

“I have been struck again and again by how important measurement is to improving the human condition.” -*Bill Gates*



User Experience Measures for Digital Medicine



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NODE.Health is a non-profit, professional association for digital medicine, focused on creating, gathering, and disseminating the evidence and best practices needed to facilitate digital transformation in healthcare. By creating an ecosystem of evidence, we serve as the catalyst that makes disruptive innovation actionable, sustainable and beneficial—for everyone involved.

Jay Erickson is an advisory board member at NODE.Health as well as Chief Innovation Officer and founding partner at Modus, a global human-centered digital agency. He is also a cancer survivor and patient advocate.

Agenda

- Background
- What is UX and why is it important?
- Principles & Measures with real-world examples
- Scoring System
- Q & A





Memorial Sloan Kettering
Cancer Center



JOHNS HOPKINS
SCHOOL of MEDICINE



Yale
NewHaven
Health

NYU Langone
Health

Team



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DIGITAL HEALTH

DIGITAL MEDICINE

DIGITAL THERAPEUTICS

DEFINITION	Digital health includes technologies, platforms, and systems that engage consumers for lifestyle, wellness, and health-related purposes; capture, store or transmit health data; and/or support life science and clinical operations.	Digital medicine includes evidence-based software and/or hardware products that measure and/or intervene in the service of human health. ¹	Digital therapeutic (DTx) products deliver evidence-based therapeutic interventions to prevent, manage, or treat a medical disorder or disease. ²
CLINICAL EVIDENCE	Typically do not require clinical evidence.	Clinical evidence is required for all digital medicine products.	Clinical evidence and real world outcomes are required for all DTx products.
REGULATORY OVERSIGHT	These products do not meet the regulatory definition of a medical device ³ and do not require regulatory oversight.	Requirements for regulatory oversight vary. Digital medicine products that are classified as medical devices require clearance or approval. Digital medicine products used as a tool to develop other drugs, devices, or medical products require regulatory acceptance by the appropriate review division.	DTx products must be reviewed and cleared or certified by regulatory bodies as required to support product claims of risk, efficacy, and intended use.

1 <https://www.dimesociety.org/index.php/defining-digital-medicine>

2 <https://www.dtxalliance.org/dtxproducts/>

3 It is important to check with local regulatory requirements in each jurisdiction the product is manufactured, registered, or used in.

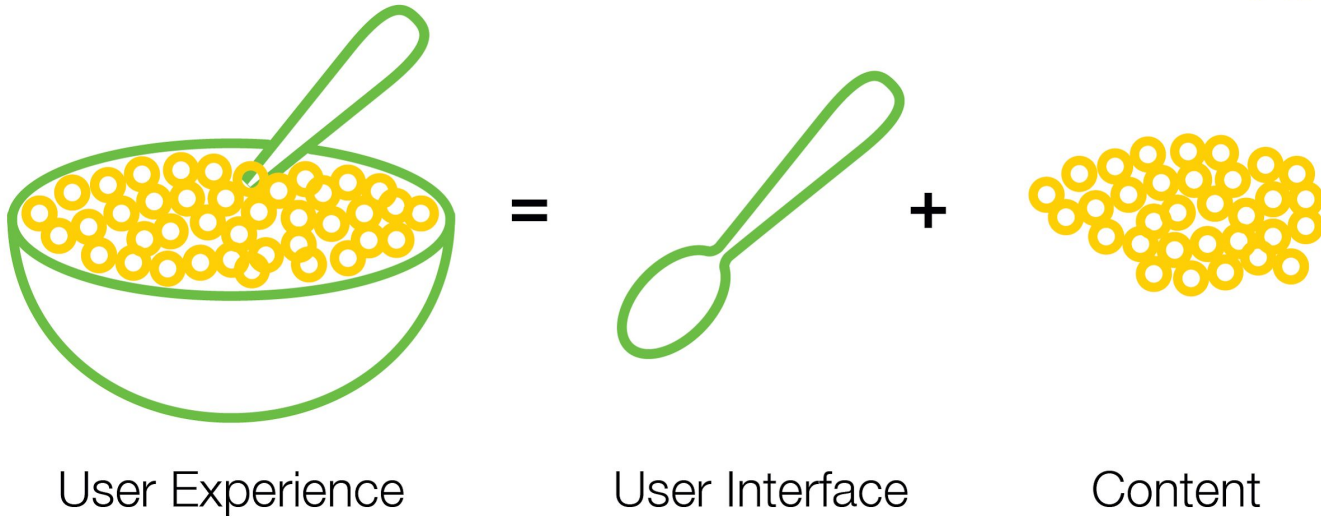
Goal

To create a framework to **measure user experience (UX)** specific to digital health to drive **better experiences** and **efficacy**.

Who can benefit from the framework?

- **Health Systems** – to evaluate potential solutions or improve existing patient or clinician experiences
- **Startups/Product Companies** – measure and improve the UX of your product over time

What is User Experience?

