

EHR Usability Test Report of TalkEHR (1.0)

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EXECUTIVE SUMMARY

A usability test of [TalkEHR 1.0] was conducted on [12/08/2016] by [MTBC testing team]. 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 (TalkEHR 1.0).

During the usability test, [10] healthcare providers matching the target demographic criteria served as participants and used the TalkEHR in simulated, but representative tasks.

This study collected performance data on [41] tasks conducted on TalkEHR 1.0:

- Record medication via CPOE.
- Change medication via CPOE.
- Access CPOE medication orders.
- Record Lab orders via CPOE.
- Change Lab orders via CPOE.
- Access CPOE Lab orders.
- Record Imaging orders via CPOE.
- Change Imaging orders via CPOE.
- Access CPOE Imaging orders.
- Using CPOE, trigger drug-drug interaction by entering a new medication order.
- Using CPOE, trigger drug-allergy interaction by entering a new medication order.
- Adjust the severity level of drug-drug interactions.
- Record preferred language, date of birth, birth sex, race, ethnicity, sexual orientation Change preferred language, date of birth, birth sex, race, ethnicity, sexual orientation,
- Access preferred language, date of birth, birth sex, race, ethnicity, sexual orientation,
- Record a problem to the problem list.
- Change a problem on the problem list.
- Access and display the active problem list.
- Record a medication to the medication list.
- Change a medication on the medication list.
- Access and display the active medication list.
- Record a medication allergy to the medication allergy list.
- Change a medication allergy on the medication allergy list.
- Access and display the active medication allergy list.
- Configure CDS interventions and reference resources.
- Trigger CDS interventions using data elements from the problem list, medication list, medication allergy list, demographics, lab tests, and vital signs.
- Access diagnostic and therapeutic reference information using the Info button standard for data elements in the problem list, medication list, and demographics.

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- Receive CDS interventions based on data elements in the problem list, medication list, and medication allergy list after incorporating a CCDA.
- Access the following attributes for a CDS intervention: bibliographic citation, developer, funding source, release/revision date.
- Record UDI and Status.
- Change UDI and Status.
- Create a list that contains UDIs, description, and method to access UDIs.
- Access UDI, device description, UDI identifiers, and UDI attributes.
- Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record.
- Create new CCDA with reconciled data.
- Create new prescription.
- Change prescription.
- Cancel prescription.
- Refill prescription.
- Obtain fill status.
- Request /receive medication history information.

During the [45 minute] one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix 3); they were instructed that they could withdraw at any time.

Participants had no prior experience with the TalkEHR 1.0.

The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the TalkEHR 1.0. During the testing, the administrator timed the test and, along with the data logger(s) recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task.

A brief demonstration of each task was provided to the users prior to the start of each test

The following types of data were collected 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
- Participant's satisfaction ratings of the system

All participant data was de-identified – no correspondence could be made

from the identity of the participant to the data collected. Following

the conclusion of the testing, participants were asked to complete a post-test questionnaire. No compensation or incentive was given to the participants. Various recommended metrics, in accordance with the examples set forth in the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, were used to evaluate the usability of the TalkEHR1.0. Following is a summary of the performance and rating data collected on the TalkEHR 1.0.

