TURF – A Unified Framework For EHR Usability

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Research Goals for TURF

Language for

- defining usability
- Theory for

- describing, explaining, and predicting usability differences

• Methods for

- evaluating
- measuring
- designing usability
- Software tools for
 - partially automating the methods

What is Usability?

- Usability refers to how
 - -useful,
 - -usable,
 - -satisfying

 a system is for the intended users to accomplish goals in the work domain by performing certain sequences of tasks

Zhang J, Walji MF. TURF: A Unified Framework of EHR Usability. *Journal of Biomedical Informatics*. 2011, In Press.

TURF Framework for EHR Usability

Comprehensive Usability Assessment



Rapid Usability Assessment

Stage 1 Meaningful Use Objectives

NIST National Institute of Standards and Standards & Testing	l Technology				
Home Testing Infrastructure	Meaningful	Use Test Methods	What is Conformance Tes	ting? Health	IT Testing & Support
Contacts Menu Overview Approved Test Procedures Version 1.1 Archive FAQ	Home > Meaning Approve 12/3 UPDATE - N technical correction The Approved Tec Certification Prog The Version 1.1 of through a mainte technical correction procedure releas The Final Rule and Questions about directed to ONC a fdbk@nist.gov. N of the standards, should be directed Criteria # §170.302 (b)	ful Use Test Method > Carter of the second	Approved Test Procedures Ver Cedures Version ta for the Approved Test Procedu edback. Test procedures that have 1.1, as well as associated erratu 10. Descriptions of the specific of hal development update to the A asse schedule. Maintenance upd tion. Updated test procedures we ted in April, 2011. a found at <u>http://healthit.hhs.gov.</u> hitial set of standards, implement <u>hs.gov.</u> Questions about the test atically forward to ONC at the ad tations, and certification criteria. <u>Iteation@hhs.gov</u> a lergy interaction checks	rsion 1.1 ures, Ver ve errata um, are et hanges a dates will till be rele procedu dates at Question 6. 7. 8. 9.	Core Set Objectives (selected from 15) CPOE E-prescribing Demographics Problem list Medication list Medication allergy list Vital signs, BMI, growth chart Smoking status E-Copy of health information
	§170.302 (c)	Maintain up-to-date	e problem list	10	. Clinical summary

Representation Analysis – Expert Review



Usability Violations

Consistency & Visibility

 Window shown is called the Patient Select popup but the Alerts being shown are for the physician and not specific to a patient and there is no indication to the user that these are for the user logged on to the system.

Memory & Match

- 2. The user has to remember that the Alerts are for all patients. The user has to know where to look for the Alerts
- The icons do not match the expected use of these symbols.

Task Analysis - Keystroke Level Model

Medsphere OpenVista	® CIS [FALCON] -	Connected as USER, PHYSICIAN (o	penvista.medsphere.org)	_		×	
<u>File E</u> dit <u>V</u> iew <u>A</u> ction	ons <u>O</u> ptions <u>1</u>	ools <u>H</u> elp					
PATIENT, CLINIC MRN: TST900000 Age/Sex: 55 (Eep	CAL F Wt: 0101 Ht:	Common Orders	A decites of 0.00 (2000 202)		and Bradinan & Case T	ng sitt tana	×
Active Orders (include Current Orders (Active Expiring Orders	Service Lab	PATIENT STATUS Patient Condition Patient Diagnosis	ADT EVENTS Admit Patient Discharge Patient		ACTIVITY ORDERS Ad Lib Restrict to Unit	VITALS Q15MIN & Q30MIN	*
Unsigned Orders	Diet	Order a Lab Test	Transfer Patient		Max come March	100	x
Recently Expired Orde	Home Med Home Med	Available Lab Tests CBC		*	Collect Sample PURPLE-WB (PURPLE) Specimen		
Vrite Orders	Inpt. Meds	CBC ND <hemogram> CEA <carcinoembryonic ant=""></carcinoembryonic></hemogram>			BLOOD Urgency ROUTINE		
Cardiology Menu Endocrinology E Gastroenterology	Lab Lab Lab	CHLAMYDIA APTINA CHLAMYDIA GC APTIMA CHLORIDE CHOL <cholesterc< td=""><td>L></td><td>•</td><td>Enter order comment:</td><td></td><td></td></cholesterc<>	L>	•	Enter order comment:		
Mental Health Men Neurology OB/GYN Orthopedics	Lab Lab Lab	Lab Test Info Collection Type Lab Collect	Collection Date/Tin Next scheduled lal	ie o col	How Often? lect ONCE	How Long?	
Pediatric Menu Pulmonary Menu Surgery Menu	Lab - Cnem Lab - Chem Imaging - F Imaging - F Consults	CBC PURPLE-WB BLOOD LC ONCE					
Write Delayed Orders	<						
Patient Probler Summary List	m Medication:	Orders Clinical Notes F	Consults/ Discharge Procedures Summary		Vital Lab Cha Signs Results Inqui	ries med sphere	

Record CBC for PATIENT, CLINICAL F		
	KLM	
Operator Sequence:	Code	Time (s)
Find the "Orders" tab	Μ	1.2
Point to "Orders" tab	Р	1.1
Click "Orders" tab	В	0.1
Find the "Common Orders"	Μ	1.2
Point to "Common Orders"	Р	1.1
Click "Common Orders"	BB	0.2
Wait for the system to show "Common Orders" pop-up window	W	0.1
Find the "LAB ORDERS"	М	1.2
Find the "Search All Labs"	М	1.2
Click "Search All Labs"	В	0.1
Wait for the system to show "Order a Lab Test" pop-up window	W	0.2
Find "Available Lab Tests"	М	1.2
Point to "Available Lab Tests" field	Р	1.1
Click "Available Lab Tests" field	В	0.1
Type "CBC"	K(3)	0.84
Point to "CBC" on the lab test list	Р	1.1
Click "CBC" on the lab test list	В	0.1
Point to "Order" button	Р	1.1
Click "Order" button	В	0.1
Point to "Close" button	Р	1.1
Click "Close" to close the "Order a Lab	D	0 1
Test" pop-up window	D	0.1
Total Time	39	35.06

Findings from Expert Reviews



Findings from Expert Reviews



Findings from Task Analysis - Time on Task (seconds)



Comprehensive Usability Assessment

Moving from the lab to the field



TURF in Action: Redesigning EHR



Harrington, Wood, Breuer, Pinzon, Howell, Pednekar, Zhu, & Zhang (AMIA 2011) – AMIA Session S85 @ 8:30am on Wed 10/26

TURF Architecture



TURF – Video / Screen Shots here



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