

EHR Usability Test Report of ezEMRx Version 10.00

Adaptation: Common Industry Format for Usability Test Reports

Reference Standards:

- NISTIR 7741

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EXECUTIVE SUMMARY

A usability test of ezEMRx 10.00, an Ambulatory EHR, was conducted on-site at a conference center, centrally located to the participants in Northbrook, IL by ezEMRx. The purpose of this test was to test and validate the usability of the current user interface and provide evidence of usability in the EHR Under Test (EHRUT).

For the usability test, ten healthcare providers participated and used the EHRUT in simulated, but representative tasks.

This study collected performance data on the following twelve features:

- Medication List
- Medication Allergy List
- Problem List
- Interaction Check
- Prescribe Medication
- CPOE - Medication
- CPOE - Lab Orders
- CPOE - Radiology Orders
- Clinical Reconciliation Information
- Clinical Decision Support
- Demographics
- Implantable Devices

During the usability test, each participant was asked to review and sign an informed consent/release form (template included in Appendix); they were instructed that they could withdraw at any time. All the participants had no prior experience in working with a previous version of the EHRUT.

The participants were instructed to complete a series of tasks using the EHRUT. During the test, the test duration was timed and recorded as user performance data, on paper. There was no assistance provided to the participants on how to complete each task.

All participant data was de-identified, that is, no correlation could be made between the identity of the participant and the collected data. Following the conclusion of the testing, participants were compensated with \$150 for their time.

Various recommended metrics, in accordance with the examples listed in the NIST Guide to the Process Approach for Improving the Usability of Electronic Health Records, were used to evaluate the usability of the EHRUT.

The UCD process applied for the EHR Under Test (EHRUT) is not an industry standard process, but rather a custom process that is broadly based on the ISO 13407¹ Human-centered design processes for interactive systems.

¹ ISO 13407 - Human-centered design processes for interactive systems

ISO 13407 provides guidance on achieving quality in use by incorporating user-centered design activities throughout the life cycle of interactive computer-based systems. It describes user-centred design as a multi-disciplinary activity, which incorporates human factors and ergonomics knowledge and techniques with the objective of enhancing effectiveness and productivity, improving human working conditions, and counteracting the possible adverse effects of use on human health, safety and performance.

http://www.iso.org/iso/catalogue_detail.htm?csnumber=21197

INTRODUCTION

The EHRUT tested for this study was ezEMRx 10.00, an Ambulatory EHR. Designed to present medical information to healthcare providers in a clinic and specialty setting, the EHRUT consists of a workflow based approach for data capture and retrieval. The usability test was designed to represent realistic exercises and conditions.

The purpose of this study was to test and validate the usability of the current user interface and provide evidence of usability in the EHR Under Test (EHRUT). To achieve this, measures of effectiveness, efficiency and user satisfaction, such as time taken to write a prescription, capture medications and allergies, and execute orders with decision-support validation, were captured during the usability test.

The UCD process applied for the EHR Under Test (EHRUT) is not an industry standard process, but rather a custom process that is broadly based on the ISO 13407 Human centered design processes for interactive systems.

The UCD study methods (adaptation based on ISO/IEC 25062:2006² and NIST IR 7742³) and the UCD process (non-standard custom process) described in this document were applied for the following criteria:

- 170.315(a)(1) - Computerized provider order entry – medications
- 170.315(a)(2) - Computerized provider order entry – laboratory
- 170.315(a)(3) - Computerized provider order entry – diagnostic imaging
- 170.315(a)(4) - Drug-drug, drug-allergy interaction checks for CPOE
- 170.315(a)(5) – Demographics
- 170.315(a)(6) – Problem list
- 170.315(a)(7) – Medication list
- 170.315(a)(8) – Medication allergy list
- 170.315(a)(9) - Clinical decision support (CDS)
- 170.315(a)(14) - Implantable device list
- 170.315(b)(3) - Electronic prescribing
- 170.315(b)(2) - Clinical information reconciliation and incorporation

² ISO/IEC 25062:2006 Software Engineering - Software Product Quality Requirements and Evaluation (SQuaRE) -- Common Industry Format (CIF) for usability test reports. ISO/IEC 25062:2006 provides a standard method for reporting usability test findings. The format is designed to report results of formal usability tests in which quantitative measurements are collected, and is particularly appropriate for summative/comparative testing. http://www.iso.org/iso/catalogue_detail.htm?csnumber=43046

³ NISTIR 7742 - Customized Common Industry Format Template for Electronic Health Record Usability Testing. NISTIR 7742 provides a template for the modified version of Software Engineering Software Product Quality Requirements and Evaluation (SQuaRE) Common Industry Format (CIF) for usability test reports (ISO/IEC 25062:2006(E)), the Common Industry Format (CIF) usability test report. http://www.nist.gov/manuscript-publication-search.cfm?pub_id=907312

UCD PROCESS OUTLINE

The UCD process applied for the EHR Under Test (EHRUT) is not an industry-standard process, but rather a custom process that is broadly based on the “ISO 13407 Human-centered design processes for interactive systems”.