Task Measure	Result	Task Succ	Path Deviat	Task Time		Errors	Task Rating		
		ess	ion	Mean	Deviations	Mean	Task Rating	Task Rating - Standard Deviation	Rating
		Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	(Observed / Optimal)	Mean (SD)			
(a)(1) CPOE – Medications	Record medication via CPOE	96.7	7/7	13	14/13	0.59	4	0.56	Likert
	Change medication via CPOE	96.6	7/9	16	18/15	0.75	3.8	0.7	Likert
	Access CPOE medication orders	96.9	6/4	10	10/10	0.45	5	0.4	Likert
(a)(2) CPOE – Laboratory	Record Lab orders via CPOE	97.11	6/4	7	8/2	2.03	4.05	0.69	Likert
	Change Lab orders via CPOE	98.46	7/6	11	13/2	1.49	4.23	0.53	Likert
	Access CPOE Lab orders	98.6	3/3	5	4/2	0.96	5	0.4	Likert
(a)(3) CPOE – Diagnostic Imaging	Record Imaging orders via CPOE	97.11	6/4	7	8/2	2.03	88	7.02	System Usability Scale
	Change Imaging orders via CPOE	98.46	7/6	11	13/2	1.49	88.4	7.23	System Usability Scale
	Access CPOE Imaging orders	98.6	3/3	5	4/2	0.96	93	2.95	System Usability Scale
(a)(4) Drug-Drug, Drug-Allergy Interaction	Using CPOE, trigger drug-drug interaction by entering a new medication order	89.65	11/9	25	28/3	4.23	4.43	0.45	Likert
	Using CPOE, trigger drug-allergy interaction by entering a new medication order	88	12/10	25	24/4	3.36	4.68	0.51	Likert
	Adjust the severity level of drug-drug interactions	80.7	8/9	23	21/5	3.5	4.24	0.59	Likert
(a)(5) Demographics	Record preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.	99.12	5/4	6	8/1	0.22	4.56	0.35	Likert
	Change preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.	97.52	6/5	6	5/2	0.25	4.89	0.24	Likert
	Access preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.	99.81	3/4	4	3/1	0.01	4.98	0.21	Likert
(a)(6) Problem List	Record a problem to the problem list	98.11	8/6	9	8/1	0.52	98.2	3.76	System Usability Scale
	Change a problem on the problem list	97.8	7/6	9	10/1	0.27	96.1	3.5	System Usability Scale

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	Access and display the active problem list	99.68	4/4	7	7/1	0.15	97.3	1.75	System Usability Scale
(a)(7) Medication List	Record a medication to the medication list	97.65	6/4	8	8/1	0.24	5	0.02	Likert
	Change a medication on the medication list	96.5	6/5	7	7/2	0.35	4.9	0.35	Likert
	Access and display the active medication list	99.45	4/3	4	4/1	0.28	4.88	0.01	Likert
(a)(8) Medication Allergy List	Record a medication allergy to the medication allergy list	99.15	7/5	8	9/1	0.18	97.98	1.85	System Usability Scale
	Change a medication allergy on the medication allergy list	98.25	7/5	7	8/1	0.2	97.54	2.5	System Usability Scale
	Access and display the active medication allergy list	99.89	3/3	4	2/1	0.11	99	1.3	System Usability Scale
(a)(9) Clinical Decision Support	Configure CDS interventions and reference resources	88.2	8/7	10	11/2	1.49	91.65	4.78	System Usability Scale
	Trigger CDS interventions using data elements from the problem list, medication list, medication allergy list, demographics, lab tests, and vital signs	89	3/3	6	8/1	1.24	90.56	4.85	System Usability Scale
	Access diagnostic and therapeutic reference information using the Infobutton standard for data elements in the problem list, medication list, and demographics	95.6	8/7	9	7/2	1.37	88.1	4.32	System Usability Scale
	Receive CDS interventions based on data elements in the problem list, medication list, and medication allergy list after incorporating a CCDA	85.4	5/4	7	6/2	1.02	87.56	4.12	System Usability Scale
	Access the following attributes for a CDS intervention: bibliographic citation, developer, funding source, release/revision date	89	8/6	8	10/1	0.89	90	5.01	System Usability Scale
(a)(14) Implantable Device List	Record UDI and Status	98.4	8/7	11	12/2	0.52	4.95	0.25	Likert
	Change UDI and Status	97.25	8/7	14	14/1	0.34	4.96	0.3	Likert
	Create a list that contains UDIs, description, and method to access UDIs	97.7	9/6	10	8/1	0.1	4.75	0.1	Likert
	Access UDI, device description, UDI identifiers, and UDI attributes	98	5/4	5	6/1	0.31	4.73	0.14	Likert
(b)(2) Clinical Information Reconciliation and Incorporation	Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record	98.65	5/4	6	5/2	0.4	4.9	0.29	Likert
	Create new CCDA with reconciled data	97.42	4/3	3	4/1	0.35	4.76	0.34	Likert

