

CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 13:
Designing for Diverse Needs

James Fogarty
Alex Fiannaca
Lauren Milne
Saba Kawas
Kelsey Munsell

Tuesday/Thursday
12:00 to 1:20



Today

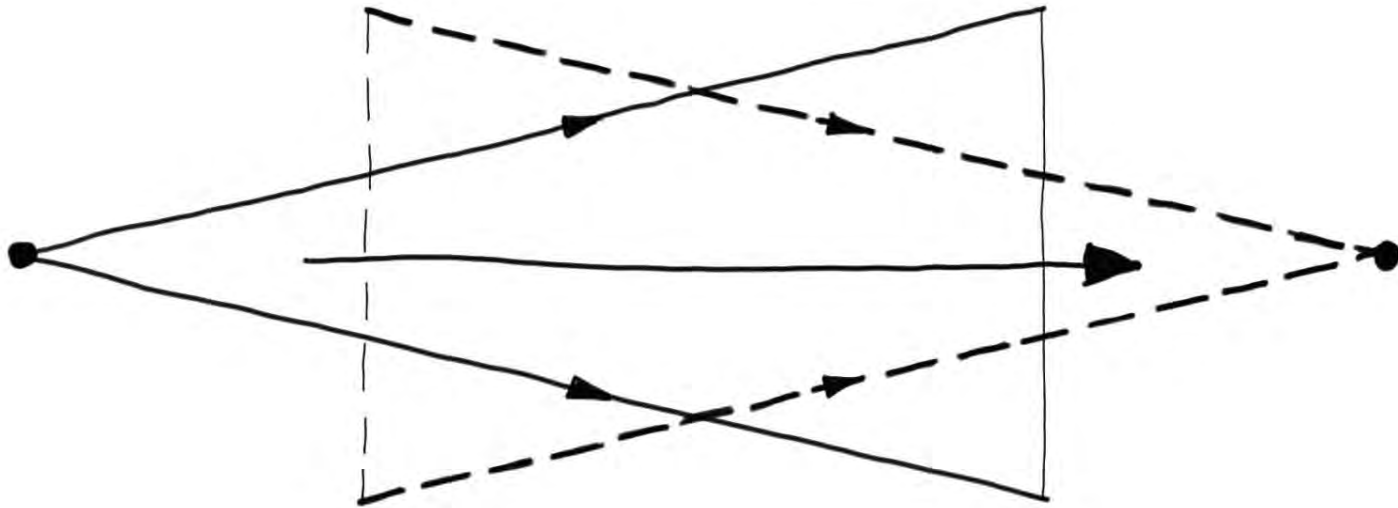
Usability Testing Check-Ins Tomorrow

UIST Report

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

A Basic Tenet of Design

From CI Terminology:
Entering Focus

You are not designing for yourself

You bring a lot of background to the table

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your design and the people who will use it

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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 through more obvious problems



Bic for Her



Finally! For years I've had to rely on pencils, or at worst, a twig and some drops of my feminine blood to write down recipes (the only thing a lady should be writing ever). I had despaired of ever being able to write down said recipes in a permanent manner, though my men-folk assured me that I "shouldn't worry yer pretty little head". But, AT LAST! Bic, the great liberator, has released a womanly pen that my gentle baby hands can use without fear of unlady-like callouses and bruises. Thank you, Bic!

Bic for Her



It is very, very hard to imagine that the people who made the decision to launch “Bic for Her” were the same women expected to buy them.

Apple HealthKit Launch



“with Health, you can monitor all of your metrics that you’re most interested in”
Apple Software executive Craig Federighi

Apple HealthKit Launch



“with Health, you can monitor all of your metrics that you’re most interested in”
Apple Software executive Craig Federighi

“If you’re a human who menstruates,
you’re shit out luck”

“The fact that it’s a women’s issue isn’t
grounds for dismissal”

<http://www.theverge.com/2014/9/25/6844021/apple-promised-an-expansive-health-app-so-why-cant-i-track>

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 Dowrin 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

An Activity

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

very
unappealing



very
appealing

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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Search by Cuisine

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Search by User Rating

OR

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BRUNCH | TAKEOUT | STEAKHOUSES

Event Finder

Search by Event Type

From: To:

Search by User Rating

OR

Search by Event Name

[Show Me](#)

WHATS ON | CALENDAR

Movie Finder

Search by Movie Title

OR

Search by Theatre

OR

Search by Neighbourhood

OR

Search by Genre

[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](#)

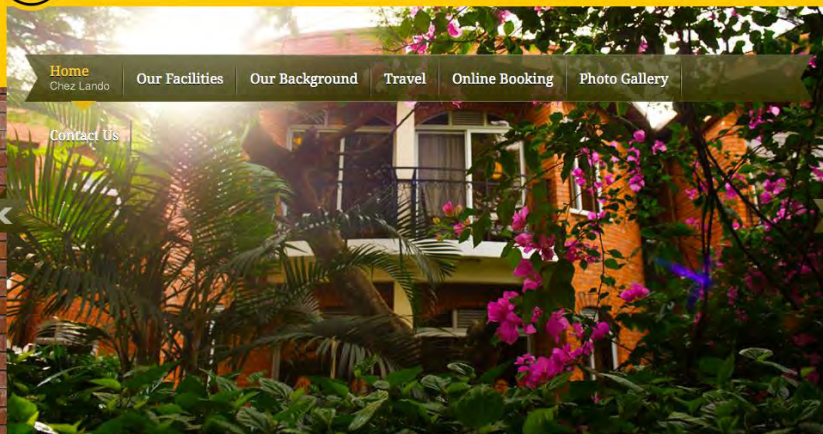
[Click here for the Tapir Blog](#) for all of your tapir news from around the globe

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very
unappealing



very
appealing



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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



THE PEOPLE'S BANK
Banki yacu. Hafi yacu.

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Enter keyword here...

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ACCOUNT ON THE GO.**
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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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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.

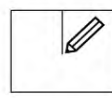
Participate now!



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' links, along with a language selector set to 'English'. A prominent statistic shows '2068991 total participants'. The main content area features six experiment cards, each with an icon, a title, a brief description, and a 'Participate now!' button. The third card, 'What is your website aesthetic?', is circled in red. Below the experiments, there are three sections: 'News From The Wild' with dates and descriptions of recent experiments, 'Why Participate?' explaining the benefits of user feedback, 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

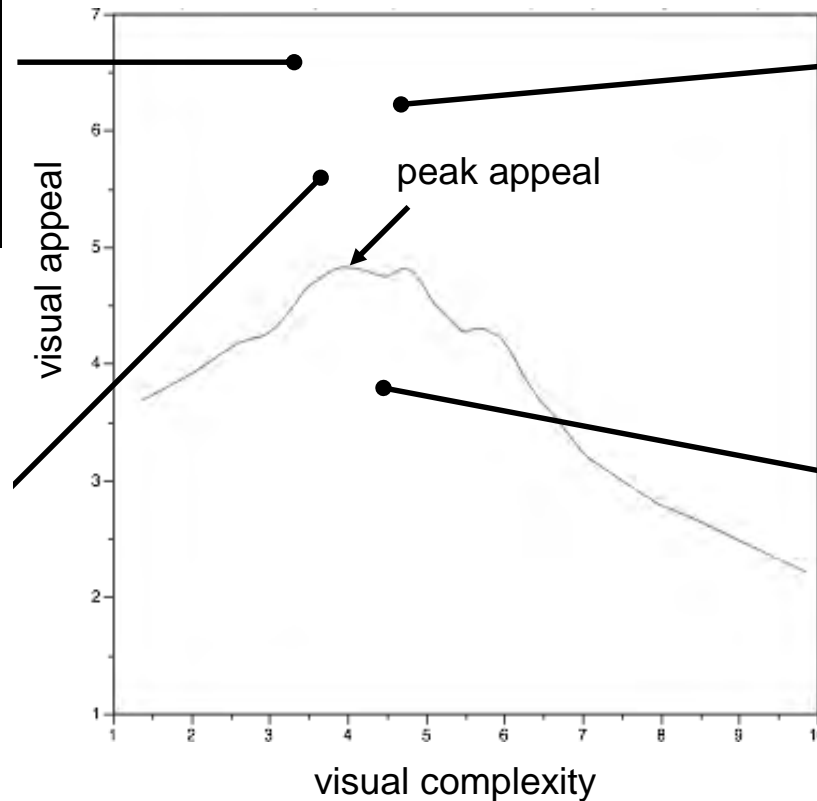
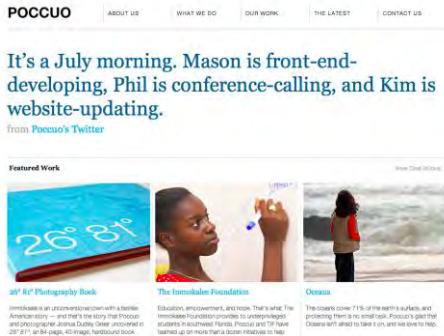
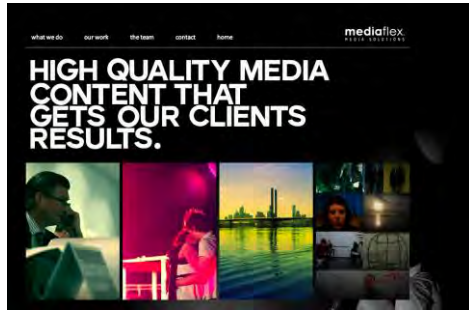