ISO 13407 provides guidance on how to achieve quality in use by incorporating user-centered design activities throughout the life cycle of interactive computer-based systems. It describes user-centered design as a multi-disciplinary activity, which incorporates human factors and ergonomics knowledge and techniques with the objective of enhancing effectiveness and productivity, improving human working conditions, and counteracting the possible adverse effects of use on human health, safety and performance.

DESIGN ACTIVITIES

The user-centered design processes for the EHR Under Test (EHRUT) are based on four design activities as described in “ISO 13407 Human-centered design processes for interactive systems”.

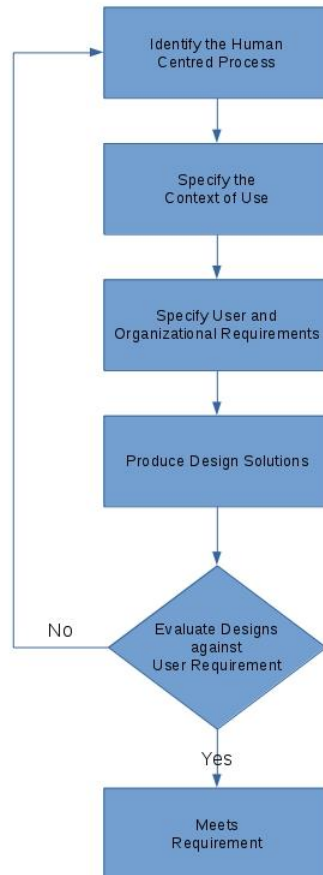
The four activities initiated early into the product design and user interface designs are:

- Understanding and specifying the context of use
- Specifying the user and organizational requirements
- Producing design solutions
- Evaluating designs against requirements

These activities were applied in an iterative manner for every interactive user interface element.

UCD PROCESS CHART

The following chart represents the UCD process and the interdependence of the UCD activities applied on an iterative model of the EHR Under Test (EHRUT).



STUDY METHOD

PARTICIPANTS

To facilitate the usability study, the selected participants were from mixed backgrounds, with different demographic characteristics. The following table lists the participants by characteristics, including demographics, professional experience, computing experience and user needs for assistive technology. Participant names were replaced with Participant IDs to ensure that an individual’s data was not tied back to the individual’s identity.

SI No.	Participant ID	Gender	Age	Education	Occupation / Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1	EZUSE201712001	Male	50-59	Bachelor’s Degree	RN	114 Months	114 Months	0 Months	No
2	EZUSE201712002	Male	50-59	Bachelor’s Degree	RN	120 Months	120 Months	0 Months	No
3	EZUSE201712003	Male	50-59	Bachelor’s Degree	RN	96 Months	96 Months	0 Months	No
4	EZUSE201712004	Male	50-59	Bachelor’s Degree	RN	120 Months	120 Months	0 Months	No
5	EZUSE201712005	Male	60-69	Bachelor’s Degree	RN	120 Months	120 Months	0 Months	No
6	EZUSE201712006	Male	40-49	Bachelor’s Degree	RN	120 Months	120 Months	0 Months	No
7	EZUSE201712007	Male	40-49	Bachelor’s Degree	RN	144 Months	144 Months	0 Months	No
8	EZUSE201712008	Male	50-59	Bachelor’s Degree	RN	120 Months	120 Months	0 Months	No
9	EZUSE201712009	Female	50-59	Bachelor’s Degree	RN	120 Months	120 Months	0 Months	No
10	EZUSE201712010	Male	50-59	Bachelor’s Degree	RN	120 Months	120 Months	0 Months	No

Ten participants were selected to participate in the usability test conducted on 20171227. The usability tests were scheduled for a duration of 120 minutes.

Usability tests were conducted on-site at a conference center, centrally located to the participants in Northbrook, IL.

STUDY DESIGN

Overall, the objective of this test was to uncover areas where the application performed well – that is, effectively, efficiently, and with satisfaction – and areas where the application failed to meet the needs of the participants. The data from this test can be used as a baseline for future tests with an updated version of the same EHR and/or in comparison with other EHRs, provided the same tasks are used. In short, this test served as both a means to record or benchmark the current usability, and also to identify areas where improvements must be made.