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(b)(3) ePrescribing	Create new prescription	99.3	29/1 9	25	24/1	0.52	94.25	7.15	System Usability Scale
	Change prescription	98.9	11/1 8	23	22/1	0.38	94.02	7.02	System Usability Scale
	Cancel prescription	98.5	25/1 7	26	25/1	0.85	82.32	6.59	System Usability Scale
	Refill prescription	99.5	11/1 1	16	14/1	0.42	81	8.1	System Usability Scale
	Obtain fill status	97.9	10/1 2	14	15/1	1.02	89.52	8.01	System Usability Scale
	Request /receive medication history information	97.8	10/1 0	14	15/1	0.98	90.2	6.23	System Usability Scale

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The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be:

[Two methods were used for rating. As per **Likert** over all EHR Performance average was **4.65** and as per **SUS** Overall EHR Performance average was **91.74**].⁵

In addition to the performance data, the following qualitative observations were made:

- Major findings
 - o [Some users took a little extra time on Clinical Information Reconciliation and Clinical Decision Support. Overall they were satisfied to see the newly added parameters in the Clinical Decision Support, but wanted to see a little improvement in the current work flow]
- Areas for improvement
 - o [Some users were a little unsatisfied with few issues in voice command due to change in the accents, and wanted to improve the efficiency.]

⁵ See Tullis, T. & Albert, W. (2008). *Measuring the User Experience*. Burlington, MA: Morgan Kaufman (p. 149). Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

INTRODUCTION

The TalkEHR 1.0(s) tested for this study was MTBC-TalkEHR Version 1.0 designed to present medical information to healthcare providers in [any healthcare setting]. The usability testing attempted 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 (TalkEHR 1.0). . To this end, measures of effectiveness, efficiency and user satisfaction, such as [Performace, Errors and time on task]), were captured during the usability testing.

METHOD

PARTICIPANTS

A total of [10] participants were involved in the testing on the TalkEHR 1.0. Participants in the test were [Clinical Assistant, MD, Physician's Assistant]. Participants were recruited by [MTBC] and were not compensated for their time and participation. In addition, participants had no direct connection to the development of or organization producing the TalkEHR 1.0(s). Participants were not from the testing or supplier organization. Participants were given the opportunity to have the same orientation and level of training as the actual end users would have received.

For the test purposes, end-user characteristics were identified and translated into a recruitment screener used to solicit potential participants; an example of a screener is provided in Appendix [1].

Recruited participants had a mix of backgrounds and demographic characteristics conforming to the recruitment screener. The following is a table of 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 cannot be tied back to individual identities.

SR.	Part ID	Gender	Age	Education	Occupation/Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1	ID01	Male	30-39	Bachelor's Degree	Clinical Assistant	84	240	0	No
2	ID02	Male	30-39	MD	MD	144	250	0	No
3	1D03	Female	40-49	Master's Degree	Physician's Assistant	120	280	0	No
4	1D04	Female	30-39	High school graduate, diploma or the equivalent	Clinical Assistant	87	210	0	No
5	ID05	Male	40-49	Master's Degree	Physician's Assistant	160	230	0	No
6	ID06	Male	40-49	MD	MD	150	240	0	No
7	ID07	Male	30-39	Bachelor's Degree	Physician's Assistant	120	220	0	No
8	ID08	Female	40-49	Associate Degree	Clinical Assistant	144	230	0	No
9	ID09	Female	50-59	Associate Degree	Clinical Assistant	160	280	0	No
10	ID10	Male	30-39	Bachelor's Degree	Physician's Assistant	90	240	0	No

[Ten] participants (matching the demographics in the section on Participants) were recruited and all participants participated in the usability test.

Participants were scheduled for [45 min] sessions with [15 min] in between each session for debrief by the administrator(s) and data logger(s), and to reset systems to proper test conditions. A spreadsheet was used to keep track of the participant schedule, and included each participant’s demographic characteristics.

