

CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 14:
Designing for Diverse Needs

James Fogarty
Daniel Epstein
Brad Jacobson
King Xia

Tuesday/Thursday
10:30 to 11:50
MOR 234



Today

Digital Mockups Due

Getting the Design Right Reports Due

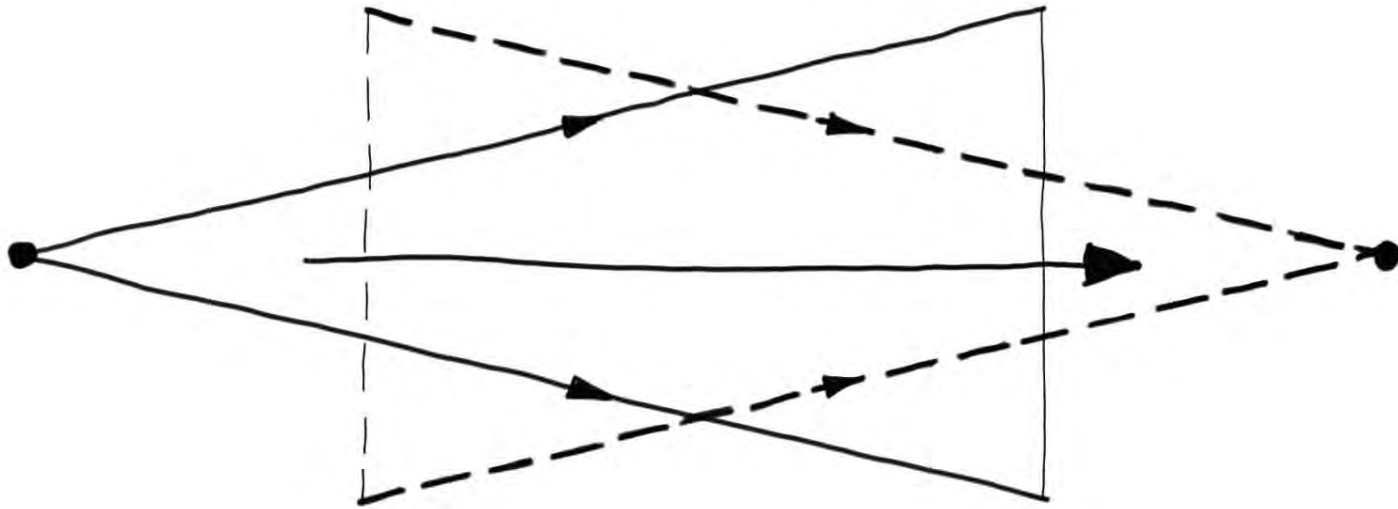
Getting the Design Right Presentations

Exam

Designing for Diverse Needs

A Basic Tenet of Design

If you do not actually understand your design problem, then you cannot make the best design



A Basic Tenet of Design

You are not designing for yourself

You bring a lot of background to the table

That background is your asset

But you also need to be mindful of it

You need to understand the context of your design and the people who will use it

What this means can vary widely

And may be beyond what you can or will do

Pinkification

This is a really complicated issue

But it is not new

We will start here

Then work to more obvious problems



Kodak, 1926



Kodak Vest Pocket Series III (1926)

Kodak launched this black camera in 1926

It was successful, but was selling more to men

Engaged Walter Dorwin Teague to design a model that would appeal to women

His solution was to release a the camera in 5 different colors, each packed in a pseudo-silk lined box, where the box and liner matched the color of the camera

Walter Dowrin Teague
Vanity Kodak (1928)



Apple, 2001



Apple G1 iPod, October 2001

Apple launched this white iPod in 2001

It was successful, but was selling more to men

Designed a model that would appeal to women

Their solution was a smaller version of the iPod in 5 different colors

Jonathan Ive
Apple iPod Mini (2004)



Walter D'wrin Teague
Vanity Kodak (1928)



Observations by Buxton

Same basic design brief

- Same use of color

- Same number and choice of colors

- Same simultaneous release of colors

Teague/Kodak example is a classic

- Known to any trained industrial designer

- Jonathan Ive is an extremely well trained designer

- Draws inspiration from the past

How About Less Controversial

Our perception of the trustworthiness and usability of a website is dramatically shaped by a first impression of appeal

How about we examine appeal around the world

Throw in age and gender for good fun

Bars Guide

100 Places to Pick Up in Toronto

100 places to pick up all around Toronto. [More...](#)






Best Bars Near the Rogers Centre 1 Comment

Posted: May 31, 2013
By Kevin Scott

These bars around the Rogers Centre are great spots before or after the game.

[READ MORE](#)



Best Karaoke Bars with Private Rooms 1 Comment

Posted: March 08, 2013
By Samantha Edwards

Check out these karaoke bars with private rooms in Toronto.

[READ MORE](#)



Best Bars for Live Music in Toronto

Posted: September 20, 2012
By Stephen Baldwin

Here are the top venues in Toronto to enjoy some live music with your drink.

[READ MORE](#)



Bars with the Best Late-Night Menus

Posted: November 15, 2012
By Samantha Edwards

Here are five bars with a great late-night menu.

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Event Finder

From: To:

OR

[Show Me](#)

WHAT'S ON | CALENDAR

Movie Finder

OR

OR

OR

[Show Me](#)

REVIEWS | TRAILERS | COMING SOON

Please rate the website you have just seen based on **visual appeal**.

very
unappealing

very
appealing

tapir design

classic design for today.



Tapir Design specialises in producing attractive, stylish websites that are accessible to all Internet users, regardless of the web browser or computer operating system that they use.

[Contact the webmaster](#)

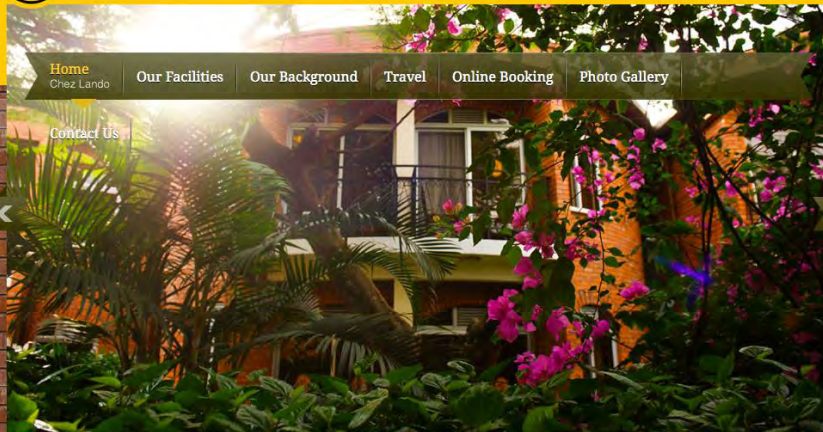
[Click here for the Tapir Blog](#) for all of your tapir news from around the globe

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unappealing



very
appealing



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[Travel](#) /
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Rooms & Suites!



Every room has a private patio and beautiful views of our expansive gardens. We offer 2 restaurants

[Read Article](#)

Meetings & Events



Hotel Chez Lando has a variety of meetings & events facilities to hold your event. Hotel Chez Lando

[Read Article](#)

Dining & Bars



On the menu are a variety of old La Fringale favorites such as pepper steak, chicken cordon bleu

[Read Article](#)

Welcome to Hotel Chez Lando!

Hotel Chez Lando, your first window to Rwanda. At Chez Lando, we apply the tradition of Rwandan hospitality to the needs of modern travelers; we cater to the smallest detail of your stay. Our quaint garden-style hotel is located just five minutes from Kigali International Airport and is right on the way to the heart of town.

Sixteen years after the Genocide, Hotel Chez Lando is opening its new Barbecue, new Restaurant with Terrace and new Meeting Hall where comfort and light meet blossoming flowers. The architecture of the new additions blends with its environment; stylish and modern, it is matching the new face of Rwanda.

*** Special Offers***

-We offer a free breakfast, airport shuttle & Wi-Fi must mention the arrival time, flight name & number in your booking (special request part in case of online booking) I/IVISA & Master Card Accepted.

Please rate the website you have just seen based on **visual appeal**.

very
unappealing



very
appealing



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Banki yacu. Hafi yacu.

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Simple things that make life easier.

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LATEST NEWS

- On the 18th of June, 2013 Banque Populaire du Rwanda scooped an Award as the Best Agri Business...
- Banque Populaire du Rwanda on Friday of the 26th April, 2013, held a commemoration ceremony to...

Banque Populaire du Rwanda

Tariff Guide

EXCHANGE RATES

Currency	Selling	Buying
USD	696.824572	679.824572
EURO	984.813009	925.006257
GBP	1161.400411	1132.103058
CAD	619.531308	603.393408
CHF	777.24316	757.423256

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Popular Rwandan Website

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RETAIL BANKING BUSINESS BANKING RURAL BANKING SERVICES ABOUT BPR CONTACT US

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CHF	777.24316	757.423256



2068991 total participants



Trust us; you will love this test!

Take this test to see how well you can spot (un)trustworthy websites. This experiment takes around 12 minutes.

Participate now!



How fast is your memory?

See how quickly you can retrieve information you have just memorized. This experiment takes around 10 minutes.

Participate now!



What is your website aesthetic?

Compare your visual preferences to people around the world. This experiment takes around 10 minutes.

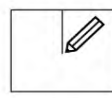
Participate now!



Test your social intelligence!

Test how well you can read emotions of others just by looking at their eyes. This experiment takes around 10 minutes.

Participate now!



Are you more Eastern or Western?

In this test, you will learn whether you are more sensitive to a focal object (as most Americans) or more attuned to the context (as many Japanese). This experiment takes around 8 minutes.

Participate now!



Looking for more studies?

We have joined forces with [TestMyBrain](#) and [GamesWithWords!](#) Learn about your brain, test your language sense, and participate in other studies on [LessWeird.org](#).

News From The Wild

April 25, 2014

During the summer, we launched an experiment to examine graph prediction tendencies amongst different cultures, particularly the contrast be...

[Read more](#)

March 20, 2014

How do you feel about Naver.

[Read more](#)

Why Participate?

LabinTheWild provides you with personalized feedback, letting you compare yourself to people of other countries.

By participating, you contribute to research on people's similarities and differences around the world when interacting with technology.

Join the Wilderness



Enter your email to find out about new studies and breakthrough results:

Notify me!

Large Scale Data Collection

The screenshot shows the LabinTheWild website interface. At the top, it displays 'Our Experiments', 'About Us', and 'Blog' in the left navigation, and 'English' in the right. A prominent badge in the top right corner states '2068991 total participants'. The main content area features a grid of experiment cards, each with a thumbnail image, a title, a brief description, and a 'Participate now!' button. The card titled 'What is your website aesthetic?' is circled in red. Below the grid, there are three sections: 'News From The Wild' with dates and descriptions of recent experiments, 'Why Participate?' explaining the benefits of joining, and 'Join the Wilderness' with social media icons and an email sign-up form.

