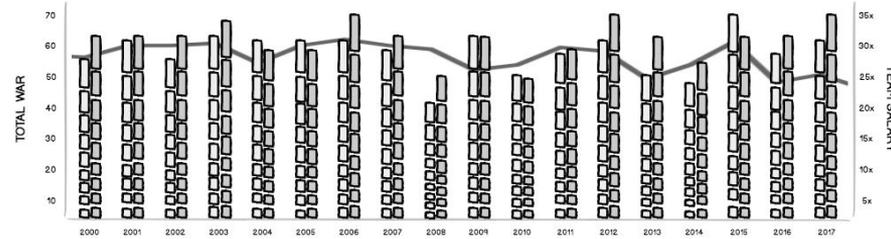
Search Hitter



Team View

BOSTON RED SOX

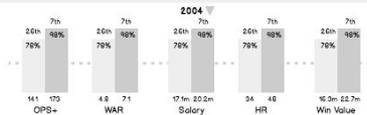
1 = 5.0 WAR, 1 = 5x Avg Salary



David Ortiz



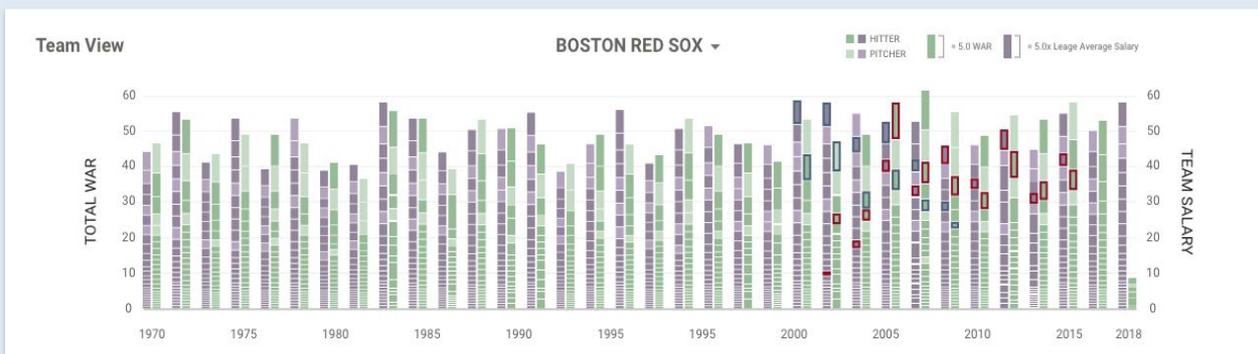
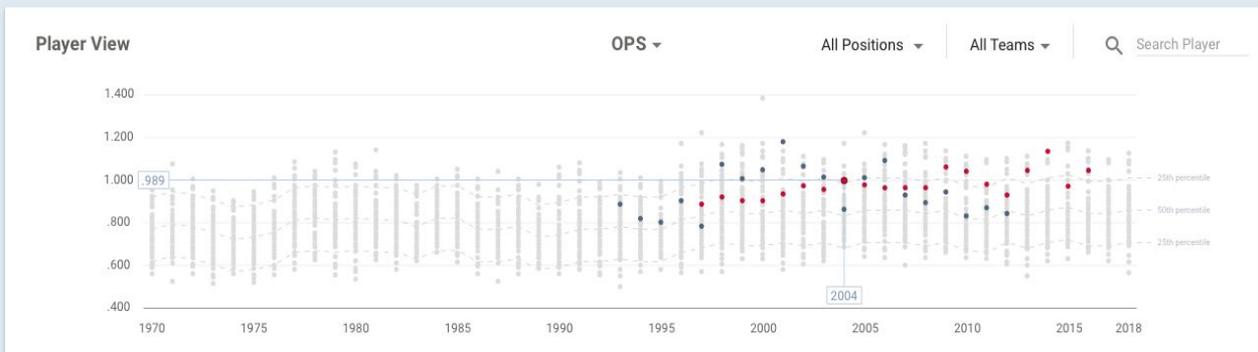
Team: BOS (16), MIN (4)
 Position: DH, 1B
 Age: 42
 Career: 1997-2016 (20 Years)
 Awards: AS (10), SS (7)



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

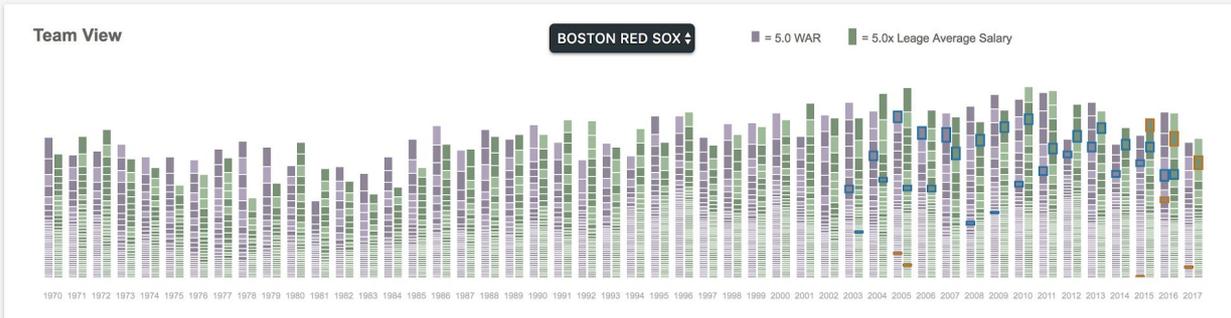
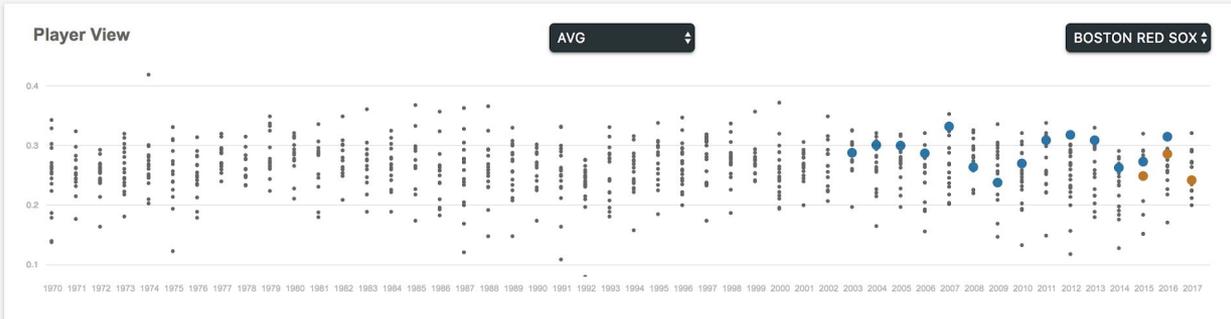
	WAR	Salary	BA	HR	OPS
Team	BOS (16), MIN (4)				
Career	1997-2016 (20)				
Age	42				
Awards	AS (10), SS (7)				
	2004	\$4.6m	.301	41	.983
	Rank		35th	8th	12th
	Career	\$59.5m	.286	541	.931
	Rank		145th	24th	473rd
				17th	35th



Manny Ramirez - OF, DH

	WAR	Salary	BA	HR	OPS
Team	BOS (8), CLE (8), LAD (3)				
Career	1993-2011 (19)				
Age	45				
Awards	AS (12), SS (9)				
	2004	\$4.6m	.301	41	.983
	Rank		35th	8th	12th
	Career	\$159.5m	.286	541	.931
	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	0.035	0.005