2.4 million ratings
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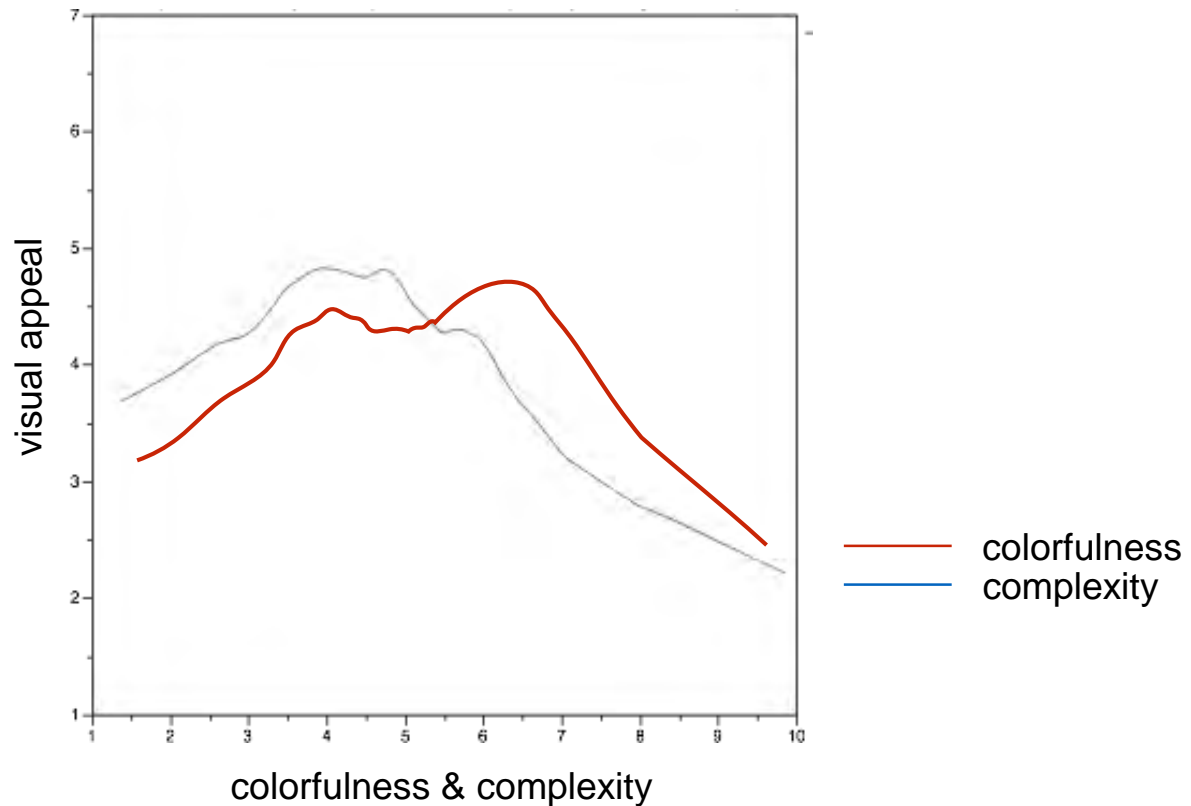
39 image metrics
describing website
perceived **colorfulness**
and **complexity**

Age, country,
gender, education

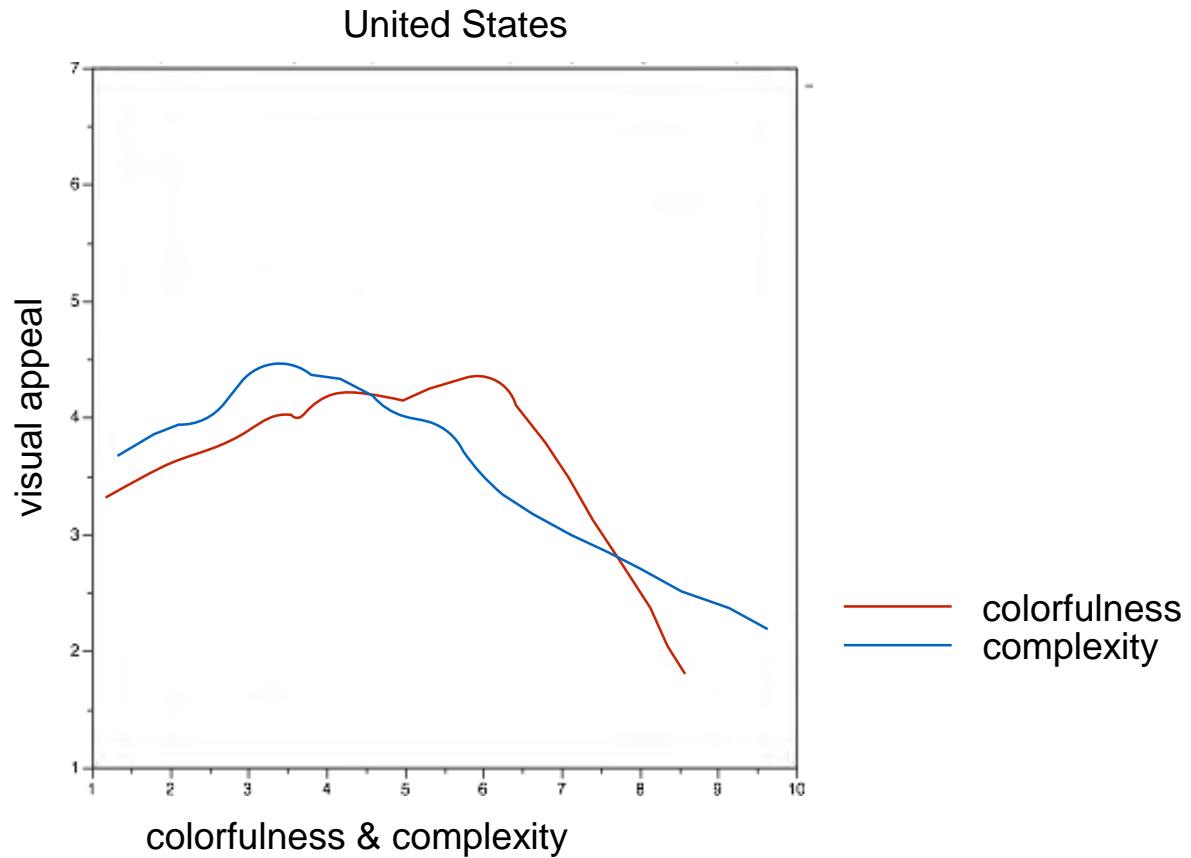
Plotting Appeal by Complexity



Plotting Appeal by Colorfulness



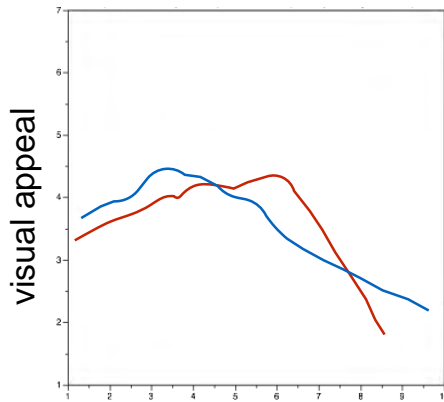
United States



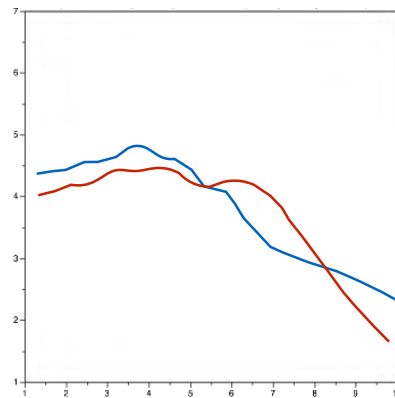
Other Countries

— colorfulness
— complexity

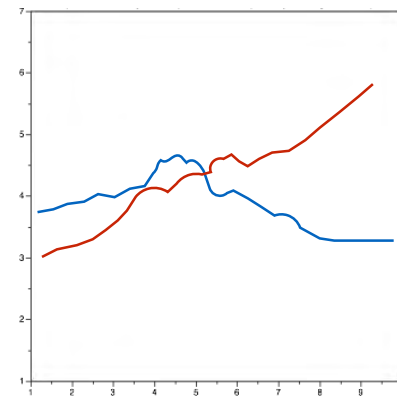
United States



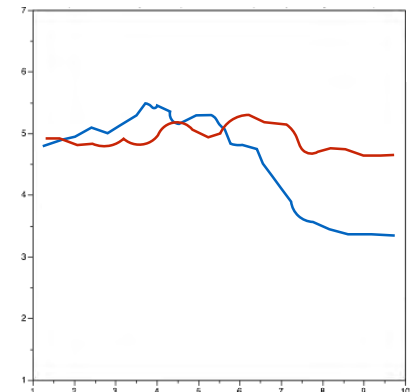
Germany



Macedonia



Hong Kong



colorfulness & complexity

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Go Back & Proceed	Go Back & Proceed	Go Back & Proceed

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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 Deck

The Vancouver Foundation

LANCER

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LIZARD POINT

BROWSER-BASED ACTIVITIES FOR FUN AND LEARNING

- Test your geography knowledge - available any time!
- Online math practice and specialized word search
- Buy it now! Like a Lizard Point - grab the exciting, exciting!

JEWELRY CREATIONS BY LIZARD POINT

• Visit Jewelry Creations by Lizard Point if you're looking for unique jewelry and more from our collection of hand-crafted, sterling silver, gold

POCQUO

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

From POCQUO's Twitter

Featured Work

UP 47 Photography Deck

The Vancouver Practitioner

VENUE

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tapir design

classic design for today.

Some things aren't meant to be changed - effective, elegant, timeless. That's why we continue to rely on classic design for the most powerful of computer operating systems that



LIZARD POINT

BROWSER-BASED ACTIVITIES FOR FUN AND LEARNING

- Teach your geospatial concepts / classes using webGIS
- Utilize webGIS practice and generated worksheets
- Buy it with the LIZARD Planner - printout printable manual

JEWELRY CREATIONS BY LIZARD POINT

- With Jewelry Creations by Lizard Point you can create, personalize, download, share, track and print out all types of jewelry designs, such as:



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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classic design for today.

tapir design specializes in providing effective, stylish websites that are accessible to all. We focus on the usability of the web, removal of complex operating systems that



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Use Links: Home, Guide, About, White, Contact, Reviews, Feedback, etc.

Advertisement: Free Restaurant Online Reservation

Search by Cuisine Type

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Search by Restaurant Name or by Cuisine Type