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 may serve as a baseline for future tests with an updated version of the same EHR and/or comparison with other EHRs provided the same tasks are used. In short, this testing serves as both a means to record or benchmark current usability, but also to identify areas where improvements must be made.

During the usability test, participants interacted with [1] EHR(s). Each participant used the system remotely, and was provided with the same instructions. 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 Section 3.9 on Usability Metrics.

TASKS

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR, including:

Task Measure	N
	#
(a)(1) CPOE – Medications	Record medication via CPOE
	Change medication via CPOE
	Access CPOE medication orders
(a)(2) CPOE – Laboratory	Record Lab orders via CPOE
	Change Lab orders via CPOE
	Access CPOE Lab orders
(a)(3) CPOE – Diagnostic Imaging	Record Imaging orders via CPOE
	Change Imaging orders via CPOE
	Access CPOE Imaging orders
(a)(4) Drug-Drug, Drug-Allergy Interaction	Using CPOE, trigger drug-drug interaction by entering a new medication order
	Using CPOE, trigger drug-allergy interaction by entering a new medication order
	Adjust the severity level of drug-drug interactions
(a)(5) Demographics	Record preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
	Change preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.
	Access preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.
(a)(6) Problem List	Record a problem to the problem list
	Change a problem on the problem list
	Access and display the active problem list
(a)(7) Medication List	Record a medication to the medication list
	Change a medication on the medication list
	Access and display the active medication list
(a)(8) Medication Allergy List	Record a medication allergy to the medication allergy list
	Change a medication allergy on the medication allergy list
	Access and display the active medication allergy list
(a)(9) Clinical Decision Support	Configure CDS interventions and reference resources
	Trigger CDS interventions using data elements from the problem list, medication list, medication allergy list, demographics, lab tests, and vital signs
	Access diagnostic and therapeutic reference information using the Infobutton standard for data elements in the problem list, medication list, and demographics
	Receive CDS interventions based on data elements in the problem list, medication list, and medication allergy list after incorporating a CCDA
	Access the following attributes for a CDS intervention: bibliographic citation, developer, funding source, release/revision date
(a)(14) Implantable Device List	Record UDI and Status
	Change UDI and Status
	Create a list that contains UDIs, description, and method to access UDIs
	Access UDI, device description, UDI identifiers, and UDI attributes
(b)(2) Clinical Information Reconciliation and Incorporation	Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record
	Create new CCDA with reconciled data
(b)(3) ePrescribing	Create new prescription
	Change prescription

	Cancel prescription
	Refill prescription
	Obtain fill status
	Request /receive medication history information

Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users. Tasks should always be constructed in light of the study objectives.

PROCEDURES

Upon joining the remote session, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID.

A representative from the test team witnessed the participant's signature. To ensure that the test ran smoothly, two staff members participated in this test, the usability administrator and the data logger. The usability testing staff conducting the test was experienced usability practitioners with [10 years of experience, with master degree,]

The administrator moderated the session including administering instructions and tasks. The administrator also monitored task times, obtained post-task rating data, and took notes on participant comments.

A second person served as the data logger and took notes on task success, path deviations, number and type of errors, and comments.

Participants were instructed to perform the tasks (see specific instructions below):

- As quickly as possible making as few errors and deviations as possible.
- Without assistance; administrators were allowed to give immaterial guidance and clarification on tasks, but not instructions on use.
- Without using a think aloud technique.

For each task, the participants were given a written copy of the task. Task timing began once the administrator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below in Section 3.9.

Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Scale, see Appendix 5), compensated them for their time, and thanked each individual for their participation.

Participants' demographic information, task success rate, time on task, errors, deviations, verbal responses, and post-test questionnaire were recorded into a spreadsheet.

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Participants were thanked for their time. Participants signed a receipt and acknowledgement form (See Appendix 6) indicating that they had received the compensation.

TEST LOCATION

The tests were performed remotely via GoToMeeting software.

TEST ENVIRONMENT

The TalkEHR would be typically be used in a healthcare office or facility.

