

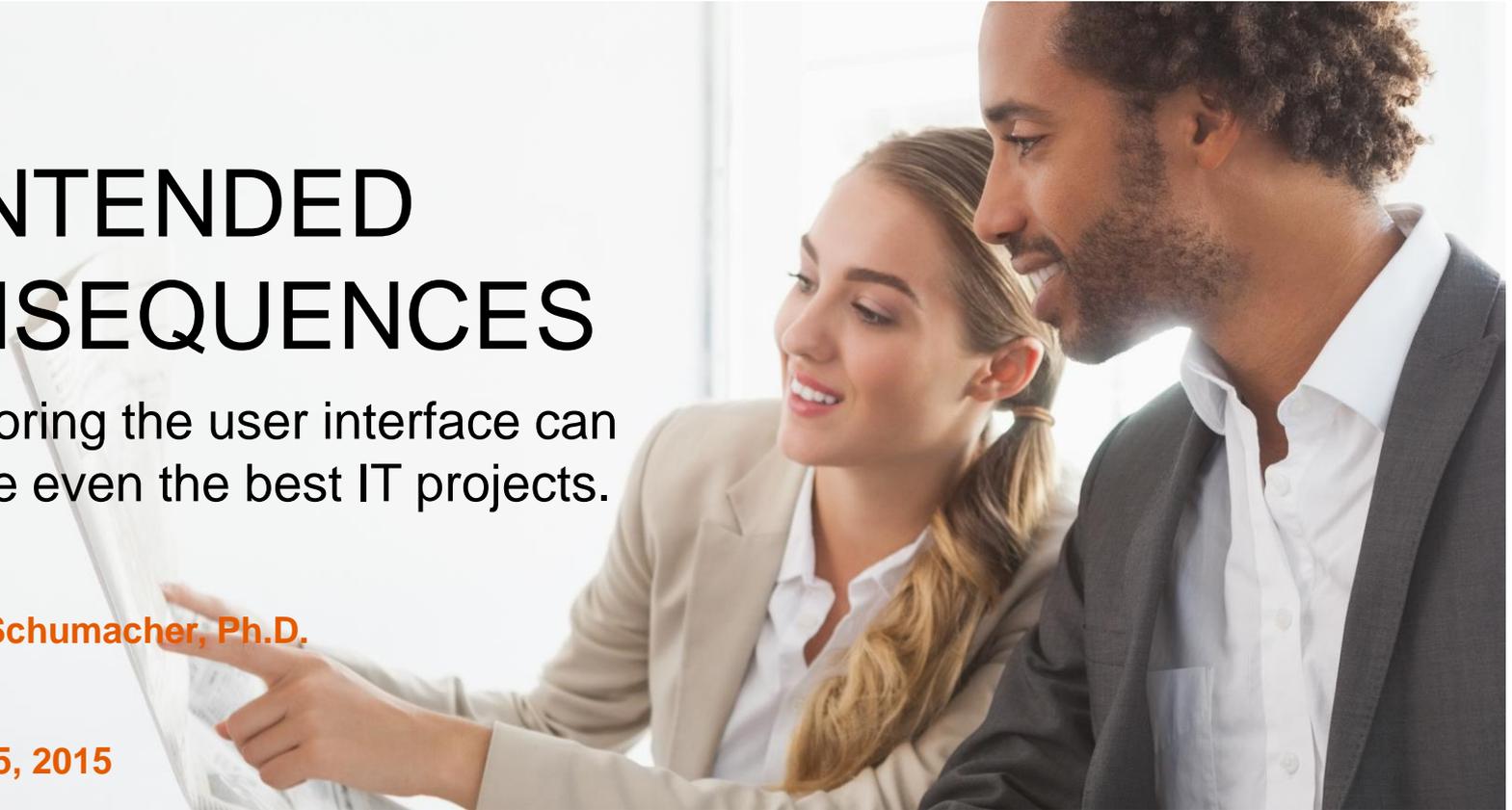
Consequências involuntárias: Como ignorar a interface do usuário pode sabotar até mesmo os melhores projetos de TI.



UNINTENDED CONSEQUENCES

How ignoring the user interface can sabotage even the best IT projects.

Robert M. Schumacher, Ph.D.
EVP
GfK UX
November 5, 2015



Pode a interface do usuário realmente sabotar um projeto de TI? É um problema para EHRs?



Can the 'user interface' *really*
sabotage an IT project?

Is the UI a problem for EHRs?

Como você mede o sucesso de um projeto de TI?

How do you measure success of an IT project?

Effects of Poor Usability

Efeitos de uma interface de usuário má

Quality of care – Declining satisfaction in face to face care

Qualidade do cuidado – o declínio da satisfação em casos cara a cara

45% of respondents say patient care is worse since implementing an EHR.

67% of oncologists said EHRs took away from face-to-face time

Nearly 23% of internists say patient care is **significantly worse**

26% said the new technology diminished their ability to effectively manage patient treatment plans.

Medical Economics Feb. 10, 2014 : Physician outcry on EHR functionality, cost will shake the health information technology sector

Friedberg, M.W., Chen, P. G., Van Busum, K.R. et al. (2013). Factors Affecting Physician Professional Satisfaction and Their Implications for Patient Care, Health Systems, and Health Policy. RAND Corporation and the American Medical Association. Washington, D.C.

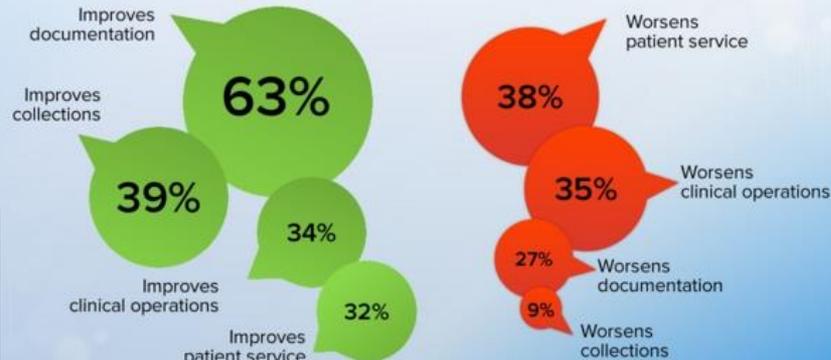


Why You Don't Use an EHR



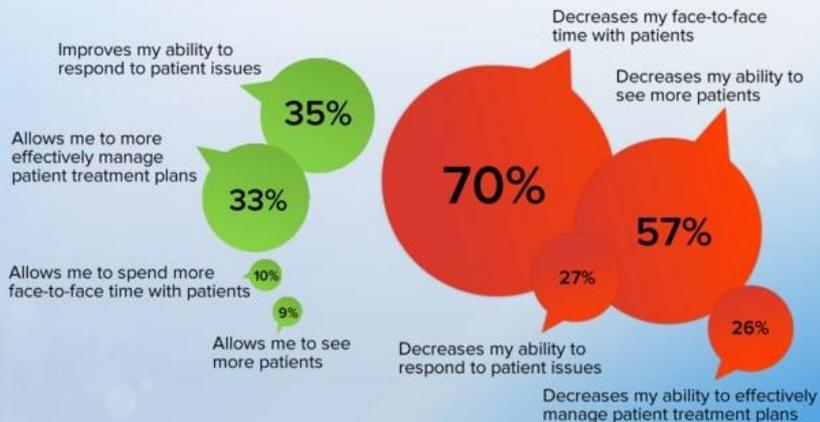
Respondents could choose more than one answer.

EHRs' Effect on Your Practice



Respondents could choose more than one answer.

EHRs' Effect on Patient Encounters



Respondents could choose more than one answer.

Survey of 18,575 practicing US physicians across 25 specialties

Medscape EHR Report July 15 2014

Effects of Poor Usability– EHR Examples *Efeitos de uma interface de usuário má*



Productivity – Seeing fewer patients

Produtividade – Vendo menos pacientes

34% EHR physician users were “very dissatisfied” with the ability of their EHR to decrease workload -- an increase from 19 percent in 2010.