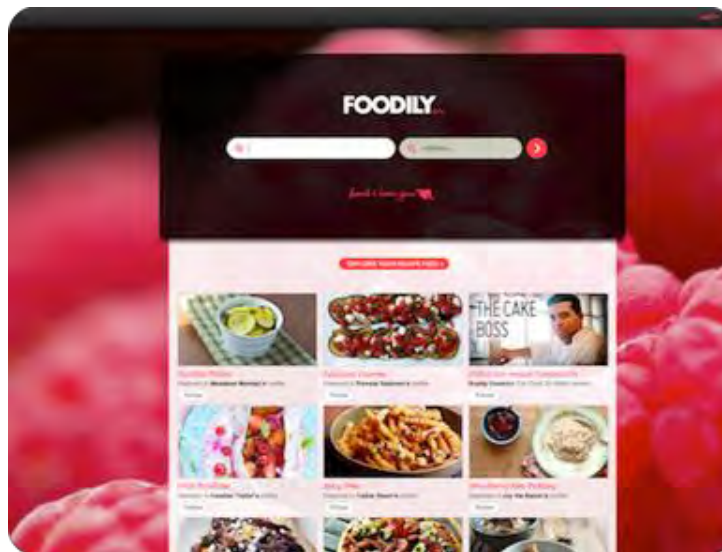




> 50 years



< 20 years



female



male



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



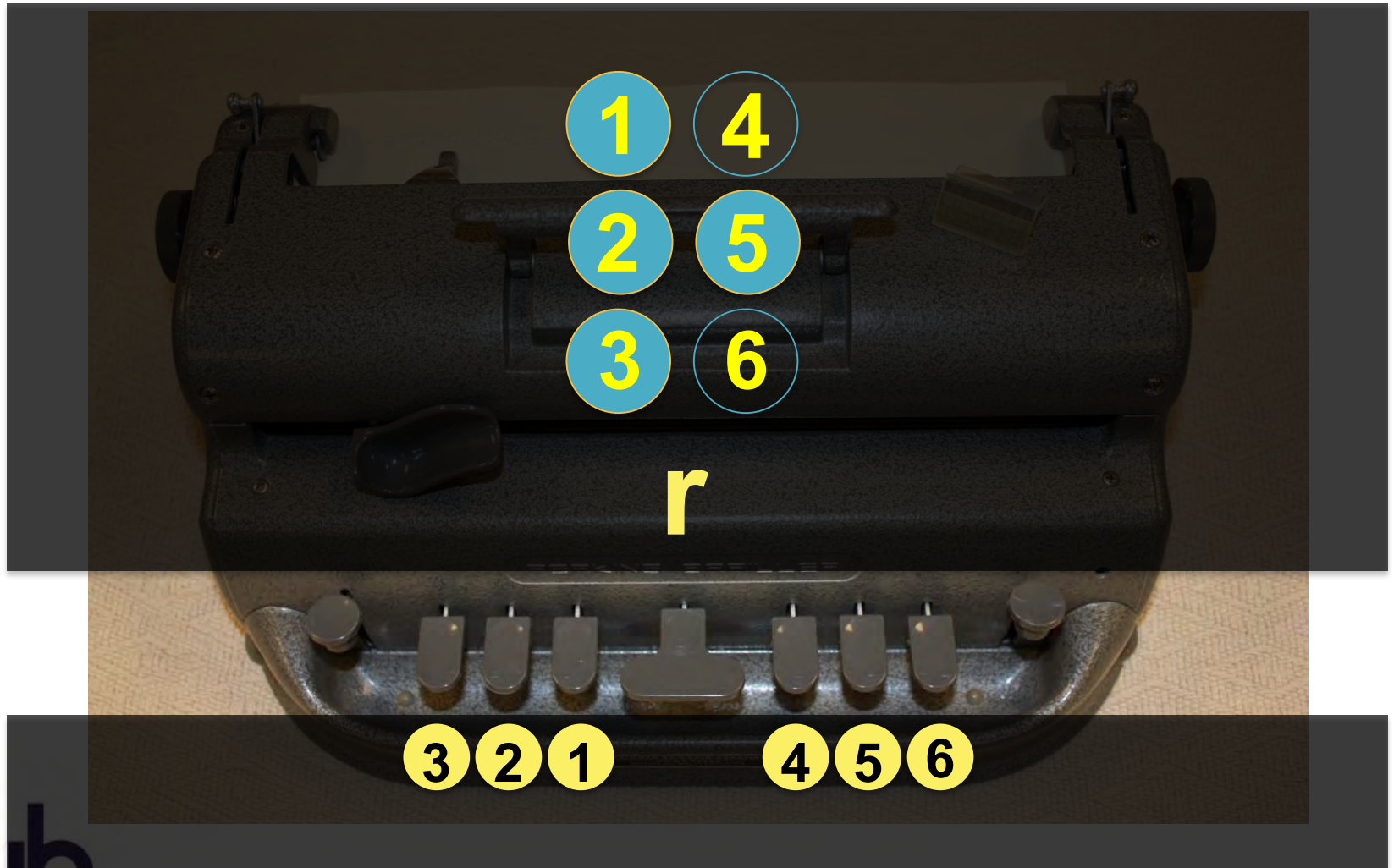
A Closer Look at Text Entry



Contrast with Braille Input



Contrast with Braille Input



Ability-Based Design

States that all interfaces make assumptions about the abilities needed to use them

Any one-size-fits-all design is therefore inaccessible to many people

Instead of asking people to struggle to adapt, asks that interfaces adapt or be adaptable to match the abilities of each person

