

EVALUATING THE USER EXPERIENCE AS PART OF A LARGE DIGITAL DOCUMENTATION RE-DESIGN

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PRESENTATION OBJECTIVES

- ▶ Review Project Background
- ▶ Describe Scenario Development
- ▶ Review User Experience Testing Process
- ▶ Describe Usability Testing Lessons Learned

PROJECT BACKGROUND & SCENARIO DEVELOPMENT

Christine Suchecki



DIGITAL DOCUMENTATION REDESIGN

NURSING “HEAD TO TOE” ASSESSMENTS

Minimum Data Set



- Level of consciousness -
- Orientation level -
- Cognition -
- Speech-...



Exception Based Charting using Within Defined Limits (WDL)



Neurological System Assessment is "Within Defined Limits" if all are true for patient:

- Awake/alert or easily aroused and oriented
- Follows commands and demonstrates appropriate communication and cognition for age
- Speech is clear and appropriate for developmental age...

DIGITAL DOCUMENTATION REDESIGN

SCOPE OF IMPACT

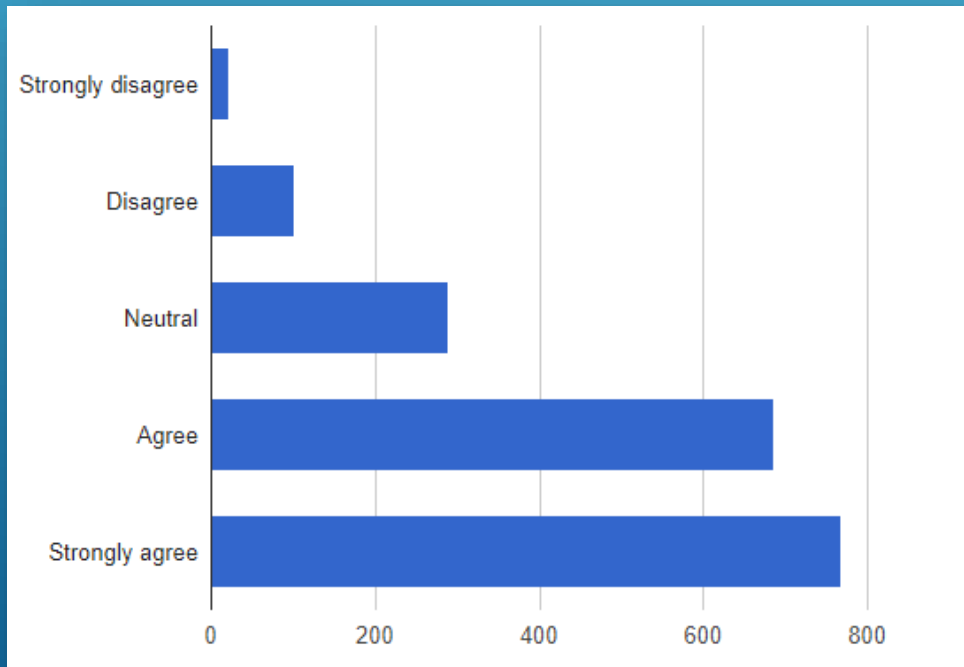
- ▶ >12,000 nurses across the organization
 - ▶ Inpatient
 - ▶ Emergency Room
 - ▶ Perioperative
 - ▶ Procedural
- ▶ Nurses spend ~15,000 hours per month in the Simple Assessment
- ▶ ~1 million filed values/day for head-to-toe assessments