This study was an adoption of the process as defined in NIST IR 7742. The methodology was adjusted to accommodate usability requirements of the ezEMRx EHR and serve as a mechanism to incorporate user feedback into product development lifecycles. The participants were engaged to simulate realistic clinical environments, using the provided laptop and with a similar network connectivity. The task elements and results were documented on paper while the study was in progress. This methodology injects user feedback on usability into the product development life cycle.

During the usability test, the system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

- Number of tasks successfully completed within the allotted time without assistance
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system

Additional information about the various measures can be found in the section on Usability Metrics.

DATA SCORING

The following table describes how the tasks were scored, errors evaluated, and time data analyzed.

Measures	Rationale and Scoring
Effectiveness: Task Success	<p>A task was counted as a "Success" if the participant was able to achieve the correct outcome, without assistance, within the allotted time.</p> <p>The results were provided as a percentage. Task times were recorded for successes. Observed task times divided by the optimal time for the task was a measure of optimal efficiency.</p> <p>Optimal task performance time, as benchmarked by expert performance, under realistic conditions, was recorded while constructing tasks.</p>
Effectiveness: Task Failures	<p>If the participant abandoned the task, did not get the correct answer, performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as a "Failure." No task times were recorded for errors.</p> <p>Not all deviations were counted as errors. They were expressed as the mean number of failed tasks per participant.</p>
Efficiency: Task Deviations	<p>The participant's path (steps) through the application was reviewed. Deviations occurred if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path was divided by the number of optimal steps to provide a ratio of path deviation.</p>
Efficiency: Task Time	<p>Each task was timed. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task.</p>
Satisfaction: Task Rating	<p>Participant's subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate ("Overall, this task was:") on a scale of 1 (Very Easy) to 5 (Very Difficult). This data was averaged across participants.</p> <p>To measure participants' likeability of the EHRUT and confidence in using it, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, "I think I would like to use this system frequently," "I thought the system was easy to use," and "I would imagine that most people would learn to use this system very quickly." See full System Usability Score questionnaire in Appendix.</p>

TASKS

A number of tasks were constructed that were realistic and representative of the kinds of activities performed in a clinic using the following EHR features:

- Medication List
- Medication Allergy List
- Problem List
- Interaction Check
- Prescribe Medication
- CPOE - Medication
- CPOE - Lab Orders
- CPOE - Radiology Orders
- Clinical Reconciliation Information
- Clinical Decision Support
- Demographics
- Implantable Devices

Tasks were selected based on the 170.314(g)(3) safety-enhanced design criteria, as part of the ONC HIT Certification Program.

TEST ENVIRONMENT

The EHRUT was one that is typically used in a healthcare office or clinic.

In this instance, the testing was conducted at a conference center located in Northbrook-Illinois. The conference center (test location) comprised of comfortable and ergonomic work spaces, and an Internet connection with a bandwidth < 5 MBPs.

For testing, the participants (Ambulatory physicians and nurses) used laptop computers comprising of a 15.6 inch display, Intel core i5 processor with 4GB memory, and configured with Microsoft Windows 10 as the operating system. During the test, the screen resolution was set to 1600x900. The participants used a mouse and keyboard when interacting with the EHRUT. The participants were instructed not to change any of the default system settings.

The application (EHRUT) itself was setup by the vendor using a training database. The application was setup to be accessible by laptop computers over a WAN connection, using a browser and a URL. The Internet response time was slower, and as a result, the overall performance degraded when compared to what users would experience in a production implementation. The intent was also to review interactions with the EHRUT under lower Internet speeds.

During the test, participants used laptops configured with the Microsoft Windows 10 platform (as stated above), and Mozilla Firefox ESR Version 52 to access the EHRUT that was set up previously with a training database, on a WAN connection.

TEST FORMS AND TOOLS

During the usability test, the documents that were used included:

- Informed Consent Form
- Initial Questionnaire
- Participant Instructions
- SUS Questionnaire
- Incentive Receipt and Acknowledgement

Examples of these documents can be found in the **Appendices**.

The participant's interaction with the EHRUT was captured and recorded within the EHR.

USABILITY METRICS

According to the NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, EHRs should support a process that provides a high level of usability for all users. The goal is for users to interact with the system effectively, efficiently, and with an acceptable level of satisfaction. To this end, metrics for effectiveness, efficiency and user satisfaction were captured during the usability testing.