In this instance, the testing was conducted in [MTBC]. For testing, the computer used a [Desktop PC] running [Windows operating system].

The participants used [Mouse, keyboard and Microphone] when interacting with the TalkEHR 1.0.

The [TalkEHR 1.0] used [19 Inch Display with 1280 to 1600 Screen Resolution .] The application was set up by the [MTBC Development Team] according to the vendor's documentation describing the system set-up and preparation. The application itself was running on a

[Web Technology] using a [test database] on a [LAN / WAN] connection.

Technically, the system performance (i.e., response time) was representative to what actual users would experience in a field implementation. Additionally, participants were instructed not to change any of the default system settings (such as control of font size).

TEST FORMS AND TOOLS

During the usability test, various documents and instruments were used, including:

1. Informed Consent
2. Moderator's Guide

3. Post-test Questionnaire

Examples of these documents can be found in Appendices 3-6 respectively. The Moderator's Guide was devised so as to be able to capture required data.

The participant's interaction with the TalkEHR 1.0 was captured and recorded digitally with GoToMeeting software running on the test machine.

PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to the each participant (also see the full moderator's guide in Appendix [B4]):

Thank you for participating in this study. Your input is very important. Our session today will last about [45]]. During that time you will use an instance of an electronic health record.

I will ask you to complete a few tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you we are testing the system, therefore if you have difficulty all this means is that something needs to be improved in the system. I will be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application.

Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. I did not have any involvement in its creation, so please be honest with your opinions. All of the information

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that you provide will be kept confidential and your name will not be associated with your comments at any time. Should you feel it necessary you are able to withdraw at any time during the testing.

Following the procedural instructions, participants were shown the TalkEHR and as their first task, were given time ([45] minutes) to explore the system and make comments. Once this task was complete, the administrator gave the following instructions:

For each task, I will read the description to you and say “Begin.” At that point, please perform the task and say “Done” once you believe you have successfully completed the task. I would like to request that you not talk aloud or verbalize while you are doing the tasks.⁹ I will ask you your impressions about the task once you are done.

Participants were then given [45] tasks to complete. Tasks are listed in the moderator’s guide in Appendix [B4].

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:

1. Effectiveness of [TalkEHR 1.0] by measuring participant success rates and errors
2. Efficiency of [TalkEHR 1.0] by measuring the average task time and path deviations

⁹ Participants should not use a think-aloud protocol during the testing. Excessive verbalization or attempts to converse with the moderator during task performance should be strongly discouraged. Participants will naturally provide commentary, but they should do so, ideally, after the testing. Some verbal commentary may be acceptable between tasks, but again should be minimized by the moderator.

3. Satisfaction with [TalkEHR 1.0] by measuring ease of use ratings

DATA SCORING

The following table details how tasks were scored, errors evaluated, and the time data analyzed.¹⁰

Measures	Rationale and Scoring
<p>Effectiveness: Task Success</p>	<p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis.</p> <p>The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.</p> <p>Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p>
<p>Effectiveness: Task Failures</p>	<p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an “Failures.” No task times were taken for errors.</p> <p>The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors.¹¹ This should also be expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>
<p>Efficiency: Task Deviations</p>	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur 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 is divided by the number of optimal steps to provide a ratio of path deviation.</p>

	It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.
Efficiency: Task Time	Each task was timed from when the administrator said “Begin” until the participant said, “Done.” If he or she failed to say “Done,” the time was stopped when the participant stopped performing the task. 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. Variance measures (standard deviation and standard error) were also calculated.
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 Difficult) to 5 (Very Easy). These data are averaged across participants.¹²</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants’ confidence in and likeability of the [TalkEHR 1.0] overall, 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 5.¹³</p>

Table [Results]. Details of how observed data were scored.

RESULTS

DATA ANALYSIS AND REPORTING

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. There were no participants who failed to follow session.

The usability testing results for the TalkEHR 1.0 are detailed below (see Table Results)¹⁴.