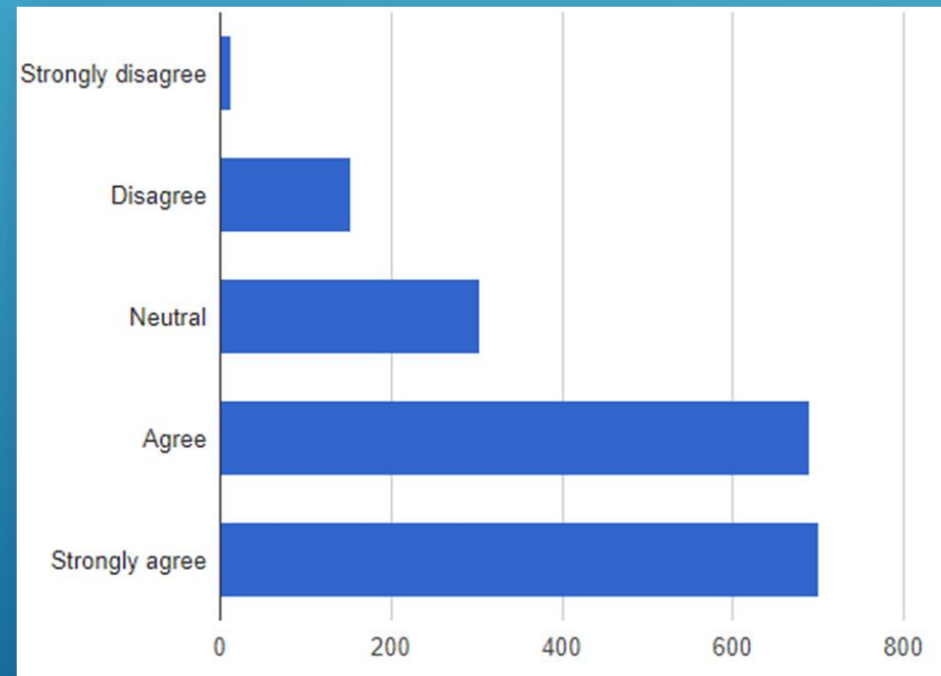
DIGITAL DOCUMENTATION REDESIGN

WHY


There is too much documentation and too little time



The volume of nursing documentation impedes patient care

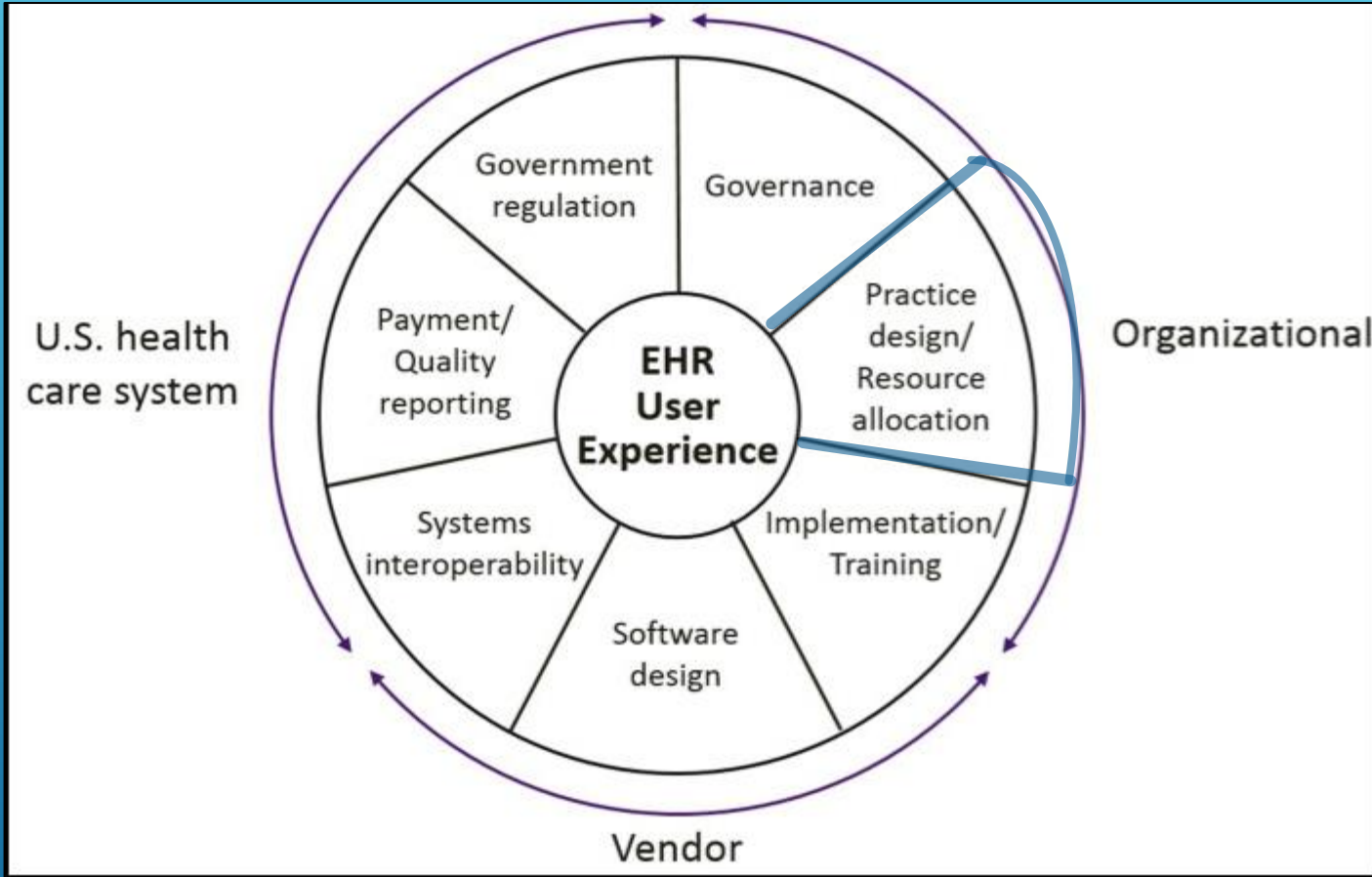


DIGITAL DOCUMENTATION REDESIGN OBJECTIVES

- ▶ Decrease clicks
 - ▶ Decrease cognitive burden
 - ▶ Increase meaningful documentation
 - ▶ Increase visibility of patient story
 - ▶ Increase end user satisfaction and experience
- 
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VALUE OF USER EXPERIENCE

Ensures that design is **efficient**, **effective**, and **satisfying** to the user.



Schumacher, R. and Lowry, S. (2010), (NISTIR 7741) NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, NIST Interagency/Internal Report (NISTIR), National Institute of Standards and Technology, Gaithersburg, MD, [online], <https://doi.org/10.6028/NIST.IR.7741>, https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=907313 (Accessed February 10, 2023)

“