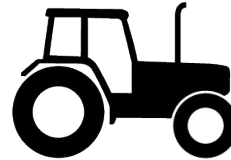


What is User Experience?

same interface



different use cases & experiences



Why is UX Important for Digital Medicine?

- human dignity & easing the burden of disease
- better UX = better adoption & engagement = better outcomes
- antidote to clinician burnout (affects outcomes)



“one of the **strongest predictors of burnout was how much time an individual spent tied up doing computer documentation.**”

- Atul Gawande

“Why Doctors Hate Their Computers”
The New Yorker, November 12, 2018

“**...63 percent of physicians** surveyed reported at least one symptom of burnout at the end of 2021, an **increase from 44 percent in 2017**”

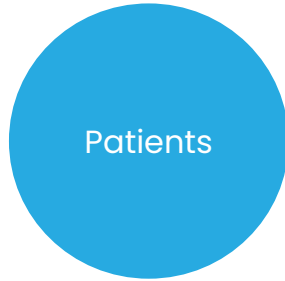
-NY Times, September 29, 2022

Why is UX Important for Digital Medicine?



The Framework

Scope



Scope



“little e” – engagement
with the digital
experience itself



“Big E” – engagement
with the care plan or
therapy

for more info, see:

<https://www.linkedin.com/pulse/engagement-actually-has-three-es-little-e-big-easy-jay-erickson/>


Components



Principles



Measures



Scoring
System

The Eight Principles



Data
Control

Provides a high level of privacy, transparency, control and security around data



Value

Provides efficiency and value for users



Functional
Performance

Performs functions quickly and accurately without impeding the user



Design

Follows familiar user-centered design patterns and is easy to use



Research

Is well founded in science and user research



Satisfaction

Users are satisfied and provided moments of delight



Special Needs
& Accessibility

Is accessible and optimized for the special needs of its target population



Support &
Feedback

Provides customer support and feedback opportunities

Data Control

Provides a high level of privacy, transparency, control and security around data

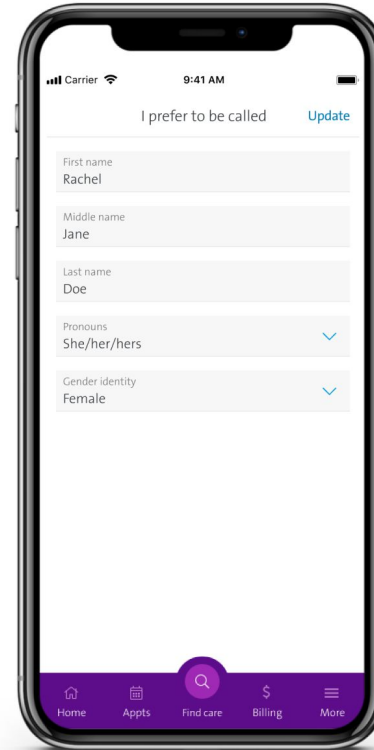
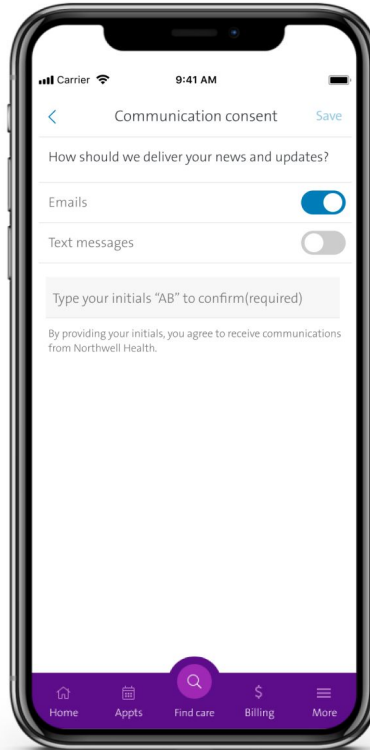
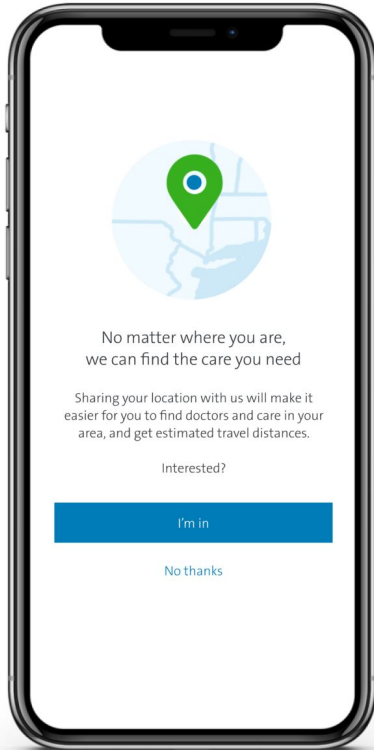
- The user can edit and remove their profile information
- P The user has control over their data (including revoking, sharing, transferring, exporting, avoiding data loss, etc)
- P Data security approach and storage location is communicated clearly to the user
- P Data privacy and sharing is communicated clearly to the user
- P Consents and opt-ins/outs are implemented, confirmed and clear for any data sharing
- P The app explains any sensors or permission requests on personal devices it will use and why