“We used to see 32 patients a day with one tech, and now we struggle to see 24 patients a day with four techs. And we provide worse care,” said one survey respondent.

American College of Physicians sponsored survey of 4279 physicians by AmericanEHR from 2010 to 2012

Medical Economics Feb. 10, 2014 : Physician outcry on EHR functionality, cost will shake the health information technology sector

Effects of Poor Usability– EHR Examples
Efeitos de uma interface de usuário má



Safety – Poor user interfaces create conditions for major mistakes

Segurança – interfaces de usuário más criam condições para grandes erros

Baby's death spotlights safety risks linked to computerized systems

As hospitals rely more on electronic data, worries over potential errors grow

Chicago Tribune

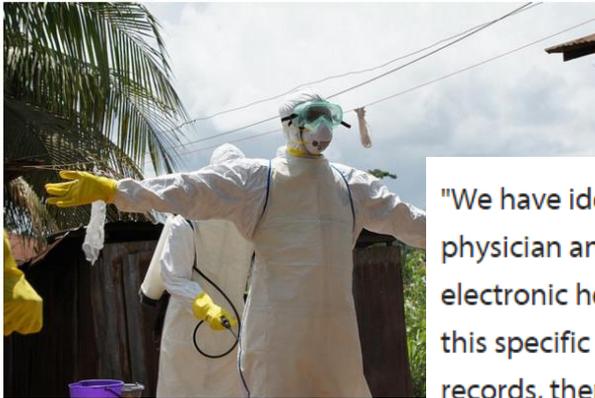
Effects of Poor Usability– Public Health

Efeitos de uma interface de usuário má – Saúde Pública



Safety – Poor user interfaces create conditions for major mistakes

Segurança – interfaces de usuário más criam condições para grandes erros



"We have identified a flaw in the way the physician and nursing portions of our electronic health records (EHR) interacted in this specific case. In our electronic health records, there are separate physician and nursing workflows," Texas Health officials explained in the Oct. 1 media statement. "As designed, the travel history would not automatically appear in the physician's standard workflow."

Healthcare IT News
– 3 Oct 2014

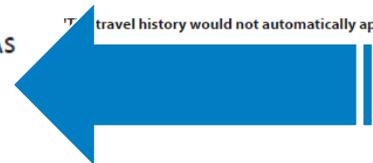


◀ Erin McCann, Managing Editor

Erin McCann is Managing Editor at *Healthcare IT News*. She covers healthcare privacy and security, meaningful use, ambulatory care and healthcare policy. Follow Erin on Twitter @EMcCannHITN and Google+

Questions raised about EHR workflow in Ebola case

"Travel history would not automatically appear in the physician's standard workflow"



Healthcare IT News – 6 Oct 2014

Missed Ebola diagnosis leads to debate

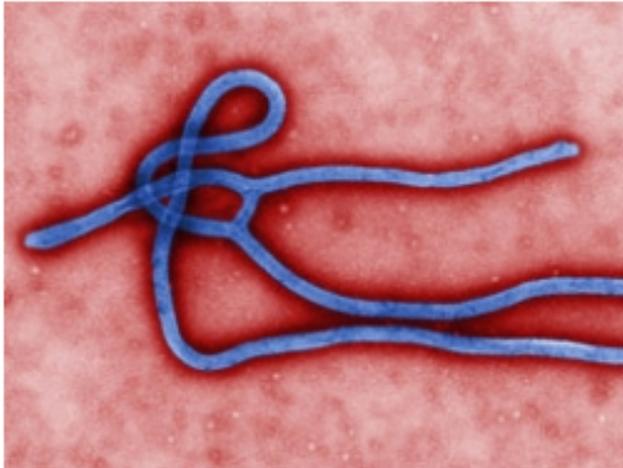


Photo: CDC Global, August 2014

Texas Health revises statements to: 'no flaw in the EHR'

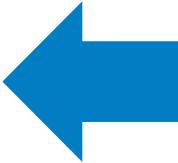
DALLAS | October 6, 2014

[Tweet](#) 106 [G+1](#) 4 [Recommend](#) 93 [Share](#) 225

A statement from the 25-hospital Texas Health Resources explaining why critical travel information was not communicated regarding the nation's first Ebola patient has left many wondering where the problem occurred. And, more importantly, how to fix it.

On Oct. 1, THR issued a statement, which appeared to point fingers at THR's Epic electronic health record system versus potential human error, saying that a flaw in the interaction between the physician and nursing

portion of the EHR caused the patient's travel history to not appear in the physician's standard workflow. Epic contacted *Healthcare IT News* to highlight that Texas Health Resources had issued an Oct. 3 correction to their initial statement. They declined to comment on anything further.



AMA pede revisão de design dos Registros Eletrônicos de Saúde para melhorar a usabilidade



Sept. 16, 2014

AMA Calls for Design Overhaul of Electronic Health Records to Improve Usability

For immediate release:

Sept. 16, 2014

Champions reboot of technology to help physicians take better care of patients

CHICAGO - Building on its landmark [study](#) with RAND Corp. confirming that the use of Electronic Health Records (EHRs) is taking a significant toll on physicians, the American Medical Association today released a new [framework](#) outlining the design principles for EHR systems that have neglected usability as a necessary feature. Responding to the findings of the study, the AMA today released a new [framework](#) outlining the design principles for EHR systems that have neglected usability as a necessary feature. Responding to the findings of the study, the AMA today released a new [framework](#) outlining the design principles for EHR systems that have neglected usability as a necessary feature.



“EHR usability, however, represents a unique and vexing challenge to physician professional satisfaction”.
2013 Rand Report

Yes, the UI can sabotage an IT project

Users are now in revolt

www.LetDoctorsBeDoctors.com



EHR State of Mind | #LetDoctorsBeDoctors | ZDoggMD.com

YouTube • EHR's suck. Let's make 'em better. Go to <http://LetDoctorsBeDoctors.com> and tell the IT and government folks what's up. And check out...

Do not misunderstand.

I am not a Luddite

Usability *Usabilidade*



yü-zə-'bí-lə-tē from O.Fr. *usable* (1311), from *user* (see *use*). Not a common word before c.1840.

The extent to which an interface can be used by **specified users** to achieve **specified goals** with effectiveness, efficiency, and satisfaction in a **specified context** of use.

A medida em que uma interface pode ser usada por usuários específicos para atingir metas especificadas com eficácia, eficiência e satisfação num contexto de uso especificado.



Adapted from ISO 9241 definition of Usability

What Usability is NOT...

O que a usabilidade não é...