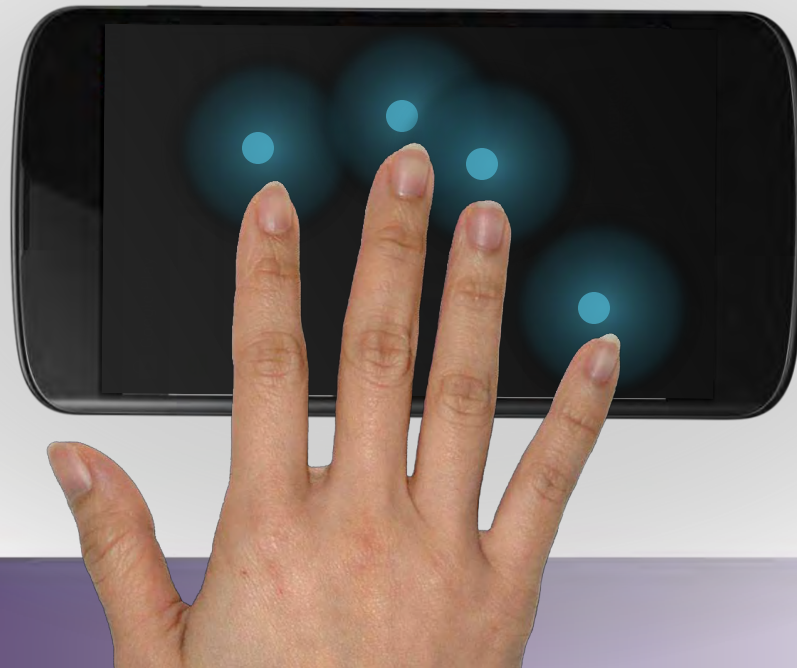
Perkinput



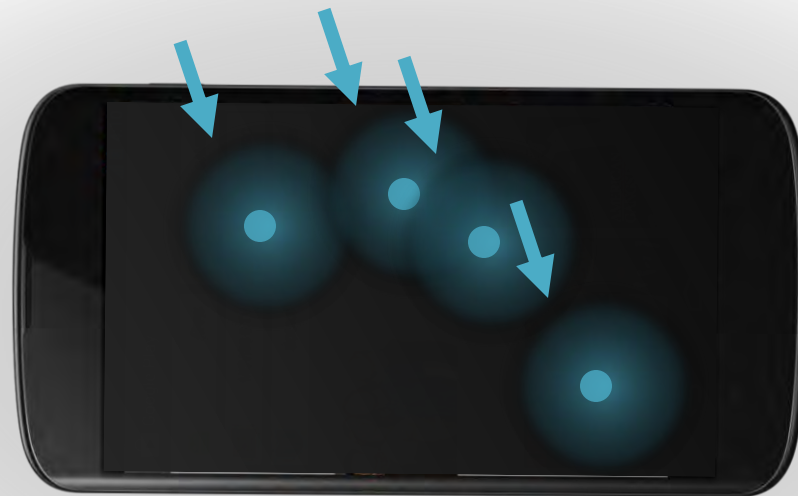
Perkinput



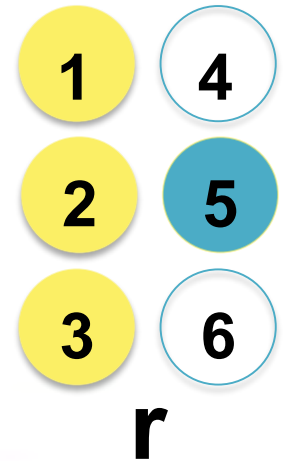
Perkinput



Perkinput



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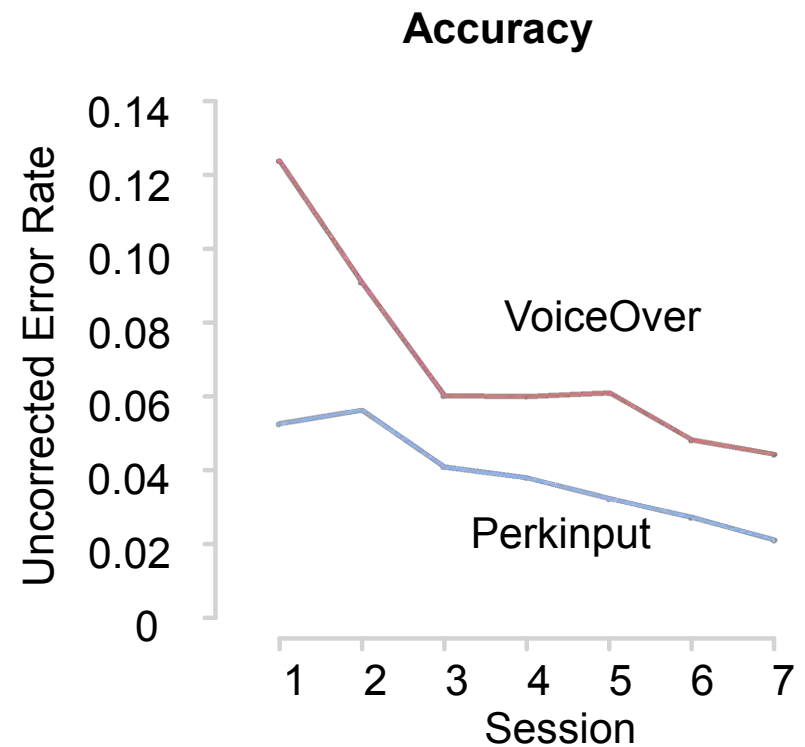
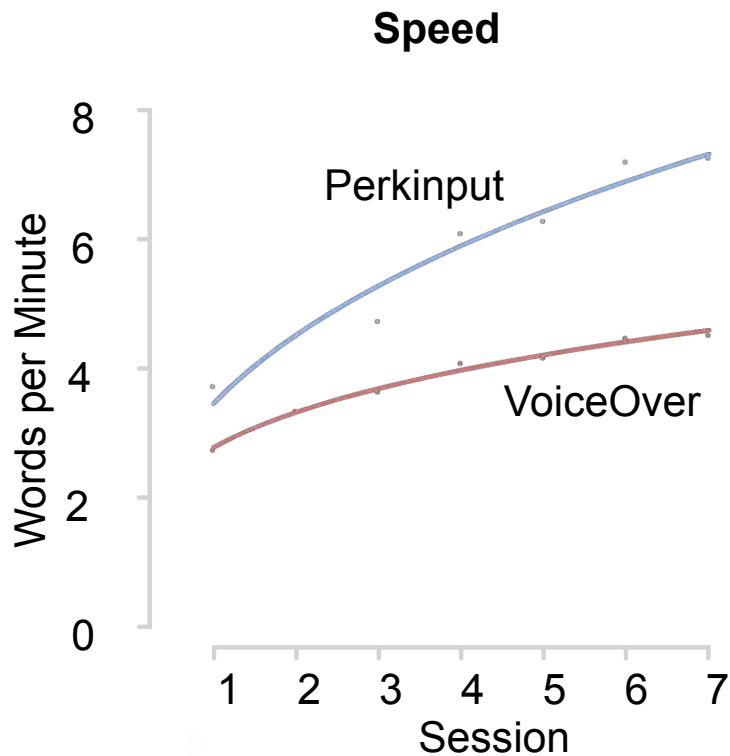
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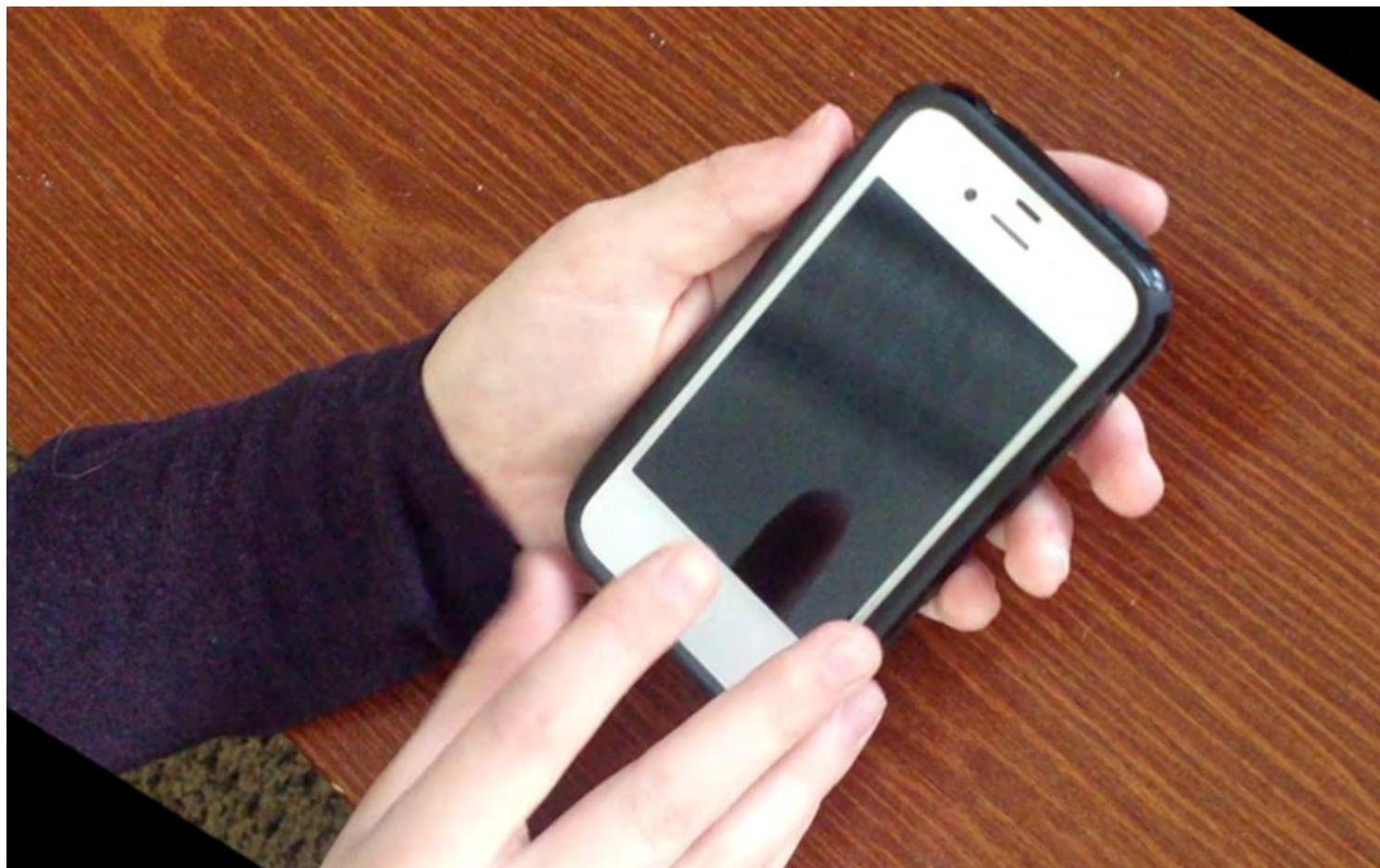
Perkinput