● = *all users*

P = *patient-only*

C = *clinician-only*

Real World Example

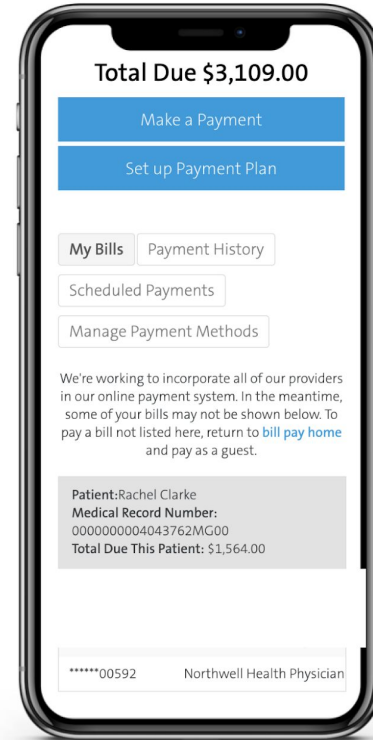
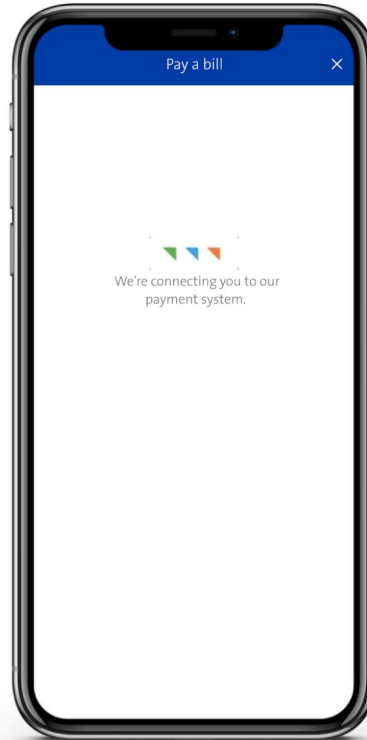
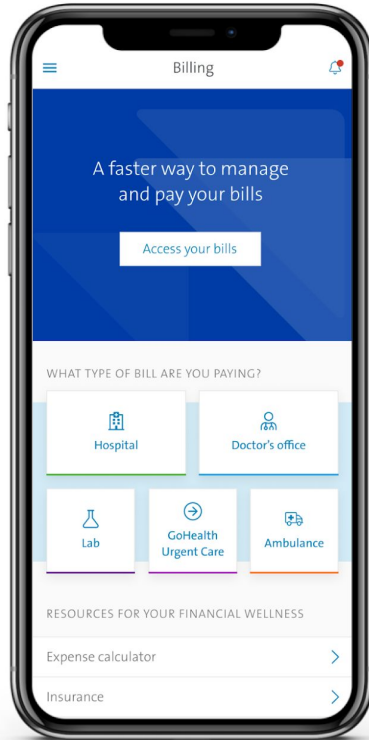


Functional Performance

Performs functions quickly and accurately without impeding the user

- Screens load and system actions execute in a timely manner
- If a secondary system there is single-sign on and any relevant context is maintained (e.g. selected patient) from the primary system
- The error rate experienced by users is low
- P It is easy to connect peripherals and related services

Real World Example

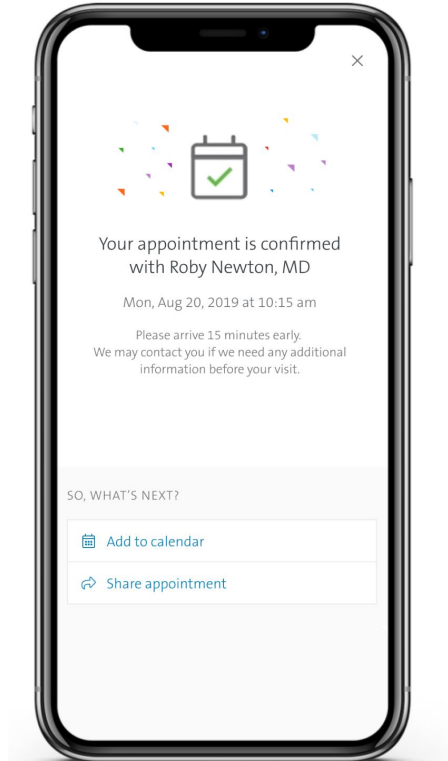


Satisfaction

Users are satisfied and provided moments of delight

- Experience provides moments of levity, delight or emotional reward to the user
- The experience has a good net promoter score (i.e. on scale of 1-10 how likely are you to recommend this app)
- The experience has acceptable adoption and engagement levels consistent with the expected levels