Task Measure	Result	Task	Path	Task Time		Errors	Task Rating		
		Succ ess	Deviat ion	Mean	Deviations	Mean	Task	Task	Rating
N #		Mean (SD)	Deviatio ns (Observ ed / Optimal)	Mean (SD)	(Observed / Optimal)	Mean (SD)	Rating	Ratin g - Stan dard Devia tion	
(a)(1) CPOE – Medications	Record medication via CPOE	96.7	7/7	13	14/13	0.59	4	0.56	Likert
	Change medication via CPOE	96.6	7/9	16	18/15	0.75	3.8	0.7	Likert
	Access CPOE medication orders	96.9	6/4	10	10/10	0.45	5	0.4	Likert
(a)(2) CPOE – Laboratory	Record Lab orders via CPOE	97.11	6/4	7	8/2	2.03	4.05	0.69	Likert
	Change Lab orders via CPOE	98.46	7/6	11	13/2	1.49	4.23	0.53	Likert
	Access CPOE Lab orders	98.6	3/3	5	4/2	0.96	5	0.4	Likert
(a)(3) CPOE – Diagnostic Imaging	Record Imaging orders via CPOE	97.11	6/4	7	8/2	2.03	88	7.02	System Usability Scale
	Change Imaging orders via CPOE	98.46	7/6	11	13/2	1.49	88.4	7.23	System Usability Scale
	Access CPOE Imaging orders	98.6	3/3	5	4/2	0.96	93	2.95	System Usability Scale
(a)(4) Drug-Drug, Drug-Allergy Interaction	Using CPOE, trigger drug-drug interaction by entering a new medication order	89.65	11/9	25	28/3	4.23	4.43	0.45	Likert
	Using CPOE, trigger drug-allergy interaction by entering a new medication order	88	12/10	25	24/4	3.36	4.68	0.51	Likert
	Adjust the severity level of drug-drug interactions	80.7	8/9	23	21/5	3.5	4.24	0.59	Likert
(a)(5) Demographics	Record preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.	99.12	5/4	6	8/1	0.22	4.56	0.35	Likert
	Change preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.	97.52	6/5	6	5/2	0.25	4.89	0.24	Likert
	Access preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity.	99.81	3/4	4	3/1	0.01	4.98	0.21	Likert
(a)(6) Problem List	Record a problem to the problem list	98.11	8/6	9	8/1	0.52	98.2	3.76	System Usability Scale
	Change a problem on the problem list	97.8	7/6	9	10/1	0.27	96.1	3.5	System Usability Scale

	Access and display the active problem list	99.68	4/4	7	7/1	0.15	97.3	1.75	y Scale
(a)(7) Medication List	Record a medication to the medication list	97.65	6/4	8	8/1	0.24	5	0.02	Likert
	Change a medication on the medication list	96.5	6/5	7	7/2	0.35	4.9	0.35	Likert
	Access and display the active medication list	99.45	4/3	4	4/1	0.28	4.88	0.01	Likert
(a)(8) Medication Allergy List	Record a medication allergy to the medication allergy list	99.15	7/5	8	9/1	0.18	97.98	1.85	System Usability Scale
	Change a medication allergy on the medication allergy list	98.25	7/5	7	8/1	0.2	97.54	2.5	System Usability Scale
	Access and display the active medication allergy list	99.89	3/3	4	2/1	0.11	99	1.3	System Usability Scale
(a)(9) Clinical Decision Support	Configure CDS interventions and reference resources	88.2	8/7	10	11/2	1.49	91.65	4.78	System Usability Scale
	Trigger CDS interventions using data elements from the problem list, medication list, medication allergy list, demographics, lab tests, and vital signs	89	3/3	6	8/1	1.24	90.56	4.85	System Usability Scale
	Access diagnostic and therapeutic reference information using the Infobutton standard for data elements in the problem list, medication list, and demographics	95.6	8/7	9	7/2	1.37	88.1	4.32	System Usability Scale
	Receive CDS interventions based on data elements in the problem list, medication list, and medication allergy list after incorporating a CCDA	85.4	5/4	7	6/2	1.02	87.56	4.12	System Usability Scale
	Access the following attributes for a CDS intervention: bibliographic citation, developer, funding source, release/revision date	89	8/6	8	10/1	0.89	90	5.01	System Usability Scale
(a)(14) Implantable Device List	Record UDI and Status	98.4	8/7	11	12/2	0.52	4.95	0.25	Likert
	Change UDI and Status	97.25	8/7	14	14/1	0.34	4.96	0.3	Likert
	Create a list that contains UDIs, description, and method to access UDIs	97.7	9/6	10	8/1	0.1	4.75	0.1	Likert
	Access UDI, device description, UDI identifiers, and UDI attributes	98	5/4	5	6/1	0.31	4.73	0.14	Likert
(b)(2) Clinical Information Reconciliation and	Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information	98.65	5/4	6	5/2	0.4	4.9	0.29	Likert