The goals of the test were to assess:

- Effectiveness of the EHRUT by measuring participant success rates and errors
- Efficiency of the EHRUT by measuring the average task time and path deviations
- Satisfaction with the EHRUT by measuring ease of use ratings

SUMMARY OF TEST RESULTS

PARTICIPANTS

Ten participants were tested on the EHRUT(s). Participants in the test were physicians, nurses and medical assistants. Participants were compensated \$150 for their time. In addition, participants had no direct connection with the development of the EHRUT(s). Participants were clinicians and were not familiar with the use of the EHRUT. Participants were given the same orientation and level of training.

For test purposes, end-user characteristics were identified and translated into this document.

The following table lists participants by characteristics, including demographics, professional experience, computing experience and user needs for assistive technology. Participant names were replaced with Participant IDs so that an individual's data could not be tied back to individual' identity.

SI No.	Participant ID	Gender	Age	Education	Occupation / Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1	EZUSE201712001	Male	50-59	Bachelor's Degree	RN	114 Months	114 Months	0 Months	No
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6	EZUSE201712006	Male	40-49	Bachelor's Degree	RN	120 Months	120 Months	0 Months	No
7	EZUSE201712007	Male	40-49	Bachelor's Degree	RN	144 Months	144 Months	0 Months	No
8	EZUSE201712008	Male	50-59	Bachelor's Degree	RN	120 Months	120 Months	0 Months	No
9	EZUSE201712009	Female	50-59	Bachelor's Degree	RN	120 Months	120 Months	0 Months	No
10	EZUSE201712010	Male	50-59	Bachelor's Degree	RN	120 Months	120 Months	0 Months	No

Ten participants were recruited and requested to participate in the usability tests on 12-27-2017. Participants were scheduled for one session with a time of 120 minutes.

Usability tests were conducted on site at a conference center located in Northbrook, IL.

DATA ANALYSIS AND REPORTING

The results of the usability test were calculated according to methods specified in the Usability Metrics section.

The usability testing results for the EHRUT are detailed below. The results should be seen in light of the objectives and goals outlined in Section Study Design.

The following is a summary of the performance and rating data collected from the EHRUT.

Measure Task	N	Task Success		Path Deviation	Task Time Deviation		Task Time		Errors		Task Ratings 5=Very Easy 1=Very Difficult	
	#	Mean	SD	Deviations (Observed / Optimal)	Mean Observed (Secs)	Mean Optimal ¹ (Secs)	SD (Secs)	Mean (Secs)	Mean	SD	Mean	SD
Medication List	10	70%	34%	61/60	400	78	137	215	30%	66%	3.5	1.18
Medication Allergy List	10	78%	28%	71/70	129	58	96	117	22%	72%	3.9	1.10
Problem List	10	73%	36%	56/56	0	111	108	145	28%	64%	3.6	1.30
Interaction Check	10	80%	37%	82/80	127	120	124	144	20%	63%	4.0	1.49
Prescribe Medication	10	78%	33%	101/100	280	160	178	192	22%	67%	3.9	1.29
CPOE - Medication	10	84%	29%	81/80	240	80	267	187	16%	17%	4.2	1.23
CPOE - Lab Orders	10	90%	16%	70/70	0	111	63	108	10%	84%	4.5	0.71
CPOE - Radiology Orders	10	90%	16%	70/70	0	88	77	118	10%	84%	4.5	0.71
Clinical Reconciliation Information	10	86%	22%	128/126	185	137	105	138	14%	78%	4.3	0.95
Clinical Decision Support	10	82%	37%	37/36	108	83	141	134	18%	63%	4.1	1.54
Demographics	10	86%	22%	70/70	0	118	122	140	14%	78%	4.3	0.95
Implantable Devices	10	84%	29%	61/60	184	126	113	135	16%	71%	4.2	1.23

¹Task Time Deviation – Mean Optimal in seconds was established using the same infrastructure and internet connection at the Test Environment Site to reflect a correct baseline.

The results from the SUS (System Usability Scale) indicated that the score for Subjective Satisfaction with the System, based on performance, with these tasks, was 73%. Broadly interpreted, scores under 60 represented systems with poor usability; scores over 80 were considered “above average”. Since the interactions with the EHRUT were under lower Internet speeds, the SUS score of 73% was an indicator of sustainable use even under low grade Internet speeds.

DISCUSSION ON THE FINDINGS

Discussions with the participants ranged in findings from slowness to usability of the overall system. In specific areas of the CDS function, it was noted that the alerting mechanism was not readily visible. Deviations were noted as some participants could not follow directions as outlined.

The system slowness was related to a lower Internet speed at the test facility when compared to production customer facilities. The lower internet access speeds resulted in the deviations.