Real World Example



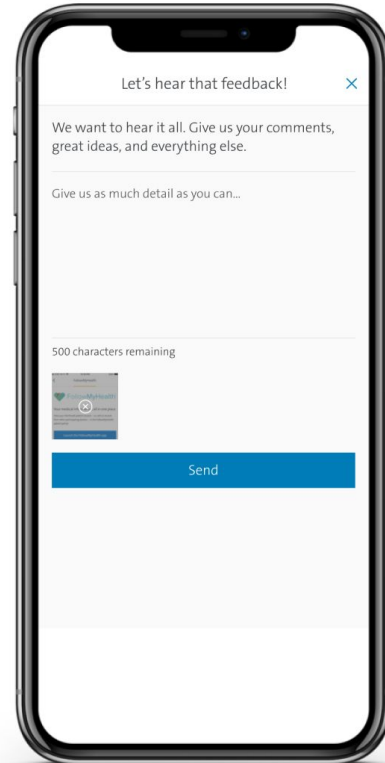
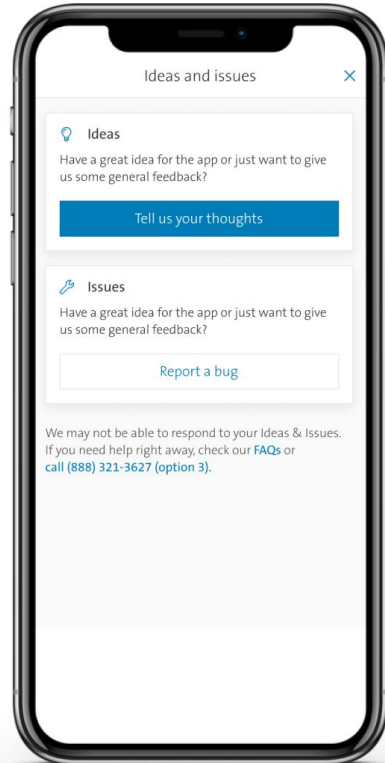


Support & Feedback

Provides customer support and feedback opportunities

- There is a means to provide feedback on the experience
- There is a simple and fast way to get help with the application
- Upon imminent or actual system or user error there is clear communication and graceful recovery.
- The system provides informative feedback to the user about actions they are about to take or have taken.
- Human support is provided in addition to digital support

Real World Example



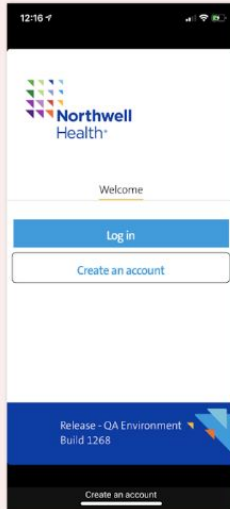
Special Needs & Accessibility

Is accessible and optimized for the special needs of its target population

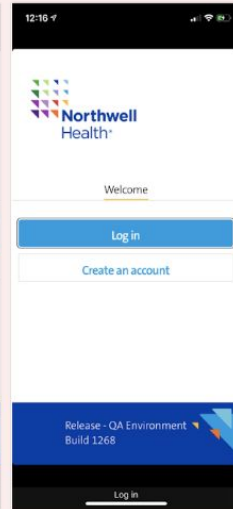
- P The experience is accessible and section 508/ADA compliant
- P The population evaluated for special needs (physical disabilities, hardware, connectivity, technical literacy, etc.) and if special needs were identified measures were implemented to address them
- P Proxy access is available (spouses, caregivers, 3rd parties)
- P There is language support for languages of populations greater than 5% of total population

Real World Example

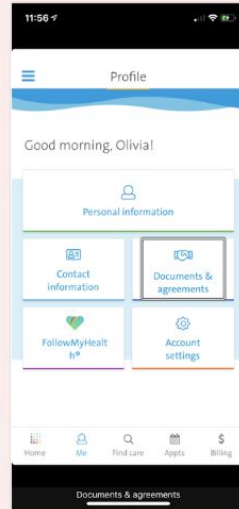
ISSUES



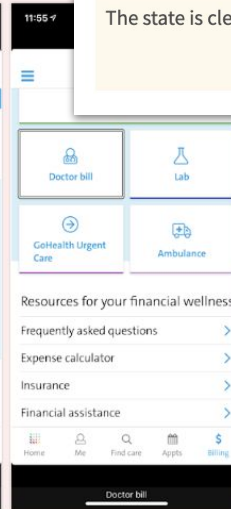
EXPECTED RESULT:
"CREATE AN
ACCOUNT, BUTTON"



EXPECTED RESULT:
"LOG IN, BUTTON"



EXPECTED RESULT:
"DOCUMENTS &
AGREEMENTS, BUTTON"



EXPECTED RESULT:
"DOCTOR BILL, BUTTON"

Buttons



Screen-Reader

Users who cannot see the screen and rely on listening to navigate and interact.

REQUIREMENT

ISSUE

The button element is provided, signaling to screen-readers that it is *actionable*.

The button element is *not* announced. Only the text inside the button is read aloud.

The state is clear to the user? *E.g., inactive state*

The inactive state is not announced, so user is unaware that it is a non-actionable element.



