SEEKING SIMPLICITY IN SEARCH USER INTERFACES

Marti A. Hearst
SIGIR 2014 Keynote Talk
Why haven’t CSI’s caught on?
Why do any search UIs catch on?
Or ...

How to create the next Search Blockbuster!
Faceted Navigation for Like Item Search

Google Web Search circa 1999

Auto-Suggest for Vocab Problem

News search

Map Navigation
What makes for a successful new search experience?

So often a problem seems unsolvable, and then suddenly someone solves it.

How? Three key factors:
- Framing a need in the right way for users,
- The right technical and social factors are in place, and
- Simplicity (usability) is key for massive adoption.
What Do I Mean By Succeed?

>70% of people with the need use the solution

>80% of the time enjoy / don’t notice the solution
SOLVE THE REAL PROBLEM
USABILITY / SIMPLICITY

TEST AND REVISION
FLOW
DETAILS
Test and Revise to find the right part of the UI design space...
I’m sure I’ll find your interface intuitive.
LISTEN
Redesigned for speed
Like a finely tuned car, the new CleanMyMac 2 was redesigned from the ground up to be fast and responsive. There's no waiting for functions to perform - just push a button and the software is off and running.

Super simple to use
CleanMyMac 2 takes the guesswork out of cleaning your Mac. Single buttons for cleaning and scanning, a simple module structure and entertaining tutorials all are purposely designed to get you working faster.
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Flow in (Search) User Interfaces

(Csikszentmihalyi)

Remove *friction*
Provide *scent*
Feel *oriented*
*Fast* response time

[Graph showing the relationship between skill and confidence level, degree of challenge, and flow channel.]

Mike Chitty
An example of failed flow.
The Success of Faceted Navigation

- Image Collections
- E-Government Sites
- Shopping Sites
- Digital Libraries
Motivation

Teaching new course: need to cover site search

User Interface Engineering

Article: Why On-Site Searching Stinks

In our most recent web-site studies, we watched users look for information within web sites. Our goal was to gather data about what makes a good link, but we did not tell users whether or not they should use the site’s search facilities. Users went to these search engines in almost half the tasks. Maybe they shouldn’t have.

Searching Reduces Success

Using an on-site search engine actually reduced the chances of success, and the difference was significant. Overall, users found the correct answer in 42% of the tests. When they used an on-site search engine (we did not study Internet search engines), their success rate was only 30%. In tasks where they used only links, however, users succeeded 53% of the time.

Worse than Nothing

Our data showed that today’s on-site search engines are worse than nothing—significantly worse. Searching is a difficult problem with no solution visible on the horizon. Until the technology is equal to the challenge, we suggest that designers seriously consider not including a search engine on their sites until the technology is equal to the challenge.
Motivation:
Text Best Described by Multiple Topics

(i) A
   B

(ii) A  B

(iii) A
   B

Figure 5.4: The Cougar interface.

SIGIR’93

RIAQ’94
Motivation: (TileBars)
Text Best Described by Multiple Topics
Motivation: Text Best Described by Multiple Topics

Figure 3.7: The results of sorting TileBars according to the frequency and distribution of the query terms. As before, Term Set 1 consists of law, legal, attorney, and lawsuit and Term Set 2 consists of network and lan.
Motivation: Text Best Described by Multiple Topics

**AUTO, CAR, ELECTRIC**

- 8 control drive accident ...
- 25 battery california technology ...
- 48 import j. rate honda toyota ...
- 16 export international unit japan ...
- 3 service employee automatic ...

**AUTO, CAR, SAFETY**

- 6 control inventory integrate ...
- 10 investigation washington ...
- 12 study fuel death bag air ...
- 61 sale domestic truck import ...
- 11 japan export defect unite ...

SIGIR’96
Fear of recurrence has been at the heart of the controversy between surgeons favoring mastectomy versus those advocating a less radical operation. Breast-conserving surgery is thought to result in a better body image, but patients are expected to worry more about cancer recurrence because only a small part of the breast is excised. To assess survival rates after breast-conserving intervention, patients were randomized into the National Surgical Adjuvant Breast Project (NSABP) prospective clinical trial (Protocol B-06) with three treatment groups: total mastectomy, lumpectomy, and lumpectomy followed by irradiation therapy. A fourth group was created to include patients who had recurrence after their first operation and thus underwent a subsequent total mastectomy. Differences appeared, not according to the type of treatment, but with respect to the number of surgical procedures.
Motivation: Text Best Described by Multiple Topics

Now it is 1999 and I need to teach a practical approach for the web.

Fortunately, dynamic approaches for the web have now become feasible too.

But how people were using them was a mess.

My contention: hierarchical faceted metadata could be made understandable if done right.
Yahoo Directory circa 2001

Let's try to find UC Berkeley from the top

[Image of a Yahoo Directory page with a search bar and categories]

- Education
- Regional

Inside Yahoo!