2.4 million ratings
39,975 participants
430 websites

Visual Feature Analysis



2.4 million ratings
39,975 participants
430 websites

39 image metrics
describing website
perceived colorfulness
and complexity

Age, country,
gender, education

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\$5.99	\$34.99	\$69.99
<ul style="list-style-type: none"> 1x Unlimited Storage 1x Unlimited Bandwidth 1x Unlimited Domains 1x 24/7 Tech Support 1x 99.9% Uptime 	<ul style="list-style-type: none"> 1x 45 GB SSD Storage 1x 2 GB RAM 1x 100 GB Bandwidth 1x 2 TBps Processor 1x 2 Year Protection 	<ul style="list-style-type: none"> 1x 20 GB Storage 1x 2 GB RAM 1x 100 GB Bandwidth 1x 2 TBps Processor 1x 2 Year Protection
Go Back & Proceed	Go Back & Proceed	Go Back & Proceed

POCCUO

It's a July morning. Mason is front-end-developing, Phil is conference-calling, and Kim is website-updating.

From Poccuo's Twitter

Featured Work

[Web App Photography Site](#)

[The Vancouver Practitioner](#)

[Lenses](#)

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To Add & Upgrade	To Add & Upgrade	To Add & Upgrade

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- Test your geography knowledge - available for students
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• Visit Jewelry Creations by Lizard Point if you're looking for personalized jewelry ideas from our designers. All hand made, starting from \$20.

POCUO

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It's a July morning. Mason is front-end-developing, Phil is conference-calling, and Kim is website-updating.

From POCUO's Twitter

Featured Work

UP 47 Photography Site

POCUO is an international non-profit for women's empowerment... and that's the only thing that makes us special. We're a team of women who are passionate about photography, and we're here to help you get started.

The Vancouver Foundation

POCUO is an international non-profit for women's empowerment... and that's the only thing that makes us special. We're a team of women who are passionate about photography, and we're here to help you get started.

UWIC

POCUO is an international non-profit for women's empowerment... and that's the only thing that makes us special. We're a team of women who are passionate about photography, and we're here to help you get started.

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Our design specifications (in production) effective, applied and above the web environment to an online search capabilities of the web browser. A computer operating system that...

LIZARD POINT

BROWSER-BASED ACTIVITIES FOR FUN AND LEARNING

- Teach your emerging technology / classroom computer
- Utilize math practice and conceptual understanding
- Buy it with the LIZARD POINT - print on demand

JEWELRY CREATIONS BY LIZARD POINT

- With jewelry creations by Lizard Point's award-winning designers
- Jewelry items from our collection of rings, pendants, earrings, necklaces, bracelets, watches and more.

DoodleKit

The time's most beautiful, quickest and advanced website tool is DoodleKit... Right now, DoodleKit is the strongest available online website builder...

Kenneth Bernheim - PC WORLD

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- UC students stay safe with Zoom**
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tapir design specializes in providing effective, stylish websites that are accessible to all. We focus on the usability of the web and the use of computer operating systems that...

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BUCKHEAD RESTAURANT GUIDE...Click to View Website

NEW! Atlanta's Top Restaurants

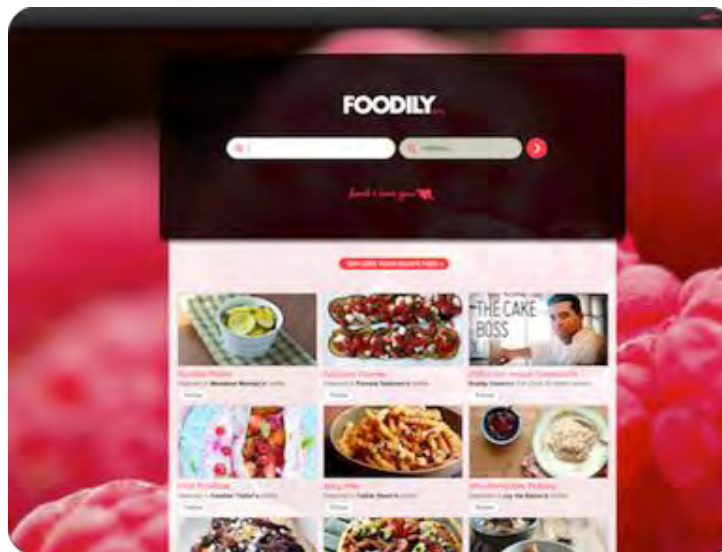
Search by Cuisine Type

Search by Restaurant Name or by Cuisine Type

> 50 years



< 20 years



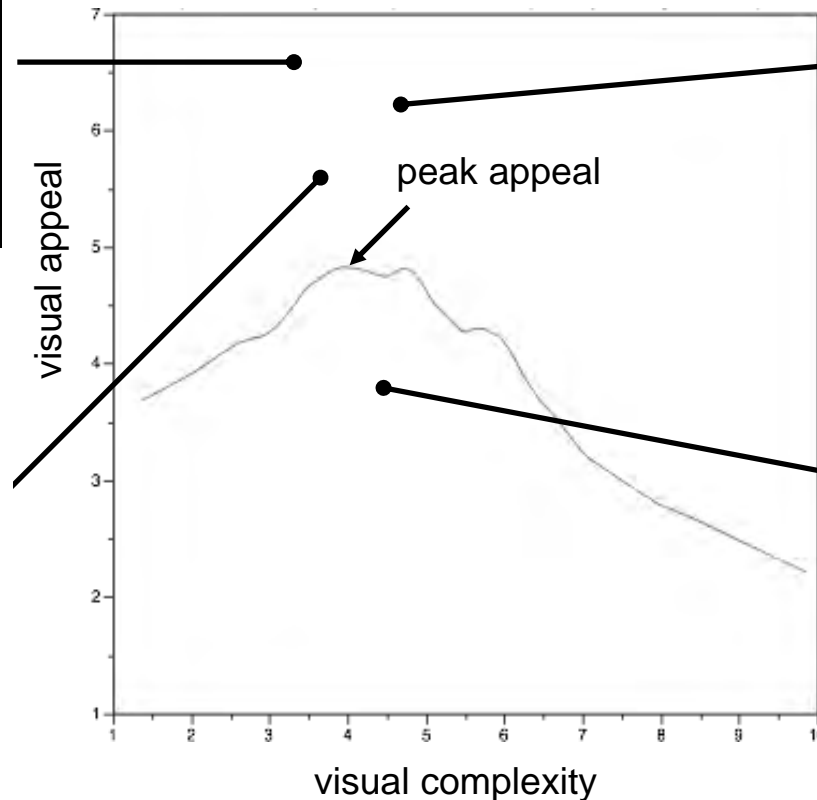
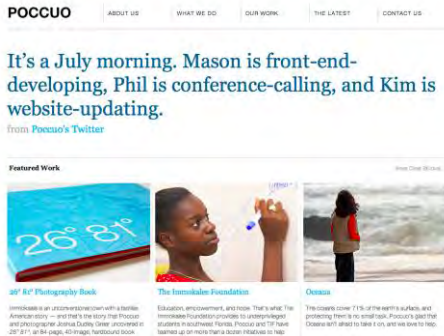
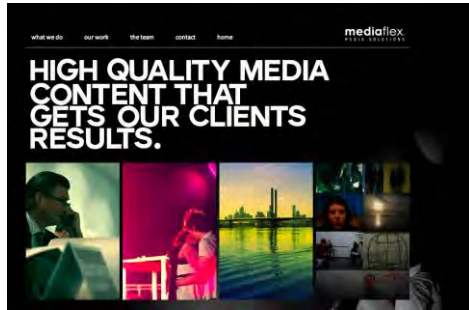
female