Value

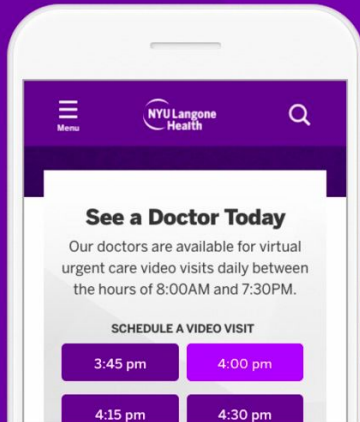
Provides efficiency and value for users

- The experience enables "jobs to be done" or tasks to be completed effectively and in a timely manner
- The experience provides valuable information in an easily digestible format
- Information needed for a particular task or decision making is grouped together in a single location
- The experience is useful for creating better clinical documentation and/or more actionable clinical decision support
- The experience avoids unjustified workflow, cognitive load, and non-actionable alerts for clinicians and reduces net work

Real World Example

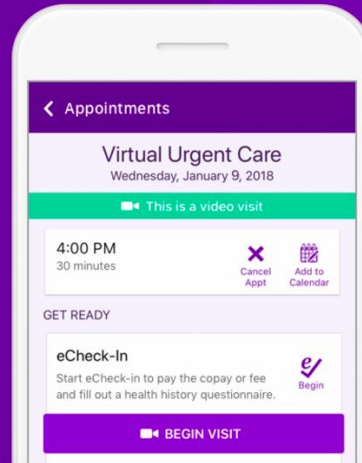
1. Select a Visit Time That Works for You

Please allow about 20 minutes before your visit time in order to complete the check-in process, which includes payment and personal health questionnaire.



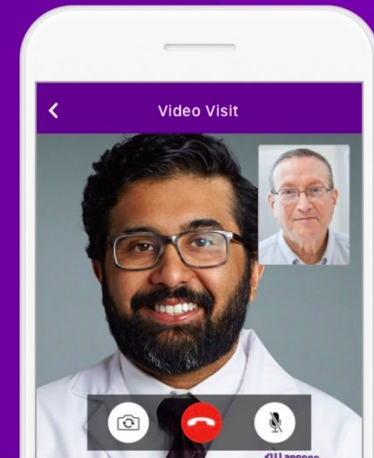
2. Complete the Check-In Process

During check-in, you make your payment and complete a health history questionnaire.



3. Begin the Visit at Your Scheduled Time to Connect with a Doctor

After the doctor connects, you begin your video chat and receive treatment.

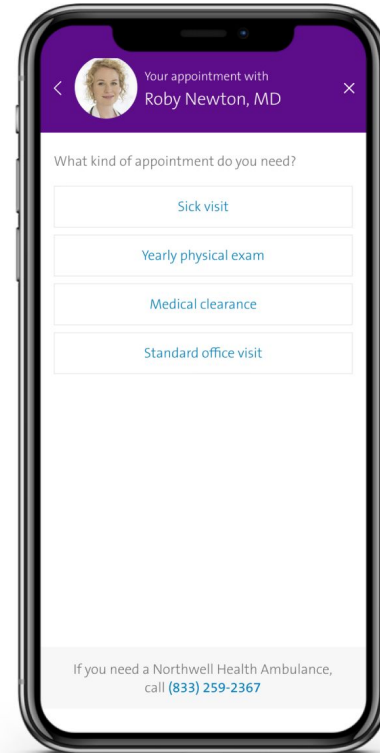
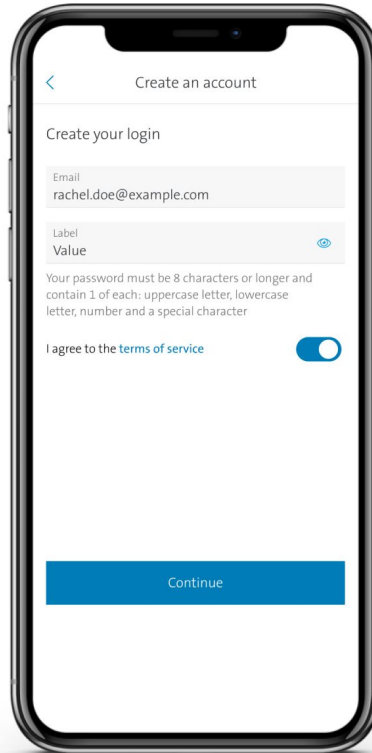
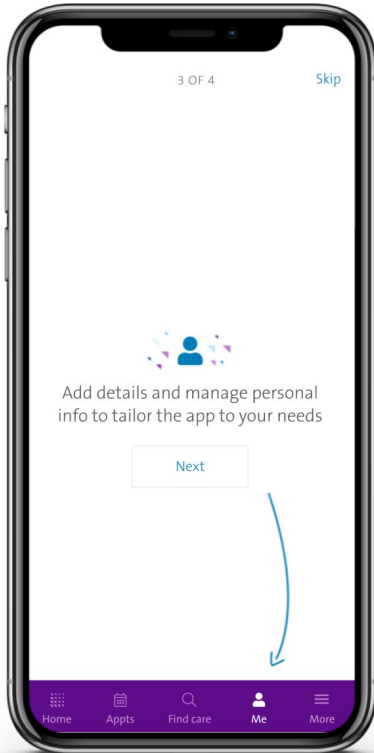