NURSES WILL USE THE EHR AS THEIR PRIMARY TOOL TO DOCUMENT, SYNTHESIZE, AND COMMUNICATE PATIENT DATA. THE IMPACT OF HEALTH IT AND FREQUENT EHR USER INTERACTION POINTS TO THE IMPORTANCE OF NURSING ENGAGEMENT IN **ADOPTION**

ROJAS, CRYSTAL L. MS, RN-BC, PHN; SECKMAN, CHARLOTTE A. PhD, RN-BC. The Informatics Nurse Specialist Role in Electronic Health Record Usability Evaluation. CIN: Computers, Informatics, Nursing 32(5):p 214-220, May 2014. | DOI: 10.1097/CIN.0000000000000042

”

Adoption of usable EHR:

- Safer, higher quality of care
- Improved ROI

Suboptimal technology impacts:

- Decreased productivity
- User frustration
- Loss of clinician buy-in
- Data inaccuracy

END USER'S PERSPECTIVE- CURRENT STATE



- ▶ Informal
- ▶ Retrospective
- ▶ Limited
- ▶ Unqualifiable
 - ▶ Net Promoter Score
 - ▶ Anecdotal feedback passed through layers of governance

SCENARIOS



Med/Surg Scenario

Adam Apple is a 68 y.o. male with history of AKI, parkinson disease, seizure disorder, and CAD with NSTEMI, who presented with unwitnessed fall in the setting of alcohol intoxication.