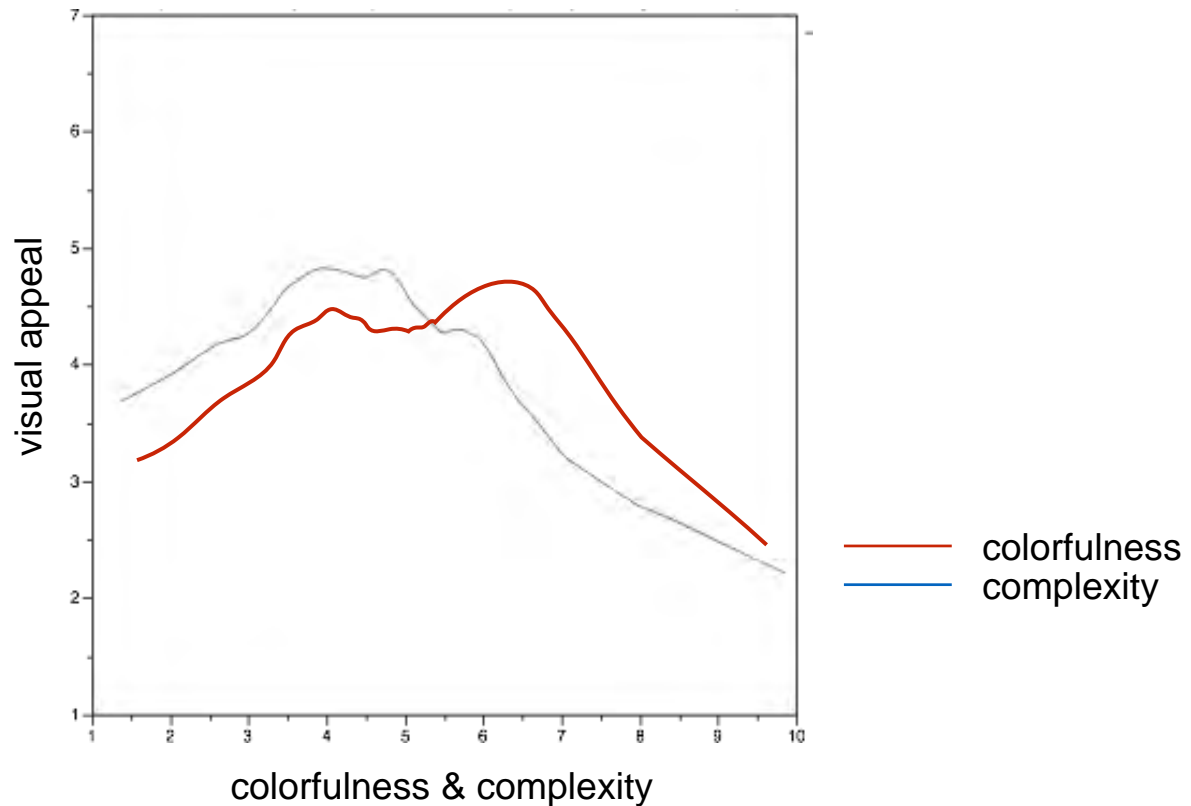
male



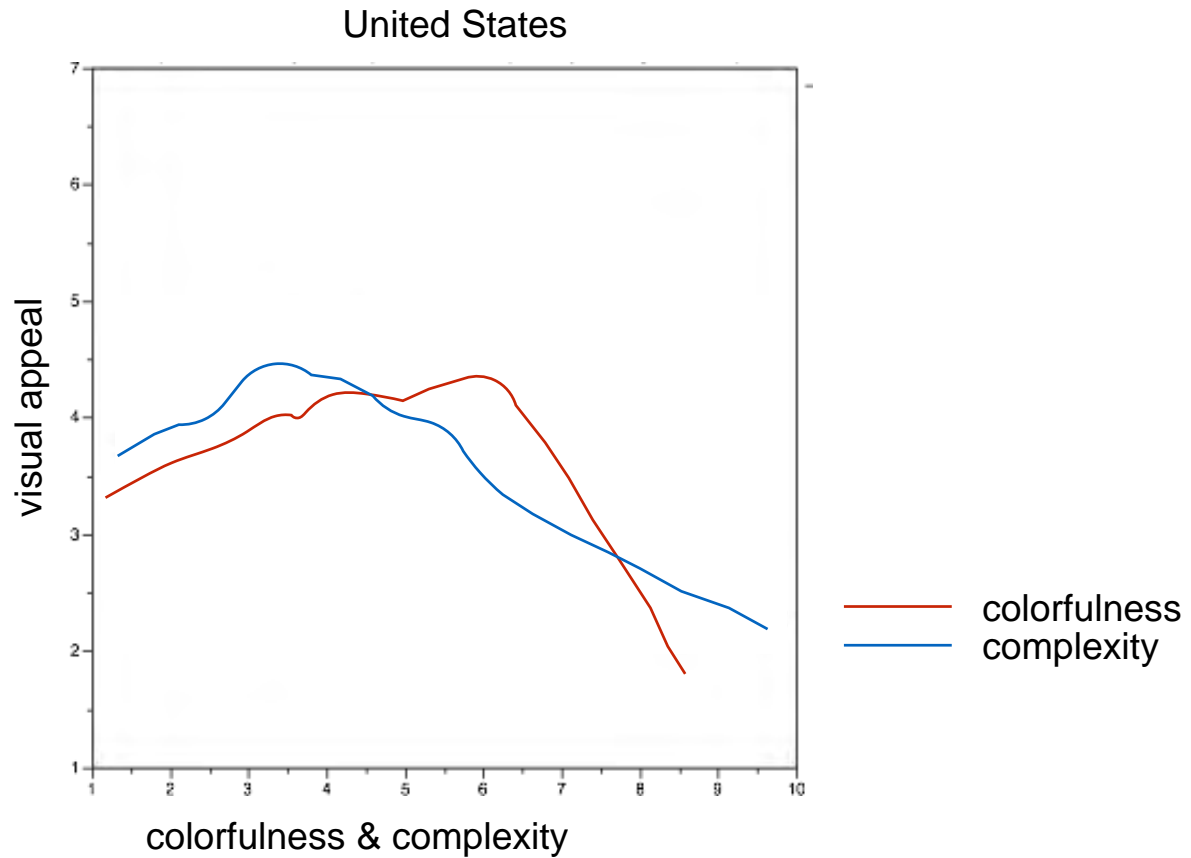
Plotting Appeal by Complexity



Plotting Appeal by Colorfulness



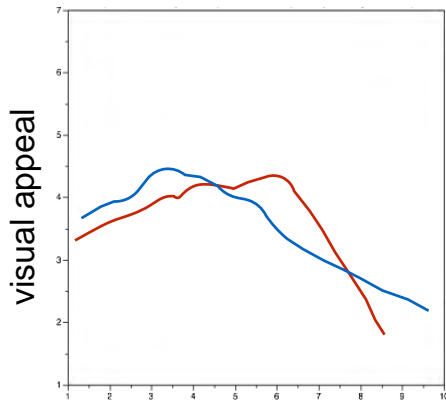
United States



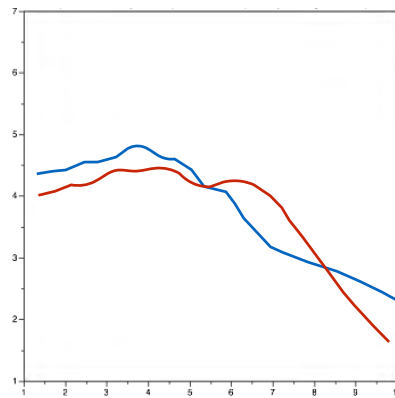
Other Countries

— colorfulness
— complexity

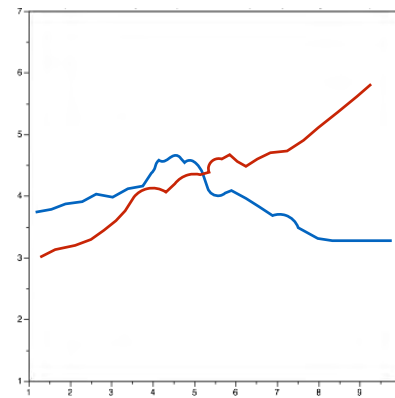
United States



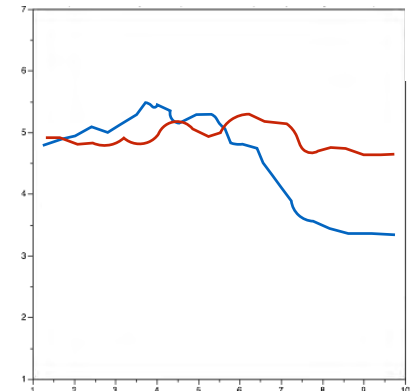
Germany



Macedonia



Hong Kong



colorfulness & complexity

Abandoning “One Best Design”

People have different preferences

We can study these preferences

We can even predict these preferences

How should we think about differences

One powerful viewpoint is social justice

Accessibility is the Law

National Federation of the Blind vs. Target, 2006

Americans with Disabilities Act, 1990

Requires accessibility in employment, public entities and public transportation, public accommodations and commercial facilities

Rehabilitation Act, 1973

Section 508, 1998

Mandates federal procurement of accessible electronic and information technologies

Universal Design vs. Assistive Technology



Personal Texting by Deaf People



Teletypewriter (TTY)
used by deaf people
in their homes circa 1970



1990s TTY with
built-in acoustic modem



SMS texting

People with Disabilities

1 billion people worldwide

15% of the population

50 million people in US

Including yourself if you
are fortunate to live to
develop disabilities

A Social Justice Problem

1 billion people worldwide

15% of the population

50 million people in US

Including yourself if you
are fortunate to live to
develop disabilities

16% of people in the US

10% of workforce

5% of STEM workforce

1% of PhDs in STEM

Current State of Devices



Current State of Devices



Equal Access to Information

Is this access equal?

Equal Access to Information

Is this access equal?