Design

Follows familiar user-centered design patterns and is easy to use

- The user experience matches current paradigms of digital interaction
- Prompts for additional information are contextual and timely
- On-boarding is completed in a timely manner and the user clearly understands the capabilities of the application after on-boarding
- The experience can be easily navigated and the user knows where they are at all times in the experience
- The information is presented to the user in easily scannable format
- User can control when, where and how they experience notifications
- Account creation and login are simple
- P** In-experience advertising is not obtrusive
 - Conversational language is favored over medical jargon and uses the same terminology that clinicians use with patients
- C** Alert frequency, characteristics, and content are appropriate for the severity of the alert

Real World Example



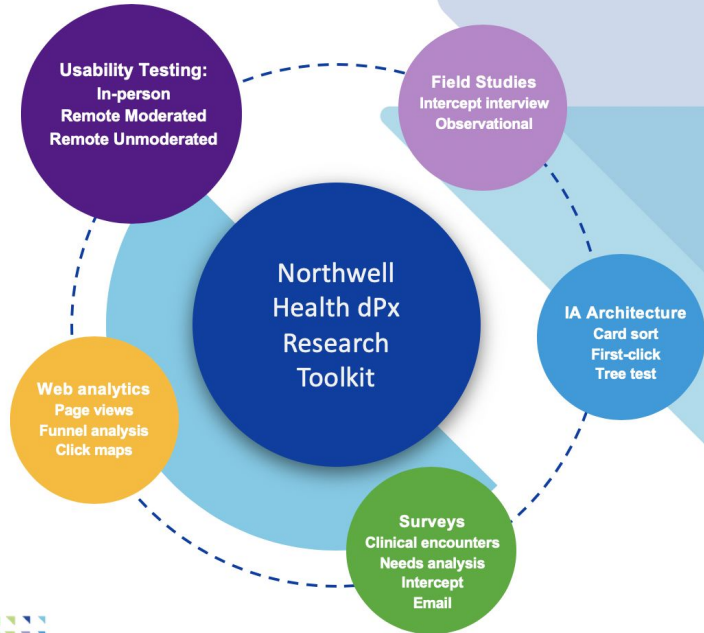
Research

Is well founded in science and user research

- Users have been engaged in the product design process through primary research, usability testing and participatory design practices
- The relevant academic literature was reviewed as evidence basis for the product
- Personas were developed as part of product creation
- User experience metrics are defined and tracked on an ongoing basis (time on task, etc)

Real World Example

dPx Research Toolkit



- Multi-method approach used whenever possible and as appropriate to understand:
 - Attitudinal v. Behavioral user insights
 - Qualitative v. Quantitative user insights
 - Context of product use
- Close partnership between research, analytics, and product teams to ensure:
 - Voice of Customer is integrated throughout product lifecycle

Real World Example

Northwell Health Paper Bill Redesign



60 participants
Ages 18-70



Over 18 hours of
session recordings



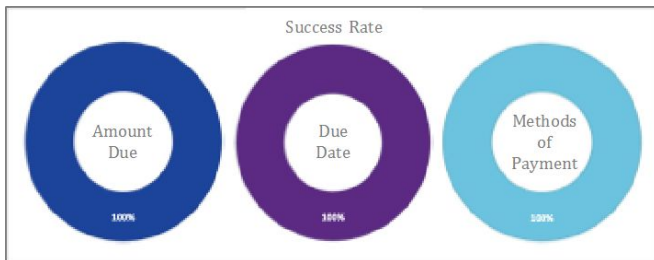
1200 user tasks
completed



12 bill versions
analyzed

100% Performance on bill comprehension tasks:

Average time on task
> 0:01



- Strong patient preference for detailed summary of care
- Reported increase in bill comprehension
- Reported increase in willingness to submit prompt payment
- Only minor language adjustments needed for some insurance detail and for uninsured patients

This is a bill
Statement Date: 10/22/2019
Page 1 of 2

Phelps Hospital
Northwell Health

Patient name: John Smith
Service date(s): 09/05/2019
Primary insurance: UnitedHealthcare PPO

Amount due **\$250.00**
Due date **11/20/19**
Account number **123456789**

Pay online | Pay by mail | Pay by phone

Visit: www.northwell.edu/pay for fast and easy payment
24 hours a day, 7 days a week

Mail us a check along with the payment coupon below.
Please include your account number on your check and make it payable to Northwell Health Physician Partners.

Call 1-888-224-4066 to speak to a payment specialist

Hours of operation:
Weekdays 8am - 8pm
Weekends 9am - 5pm

Have questions related to your bill?
Please click our online support center at www.northwell.edu/supportcenter or call our support center at 1-888-224-4066 - 24 hours a day, 7 days a week. See habla español.