Aesthetics

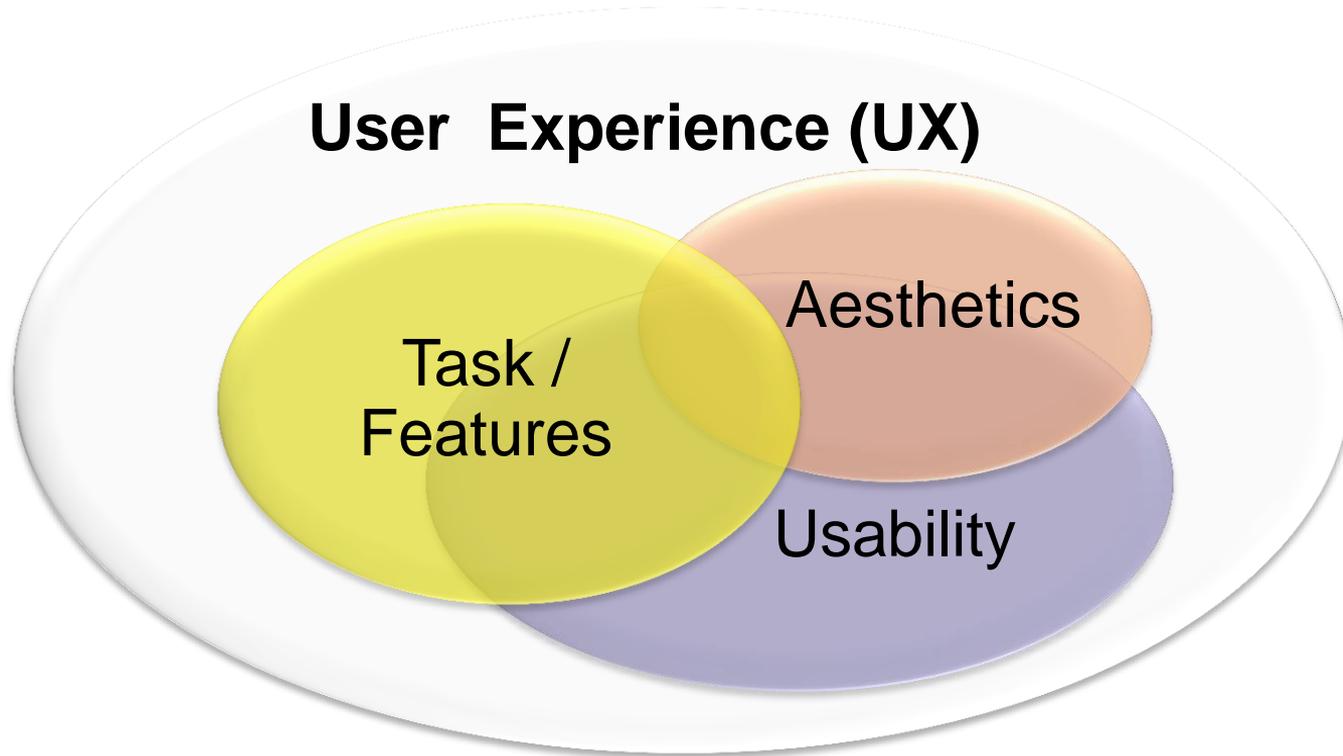


Attitude & Opinion

Functional - UAT



User Experience



The Target Quadrant

Where a lot of things end up

Functional
(Utility)
Utilidade



Usable
Utilizável

Objective: Make things that are useful and usable

Knowing the features is not enough.

You have to **know how to put those features together** to build the overall user experience.



Why do we get bad user experiences...

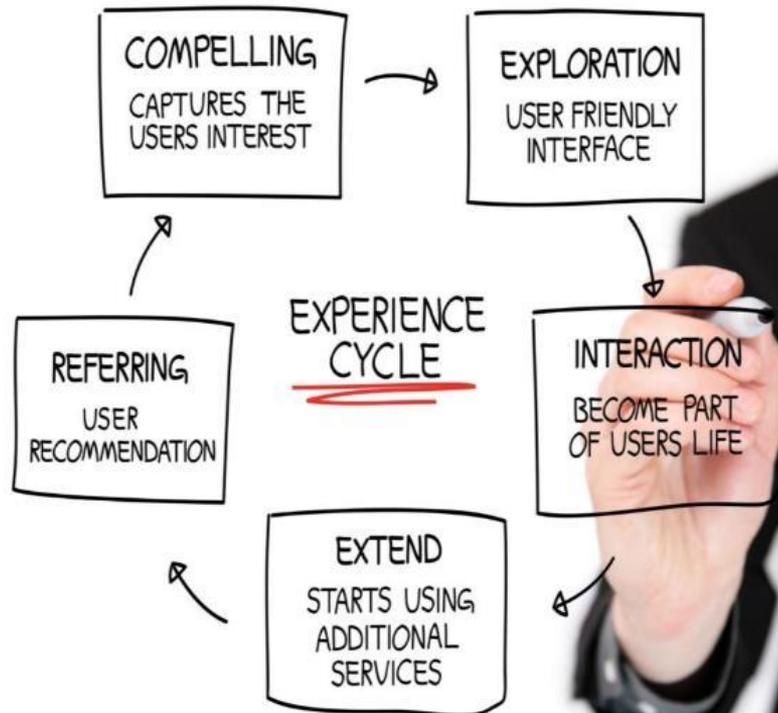


Então, se temos a intenção de construir boas experiências, por que nós temos maus

Criar uma concepção orientada para a simplicidade na interface do usuário é difícil...



Designing for simplicity in the user interface is hard...



Os programados e designers acordam um dia e dizem
'Eu acho que vou fazer a vida um pouco mais difícil para os usuários hoje?'

Do programmers and
designers wake up and say:
'I think I'm gonna make
things a little harder for
those users today?'

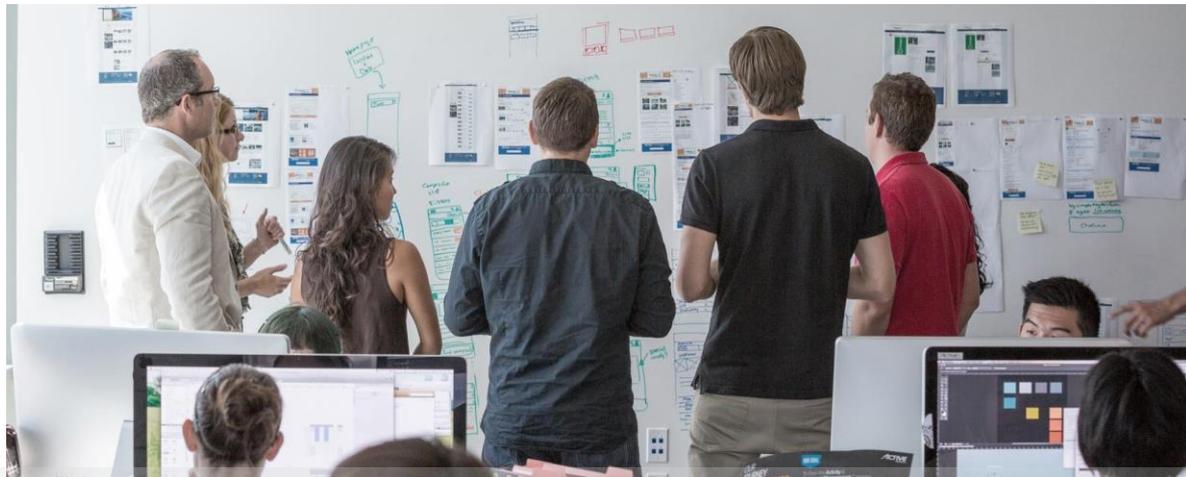


Aqueles que projetam, constroem, personalizam e implementam assumem a responsabilidade pela experiência dos usuários em termos de: Eficácia, usabilidade e segurança



Those who design, build, customize, and implement bear a responsibility to those who experience for the user experience

Efficacy,
efficiency,
usability, and
safety



Então porque é que as organizações não concentram mais energia ou recursos na experiência do usuário?



So why don't supplier and buyer organizations focus more energy and resources on usability and user experience?



Why don't organizations focus more energy



Limited Resources



Uninformed or Misguided

September 8, 2015, Vol 314, No. 10 >

Research Letter | September 8, 2015

Electronic Health Record Vendor Adherence to Usability Certification Requirements and Testing Standards

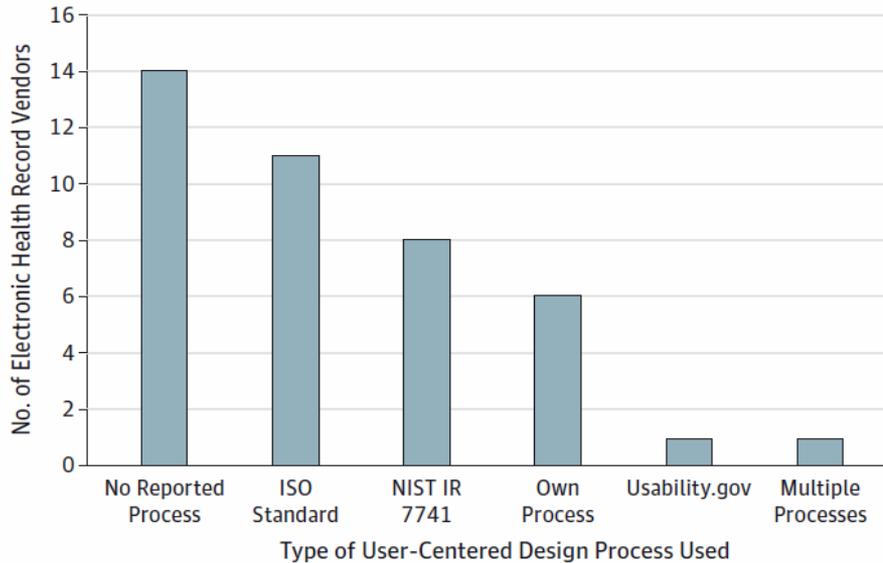
Raj M. Ratwani, PhD¹; Natalie C. Benda, BS¹; A. Zachary Hettinger, MD, MS¹; Rollin J. Fairbanks, MD, MS¹