Some dimensions to consider

Cost

Speed

Accuracy

Ease

It simply being possible is not enough

A Closer Look at Text Entry



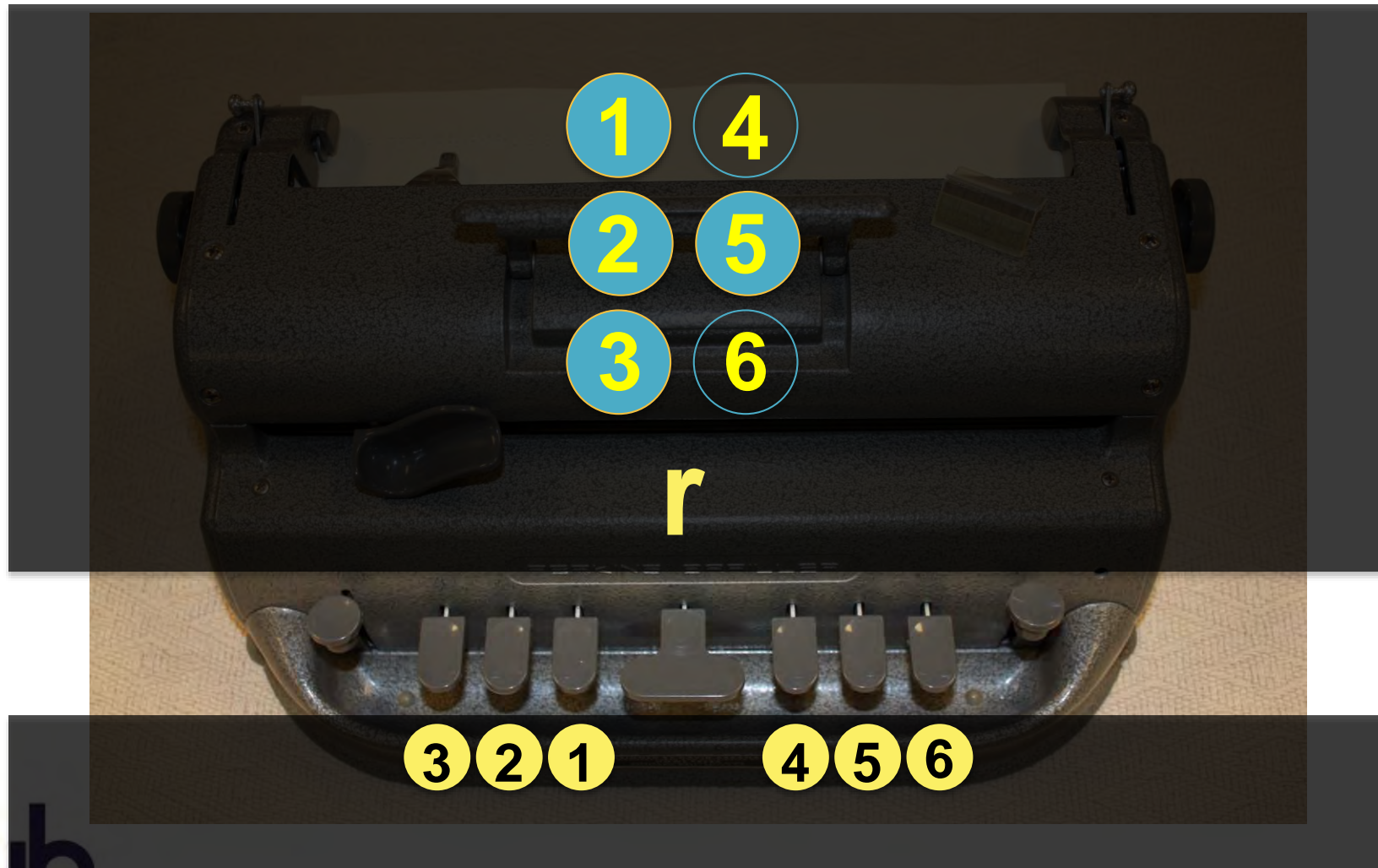
A Closer Look at Text Entry



Contrast with Braille Input



Contrast with Braille Input



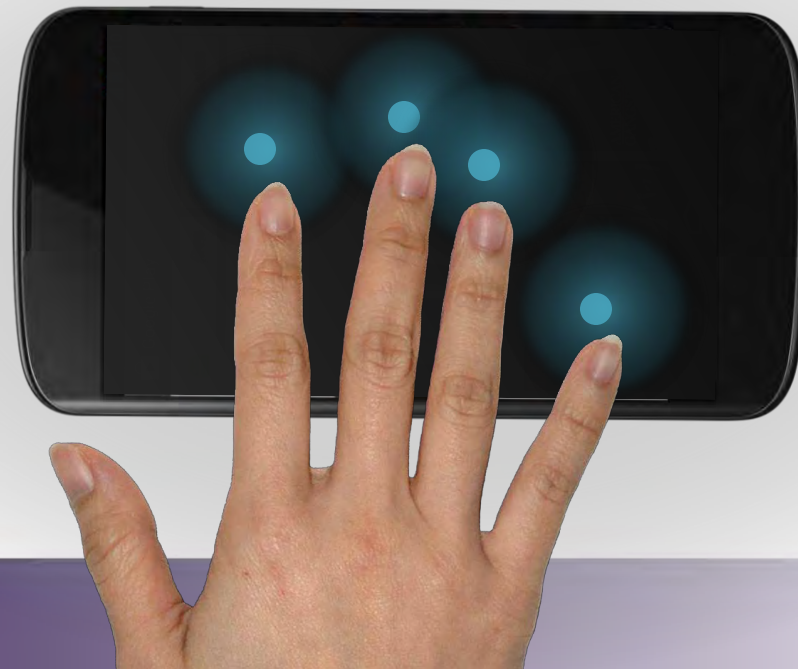
Perkinput



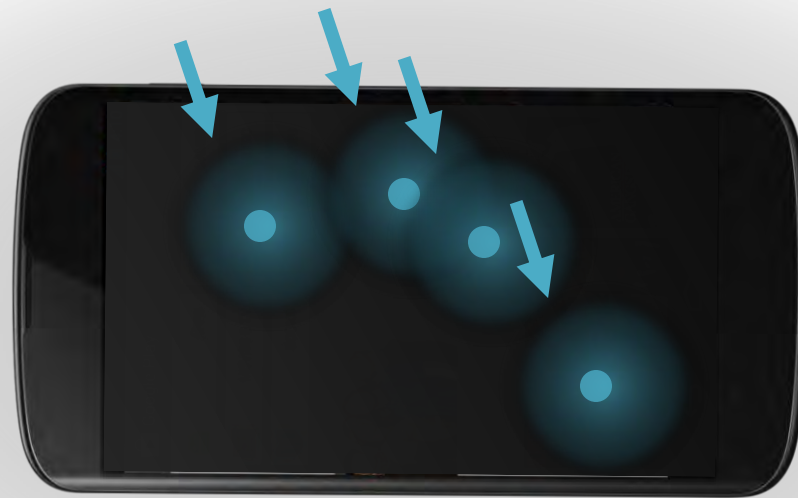
Perkinput



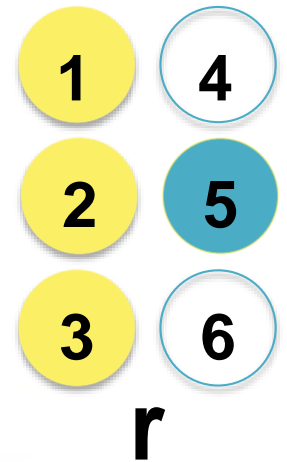
Perkinput



Perkinput



Perkinput



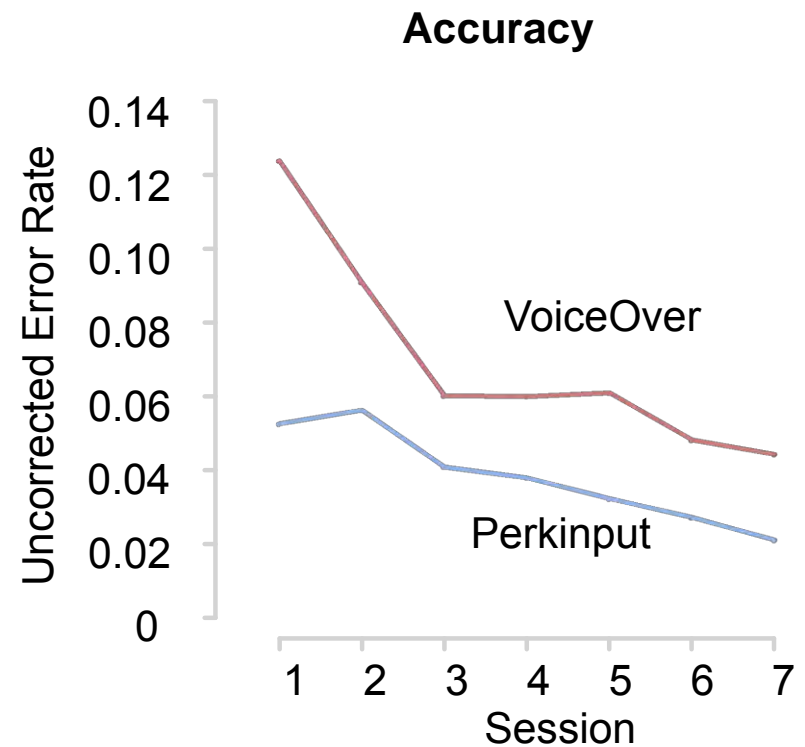
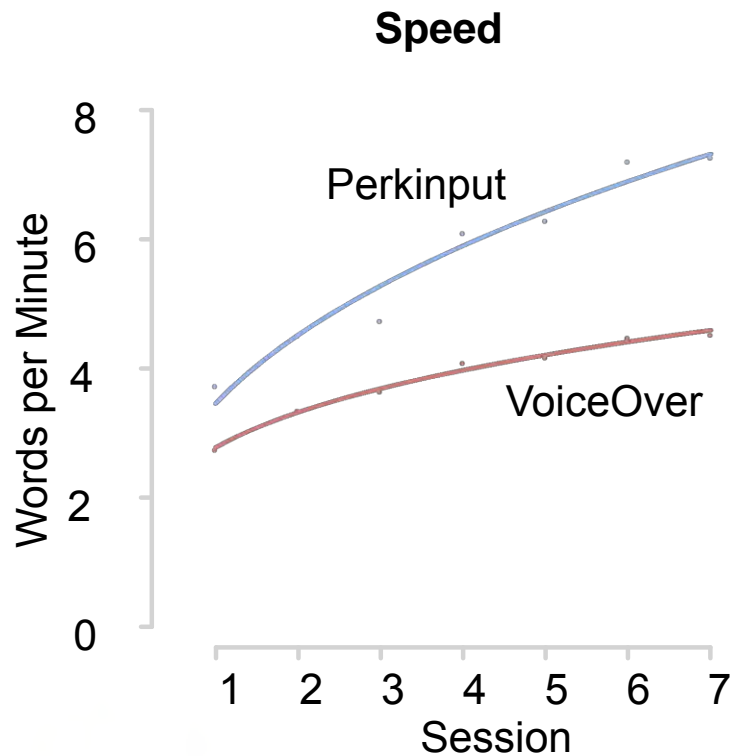
Perkinput