He has completed a pheonobarbital taper for alcohol withdrawal and continues to be monitored due his electrolyte abnormalities and cardiac instability.

At the beginning of your shift, you do a head to toe assessment. Your findings are:

- Alert and orientated x3; calm and cooperative with care; moves all extremities
- Mild, intermittent tremors in BUE; + R/L radial pulses
- Decreased sensation and +1 edema at BLE; + R/L dorsalis pedis pulses
- RR 18, regular and unlabored, lung sounds clear
- HR 88, regular Normal sinus rhythm; on cardiac monitor with occasional PVCs noted
- Skin warm, dry with scattered bruising and excoriation noted at right groin/hip
- Abdomen soft, nontender and non-distended' +BS x4 quadrants
- Continent of urine/stool; occasional diarrhea noted; urine clear/yellow.

At noon, you go to give patient standing cardiac medications and find that:

- Patient appears anxious and complaining of palpitations; BP 152/92 and HR 132
- Cardiac monitor shows that rhythm now AFib and provider notified; cardiac meds adjusted
- Otherwise, exam unchanged from initial assessment

SCENARIOS

- ▶ Clinical narratives
“typical patient”
created by workgroup
SME
- ▶ ICU
- ▶ Med-Surg
- ▶ Emergency

SCENARIO VALIDATION

- ▶ Nursing Clinical Lead documentation of script
- ▶ UX team recorded

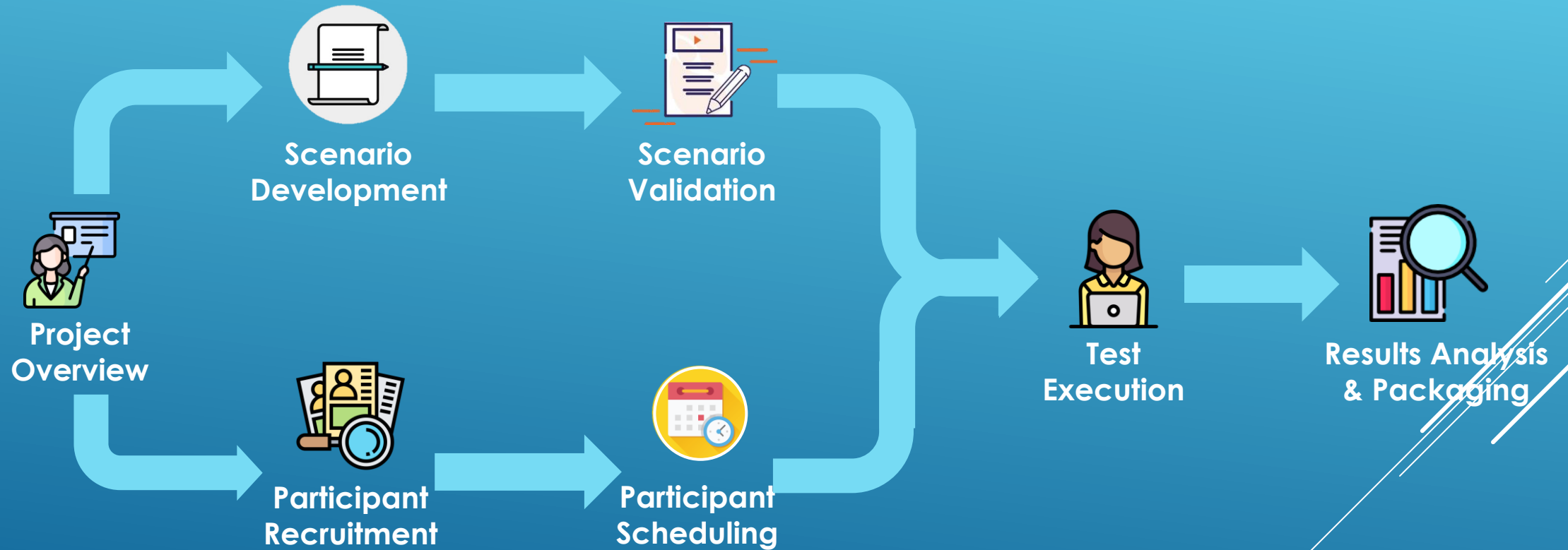


REVIEW USER EXPERIENCE (UX) TESTING PROCESS

Christopher Holland



UX TESTING PREPARATION



UX TESTING EXECUTION

Task 1

Gary is a 61 y/o and admitted to Cardiac Sicu from the OR s/p repair of mitral valve prolapse, complicated by severely impaired LV function with EF of 10-15%.