Researchers Find Large Number of EHRs Do Not Meet Usability Standards

Posted on September 8, 2015

WASHINGTON, D.C. (Sept. 8, 2015)—A report by MedStar Health's National Center for Human Factors in Healthcare finds that a significant percentage of electronic health record (EHR) vendors failed to meet federally mandated user-centered design requirements and did not conform to usability testing standards for their EHRs, yet their products were certified as having met all the requirements of the government's meaningful use program for EHRs. The findings, reported today in the *Journal of the American Medical Association*, are based on publicly available information supplied by the EHR vendors to the Office of the National Coordinator for Health Information Technology (ONC) between April 2013 and November 2014.

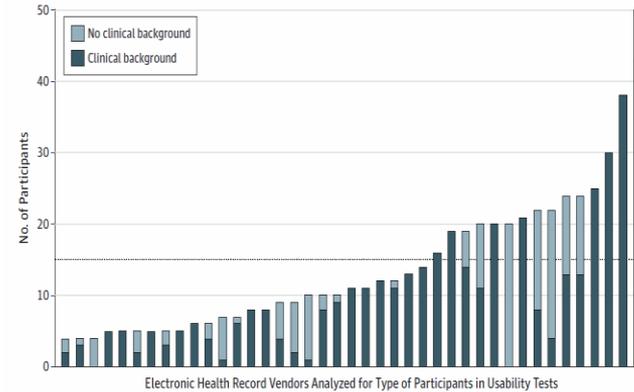
Figure 1. Type of User-Centered Design Process Used by Electronic Health Record Vendors



ISO standard...icates International Organization of Standardization usability process...7741, National Institute of Standards and Technology guide to improve...ability of electronic health records; and Usability.gov, Federal government...ability practices.



Figure 2. Type of Participants Used by Electronic Health Record Vendors for Usability Tests



Number of testers used To certify usability

Most organizations have no process to implement a good usability program despite requirements

E sobre organizações compradoras ... eles têm um grande interesse aqui



What about buyer organizations... they have an big interest here

Qual é o maior despesa operacional na maioria das implementações de software de TI? O tempo dos usuários

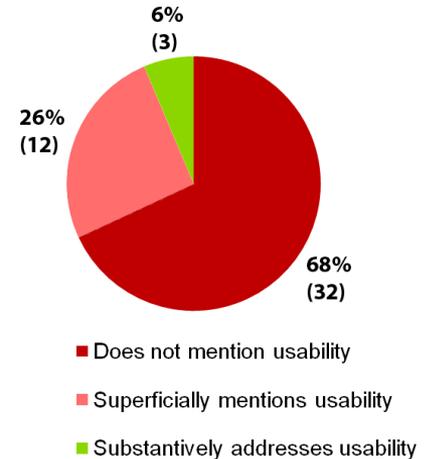


What is the highest operating expense in most IT software implementations?

Users' time

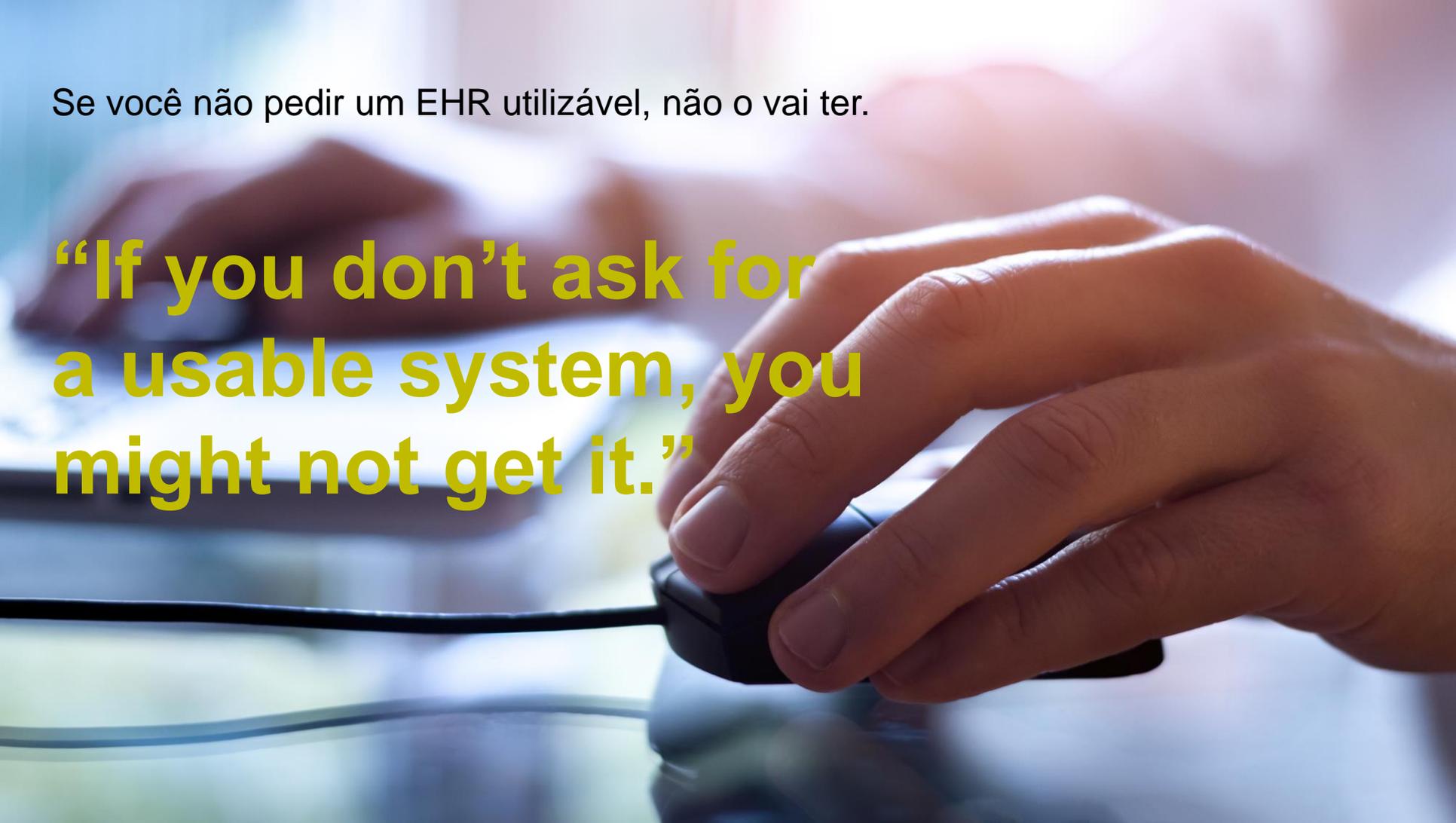
Buying organizations: Request for Proposals

- Analyzed 47 RFPs and Selection Guidelines for EHRs
- 32 out of 47 RFPs made *no* mention of usability
- Of the 15, where usability *is* mentioned, descriptions are often vague:
 - “Ease of use” is mentioned in the selection guideline
 - “Demonstrations are evaluated on intuitiveness and usability.”
 - “Ease of Use (minimizes typing, is intuitive, simple layout)” is given a suggested 8% weight in the vendor selection criteria
 - “General usability”



Se você não pedir um EHR utilizável, não o vai ter.