- Yahooligans! Teacher's Guide - features lesson plans, resources, newsletters, and more.
- Join a Chat
- Live Events
- Headline News

Categories

- Academic Competitions@
- Books@
- College Entrance (555)
- Colleges and Universities (1573)
- Distance Learning@
- Graduate Education (74)
- Guidance (66)
- Honors Programs (49)
- News and Media@
- Organizations (104)
- Policy Research Centers@
- Seminars@
- Student Life (27)
- Web Directories (16)
Yahoo Directory Circa 2001
Yahoo Circa 2001
Yahoo Directory Circa 2001

Need to break apart the categories.
REI example circa 2001

Get Ready for Adventure!

Planning to kayak Kauai, climb Kilimanjaro or cycle Spain? Prepare for active journeys at REI, your one-stop travel destination. World-renowned gear, trips and advice.

Visit our Travel shop.

Featured trip & first-class gear.

- Alaska Adventure Cruise
- Eagle Creek Ultimate Journey
- Merrell Baja Ventilator - Men's

Enter to Win a Trip to Hawaii
Camp/Hike

Backpacks

Internal Frame -- Long-Haul

- Expedition Models
- Women's Extended Backpacking
- Extended Backpacking
- Internal-Frame Pack Parts

Internal Frame -- Short Trips

- Adult Models
- Ski/Snowboard Packs
- Internal-Frame Pack Parts
- Youth Models
- Climbing Packs

External Frame
REI example -- searching

Your search for "gps" yielded 48 results.

Refine your search:
- Navigation (36 matches)
- Guidebooks (2 matches)
- Instructional (7 matches)

1 - 20 (of 48) products displayed
Page 1 of 3

Camping/Hiking—Navigation

- Brunton Eclipse GPS Compass 8096
  Price: $32.00
- Brunton Multi-Navigation System
  Price: $399.00
How to Choose the Right General Camp Supplies

#1: **Sunscreen**

Believe it or not, sunburn is the single most common backpacking injury. It’s a potential problem on just about any trip, no matter where it is or how long it lasts. To choose the right sunscreen, consider how vulnerable you are:

- **Skin color** - Dark skin and deep tans tolerate the sun’s rays more readily than fair skin. But no skin color is completely impervious to burn.
- **Weather conditions** - Overcast skies can decrease the amount of harmful exposure. But sunlight does penetrate the clouds, so you still need to be careful.
- **Altitude** - The higher up you are, the harsher the sun’s rays (on skin and eyes). Reflection off of snow (or water) can add significantly to sunburn danger.
- **Length of exposure** - The longer you’re outside, the higher your
Flamenco Study Steps

- **Identify Target Population**
  - Architects, city planners
- **Needs assessment.**
  - Interviewed architects and conducted contextual inquiries.
- **Lo-fi prototyping.**
  - Showed paper prototype to 3 professional architects.
- **Design / Study Round 1.**
  - Simple interactive version. Users liked metadata idea.
- **Design / Study Round 2:**
  - Developed 4 different detailed versions; evaluated with 11 architects; results somewhat positive but many problems identified. Matrix vs tree emerged as a good idea.
- **Metadata revision.**
  - Compressed and simplified the metadata hierarchies
Intermediate Design

Figure 2: Matrix View middle game (items grouped).

Figure 3: SingleTree View middle game (items ungrouped).
Flamenco Study Steps

• Design / Study Round 3.
  • New version based on results of Round 2
  • Highly positive user response

• Identified new user population/collection
  • 32 Students and scholars of art history
  • Fine arts images

• Study Round 4
  • Compare the metadata system to a strong, representative baseline
  • Very strong subjective responses over a strong (and significantly faster) baseline.
FACETED NAVIGATION SUCCESS

TEST AND REVISION
FLOW
DETAILS
FACETED NAVIGATION SUCCESS

SOLVE A REAL PROBLEM
ECOSYSTEM IS READY
SIMPLICITY / USABILITY
Beyond Faceted Navigation
Beyond Faceted Navigation

Your local dealer:

**Volkswagen of Oakland**

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**Beetle**
2014 1.8T
VIN: 3VWHJ7AXEM660582
$21,385
9,35
INTERIOR

**Beetle**
2014 1.8T
VIN: 3VWHJ7AXEM660425
$22,250
9,35
INTERIOR

**Beetle**
2014 1.8T
VIN: 3VWHJ7AXEM660424
$22,485
9,25
INTERIOR

**Beetle**
2014 1.8T
VIN: 3VWHJ7AXEM652059
$22,485
9,26
INTERIOR

**Beetle**
2014 2.5L

**Beetle**
2014 2.5L

**Beetle**
2014 1.8T

**Beetle**
2014 2.5L
Reprise: How To Get Blockbuster UIs

1. A real need is being met
2. The technical and social ecosystem is ready,
3. The design is usable.
People WANT Collaborative Search
Researchers have designed tools that reflect stated needs.
Figure 1. The SearchTogether client. (a) integrating messaging, (b) query awareness, (c) current results, (d) recommendation queue, (e)(f)(g) search buttons, (h) page-specific metadata, (i) toolbar, (j) browser
TeamSearch (Morris et al 2006), Coagmento (Chirag Shaw et al 2010-2014)
Why aren’t they adopted?