Phelps Hospital
Northwell Health

Amount due **\$250.00**
Due date **11/20/19**
Account number **123456789**

Please include your account number on your check and mail it payable to:
Phelps Memorial Hospital
PO Box 12345
Springville, NY XXXXX

0001234567890001234567890000012345

This is a bill
Statement Date: 10/22/2019
Page 2 of 2

Phelps Hospital
Northwell Health

Summary of care:

Service (CPT/ICD)	Description of care	Amount Billed	Allowed by insurance	Insurance payments	Amount not covered by insurance	Deductible	Co-pay	Coinsurance	Your responsibility
99203-19	Lab - Chemistry	245.00	100.00	100.00	0.00	0.00	0.00	0.00	0.00
Lab - Hematology	150.00	40.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00
Lab - Immunology	300.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00
PHOTEC	496.00	200.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
Imaging Diagnostic	537.00	200.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
CT Scan - Body Scan	1300.00	350.00	300.00	0.00	0.00	0.00	0.00	0.00	300.00
Emergency Room	1250.00	2,000.00	1,800.00	0.00	200.00	0.00	0.00	0.00	200.00

TOTAL AMOUNT DUE: \$250.00

This is for services provided by the emergency room at Phelps Hospital. In addition to this bill you may also receive bills for associated services such as ambulance, lab and Northwell Health Physician Partners.

You can request an itemized bill by visiting northwell.edu/itemizedbill or by calling (888) 224-4066 and using the automated self-service system.

How we determine your responsibility: After you receive care at Northwell, we send a bill to your insurance company. They then determine how much they will pay for a service or visit, and how much you are responsible for. (This breakdown is shown on the explanation of benefits, or EOB, provided by the insurance company). Once Northwell receives this information from the insurance company, we send a bill for the amount you owe - this is your patient responsibility.

Have questions? Here's who you should contact:

For questions related to:

- Understanding your Northwell bill
- Requesting itemized bills
- Payment plans and financial assistance
- Visit our online support center at northwell.edu/support or call us at 1-888-224-4066 - 24 hours a day, 7 days a week. *Spanish/Portuguese/Chinese

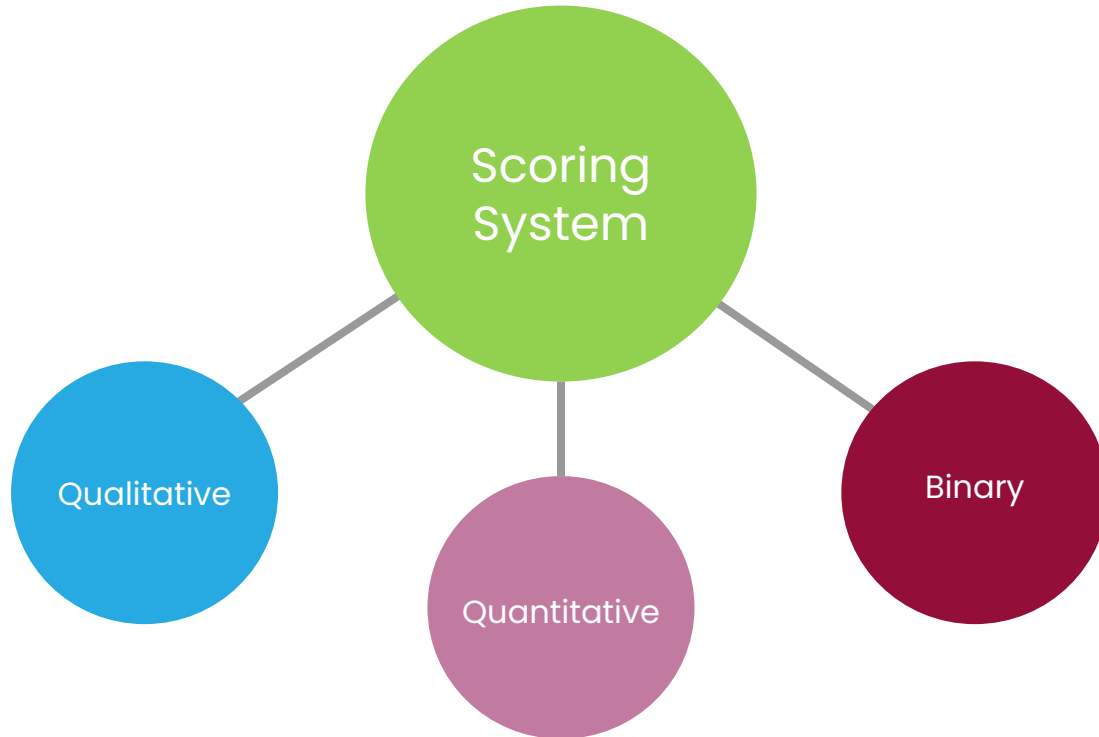
- Copays, Deductibles and co-insurance
- Claim details and insurance coverage
- Resolving an unexpected medical bill
- Please contact your insurance provider. They will be able to provide you with detailed explanations on how your bill was processed and covered.