Perkinput



Speed and Accuracy



Another Problem



Another Problem



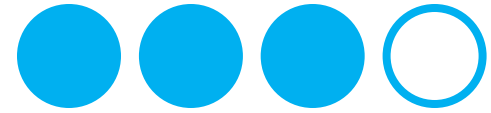
PassChords



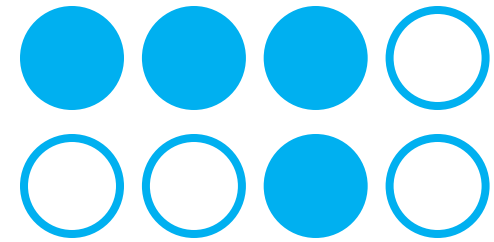
PassChords



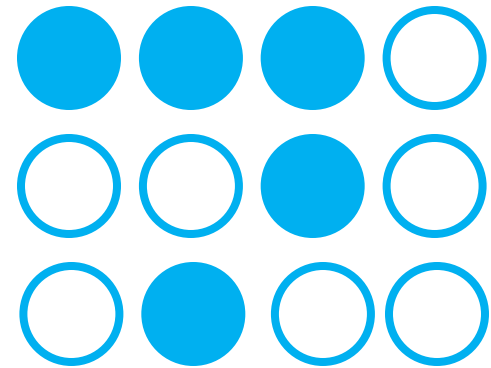
PassChords



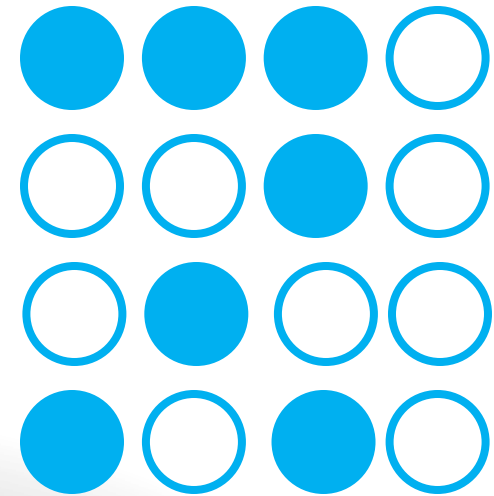
PassChords



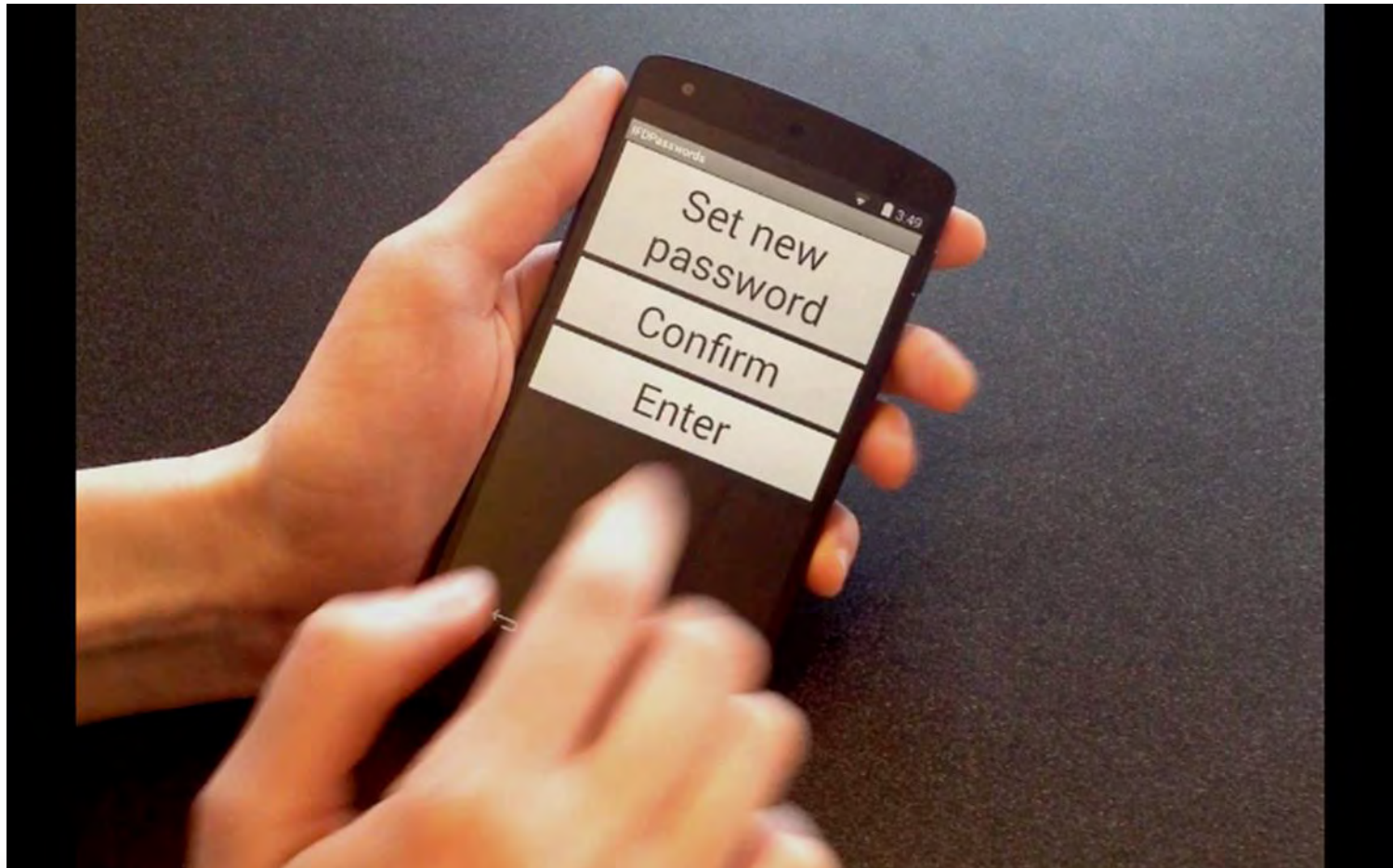
PassChords



PassChords



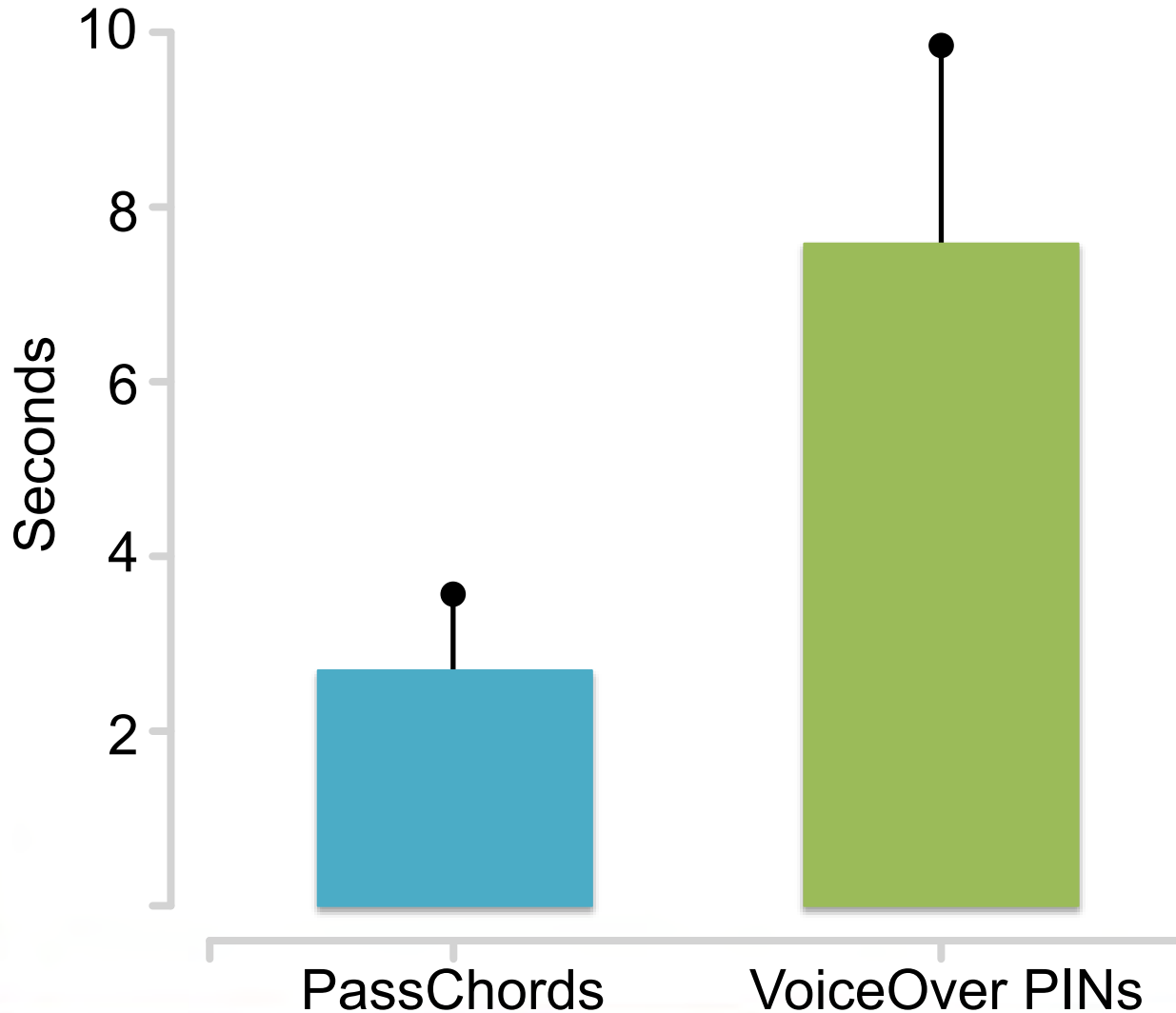
PassChords



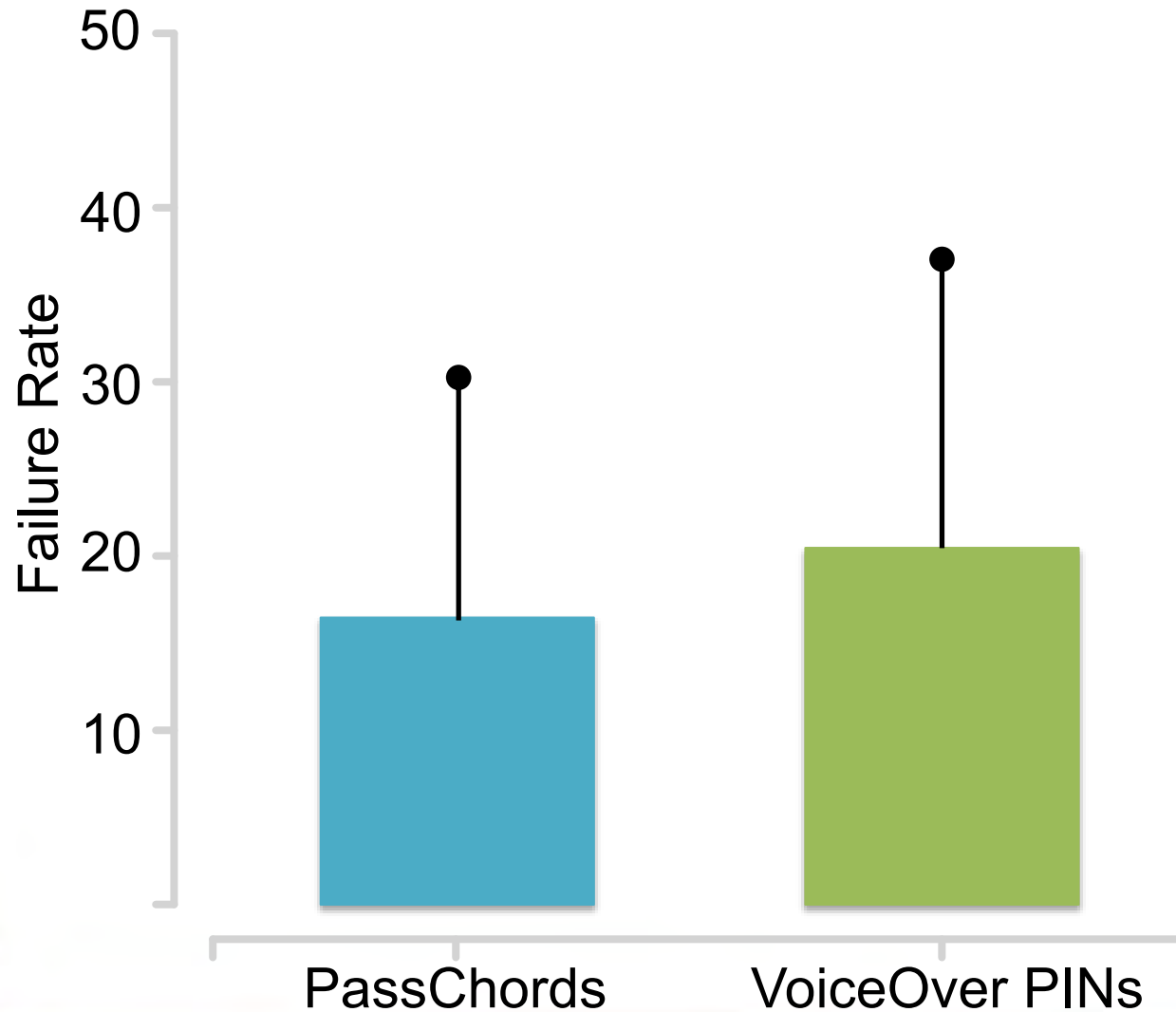
PassChords



Time to Authenticate



Accuracy



What About Security?

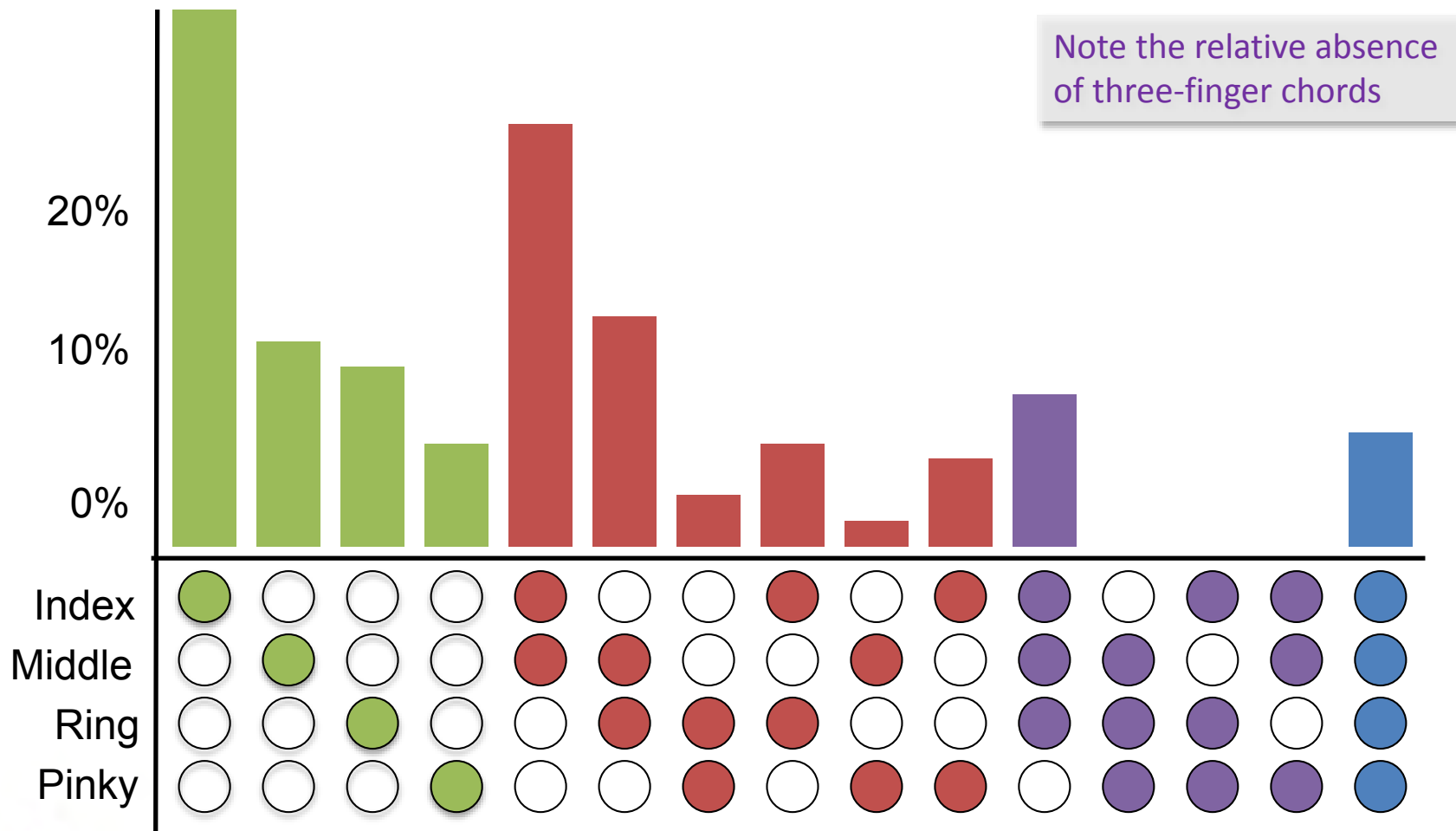
What About Security?