Functional concepts of CDS seemed to be challenging and discussions indicated mandatory requirements of user training and education of requirements. The presentation of CDS alerts invoked positive and negative responses from the participants. There were indications of users looking to find the trigger events on such instances. On an alternate note, some participants found the CDS alerts to be apt towards clinical decision assistance.

The overall discussions presented a positive mindset from the participants.

EFFECTIVENESS

The analysis indicated that most participants were successful in completing the tasks as presented. Deviations were noticed for participants whose roles restricted functional areas.

EFFICIENCY

The analysis indicated that the providers were able to perform all functions successfully. Observations of participants with roles such as Nurses showed deviations. However, these observations were considered as exclusions since tasks such as CPOE and CDS were not realistic events in a daily working scenario and hence the participants could not relate to the functional aspects of such tasks.

SATISFACTION

To measure participants' confidence and likeability of the EHRUT overall, the Testing team administered the System Usability Scale (SUS) post-test questionnaire. The satisfaction index presented a positive outlook on usability. The responses have been aggregated and presented in the table below.

Questions included, "I think I would like to use this system frequently," "I thought the system was easy to use," and "I would imagine that most people would learn to use this system very quickly." The responses indicated very positive user usability responses.

Aggregate SUS index -- 1 (Strongly Disagree) to 5 (Strongly Agree)

Index Parameter	Index
I think that I would like to use this system frequently	5
I found the system unnecessarily complex	2
I thought the system was easy to use	4
I think that I would need the support of a technical person to use this system	3
I thought there was too much inconsistency in this system	3
I would imagine that most people would learn to use this system very quickly	4
I found the system very cumbersome to use	3
I felt very confident using the system	4
I needed to learn a lot of things before I could get going with this system	2

MAJOR FINDINGS

The major finding based on the study indicated slowness of the system by all participants. This was a result of lower Internet connectivity speeds. It was further determined that such slow response times are not present in production environments.

AREAS FOR IMPROVEMENT

Observations and discussions did present several areas of improvement. The highlights were:

- Training was required for users, based on roles
- More intuitive screen descriptors were required
- Directions for study had to be improved and screenshots were required in the training material

APPENDIX

Sample – Initial Questionnaire

ezEMRx is recruiting individuals to participate in a usability study of its Electronic Health Record (EHR). We would like to ask you a few questions if you are interested in participating. This will only take a few minutes of your time. This is strictly for research purposes. If you are interested and qualify for the study, you will be paid to participate.

1. Have you participated in a focus group or usability test in the past 6 months?

2. Do you, or does anyone in your home, work in marketing research, usability research or web design?

3. Do you, or does anyone in your home, have a commercial or research interest in electronic health record software or a consulting company?

4. Which of the following best describes your age? [23 to 39; 40 to 59; 60 - to 74; 75 and older]

5. Which of the following best describes your race or ethnic group? [Caucasian, Asian, Black/African-American, Latino or Hispanic]

6. Do you require any assistive technologies to use a computer? [if so, please describe.]

Professional Demographics

What is your current position and title? (Must be a healthcare provider.)

RN: Specialty _____

Physician: Specialty _____

Resident: Specialty _____

Administrative Staff

How long have you held this position? _____

Describe your work location (or affiliation) and environment?

Which of the following describes your highest level of education? [High school graduate/GED, some college, college graduate (RN, BSN), postgraduate (MD/PhD), other (explain)]

Sample – Computer Expertise

Computer Expertise

Approximately how many hours per week do you spend on the computer? [e.g., 0 to 10, 11 to 25, 26+ hours per week]

Which computer platform do you usually use? [e.g., Mac, Windows, etc.]

Which Internet browser do you usually use? [e.g., Firefox, IE, Chrome, etc.]

In the last month, how often have you used an electronic health record?

For how many years have you used an electronic health record?

How many EHRs do you use or which are the ones that you are familiar with?

How does your work environment maintain patient records?

- On paper
- Some on paper, some electronically
- Electronically

Contact and Demographic Details

Participant Name: _____

Gender: _____

Address: _____

City, State, Zip: _____

Phone Number (Daytime): _____

Phone Number (Evening): _____

Alternate Phone Number: _____

Email Address: _____

Sample – Non-Disclosure Agreement

NON-Disclosure Agreement

This AGREEMENT is entered into as of _____ 2017 between _____ ("the Participant") and the testing organization "ezEMRx Inc", located at 1875 Big Timber Road, Suite: A (East Entrance), Elgin IL 60123.