He arrives sedated and intubated on ventilator; with multiple drips supporting hemodynamics; temporary epicardial pacing. The patient is sedated initially.

At the beginning of your shift, you do a head-to-toe assessment. Enter in your findings into Epic:

- Pupils 2mm round, brisk reaction bilaterally



Search (Alt+Comma)	1300	1409	Last Filed
RUE Neurovascular Assessment			
RUE Neurovascular System Assessment	X	X	No change <<
RUE Neurovascular Exceptions/Add'l Asse...	Sensation; Mot...		Sensation; Mot... <<
RUE Color	Pale		Pale <<
RUE Temperature/Moisture	Cool		Cool <<
RUE Motor Response	None		None <<
RUE Sensation	Other (Com...		No sensation <<

- Proctor builds and loads simulated EHR environment, and side-docks scenario on screen, and turns on key/click counter
- Testers join recorded MS Team session, are briefed on UX testing, and take control of proctor's screen
- Tasks are conducted sequentially, with prompt to “think out loud” as testers move through workflow
- Select questions are asked in-session to garner feedback. Testers are then provided post-session survey to quantify preferences

MEASURING USER EXPERIENCE

Satisfaction

Does executing this task meet or exceed my users' expectations?

In-Session Feedback

Post-Session Survey



	1 - Strongly Disagree	2 - Disagree	3 - Neutral	4 - Agree	5 - Strongly Agree
I think that I would like to use the ID transfer frequently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the ID transfer consistently complete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought the ID transfer was easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that I could receive the support of a technical person to be able to use the ID transfer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the various components in the ID transfer easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought there was too much information in the ID transfer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would imagine that most people would have to use the ID transfer very rarely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the ID transfer very cumbersome to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did not consider using the ID transfer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I needed to learn a lot of things before I could get going with the ID transfer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This ID transfer design meets my requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spent too much time with errors in the ID transfer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All the ID transfer screen entered are valuable to patient care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did myself often correcting errors in the ID transfer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

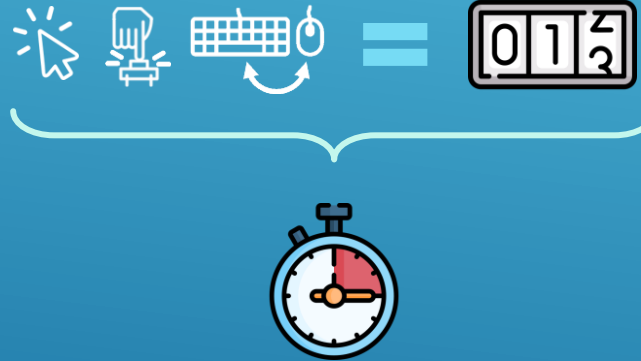
Targeted Preference Questions

System Usability Scale + Project-Value Questions

Efficiency

Can my users complete this task with less time or resources?

Workflow Analyzer



Keystroke-Level-Model Time to Complete (Control & Actual User)

Effectiveness

Can my users complete this task more accurately?