**“If you don’t ask for
a usable system, you
might not get it.”**



58% of 2600 surveyed physicians said EHR systems were **difficult to use**,
90% said that **easy-to-use systems** and better functionality **was key to improving quality of care**

Accenture doctors survey 2015: Healthcare IT pain and progress (as referenced in (Health Data Management, 4/13/15; <http://www.healthcareitnews.com/news/even-ehr-proficiency-rises-enthusiasm-dips>).

Why don't organizations focus more energy



Limited Resources



Uninformed or Misguided



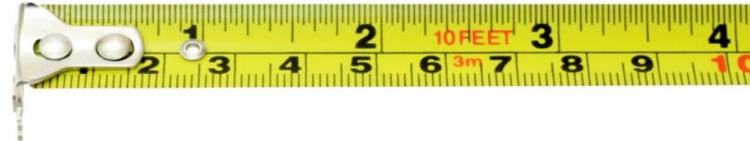
Can't Measure Usability

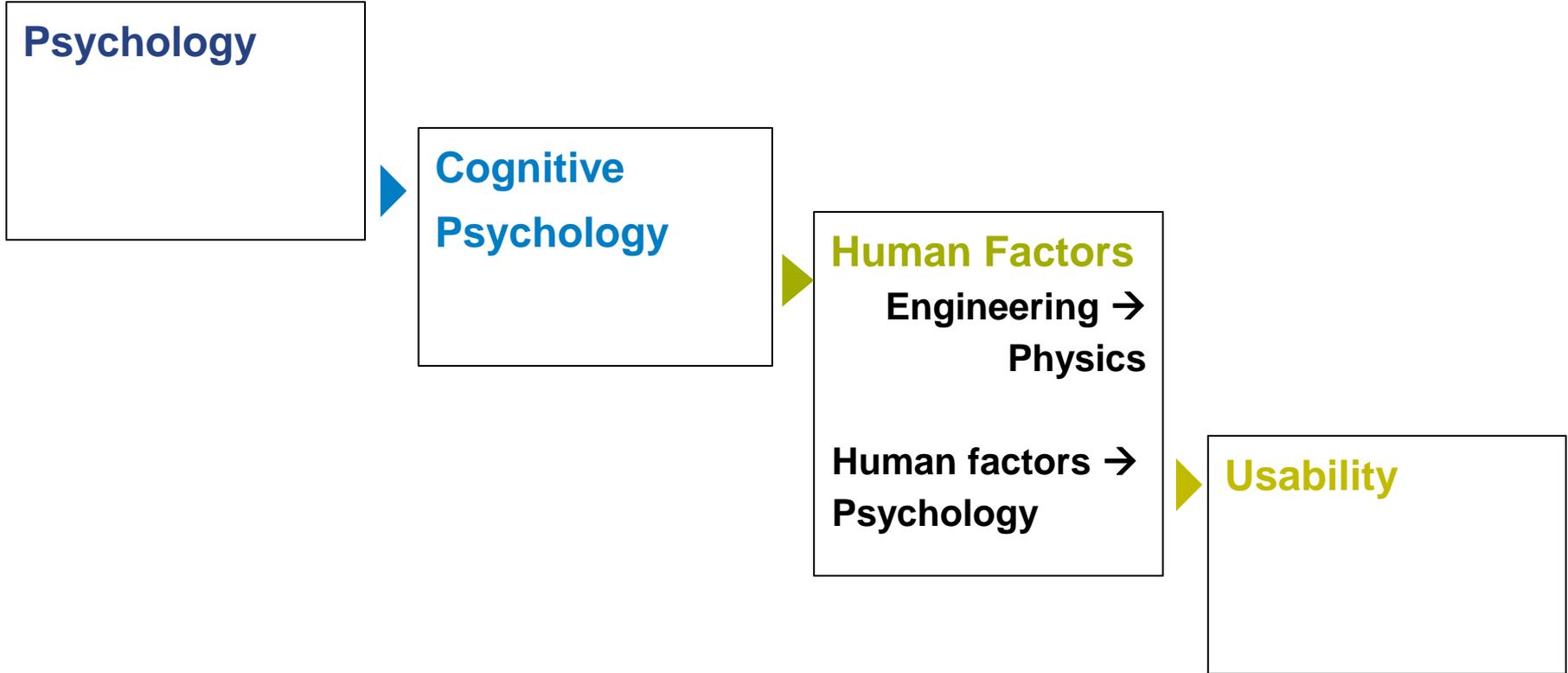
Improve



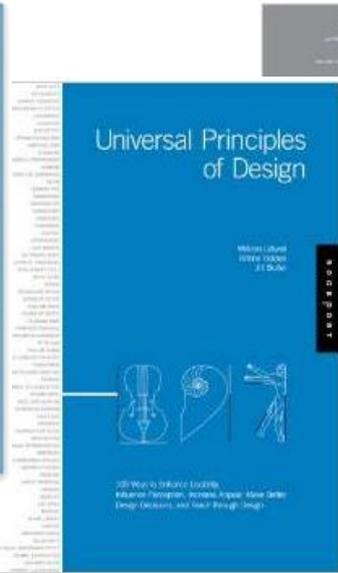
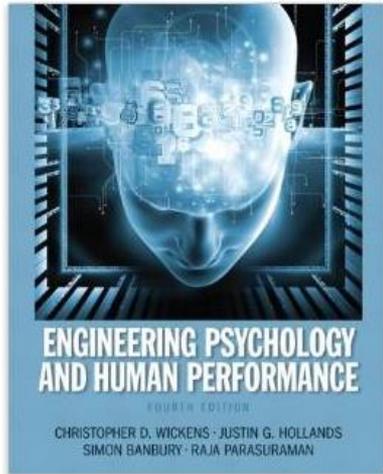
Behavior

Measure





There is a knowledge-base...



GOV.UK Search

ALPHA Last updated 2 July 2012

Government Digital Service

Design Principles

Listed below are our design principles and examples of how we've used them so far. These build on, and add to, our original [7 digital principles](#).

- 1 Start with needs*
- 2 Do less
- 3 Design with data
- 4 Do the hard work to make it simple
- 5 Iterate. Then iterate again.
- 6 Build for inclusion
- 7 Understand context
- 8 Build digital services, not websites
- 9 Be consistent, not uniform
- 10 Make things open: it makes things better

1 Start with needs*

*user needs not government needs

Forewords by:
Michael O. Leavitt
Secretary of Health and Human Services

Ben Shneiderman
Professor of Computer Science, University of Maryland

Methods of measuring behavior

Reaction time → Performance

Errors → Cognitive workload

Eye tracking → Attention

...

There is a rich history of constructing studies to understand and explain human performance

Principles of behavior that inform design

Memory

Motor capabilities

Signal detection

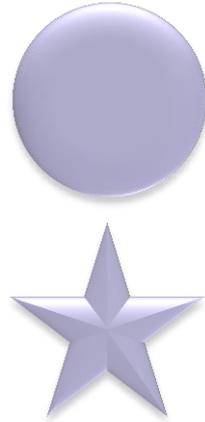
Psycholinguistics

Choice theory

...

Knowledge of human capabilities embodied in user interface design can optimize user performance

A Negative
statement, with
No (negative)
response



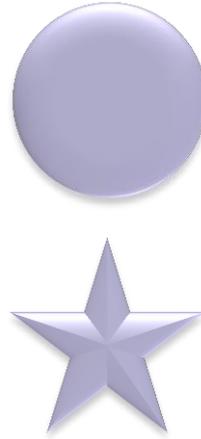
A Positive
statement, with Yes
(affirmative)
response

Sim ou Não?