Speed and Accuracy



Another Problem



Another Problem



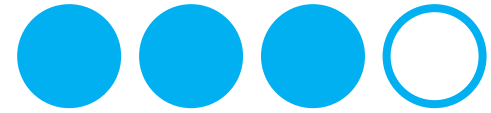
PassChords



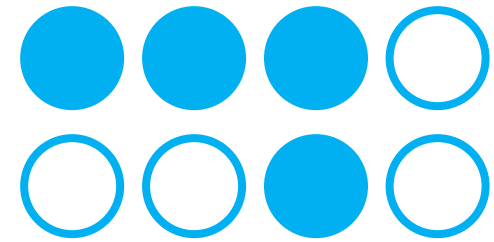
PassChords



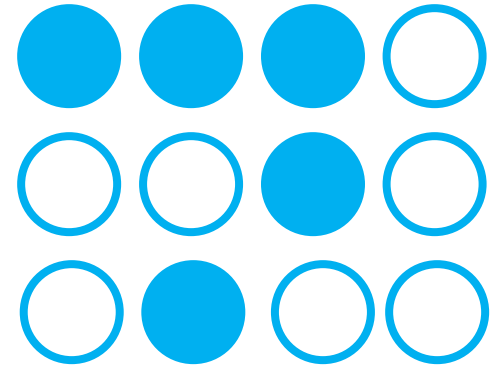
PassChords



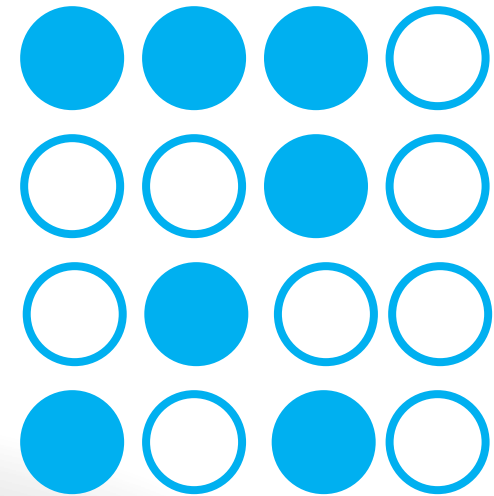
PassChords



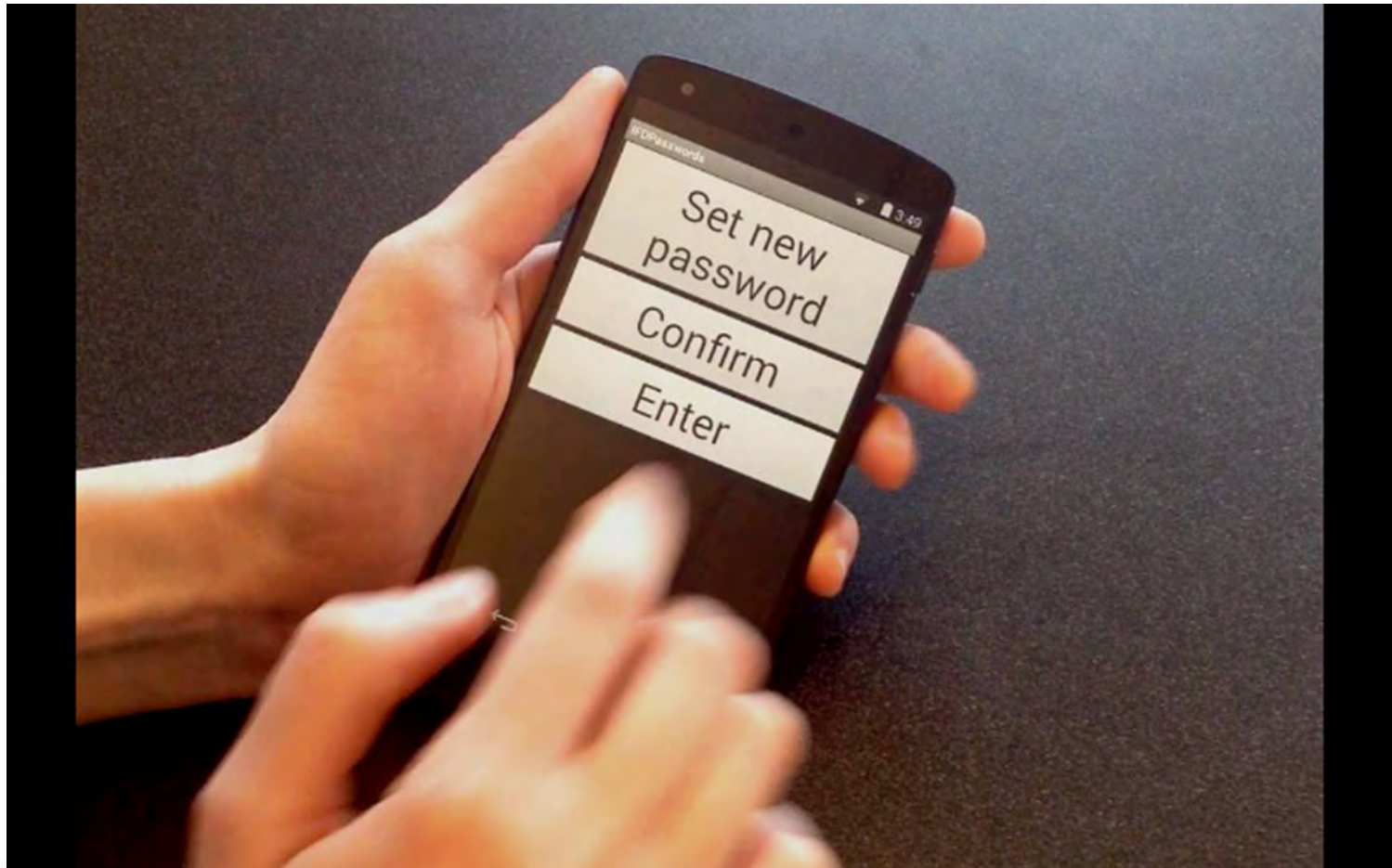
PassChords



PassChords



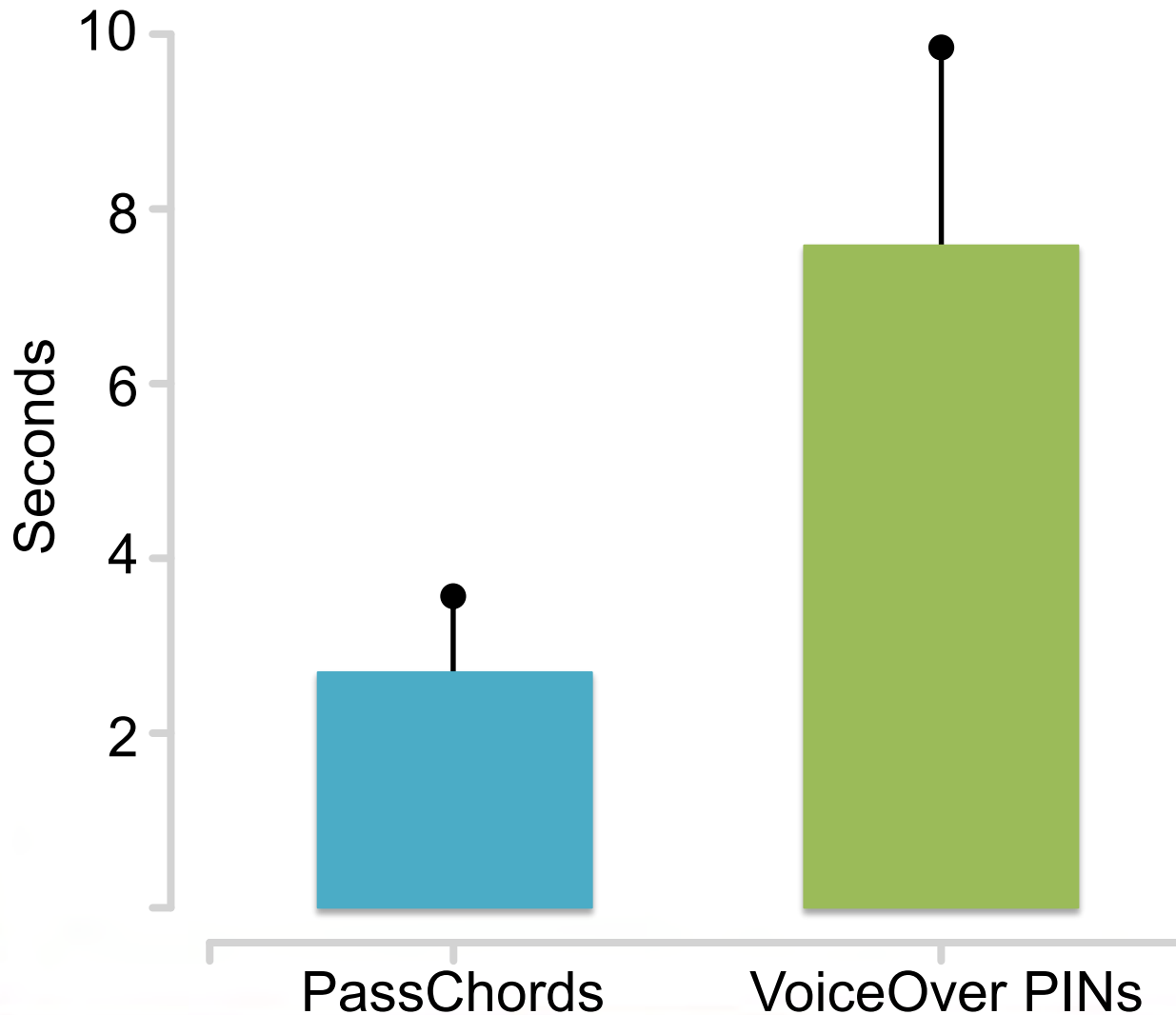
PassChords



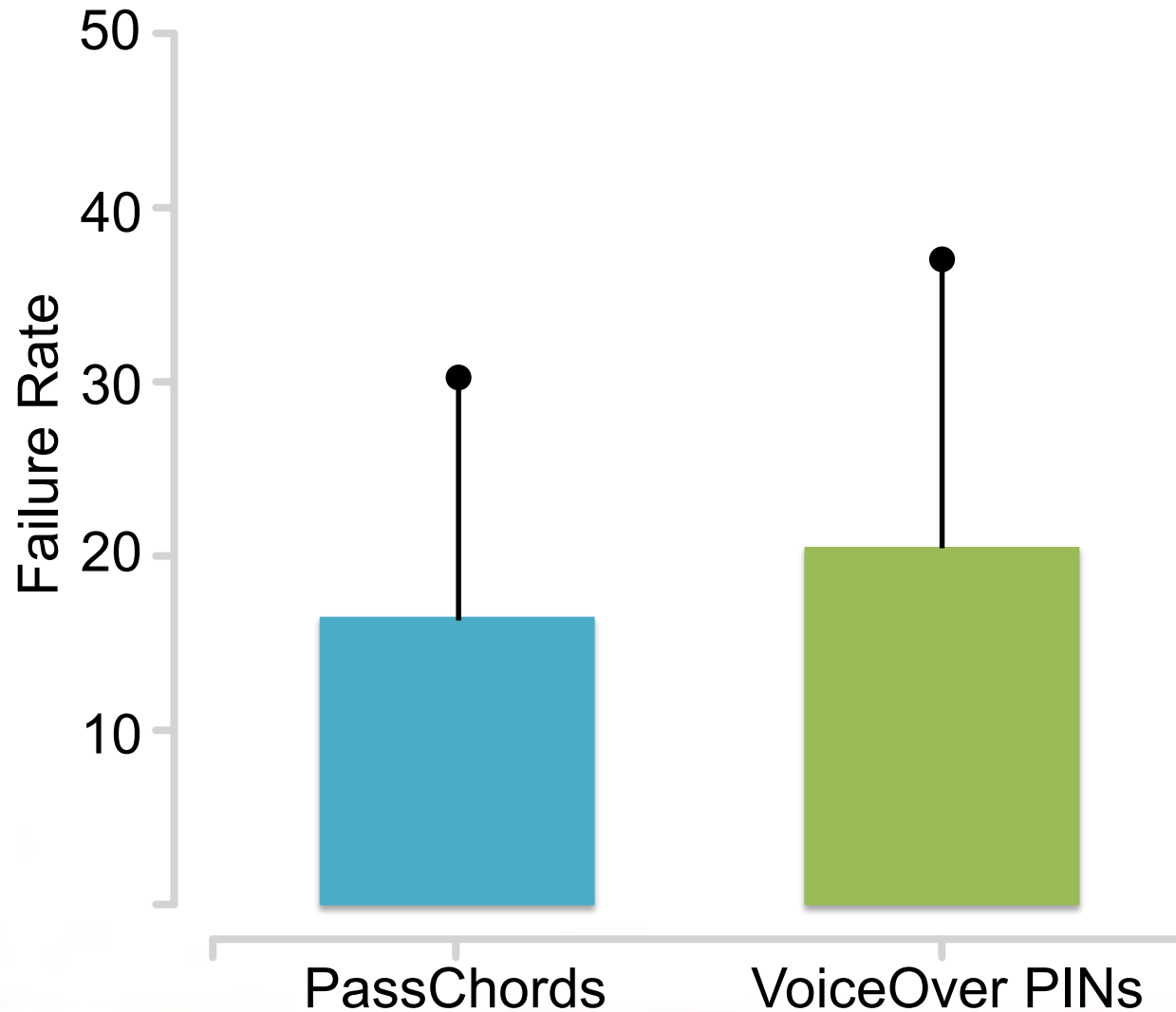
PassChords



Time to Authenticate



Accuracy



What About Security?

What About Security?

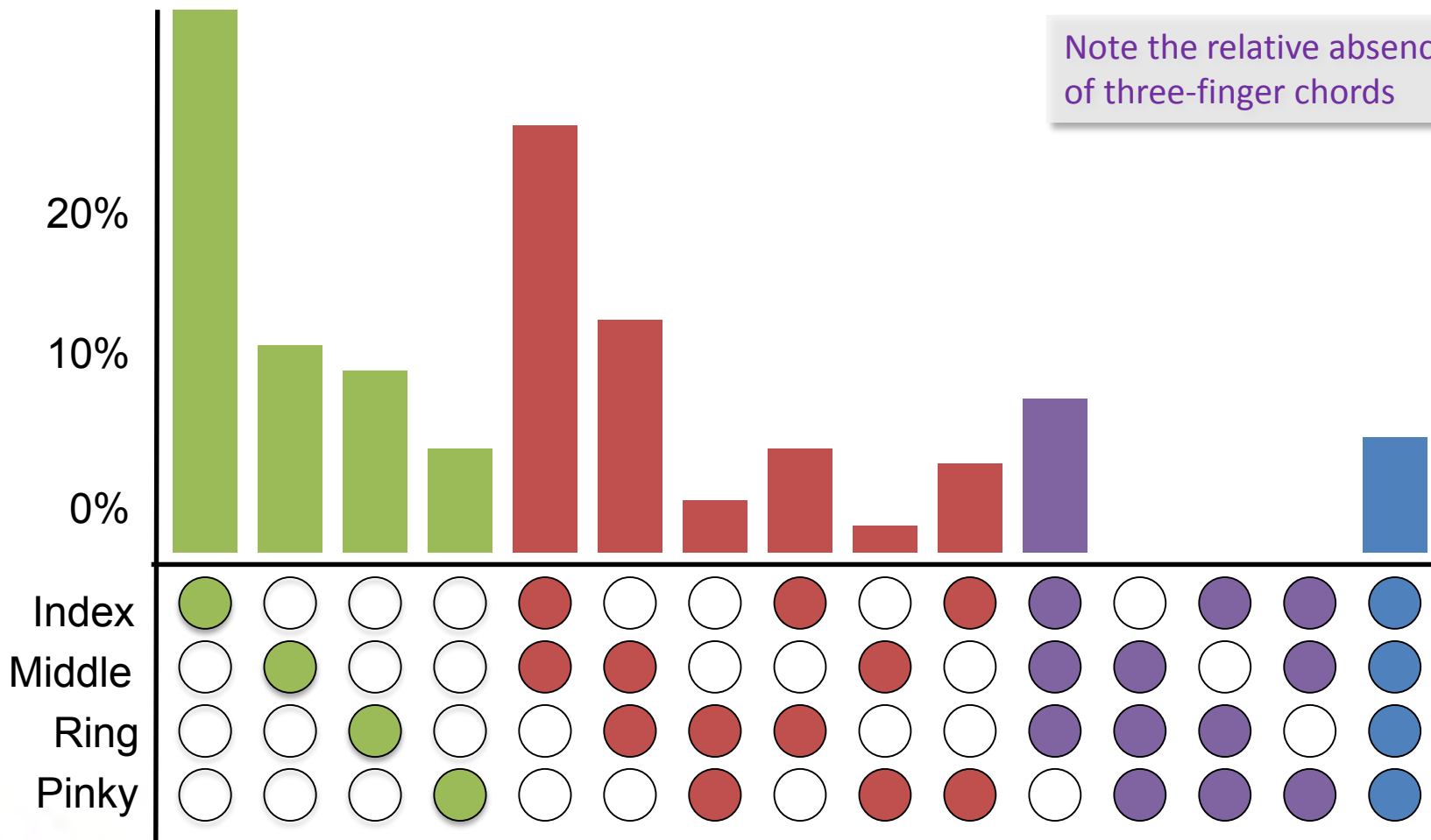
One measure is Guessing Entropy

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

4-digit PINS: 12.7 bits

Finger Pattern Frequency

Note the relative absence of three-finger chords



What About Security?