One measure is Guessing Entropy

The minimum number of bits needed
to encode the set of all possible passwords

4-digit PINs: 12.7 bits

Finger Pattern Frequency



What About Security?

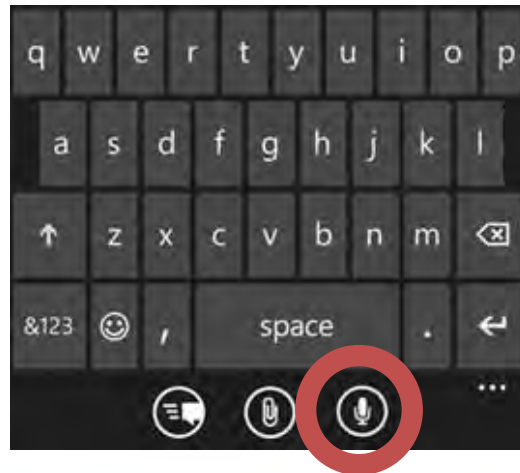
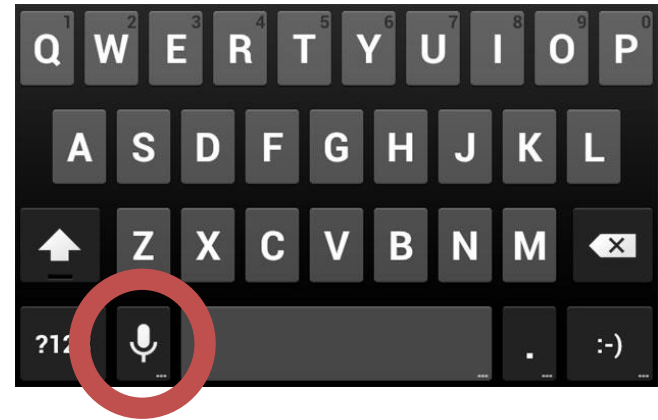
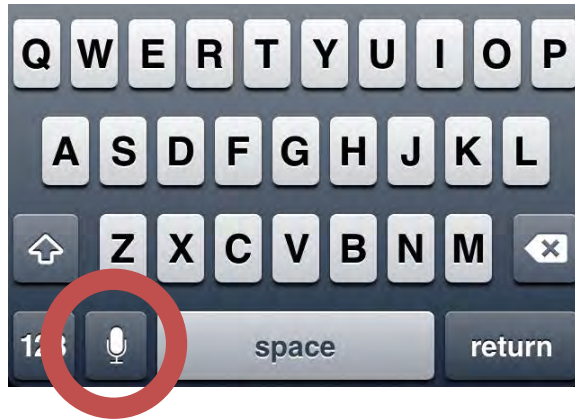
One measure is Guessing Entropy

The minimum number of bits needed
to encode the set of all possible passwords

4-digit PINS: 12.7 bits

4-tap PassChords: 12.6 bits

Speech Input



Reviewing Errors and Edits

When of my hobbies is hiking.
I really **enjoyed** getting away...

The triangle **consist** of a **2 mile** hike
to the beach, **I three-mile** hike along
the beach, and a **2 mile** hike back.

It is a very common hike, but **I knew** to
the **northwestern if you** like I need
to do it.