O círculo está em cima da estrela
O círculo não está em cima da estrela

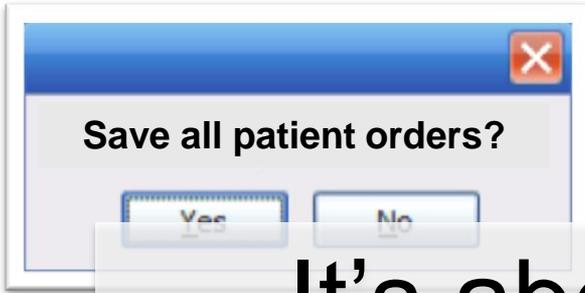


The circle is not above the star



The circle is above the star

- Positive **statements** evoke faster responses than negative statements
- Yes **responses** are much faster than No responses (~ 500 msec)



It's about cognitive effort
Not just 'too many clicks'



Methods of measuring behavior

Reaction time → Performance

Errors → Cognitive workload

Eye tracking → Attention

...

There is a rich history of constructing studies to understand and explain human performance

Principles of behavior that inform design

Memory

Motor capabilities

Signal detection

Psycholinguistics

Choice theory

...

Knowledge of human capabilities embodied in user interface design can optimize user performance

© Martin Handford – All images this slide and next

Signal Detection





What was the patient's
highest platelet count?

Reg: 000103335 Visit: 0025
 Admit: 1/22 HD: 15
 Rm: CES-7: DOB: 7/16/64
 Diagnosis: Ruptured Spleen... **Allergies**

Set Lab Options

From: 1/25/2001

To: 1/31/2001

Micro:

Other:

Priority: 5

Compression: None

[Set Options](#)

Select View

[Grid View](#) [Skeleton View](#)

Legend

Normal *Bold Italics indicates a comment exists*

Abnormal

Low

High * indicates a previous value exists

Critical

	01/30/01 04:04	01/30/01 04:03	01/29/01 04:15	01/28/01 04:00	01/27/01 03:54	01/26/01 04:35	01/25/01 13:27	01/25/01 04:05
- Key Labs								
- CBC								
<u>White Blood Count</u>		25.9	30.5	35.6*	42.1	41.3		36.6
<u>Red Blood Count</u>		3.80	3.69	3.86	3.90	3.82		3.34
<u>Hemoglobin</u>		11.6	11.4	12.0	12.0	12.0		10.4
<u>Hematocrit</u>		35.0	34.0	35.7	36.0	35.1		30.7
<u>MCH</u>		93.0	92.0	95.0	92.0	95.0		91.9
<u>MCHC</u>		30.5	31.0	31.0	31.0	31.4		31.2
<u>MPV</u>		32.7	33.2	33.5	33.4	34.1		33.9
<u>Platelet Count</u>		962	962	962	962	962		909
<u>Seq Neutrophils</u>		65	66	64	68	70		75
<u>Band Neutrophils</u>		9	2	14	13	12		6
<u>Lymphocytes</u>		19	19	6	6	8		7
<u>Monocytes</u>		5	9	9	4	4		4
<u>Eosinophils</u>		1	1	3	3	3		4
<u>Metamyelocyte</u>		1	2	4	2	2		2
<u>Nucleated RBC</u>				1				

When everything is highlighted, nothing is highlighted



Measuring Behavior with Survey: UX Score



Usability



Learnability

The operation of the interactive system is easy to learn.

Operability

The features / functions are accessible and easy to use. The user controls the interactive system.

Usefulness



Product Fit

The system gives the user the feeling of belonging to a group of users and of being a special individual.

Inspiration

The user has fun as a result of the interaction and that inspires her or him to try more new things.

Aesthetics

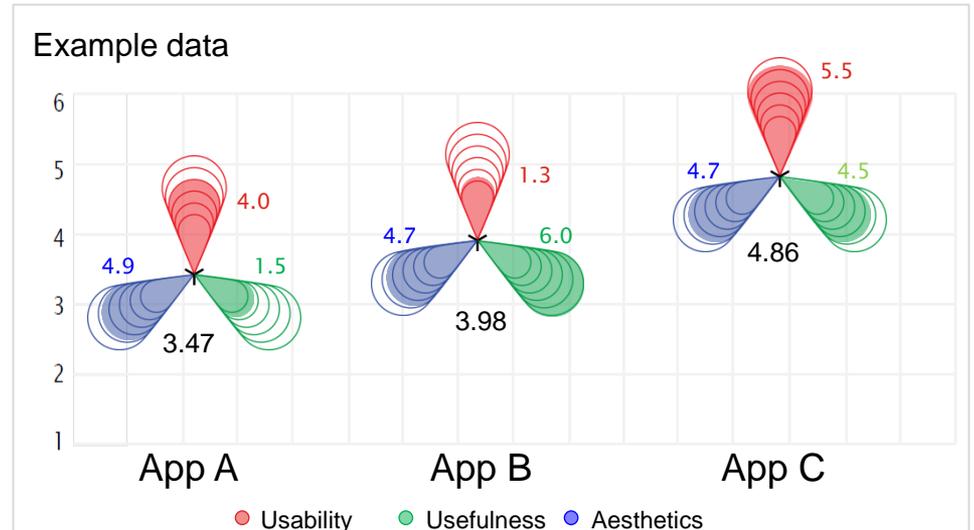
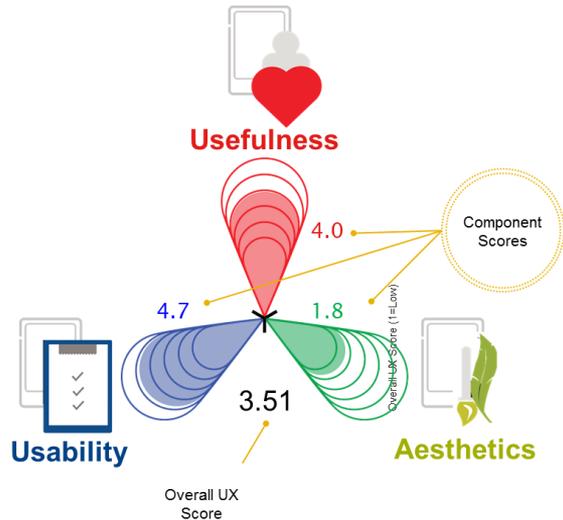


Look & Feel

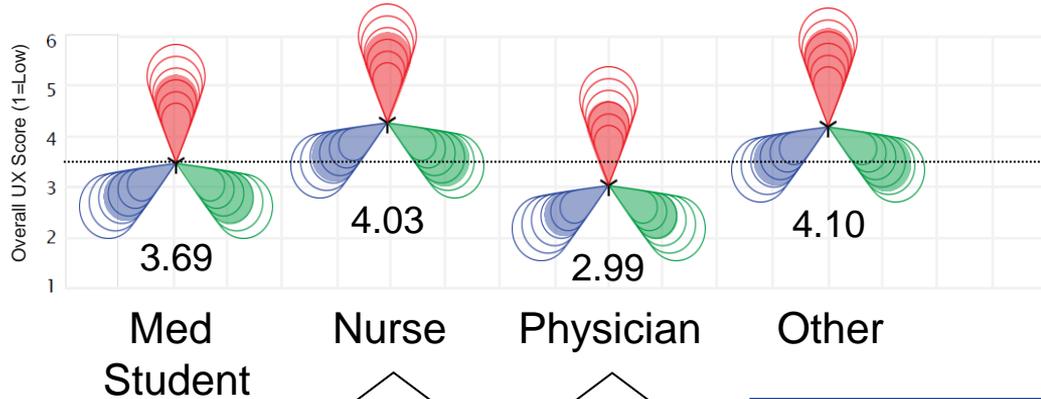
The user is pleased by how the system looks and feels.

Evaluating overall user experience

Users rate experiences across a number of statements in each of three core pillars that relate to usability, usefulness and aesthetics.