Functional & Documentation Accuracy

Pupils	
R Pupil Size (mm)	1
R Pupil Shape	Round
R Pupil Reaction	Sluggish
L Pupil Size (mm)	1
L Pupil Shape	Round
L Pupil Reaction	Sluggish

Integumentary	
Integumentary System Assessment	X
Integumentary Exception/Add'l Assessments	Skin conditions/...
Skin Temperature	Cool, Clammy
Skin Integrity/Conditions	Other (comm...)
Impaired Skin Location	Grain & Coccyx

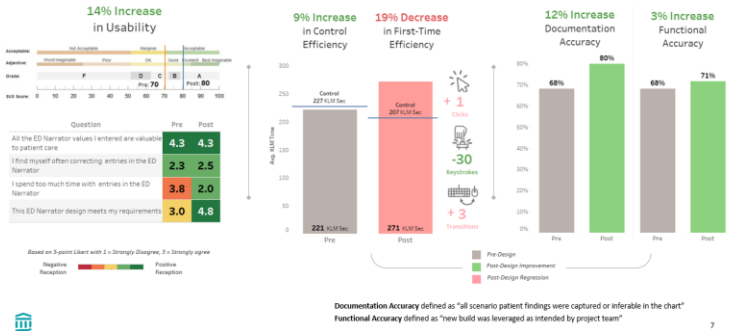
% Documentation as Intended vs. % Documentation in Chart

Usability is the extent to which a product can be used by specified users to achieve specified goals with **satisfaction**, **efficiency**, and **effectiveness** in a specified context of use - ISO Definition

RESULTS ANALYSIS

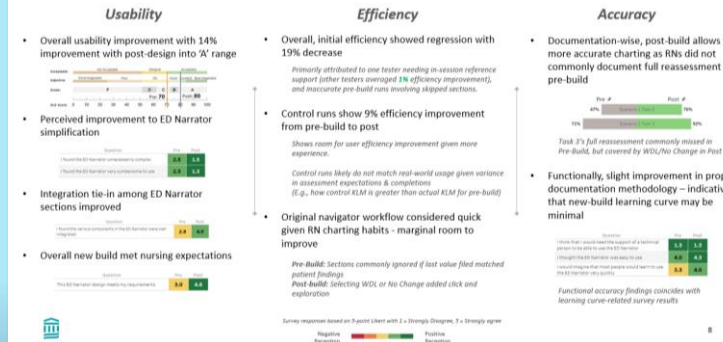


UX Testing Summary



Summary of User Experience Analysis

UX Results Interpretation



Interpretation of UX Results

Prominent Themes & Observations

- Basic Head-to-Toe with WDL Assessment was streamlined and easy to use**
 - Testers expressed a preference for quickly documenting on systems that met WDL definition, then navigating to specific system assessments to document exceptions
- WDL definitions actively leveraged during testing**
 - The WDL definitions appeared conveniently located and were intuitively referenced throughout testing to ensure findings met definitions
- Testers wanted more functionality out of Basic Head-to-Toe**
 - One tester anticipated finding a "No Change" button within the basic head to toe assessment and expressed concern over its absence
 - Another tester described a desired workflow of charting entirely within the basic head to toe assessment rather than having to navigate to other body system assessments

Click to watch: [Jamie: Impressions \(@ 27min 24 sec\)](#)
Tester describes perceived benefits of WDL workflow within Basic Head to Toe

Click to watch: [Kendra: Impressions \(@ 37min 08 sec\)](#)
Tester volunteers feedback Basic Head-to-Toe with WDL Assessment

Click to watch: [Kendra: Scenario 1 Task 2 \(@ 10min 24 sec\)](#)
Tester expresses concern over missing "No change" function

Click to watch: [Miranda: Impressions \(@ 23min 33 sec\)](#)
Tester expresses wanting to document entirely out of Head-to-Toe

Theme & Trend Observations (with video)

KEY OUTCOMES

- Overall users found a **significant usability improvement** with the new workflow across all specialties
(**Med Surg/ICU**: 9% increase to “B” range of SUS, **ED** : 14% increase to “A” range of SUS)
- Measured control runs show **substantial action and time savings**, likely to be recognized as RN familiarity with new workflow improves
(**Med Surg/ICU**: 22% improvement; **ED**: 9% improvement)
- New workflow leads to **more accurate charting**, as RNs were more likely to document system assessments they may have skipped in legacy workflow
(**Med Surg/ICU**: 7% improvement; **ED**: 12% improvement)

“This will definitely be **great for nurses to decrease the documentation load**. I found it very easy to use once I was used to using it.”