Serial Access in Reviewing Transcript

When

Serial Access in Reviewing Transcript

of

Serial Access in Reviewing Transcript

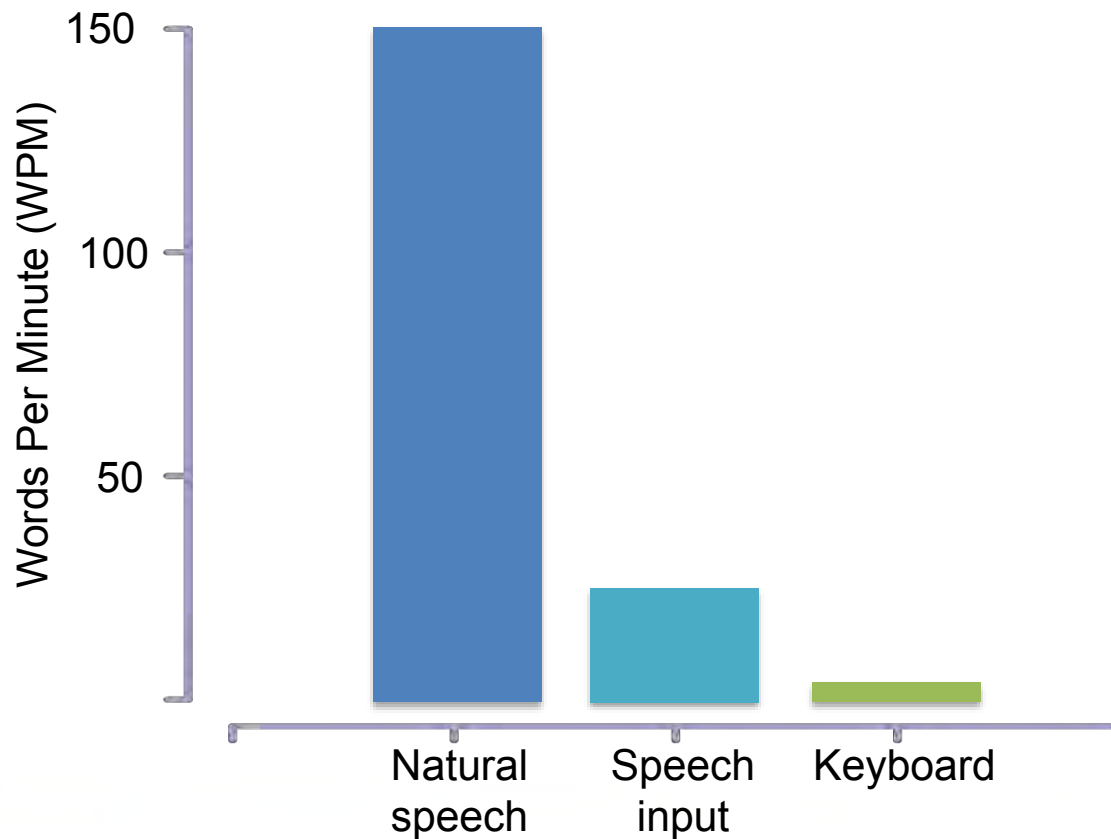
my

Serial Access in Reviewing Transcript

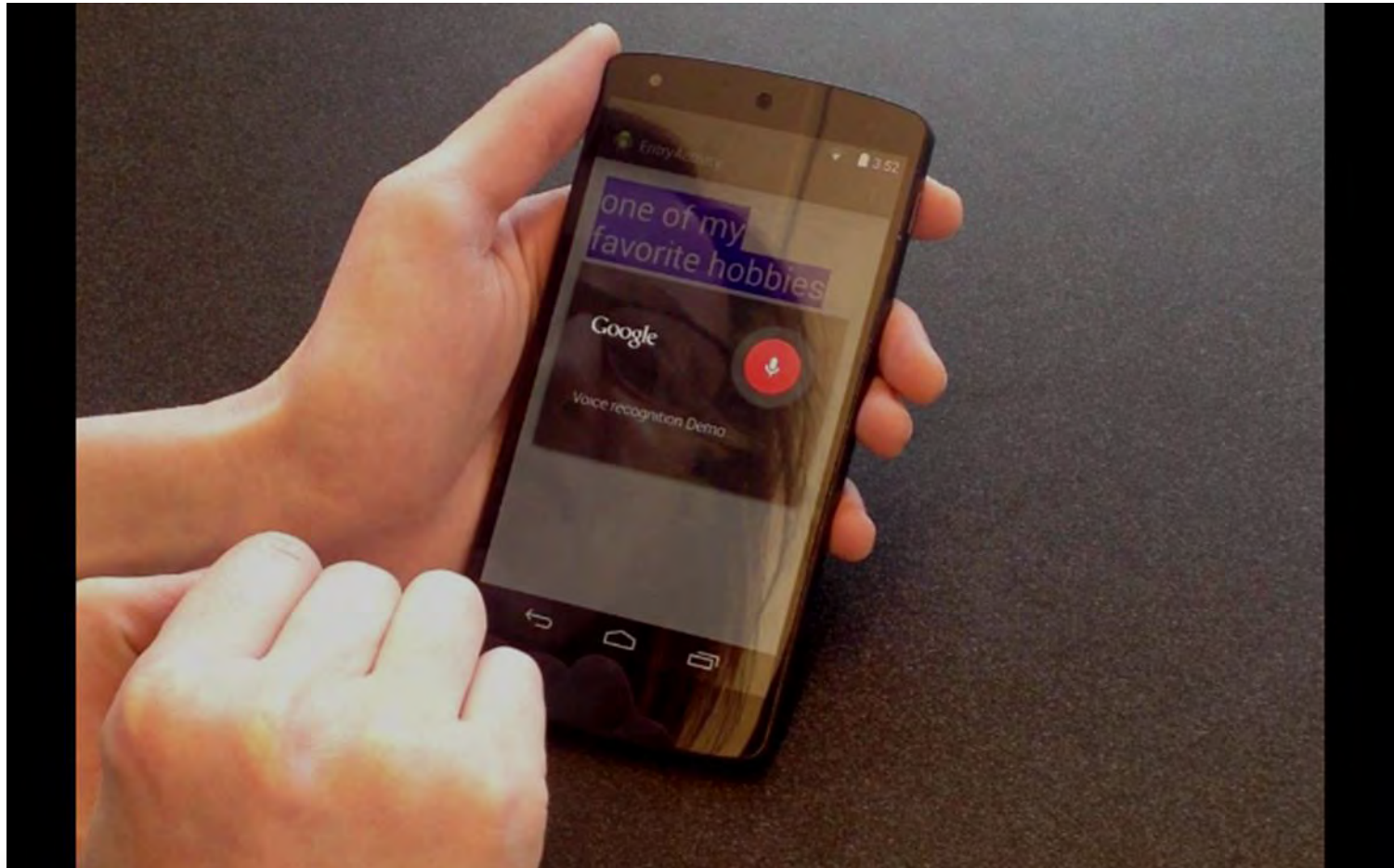
hobbies

Reviews and Edits

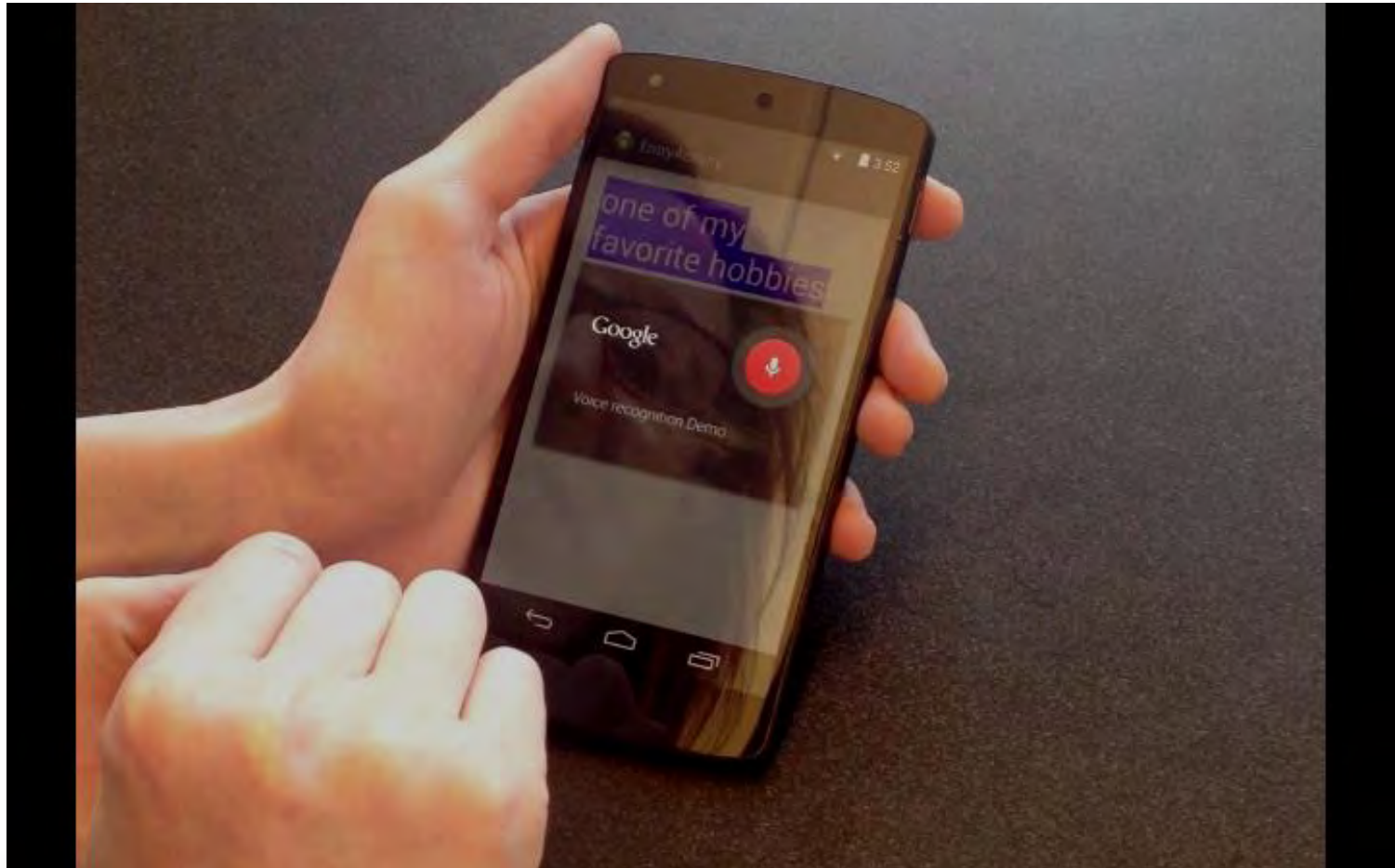
80% of composition time in review and edits