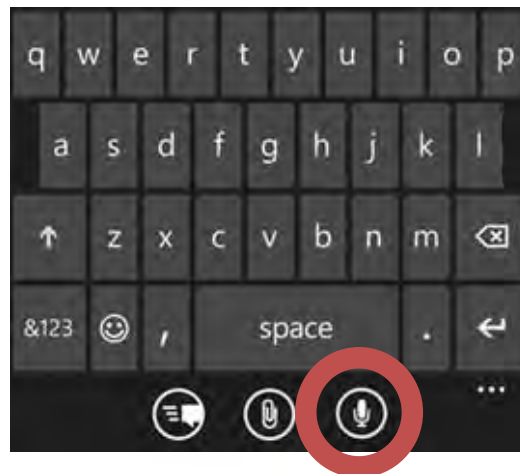
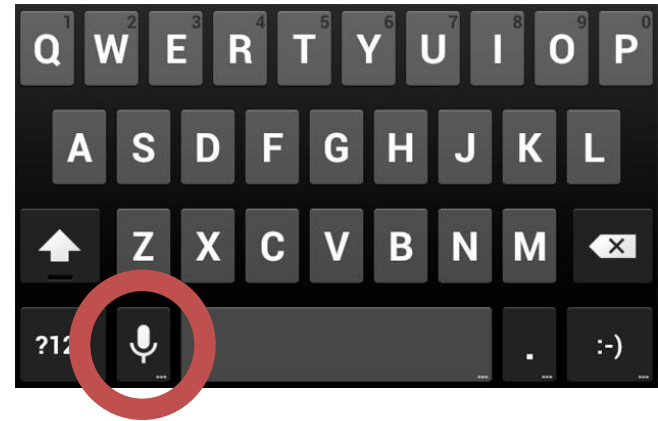
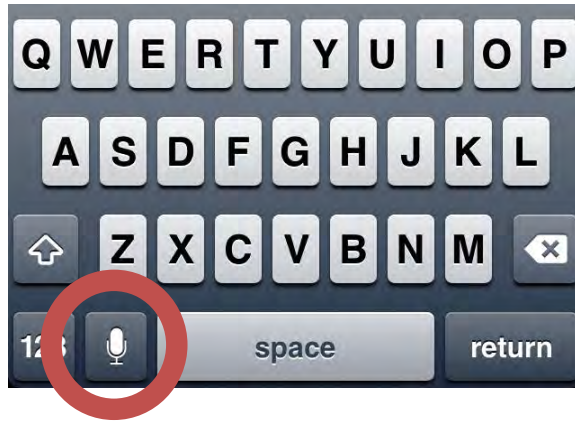
One measure is Guessing Entropy