- Survey Feedback

“I think the new charting system **will allow for less computer time and more patient face to face time**. The development is thoughtful and pertinent to my job. I look forward to this charting style.”

- Survey Feedback

NEXT STEPS FOR UX ANALYSIS

30-Day Post Go-Live Retest



Retest with participant pool following 30-day maturity with new Drop Click workflow to understand UX impact



Production Metrics Analysis



Capture key metrics related to accuracy, efficiency, completeness, and utilization with production data to benchmark Drop Click workflow against legacy

USABILITY TESTING: LESSONS LEARNED

Naomi Mercier



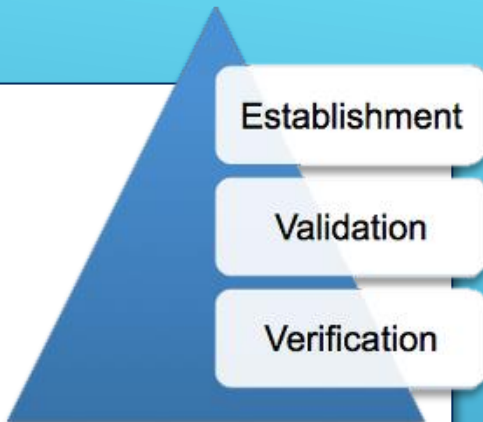
Nurse Triage Scenario for <u>UX</u> –Current State		
Step	Documentation Script	Objective
Document Contacts	<ul style="list-style-type: none"> Document incoming call Contact name, relationship, phone number if not in system 	This value tracks caller information
Document Reason for Call	<ul style="list-style-type: none"> Add Reason for Call: Abdominal Pain 	This value drives suggested protocols
Protocol Selection	<ul style="list-style-type: none"> Select Abdominal Pain Male or Female (depending on patient selected) 	Protocol used to direct call disposition
Answer Initial Assessment Questions	<ul style="list-style-type: none"> Click on "Answer Assessment" questions in selected protocol. Patient reports gradual onset, moderate abdominal pain that comes and goes and worsens after a bowel movement 	Complete Initial Assessment
Answer Protocol Questions by Disposition Category	<ul style="list-style-type: none"> Starting at the top of the Protocol go through the questions in each disposition or select "All Negative" Stop at "Schedule same day visit/appt" and 	Protocol drives Disposition

- ▶ Scenario development focused on clinical documentation relevance for the typical patient in the setting (Med-Surg, ICU etc)
- ▶ We discovered that usability scenarios need to be structured with steps & clear objectives to assist with the evaluation of the workflow process
- ▶ The adjacent screen shot is a usability scenario created after this project was complete incorporating this structure

LESSONS LEARNED: SCENARIO CREATION

LESSON LEARNED: SCENARIO VALIDATION

- ▶ Validation of each scenario was more challenging than anticipated
- ▶ We walked thru the experience that participants and validated each “task” or step in the process
- ▶ The scenarios were restructured somewhat to match the steps in the head to toe, but overall, this was a rigorous exercise that required some time



Vital Signs – *Do these need to be entered in via Nav?*
Temperature: 36.7 °C (98.1 °F)
Temp Source: Oral
Heart Rate: 94
Respiratory Rate: 20
BP: 171/100
SpO2: 97 %
O2 Device: None (Room air)
Pain Assessment - Pain Assessment: 0-10
Pain Score: 2
Height and Weight - Weight: 63.5 kg (140 lb)
Height: 157.5 cm (5' 2")

Patient is assigned ESI 2.