The Participant acknowledges that his or her voluntary participation in today's usability study may bring the Participant into possession of Confidential Information. The term "Confidential Information" means all technical and commercial information of a proprietary or confidential nature which is disclosed by *ezEMRx Inc.*, or otherwise acquired by the Participant, in the course of today's study.

By way of illustration, but not limitation, Confidential Information includes trade secrets, processes, formulae, data, know-how, products, designs, drawings, computer aided design files and other computer files, computer software, ideas, improvements, inventions, training methods and materials, marketing techniques, plans, strategies, budgets, financial information, or forecasts.

Any information the Participant acquires relating to this product during this study is confidential and proprietary to *ezEMRx, Inc.* and is being disclosed solely for the purposes of the Participant's participation in today's usability study. By signing this form, the Participant acknowledges that she/he will receive monetary compensation for feedback and will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant's Printed Name: _____

Signature: _____ **Date:** _____

Sample – Informed Consent

Informed Consent

ezEMRx Inc would like to thank you for participating in this study. The purpose of this study is to evaluate the electronic health records system. If you decide to participate, you will be asked to perform several tasks using the prototype and give your feedback. The study will last about 60-90 minutes. At the conclusion of the test, you will be compensated for your time.

Agreement

I understand and agree that as a voluntary participant in the present study conducted by ezEMRx Inc. I am free to withdraw consent or discontinue participation at any time.

I understand and agree that the purpose of this study is to make software applications more useful and usable in the future.

I understand and agree that the data collected from this study may be shared with others, outside of ezEMRx Inc and ezEMRx clients. I understand and agree that data confidentiality is assured, because only de-identified data – i.e., identification numbers not names – will be used in analysis and reporting of the results.

I agree to immediately raise any concerns or areas of discomfort with the study administrator. I understand that I can leave at any time.

Please check one of the following:

YES, I have read the above statement and agree to be a participant.

NO, I choose not to participate in this study.

Signature: _____ Date: _____

Sample – Incentive Receipt and Acknowledgement

INCENTIVE RECEIPT AND ACKNOWLEDGMENT FORM

I hereby acknowledge receipt of \$150.00 for my participation in a research study conducted by ezEMRx, Inc.

Printed Name: _____

Address: _____

Signature: _____ Date: _____

Usability Researcher: _____

Signature of Usability Researcher: _____

Date: _____

Witness: _____

Witness Signature: _____

Date: _____

Sample – System Usability Scale Questionnaire

SYSTEM USABILITY SCALE QUESTIONNAIRE

	Strongly Disagree				Strongly Agree
I think that I would like to use this system frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I found the system unnecessarily complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I thought the system was easy to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I think that I would need the support of a technical person to use this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I thought there was too much inconsistency in this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I would imagine that most people would learn to use this system very quickly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I found the system very cumbersome to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I felt very confident using the system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
I needed to learn a lot of things before I could get going with this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5

Sample – Final Questions

Final Questions

What was your overall impression of this system? _____

What aspects of the system did you like most? _____

What aspects of the system did you like the least? _____

Were there any features that you were surprised to see? _____

What features did you expect to encounter but did not see? That is, is there anything that is missing in this application? _____

Compare this system to other systems you have used? _____

Would you recommend this system to your colleagues? _____

Task 01: First Impression

This is the application you will be working with. Have you heard of It? _____ YES _____ NO

If yes, what do you know about it?

Please don't click on anything just yet.

What do you notice? What are you able to do here? Please be specific.

Notes / Comments:

Task 1: Medication List

Please click the Today's Task tab to begin the task.

On the current visit, patient “**Nia Doe**” indicates that there is change in his medication history. Locate the Medication tab and complete the following task:

- 1) View active medication.
- 2) Change the existing medication to “Completed” or “Discontinue”.
- 3) Add new medication.
- 4) Click “Medication History” to view the medication history.

Optimal Path:

- 1) Click Patient Management.
- 2) Search for patient “Nia Doe”.
- 3) Navigate to 'Medications'.
- 4) Click the medication name, change the status to “Discontinue”, specify a ‘Reason’ and click **Save**.
- 5) Search for new medication from the auto-lookup field and click Add.
- 6) Click “History” to view a history of the patient’s medication details.

- Correct
 Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
 Completed with difficulty or with help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 2: Medication Allergy List

Please click the Today's Task tab to begin the task.

On the current visit, patient “**Nia Maker**” indicates that there is change in his Allergy list. Locate the Allergy tab and complete the following task:

- 1) View the patient's active allergy list.
- 2) Change the status of one allergy to “Inactive”.
- 3) Add a new allergy.
- 4) Verify the patient allergy history.