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

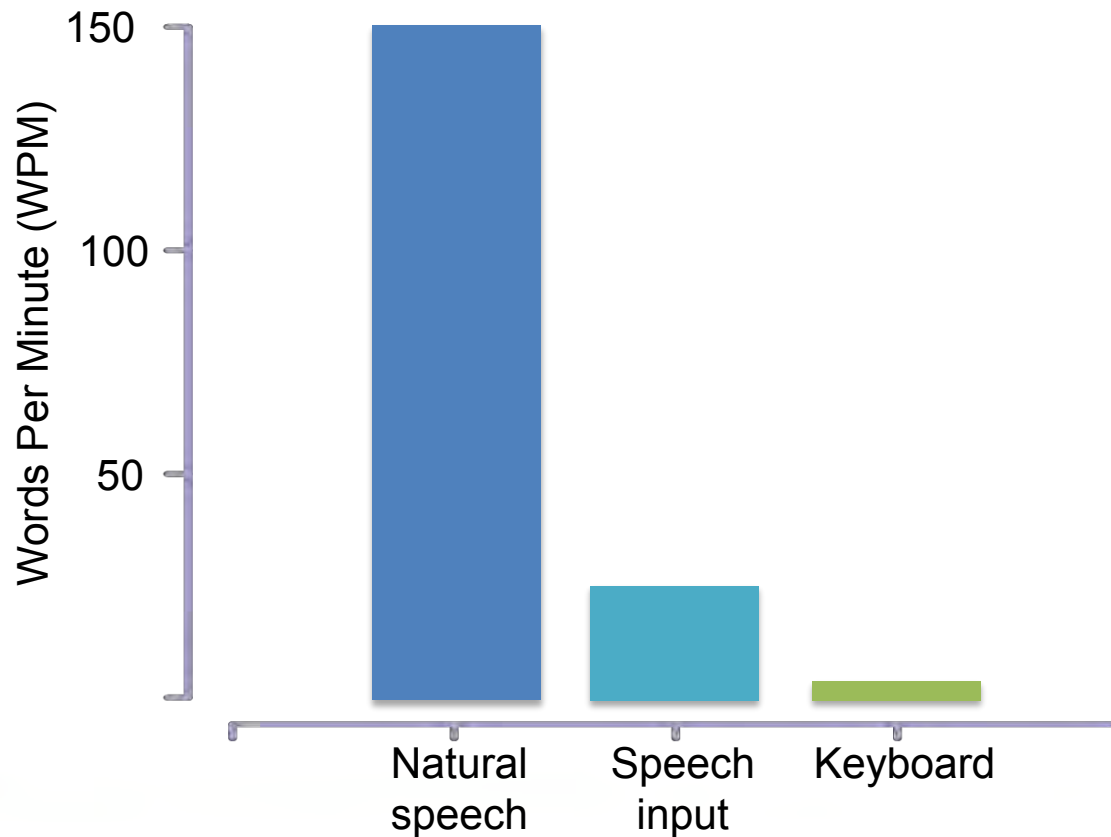
my

Serial Access in Reviewing Transcript

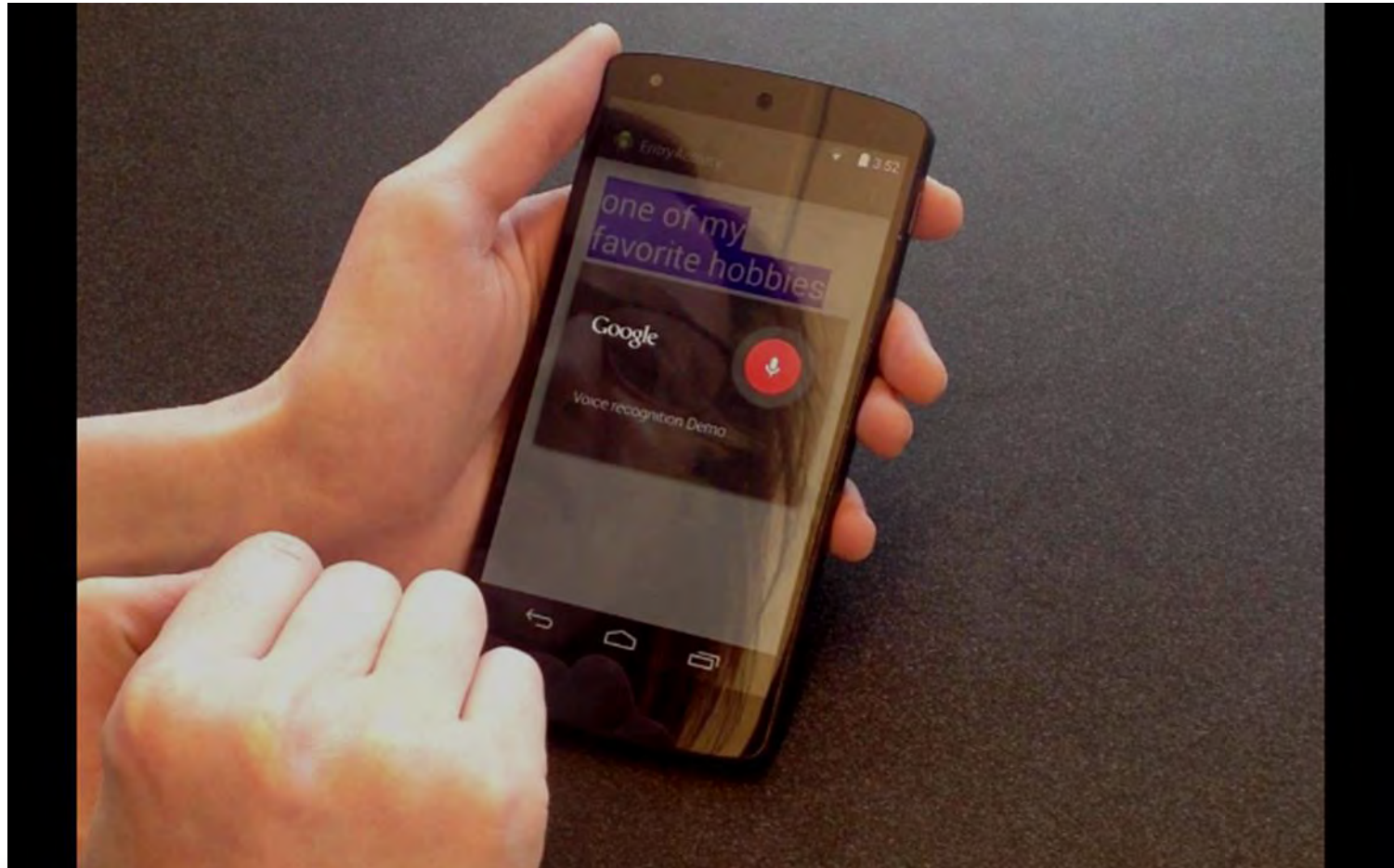
hobbies

Reviews and Edits

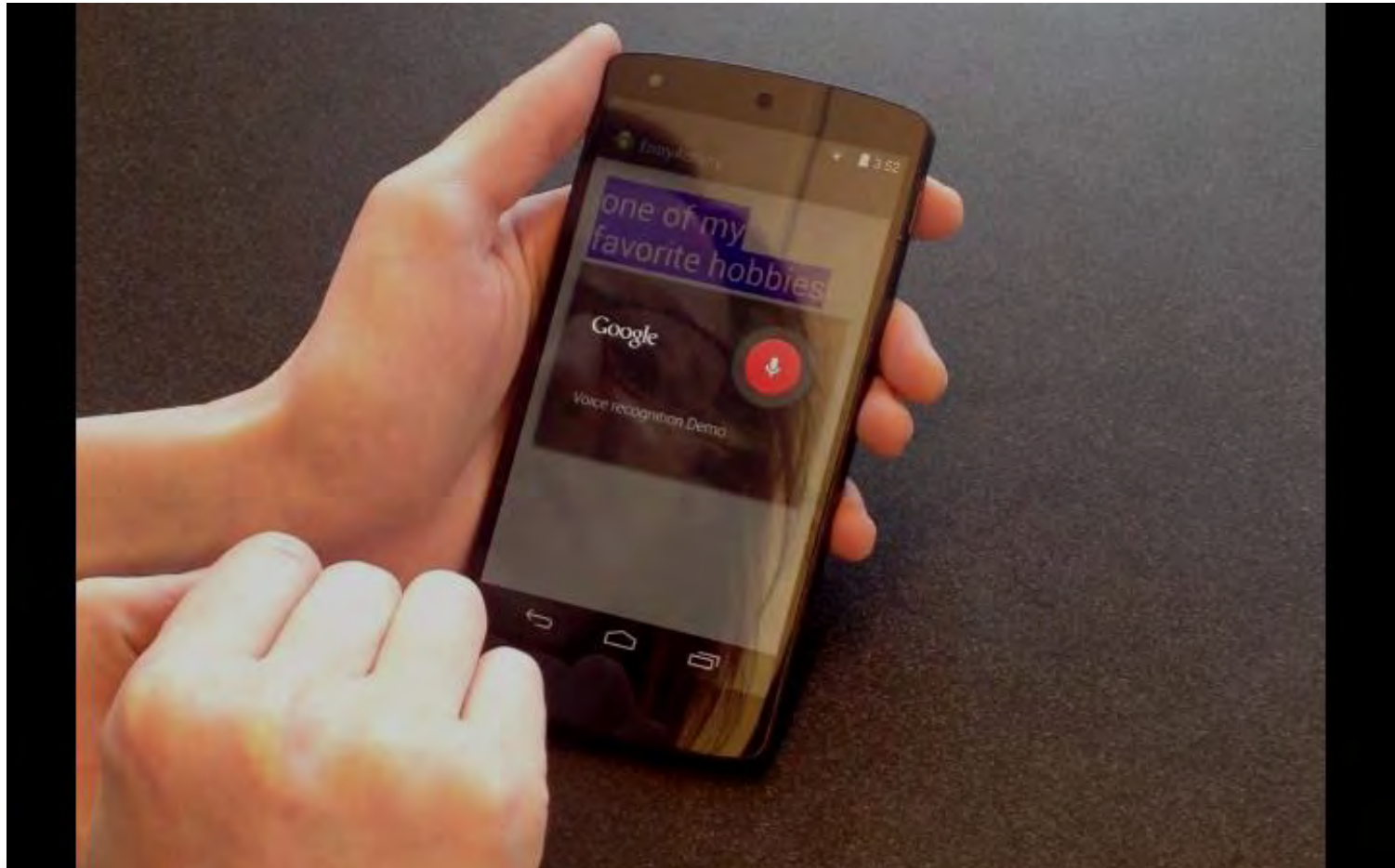
80% of composition time in review and edits



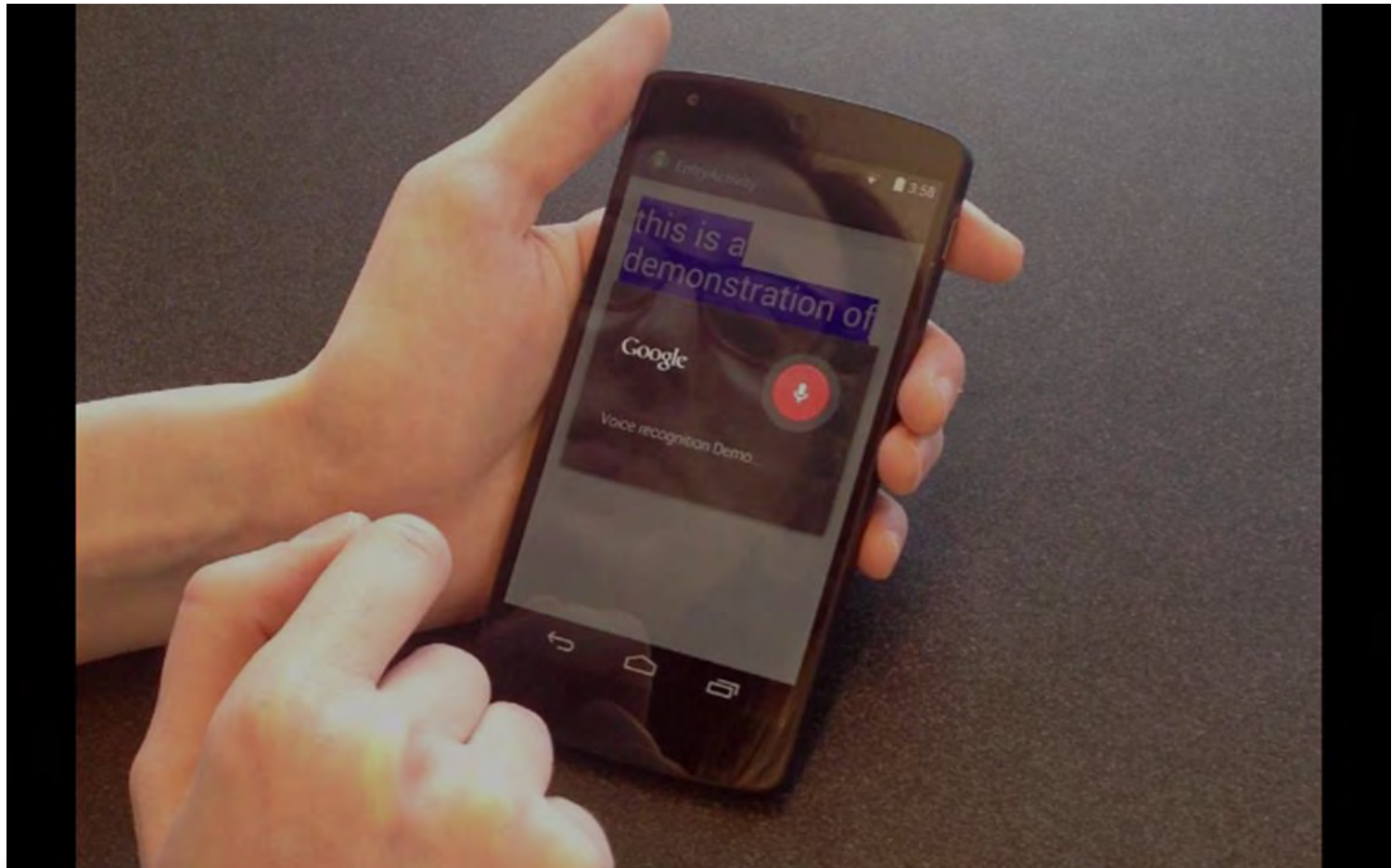
Spifi



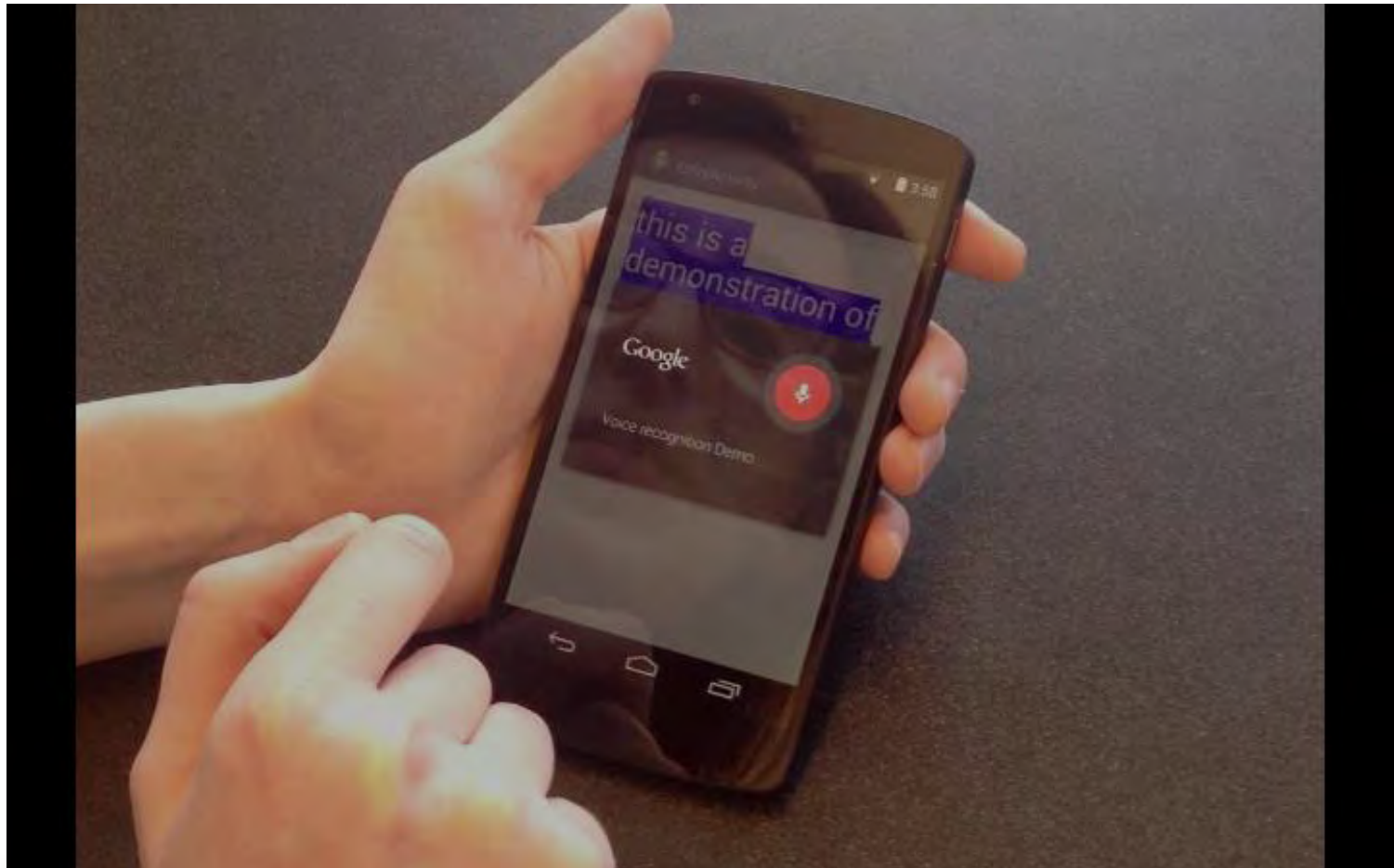
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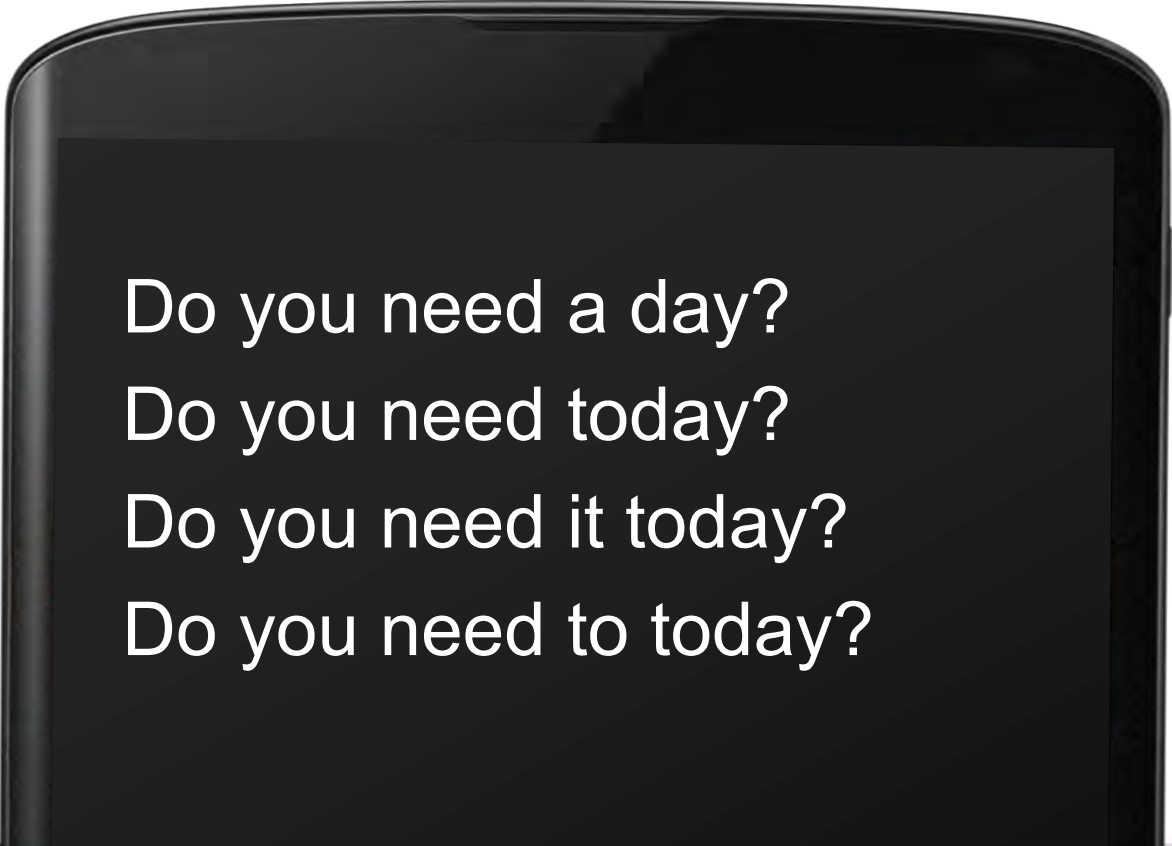
Spifi