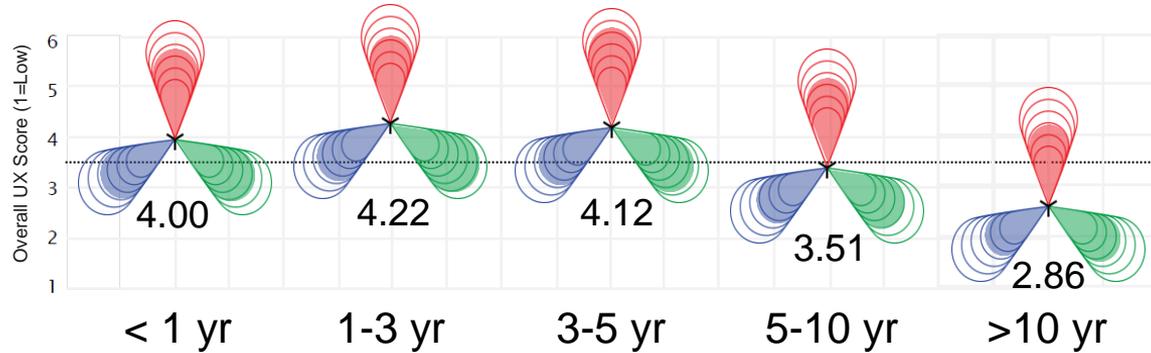


Pilot study with UX Score: By Role (n=46)

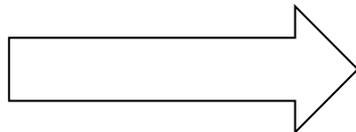


	UX Score Overall	Utility	Usability	Aesthetics
Medical student (8)	3.69	3.41	3.66	4.31
Nurse (13)	4.03	3.87	3.79	4.85
Physician (15)	2.99	2.82	3.07	3.20
Other (10)	4.10	3.70	4.13	4.85

Pilot study with UX Score: By Tenure (n=46)



	UX Score Overall	Utility	Usability	Aesthetics
< 1 year (7)	4.00	3.86	3.96	4.36
1-3 years (9)	4.22	3.83	4.19	5.06
3-5 years (9)	4.12	3.86	4.17	4.56
5-10 years (7)	3.51	3.36	3.43	4.00
> 10 years (14)	2.86	2.64	2.77	3.50



With standardized UX measures we can compare:

- Across competitive platforms
- Across user groups/roles/properties
 - Over time
 - And many other ways

O que podemos fazer para evitar essas consequências não intencionais ?



What can we do to avoid those unintended consequences?

A yellow sticky note is attached to a brown string with a wooden clothespin. The number '1' is printed in a large, bold, black font in the center of the note.

1

A yellow sticky note is attached to a brown string with a wooden clothespin. The number '2' is printed in a large, bold, black font in the center of the note.

2

A yellow sticky note is attached to a brown string with a wooden clothespin. The number '3' is printed in a large, bold, black font in the center of the note.

3

What has not worked:

Reliance on goodwill, reasoning, and complaining

Improvements in EHR UX will be evolutionary – if not glacial – due to heavy investment in installed base

O que não funcionou : Reliance sobre o ágio , raciocínio, e queixando-se melhorias em EHR UX será evolutiva - se não glacial - devido ao forte investimento em base instalada

Criar uma cultura que coloca o usuário em primeiro lugar



1

Organizations must
create a culture that puts
the user first

Build an organization that puts the user first

Construir uma organização que coloca o usuário em primeiro lugar



User experience is **cultural** – it's not just an outcome

A experiência do usuário é cultural - não é apenas um resultado

Adopt **processes** that result in good user experience

Uma boa experiência de usuário é o resultado de um processo.

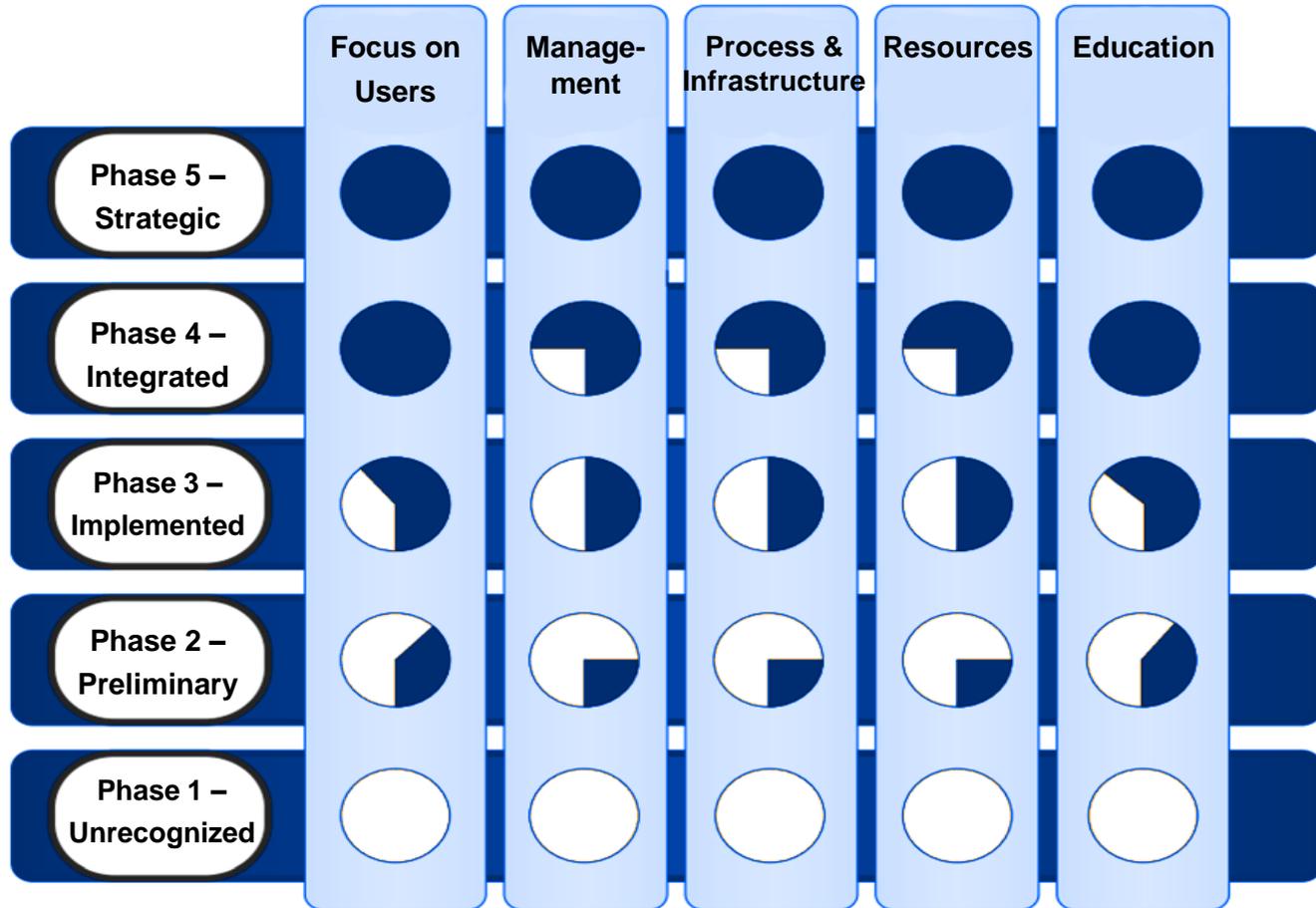
Embrace the tangled, messy, political, opinion-driven, sometimes expensive surrounding usability

A experiência do usuário é confusa, impulsiva, política e cara (mas vale a pena!)