Not enough additional value to justify switching to a specialized tool (friction)?

Usability issues not resolved?

So … instead people satisfice with non-search tools email, phone, social media.
Why Do I Think There is Hope?

Recent prominent successes in other longstanding problems of coordination and collaboration:

- small group meeting coordination
- large scale idea commenting and editing

Both are notable to me in that I observed masters students trying to solve them.
A Precedent:
Informal Meeting Scheduling
The Success of Doodle

Founded in 2007
> 20M users per month in Jan 2014
1 doodle poll every 2 seconds
To add time on a time, please enter the input field below and check the box for times that you are available.

**Demo meeting**

Heti Hearst | 1 | 0 | less than a minute ago

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[Save button]
The Success of Doodle

Solves a previously unsolved but very common collaboration problem in a very simple manner.
Previously:
No solution for problem of thousands of people commenting on ideas
IdeaScale and StackExchange

**Priot Art EP2446363A1 (Fuzzy Hashing)**
I believe this is covered by Jesse Kornblum in a paper from 2006 called: "Identifying almost identical files using context triggered piecewise hashing"

[ep2446363a1]

asked Jun 18 at 12:20
Martin P. Hellwig

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**What is the best free reliable patent drawing software?**

Does anyone have any patent drawing experience? I'm looking to do it on my own and I figure there's some decent software out there somewhere. Thanks.

[drawing]

asked Jun 18 at 1:36
user827304

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**Prior Art Request for US 20140038722 A1 “Universal virtual entity transformation”**

https://www.google.com/patents/US20140038722 A method of transforming a virtual entity from a first game to be useable in a second game comprising the steps of: a. Obtaining a set of ...
Previously: No solution for problem of Learning Management System
# Information Visualization and Presentation

## Course Modules

### Week 1: Introduction
- Prepare for Class 1/22
  - Jan 22, 0 pts
- Student Background Questionnaire
  - Jan 22

### Week 2: Visualization Goals and Types / Explanation vs Exploration
- Prepare for Class 1/27
  - Jan 27, 0 pts
- Quiz: Test Your Understanding of Readings for 1/27
  - Jan 27, 4 pts
- Prepare for Class 1/29
  - Jan 29, 7 pts

### Week 3: Perceptual Properties and Cognitive Considerations
- Prepare for Class 2/3
  - Feb 3, 0 pts
- Quiz: Test Your Understanding of Reading for 2/3
  - Multiple Due Dates, 8 pts
- Prepare for Class 2/5
  - Feb 5, 4 pts

### Week 4: Representational Mappings / Visual Lies
- Prepare for class 2/10
  - Feb 10, 4 pts
- Quiz: Review Concepts Using Questions from Other Students
  - 3 pts
- Prepare for class 2/12
  - Feb 12, 0 pts
- Objectively Assessed Visualization Design (Part 1: Individual Assignment Due Wednesday Feb 12)
World Map: Number of People Affected by Natural Disasters

For all combined global Natural Disaster data, China and India stand out as having many more affected people than any other country.

Deaths by length of incident

It appears that droughts, epidemics, and floods have been the globally deadliest natural disaster categories. There appears to be a relationship between the average length of an incident in each category with the number of people killed.

The Fall of Bacterial Infections
And ... maybe collaborative search!
Figure 1. O-SNAP uses phone orientation to support a mobile search experience. The two O-SNAP users on the left have rotated their phones to a landscape orientation to invoke collaborative search features, while the third user searches independently with her phone in the portrait orientation.
Figure 2. O-SNAP’s list view. The app’s (a) individual mode is signaled by portrait orientation and (b) collaboration mode by landscape orientation. To spur interaction, (c) contextually relevant trivia questions appear simultaneously on group members’ phones. To avoid uncomfortable interactions, (d) the “I’m hungry!” button gently suggests collaborators reach a consensus.
In summary ...
SOLVE THE REAL PROBLEM
SUPPORT FLOW & USABILITY
BE SURE THE TECHNICAL ECOSYSTEMS ARE READY
WHAT WILL BE YOUR BREAKTHROUGH?

Marti A. Hearst
UC Berkeley
SIGIR 2014 Keynote Talk