"I think it's well laid out, it's organized, it's itemized, and it's very easy to understand. I don't think I've received a bill this easy to understand in a very long time."
- 29 year old, male, Northwell Health customer

Scoring System – How can I use it?

- Download the [worksheet](https://www.nodehealth.org/ux-measures) (<https://www.nodehealth.org/ux-measures>)
- Remove non-applicable measures
- Adjust weightings as desired
- Collect qualitative scores from reviewers (ideally at least 2)
- Fill out binary and quantitative scores
- Review output with team
- For ongoing product management decide what to address or add to roadmap and re-score after a period of time (ideally once per quarter)

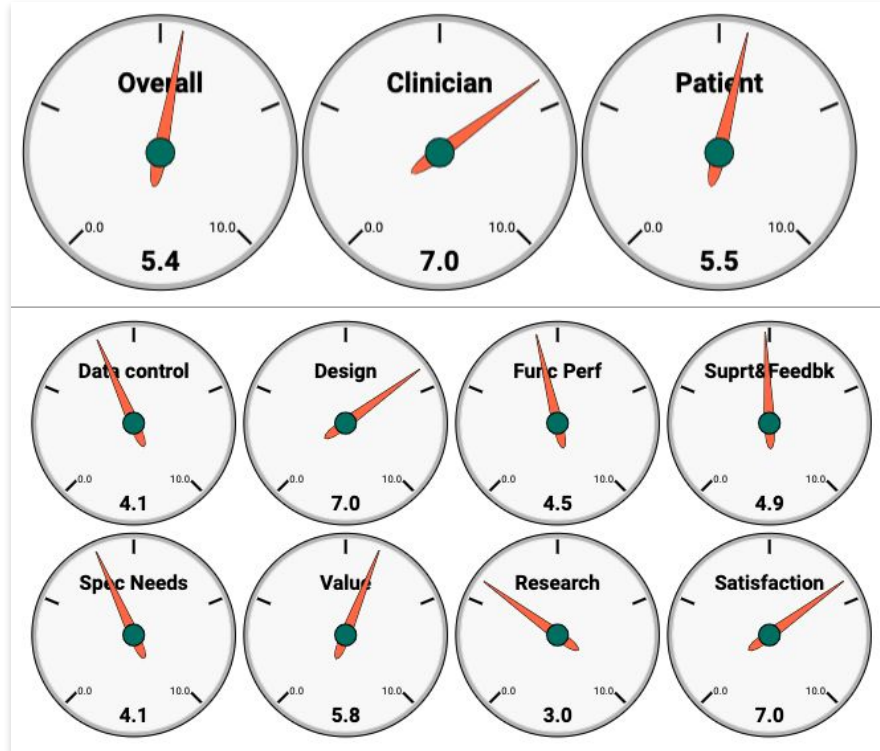
Scoring System - 3 Type of Scores



Scoring System

Principle	Scope	Evaluation	reviewer 1	reviewer 2	reviewer 3	value	normalized value	weight (1-10)	weighted value	potential max
for all of the below 1-10 (1 - strongly disagree, 10 - strongly agree)										
Data control	patient	The user has control over their data (including revoking, sharing, transferring, exporting, avoiding data loss, etc)	5			5	5	5	25	50
Data control	all users	The user can edit and remove their profile information.	5			5	5	5	25	50
Data control	patient	Consents and opt-ins/outs are implemented, confirmed and clear for any data sharing	5			5	5	5	25	50
provide values for all of the below										
Satisfaction	all users	The experience has a good net promoter score (i.e. on scale of 1-10 how likely are you to recommend this app) - enter NPS of a sampling of no less than 5% of users in the last 3 months				5	5	5	25	50
Special needs & accessibility	patient	The experience is accessible and section 508/ADA compliant - enter W3 conformance level (A=1, AA=2, AAA=3)				2	7	5	33	50
Functional Performance	all users	Screens load and system actions execute in a timely manner - enter 1-5 for ranges of average load time for screens or wait times for system actions based on sampling of no less than 5 or 20% of actions or screens (whichever is more) in seconds (0 = > 10 seconds, 1 = > 5 seconds, 2 = > 2 second, 3 = > 1 second, 4 = 1-0.5 second, 5 = < .5 second))				3	6	5	30	50
Functional Performance	all users	The error rate experienced by users is low - enter number of errors experienced as a percentage of interactions				0.05%	5	5	25	50
for all of the below answer YES/NO										
Support & Feedback	all users	Human support is provided in addition to digital support				no	0	5	0	50
Special needs & accessibility	patient	The population evaluated for special needs (physical disabilities, hardware, connectivity, technical literacy, etc.) and if special needs were identified measures were implemented to address them				no	0	5	0	50

Scoring System - Dashboard



Thank You!

nodehealth.org/ux-measures