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

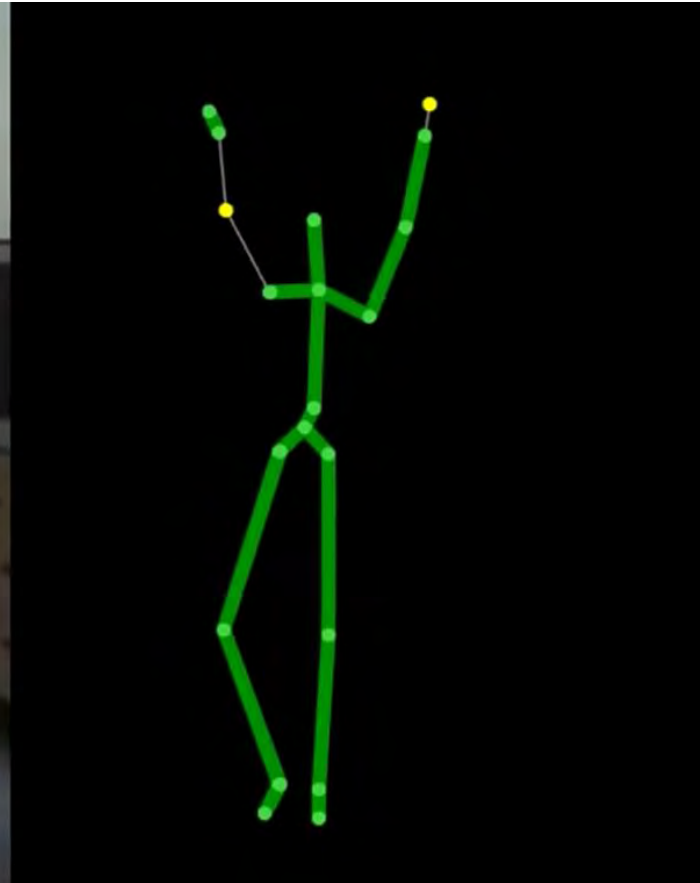


“Sometimes you don’t follow along as well unless [you are] one on one.”

Accessibility is More than Text Entry



Accessibility is More than Text Entry



Accessibility is More than Text Entry



OneBusAway

Home Tools Research Contact Us Settings

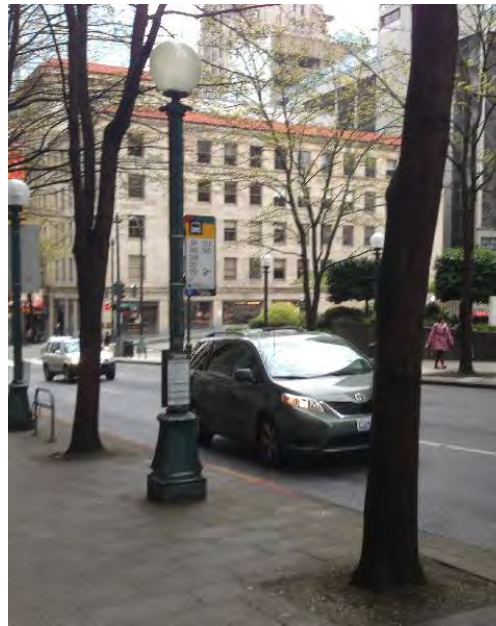
NW MARKET ST & BALLARD AVE NW

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

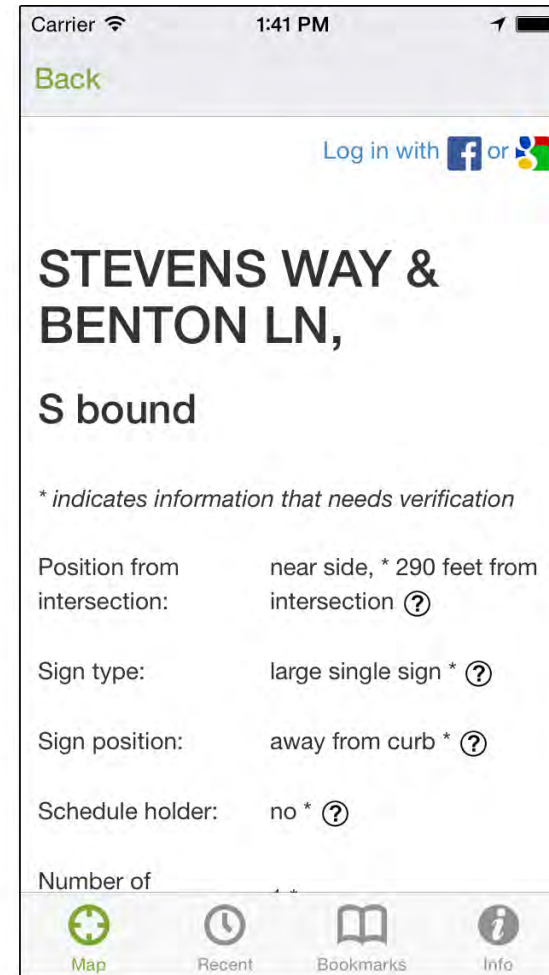
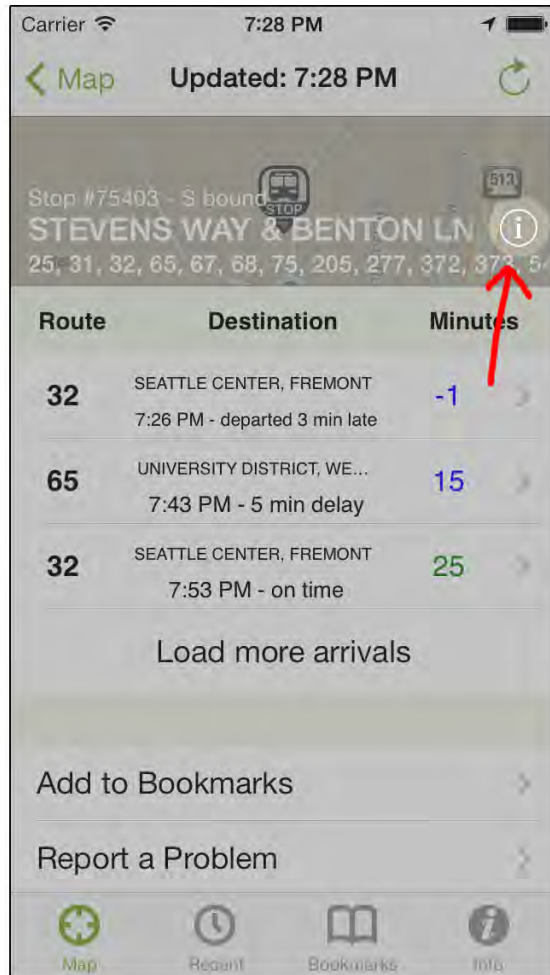
Last Update: 03:57 PM

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

Back to Bic for Her



It is very, very hard to imagine that the people who made the decision to launch “Bic for Her” were the same women expected to buy them.

Back to Bic for Her



It is very, very hard to imagine that the people who made the decision to launch “Bic for Her” were the same women expected to buy them.

There are lots of ways to make an awful mistake, but some of the worst could be avoided if consumer companies were staffed by actual consumers. Entrepreneurs rarely make this kind of mistake because they tend to start businesses to solve their own problem. That’s why they rarely look as silly as Bic does right now.

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

“Entrepreneurs ... tend to
start businesses to solve
their own problem”

Diverse participation is
critical in effective design

CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 13:
Designing for Diverse Needs

James Fogarty
Alex Fiannaca
Lauren Milne
Saba Kawas
Kelsey Munsell

Tuesday/Thursday
12:00 to 1:20