User experience is only part of the whole

A experiência do usuário é apenas uma parte do todo

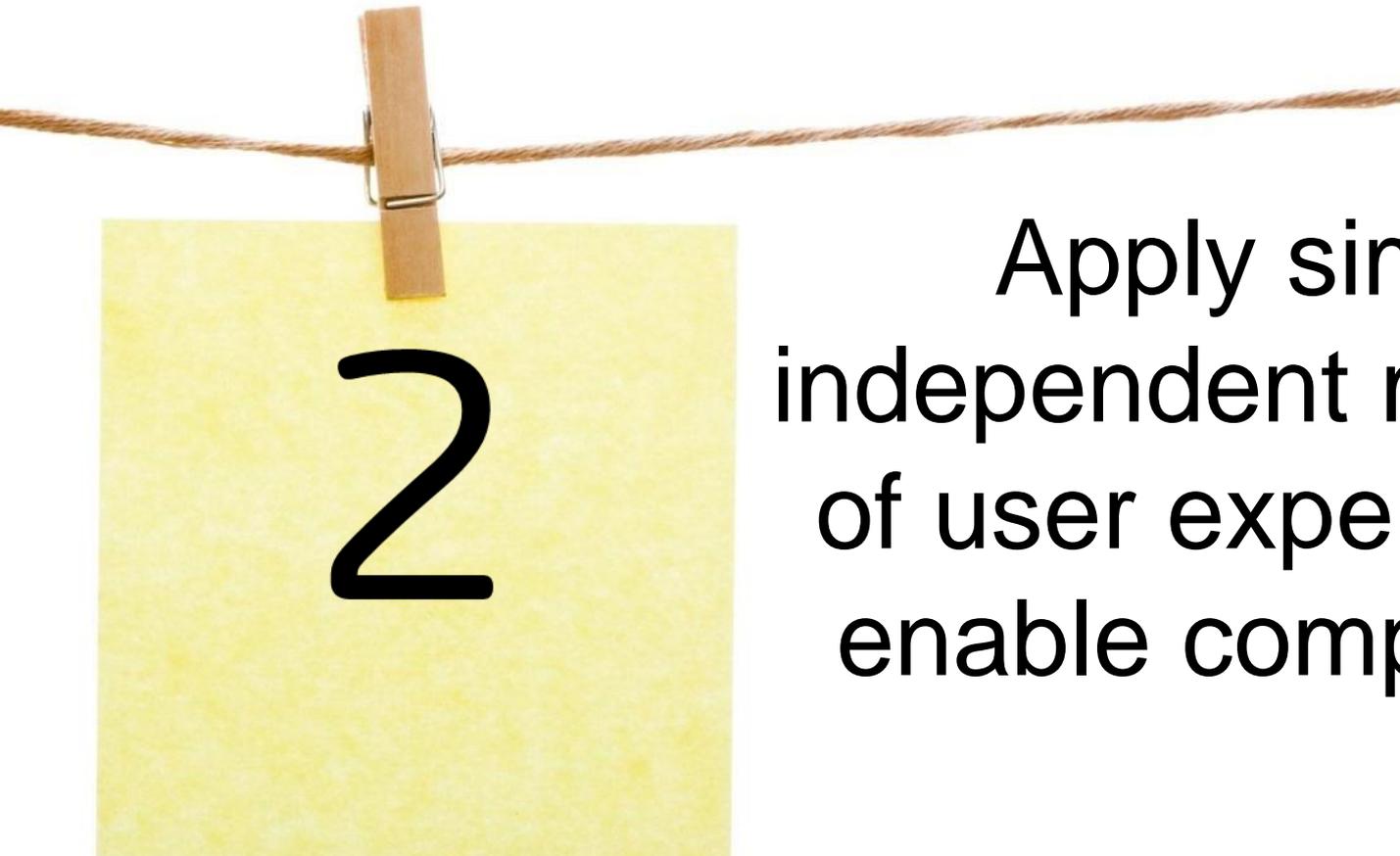




HIMSS:
Promoting Usability in Health Organizations: Initial Steps and Progress Toward a Healthcare Usability Maturity Model

February 2011

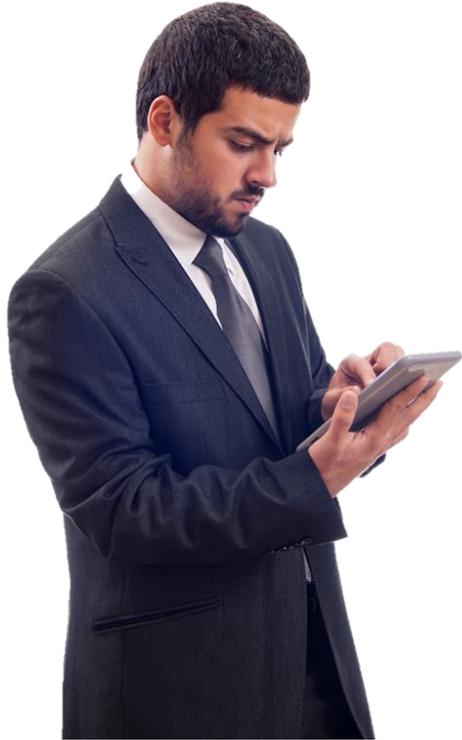
Aplicar medidas simples, independentemente da experiência do usuário para permitir comparações

A wooden clothespin is attached to a string, holding a yellow sticky note. The number '2' is written in large black font on the sticky note.

2

Apply simple,
independent measures
of user experience to
enable comparisons

Trazer consistência e regularidade para a medição de usabilidade Estas medidas devem ser públicos



Bring consistency and regularity to the measurement of usability (internally and externally)

Some measures must be public for the benefit of all

*Trata as interfaces de usuário com tanta seriedade como
Outras interfaces de sistema*

A yellow sticky note is attached to a brown string with a wooden clothespin. The number '3' is written in large black font on the note.

3

Treat *user* interfaces
as seriously as any
other system interfaces

Projeto começa com pesquisa Aplicar padrões conhecidos de interface de usuário Teste cedo, muitas vezes teste



Design begins with research

Apply known user interface standards

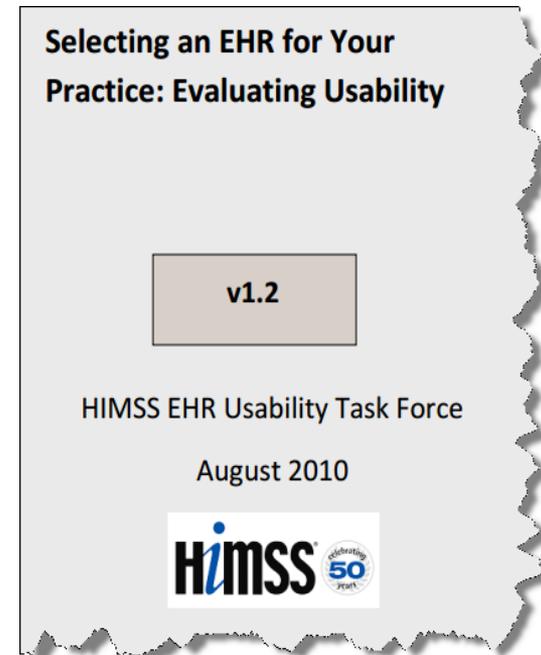
Test early, test often



Incluir requisitos de usabilidade na adjudicação de contratos, e em seguida, fazer fornecedores demonstrar que as interfaces são fáceis de usar!



Include usability requirements in procurement then make vendors demonstrate ease of use

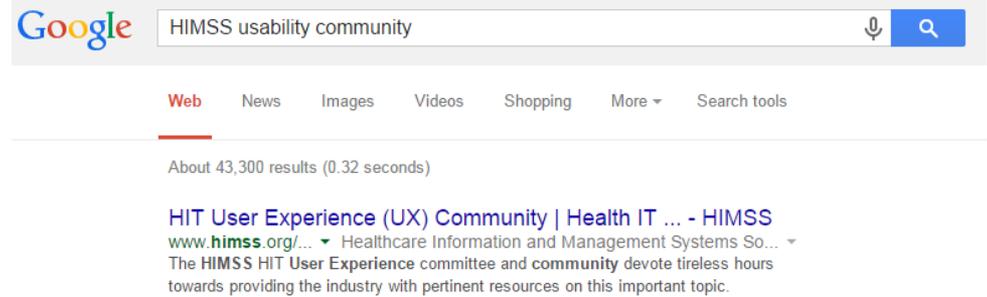




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Thank you.