End Task 1 _____

She is placed on Cardiac monitor – *Is action required for the tester here?*

She has a past medical history of hypertension, asthma, anxiety who presents for evaluation of substernal chest pressure. Denies nausea, vomiting, abdominal pain, diarrhea, cough, States she took 81 mg of aspirin today after developing the chest pressure, but does not normally take aspirin daily. Pt used Albuterol without effect. – *Does this affect tester's documentation? Or is this just for context? If context, is it needed?*

Denies recent travel, tobacco use, hormone use,

She takes Albuterol inhaler as needed, Losartan 50 mg tablet daily, and Ativan 0.5 mg as needed for anxiety. – *Does this affect tester's documentation? Or is this just for context? If context, is it needed?*

Your initial assessment reveals:


- She is awake alert and oriented speech is clear.
- Skin is warm and dry

LESSON LEARNED: TRAINING AND TESTING A NEW PROCESS

- ▶ Goal to assess the future state workflow & inform our training development
- ▶ Trained users on the new format in a 3-minute video before the testing
- ▶ Users left steps out of the documentation & impacted efficiency scores
- ▶ We did gain some insights that contributed the training scenario and workflow teaching points
- ▶ We plan to retest users now that we are live, and they have been adequately trained for more accurate user perceptions



EXPANDED OPPORTUNITY: SIMULATION LAB TO TEST USABILITY


- ▶ As mentioned, we discovered usability testing scenarios can be awkward to follow and document
 - ▶ Major trends in usability testing include more testing in naturalistic environments such as simulated nursing units and classrooms
 - ▶ We suggest as an expanded opportunity, to test documentation in a simulated environment
- 

LESSONS LEARNED: PARTICIPANT SELECTION

- ▶ Participants need to actively use the functionality being tested
- ▶ Different levels of experience with documentation is recommended
- ▶ Best participants are engaged and are willing to go through the process several times (pre and post)



LESSONS LEARNED: USABILITY TESTING FOR PERIOPERATIVE USERS

- ▶ We initially focused the UX testing for IP Nursing staff (Adult Med/Surg, ICU and ED)
 - ▶ We did branch out to special areas such as Perioperative as we did not anticipate workflow impacts
 - ▶ In hindsight we may have found some of the workflow concerns ahead of time if we had UX participants from Perioperative units
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- A decorative graphic consisting of several parallel white lines of varying lengths and orientations, located in the bottom right corner of the slide.

REFERENCES

Bangor A, et al (2008) An Empirical Evaluation of the System Usability Scale, *International Journal of Human-Computer Interaction*, 24:6, 574-594, DOI: [10.1080/10447310802205776](https://doi.org/10.1080/10447310802205776)

Brooke J. (1996). SUS: A quick and dirty usability scale. In Jordan P.W., Thomas B., Weerdmeester B. A., McClelland I. L. (Eds.), *Usability Evaluation in Industry* (pp. 189-194). London: Taylor & Francis

ROJAS, CRYSTAL L. MS, RN-BC, PHN; SECKMAN, CHARLOTTE A. PhD, RN-BC. The Informatics Nurse Specialist Role in Electronic Health Record Usability Evaluation. *CIN: Computers, Informatics, Nursing* 32(5):p 214-220, May 2014. | DOI: [10.1097/CIN.0000000000000042](https://doi.org/10.1097/CIN.0000000000000042)

Schumacher, R. and Lowry, S. (2010), (NISTIR 7741) NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, NIST Interagency/Internal Report (NISTIR), National Institute of Standards and Technology, Gaithersburg, MD, [online], <https://doi.org/10.6028/NIST.IR.7741>, https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=907313 (Accessed February 10, 2023)

Tutty, M. A., Carlasare, L. E., Lloyd, S., & Sinsky, C. A. (2019). The complex case of EHRs: examining the factors impacting the EHR user experience. *Journal of the American Medical Informatics Association*, 26(7), 673–677. <https://doi-org.treadwell.idm.oclc.org/10.1093/jamia/ocz021>

Wichansky, Anna (2000) Usability testing in 2000 and beyond, *Ergonomics*, 43:7, 998-1006, DOI: [10.1080/001401300409170](https://doi.org/10.1080/001401300409170)

THANK YOU!

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