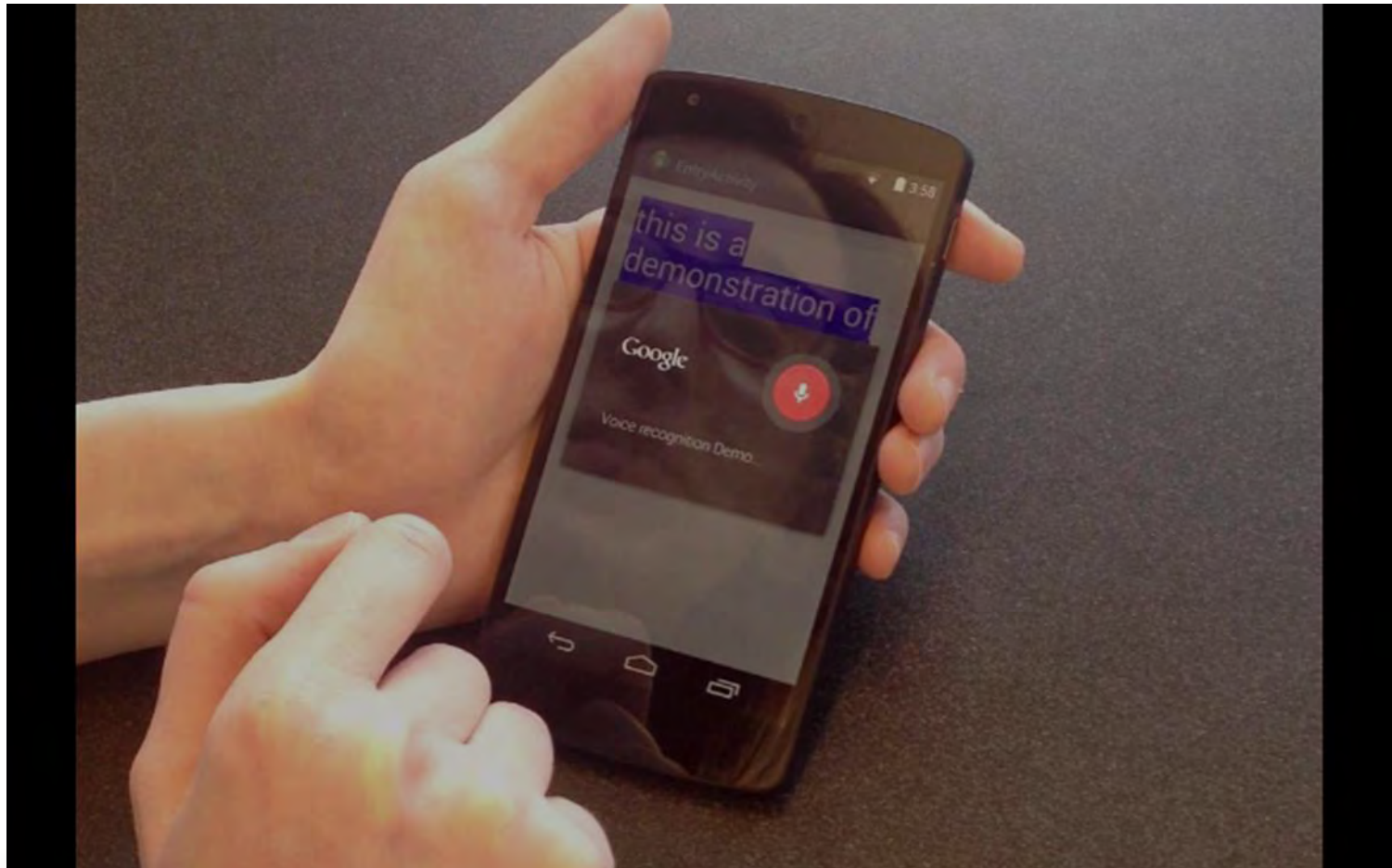
Spifi



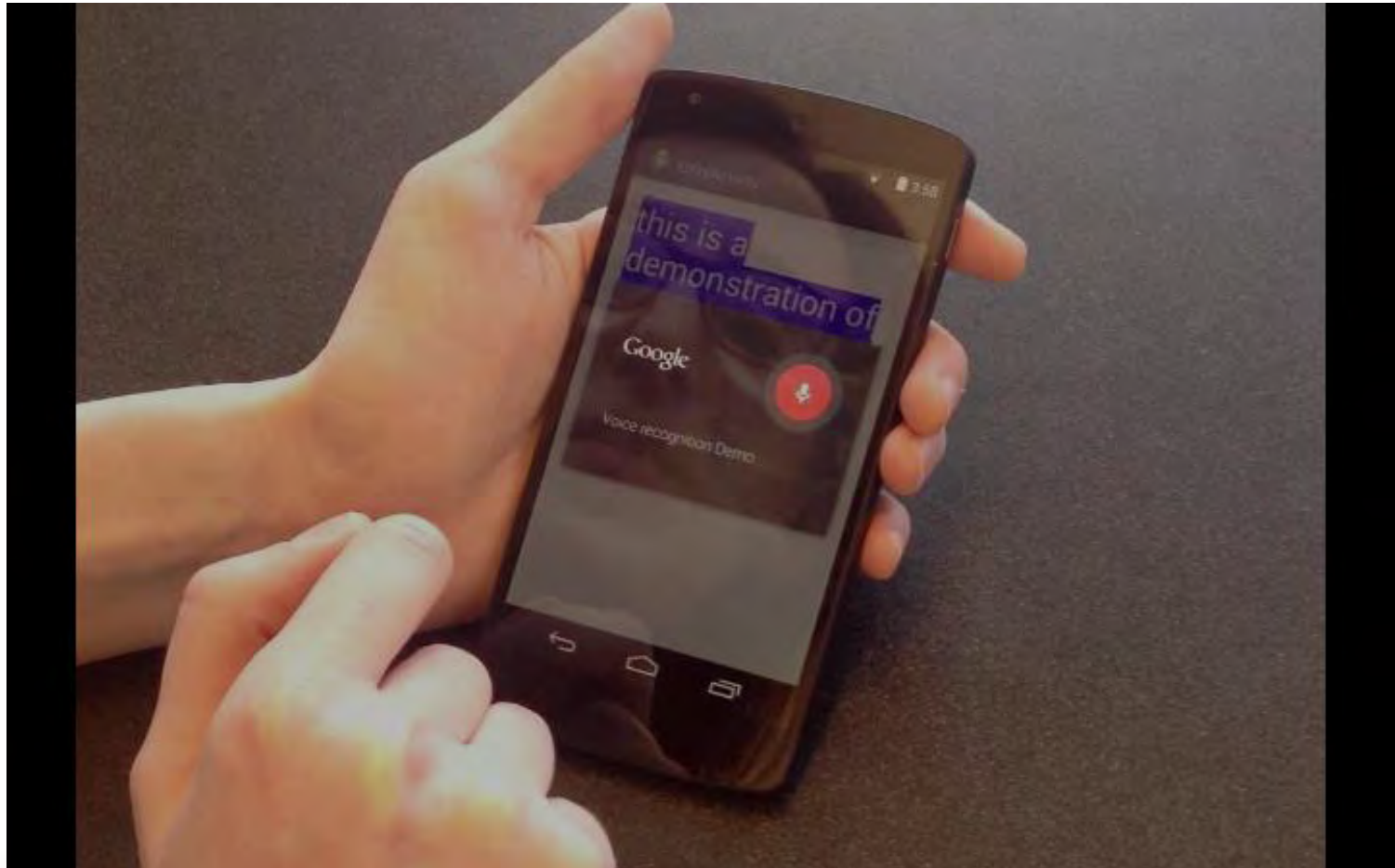
Spifi



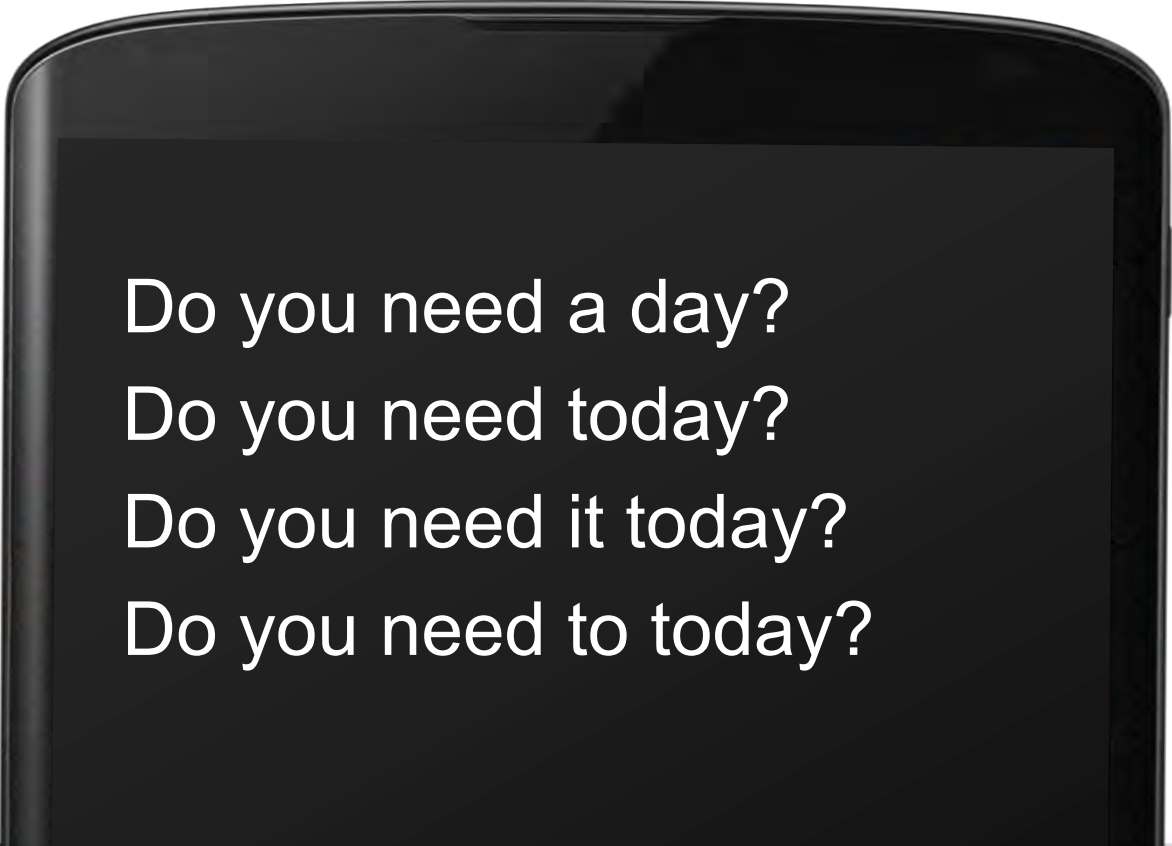
Spifi



Spifi



Recognize Speech as N-best List



Do you need a day?
Do you need today?
Do you need it today?
Do you need to today?

Find Uncertain Words

Do you need **a day**?

Do you need **today**?

Do you need **it today**?

Do you need **to today**?

Do you need **** *******

Split Into Phrases and Align Alternatives

Do you need

a day?

today?

it today?

to today?

Accessibility is More than Text Entry

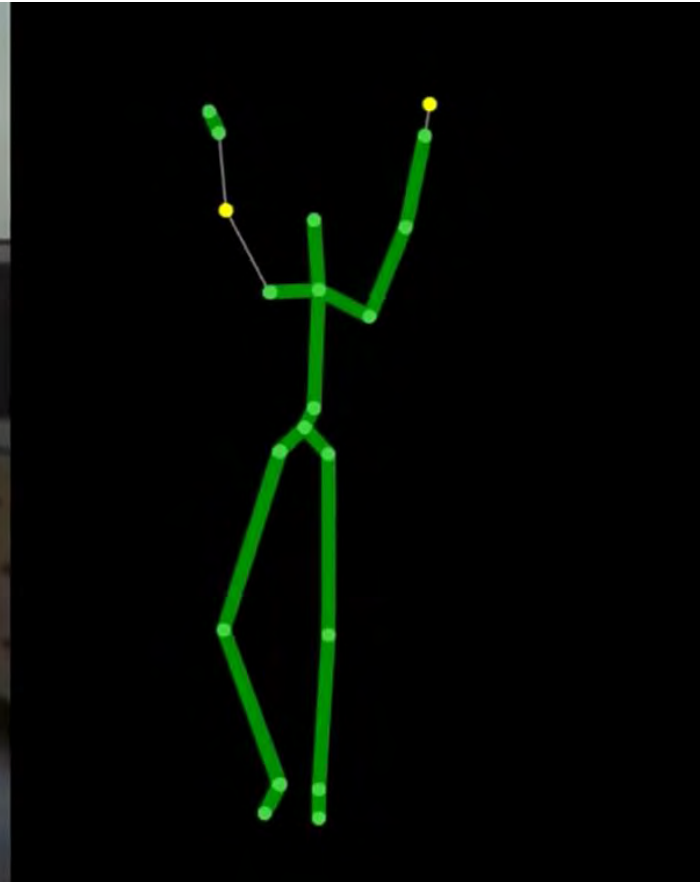


“Sometimes you don’t follow along as well unless [you are] one on one.”

Accessibility is More than Text Entry



Accessibility is More than Text Entry



Accessibility is More than Text Entry



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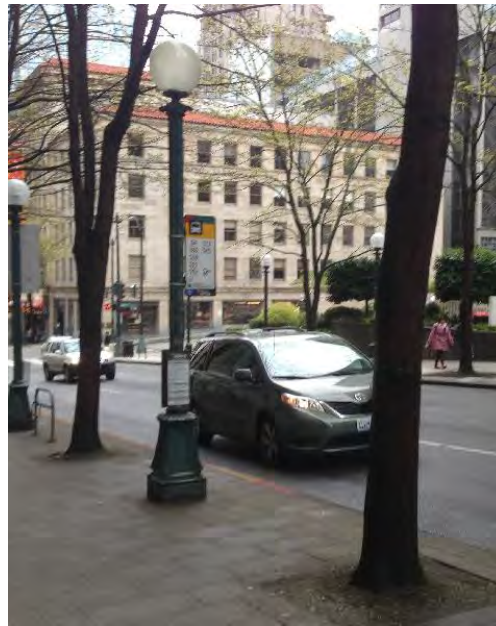
NW MARKET ST & BALLARD AVE NW

Stop # 18120 - E bound

route	destination	minutes
18	DOWNTOWN SEATTLE 03:54 - departed 2 mins late	-3
44	UNIVERSITY OF WASHINGTON MEDICAL CENTER 03:55 - scheduled departure	-3
17	DOWNTOWN SEATTLE 03:57 - departed 6 mins late	NOW
75	BALLARD 04:06 - 2 min delay	8
44	UNIVERSITY OF WASHINGTON MEDICAL CENTER 04:07 - on time	9
18	DOWNTOWN SEATTLE 04:13 - on time	15
44	UNIVERSITY OF WASHINGTON MEDICAL CENTER 04:19 - on time	21
17	DOWNTOWN SEATTLE 04:20 - on time	22
44	UNIVERSITY OF WASHINGTON MEDICAL CENTER WALLINGFORD 04:37 - 3 mins early	35

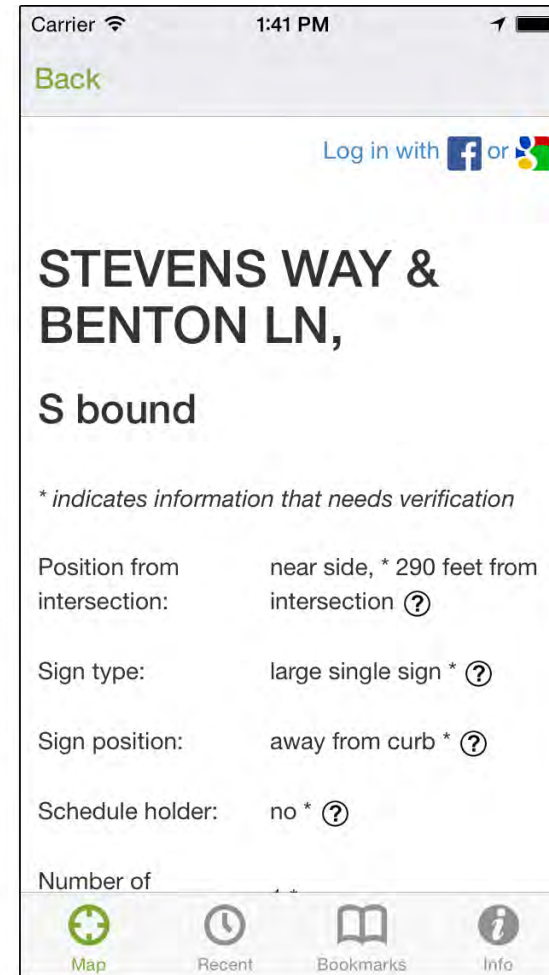
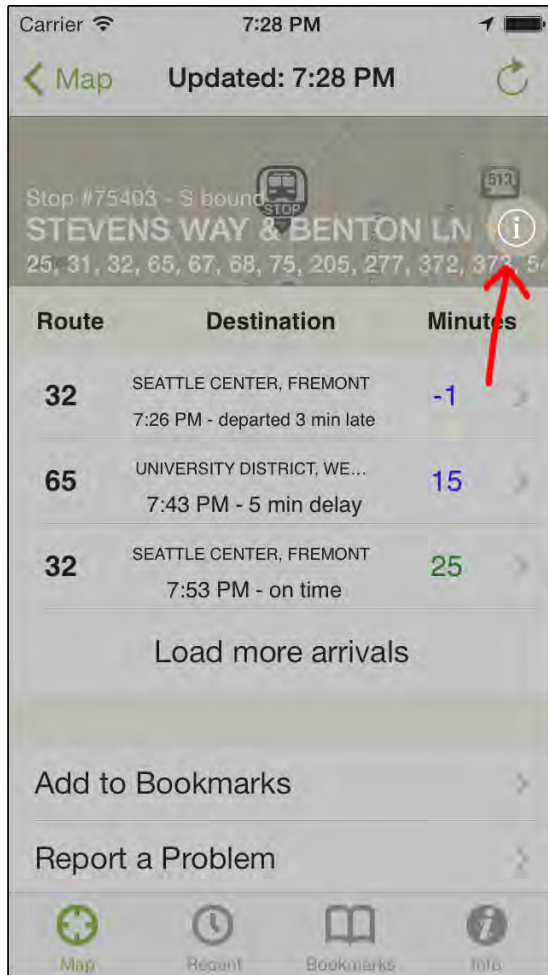
Last Update: 03:57 PM

Accessibility is More than Text Entry



How do you find a bus stop?

Accessibility is More than Text Entry



What is Disability?

Old model is medical, focused on the individual with a mindset of “fixing” an impairment

Current model understands disability is imposed by society and design not accounting for diversity

“Disability is thus not just a health problem.

...the interaction between features of a person’s body and features of the society in which he or she lives.

Overcoming the difficulties...requires interventions to remove environmental and social barriers.”

What is Disability?

Impairment

a problem in body function or structure

Activity Limitation

a difficulty encountered by a person
in executing a task or action

Participation Restriction

a problem experienced by a person
in involvement in life situations

A Basic Tenet of Design

You are not designing for yourself

You need to understand the context of your design and the people who will use it

We need diversity in who is doing design

As a field, our work suffers because of this failing

CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 14:
Designing for Diverse Needs

James Fogarty
Daniel Epstein
Brad Jacobson
King Xia

Tuesday/Thursday
10:30 to 11:50
MOR 234