Optimal Path:

- 1) Click Patient Management.
- 2) Search for patient “ Nia Maker”.
- 3) Navigate to ‘Allergy’.
- 4) Click on an existing Allergy and change the status to “Inactive”.
- 5) Search for a new allergy from the auto-lookup field and specify the “Severity”, “Event”, and “Reaction”.
- 6) Click ‘Add’ to add the allergies.
- 7) Click “History” to view the patient's historical allergy list.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 3: Problem List

Please click the Today's Task Tab to begin the task.

On the current visit, patient “**Nia Doran**” indicates that there is change in his problem list. Locate the Problem tab and complete the following task:

- 1) View the patient’s active problem list.
- 2) Change the status of one problem to “Resolved”.
- 3) Add a new problem.
- 4) Verify the patient problem history.

Optimal Path:

- 1) Click Patient Management.
- 2) Search for patient “ Nia Doran”.
- 3) Navigate to the ‘Problem’ tab.
- 4) Click an existing Problem and change the status to “Resolved”.
- 5) Search for a new problem by specifying the ‘Problem Code’ or Problem Name’. Capture the onset date as ‘05/05/2010’ and click ‘Save’.
- 6) If ICD10 to Snomed mappings does not exist, then the system will show the Snomed mapping overlay and you can search or lookup and add the associated “SNOMED CODE”.
- 7) Click Save.
- 8) Click “History” to view the patient’s historical problems.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 4: Interaction Check – [D-to-D and D-to-A]

Please click the Today's Task tab to begin the task.

After examining the patient “**Nia Miller**”, you have decided to put this patient on the medication -> “Lipitor”. Check for any ‘D to D or ‘D to A’ interaction and place an order for this medication.

Optimal Path:

- 1) Click Patient Management.
- 2) Search for patient “Nia Miller”.
- 3) Navigate to 'Order Entry'.
- 4) Click 'Rx'.
- 5) Click the “Drug Search” button
- 6) Search and select the required drug.
- 7) Add “Duration”, “Quantity”, “Sig”, “Refill” and click Add.
- 8) Click “Execute Order” to view D-to-D and D-to-A interaction.

- Correct
 Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
 Completed with difficulty or required help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 5: Prescribe Medication

Please click the Today's Task tab to bring the task.

After examining the patient “**Nia Jones**”, you have decided to put this patient on the medication -> “Lipitor”. Check for any interaction, choose the pharmacy and ePrescribe this medication.

Optimal Path:

- 1) Click Patient Management.
- 2) Search for patient “Nia Jones”.
- 3) Navigate to ‘Order Entry’.
- 4) Click the ‘Rx’ tab.
- 5) Click the “Drug Search” button.
- 6) Search and select the required drug.
- 7) Add “Duration”, “Quantity”, “Sig”, “Refill” and click Add.
- 8) Click “Execute Order” to view interaction.
- 9) Select Pharmacy.
- 10) Click “Send” to ePrescribe.

- Correct
 Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
 Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 6: CPOE - Medication

Please click the Today's Task tab to begin the task.

After examining the patient “**Nia Miller**”, you have decided to create an order for medication for this patient. Check for any D-to-D interaction and complete the order.

- 1) Select the existing order-set for this patient.
- 2) Add or remove any one medication based on the patient requirement.
- 3) Select the required action and execute the order.

Optimal Path:

- 1) Click Patient Management
- 2) Search for patient “Nia Miller”.
- 3) Navigate to ‘Order Entry’.
- 4) Click the ‘Select Order Set’ button and choose ‘CPOE – Medication Orders’.
- 5) Click the **RX** tab to make changes to the medication orders, if required.
- 6) Click “**Execute Orders**” to execute orders from the “**RX**” tab.
- 7) System will show any ‘Drug to ‘Drug’ or ‘Drug to ‘Allergy’ Interaction page -> select the override reason, if applicable, and click ‘OK’.
- 8) Select ‘No Pharmacy Found’ and click ‘Print’ to print the Prescription.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 7: CPOE – Laboratory Orders

Please click the Today's Task tab to begin the task.

After examining the patient “**Nia Miller**”, you have decided to create an order for lab for this patient.

- 1) Select the existing order-set for this patient.
- 2) Add or remove any one investigation based on the patient requirement.
- 3) Select the required action and execute the order.

Optimal Path:

- 1) Click Patient Management.
- 2) Search for patient “Nia Miller”.
- 3) Navigate to 'Order Entry'.
- 4) Click the 'Select Order Set' button and choose 'CPOE – Laboratory Orders'.
- 5) Click the **Lab Name 'Others'** to make changes to the Laboratory orders, if required.
- 6) Click the '**Execute Orders**' button on the right hand side”, to execute orders.
- 7) Click 'Save' to complete the Lab orders.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ **seconds**

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 8: CPOE – Radiology Orders

Please click the Today's Task tab to begin the task.