Incorporation	currently in the patient's record								
	Create new CCDA with reconciled data	97.42	4/3	3	4/1	0.35	4.76	0.34	Likert
(b)(3) ePrescribing	Create new prescription	99.3	29/19	25	24/1	0.52	94.25	7.15	System Usability Scale
	Change prescription	98.9	11/18	23	22/1	0.38	94.02	7.02	System Usability Scale
	Cancel prescription	98.5	25/17	26	25/1	0.85	82.32	6.59	System Usability Scale
	Refill prescription	99.5	11/11	16	14/1	0.42	81	8.1	System Usability Scale
	Obtain fill status	97.9	10/12	14	15/1	1.02	89.52	8.01	System Usability Scale
	Request /receive medication history information	97.8	10/10	14	15/1	0.98	90.2	6.23	System Usability Scale

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be:

[Two methods were used for rating. As per **Likert** over all EHR average Performance was **4.65** and as per **SUS** Overall EHR average Performance was **91.74**].

Discussions of the Findings

Effectiveness:

Most users praised the new system. They were excited to see the newly built voice command technology which has been introduced for the very first time by any of the EHRs available in the market.

Major Findings:

Some users took a little extra time on Clinical Information Reconciliation and Clinical Decision Support. Overall they were satisfied to see the newly added parameters in the Clinical Decision Support, but wanted to see a little improvement in the current work flow.

Efficiency:

Most of the tasks were completed by the users on time with deviations in Computerized Provider Entry Clinical Information Reconciliation, Clinical Decision Support and Medication List.

Satisfactions:

All the users were satisfied with the overall workflow and provided few suggestions to make it more user- friendly.

Areas for Improvement:

The users were a little unsatisfied with few issues in voice command due to change in the accents, and wanted to improve the efficiency.

APPENDICES

The following appendices include supplemental data for this usability test report. Following is a list of the appendices provided:

- 1: Sample Recruiting screener
- 2: Participant demographics
- 3: Non-Disclosure Agreement (NDA) and Informed Consent Form
- 4: Example Moderator's Guide
- 5: System Usability Scale Questionnaire

Appendix 1: SAMPLE RECRUITING SCREENER

The purpose of a screener to ensure that the participants selected represent the target user population as closely as possible. (Portions of this sample screener are taken from www.usability.gov/templates/index.html#Usability and adapted for use.)

Recruiting Script for Recruiting Firm

Hello, my name is _____, calling from *[Insert name of recruiting firm]*. We are recruiting individuals to participate in a usability study for an electronic health record. We would like to ask you a few questions to see if you qualify and if would like to participate. This should 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. Can I ask you a few questions?