After examining the patient “**Nia Miller**”, you have decided to create an order for radiology for this patient.

- 1) Select the existing order-set for this patient.
- 2) Add or remove any one investigation based on the patient requirement
- 3) Select the required action and execute the order.

Optimal Path:

- 1) Click Patient Management.
- 2) Search for patient “Nia Miller”.
- 3) Navigate to ‘Order Entry’.
- 4) Click the ‘Select Order Set’ button and choose ‘CPOE – Radiology Orders’.
- 5) Click the **Lab Name ‘Others’** to make changes to the Radiology orders.
- 6) Click ‘Execute Orders’ from the “**Lab**” tab.
- 7) Click ‘Save’ to complete the Radiology orders.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ **seconds**

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 9 : Clinical Information Reconciliation

Please click the Today's Task tab to begin the task.



Patient “**Christina Jones**” is an existing patient of yours and has recently undergone surgery and has received the CCDA from the facility. Incorporate the CCDA to the her System.

a) Verify the patient incoming medical records (Problems / Medication / Allergies) against the existing records and complete reconciliation for this patient.

Optimal Path:

- 1) Click the 'Incoming HIE' task.
- 2) Select the patient “Christina Jones”.
- 3) If the patient is not matched, click “Search’ and create the patient.
- 4) Click the ‘Verified’ button. Clinical Reconciliation Task will be shown with the following tabs. “Medication’, ‘Problems’ and ‘Allergies’

Reconciliation Process

- 1) System will show the medication received (via CCDA) and the current medication (side by Side), verify the Medication and click “Accept () or discard the changes ()”.
- 2) After confirming, click “Validate” and ‘Confirm”.
- 3) Repeat Step 1 through 3 for the other 2 tabs (Allergies / Problems)
- 4) Click ‘Submit’ to complete clinical reconciliation.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ **seconds**

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments


Task 10: Clinical Decision Support

Please click the Today's Task tab to begin the task.

Patient “**Nia Major**” is an existing patient of yours and has come in for a consultation and is currently on multiple medications / has active problems and has pending results for verification.

- 1) Click the patient’s records. System will trigger an automated clinical decision support based on the patient conditions / medication / labs
- 2) Click the CDS alert icon and complete the required task.

Optimal Path:

- 1) Click Patient Management.
- 2) Select the Patient “Nia Major”. System will trigger an automated CDS alerts  on the right hand top corner.
- 3) Click the icon and a CDS window will be displayed showing the appropriate details as per the patient medication / problems / allergies etc.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ **seconds**

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: “Very Easy” (1) to “Very Difficult” (5)

Administrator Comments

Task 11: Demographics

Please click the Today's Task tab to begin the task.

Patient '**Nia Major's**' demographics have to be captured again as they have changed. Follow the instructions below to update the demographics for this patient.

Optimal Path:

- 1) Log into ezEMRx and click Patient Management.
- 2) Search for the patient "Nia Major".
- 3) Navigate to 'Demographics'.
- 4) Click 'Personal Information' and add the following details:
 - Specify the patient's middle name as 'Jones'.
 - Gender identity
 - Sexual Orientation
 - Race
 - Ethnicity
 - Patient's Current Address
 - Patient's Home Phone
- 5) Capture all the information and click 'Update' to save the changes.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: *"Very Easy" (1) to "Very Difficult" (5)*

Administrator Comments

Task 12: Implantable Devices

Please Click on the Today's Task Tab as starting point of the task.

Patient '**Nia Major**' has under surgery and a 'Pacemaker' has been implanted. Navigate the patient medical records and capture the 'Implantable device for this patient.

Optimal Path :

- 1) Click Patient Management.
- 2) Search for patient "Nia Major".
- 3) Navigate to the 'Implantable Devices' tab.
- 4) Click 'Device Lookup'.
- 5) Select 'Entry' -> Enter device ID – **00643169007222** and click 'Search'.
- 6) Select Device and click 'Add'.

- Correct
- Minor Deviations / Cycles: Describe below

- Major Deviations: Describe below

Success:

- Easily completed
- Completed with difficulty or help: Describe below

- Not completed

Task Time: _____ seconds

Observed Errors and Verbalizations:

Comments: _____

Rating: Overall, this task was: _____

Participant written scale: "Very Easy" (1) to "Very Difficult" (5)

Administrator Comments