1. [If not obvious] Are you male or female? [Recruit a mix of participants]
2. Have you participated in a focus group or usability test in the past xx months? [If yes, Terminate]
3. Do you, or does anyone in your home, work in marketing research, usability research, web design [...etc.]? [If yes, Terminate]
4. Do you, or does anyone in your home, have a commercial or research interest in an electronic health record software or consulting company? [If yes, Terminate]
5. Which of the following best describes your age? [23 to 39; 40 to 59; 60 - to 74; 75 and older] [Recruit Mix]
6. Which of the following best describes your race or ethnic group? [e.g., Caucasian, Asian, Black/African-American, Latino/a or Hispanic, etc.]
7. Do you require any assistive technologies to use a computer? [if so, please describe]

Professional Demographics

8. What is your current position and title? (Must be healthcare provider)
 - RN: Specialty _____
 - Physician: Specialty _____
 - Resident: Specialty _____
 - Administrative Staff
 - Other [Terminate]

9. How long have you held this position?
10. Describe your work location (or affiliation) and environment? (Recruit according to the intended users of the application) [e.g., private practice, health system, government clinic, etc.]
11. Which of the following describes your highest level of education? [e.g., high school graduate/GED, some college, college graduate (RN, BSN), postgraduate (MD/PhD), other (explain)]

Computer Expertise

12. Besides reading email, what professional activities do you do on the computer? [e.g., access EHR, research; reading news; shopping/banking; digital pictures; programming/word processing, etc.] [If no computer use at all, Terminate]
13. About how many hours per week do you spend on the computer? [Recruit according to the demographics of the intended users, e.g., 0 to 10, 11 to 25, 26+ hours per week]
14. What computer platform do you usually use? [e.g., Mac, Windows, etc.]
15. What Internet browser(s) do you usually use? [e.g., Firefox, IE, AOL, etc.]
16. In the last month, how often have you used an electronic health record?
17. How many years have you used an electronic health record?
18. How many EHRs do you use or are you familiar with?
19. How does your work environment patient records? [Recruit according to the demographics of the intended users]
 - On paper
 - Some paper, some electronic
 - All electronic

Contact Information

Those are all the questions I have for you. Your background matches the people we're looking for. [No compensation was given to the participants]

Would you be able to participate on [date, time]? [If so collect contact information]

May I get your contact information?

- Name of participant:
- Address:
- City, State, Zip:
- Daytime phone number:
- Evening phone number:
- Alternate [cell] phone number:
- Email address:

Before your session starts, we will ask you to sign a release form allowing us to videotape your session. The videotape will only be used internally for further study if needed. Will you consent to be videotaped?

This study will take place remotely. I will confirm your appointment a couple of days before your session and provide you with GoToMeeting conference call details. What time is the best time to reach you?

Appendix 2: PARTICIPANT DEMOGRAPHICS

The report should contain a breakdown of the key participant demographics. A representative list is shown below.

Following is a high-level overview of the participants in this study.

Gender	
Men	6
Women	4
Total (Participants)	10

Occupation / Role	
Medical Doctors	2
Physician Assistants	4
Clinical Assistants	4
Total (Participants)	10

Years of technology experience	
0-5	0
6-10	2
10+	8
Total Participants	10

Facility Use of EHR	
All Paper	0
All Electronic	10
Some Paper, Some Electronic	0
Total Participants	10

Appendix 3: NON-DISCLOSURE AGREEMENT AND INFORMED CONSENT FORM

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of _____, 20, between _____ ("the Participant") and the testing organization *TalkEHR 1.0* located at *Address*.

The Participant acknowledges 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 *TalkEHR 1.0* , 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 *TalkEHR 1.0* 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 s/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: _____

Informed Consent

TalkEHR 1.0 would like to thank you for participating in this study. The purpose of this study is to evaluate an 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 45 minutes.

Agreement

I understand and agree that as a voluntary participant in the present study conducted by *TalkEHR 1.0* I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the study conducted and videotaped by the *TalkEHR 1.0*.

I understand and consent to the use and release of the videotape by *TalkEHR 1.0*. I understand that the information and videotape is for research purposes only and that my name and image will not be used for any purpose other than research. I relinquish any rights to the videotape and understand the videotape may be copied and used by *TalkEHR 1.0* without further permission.

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 outside of *TalkEHR 1.0* and *TalkEHR 1.0*'s client. 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:

Appendix 4: EXAMPLE MODERATOR'S GUIDE

Only three tasks are presented here for illustration.

TalkEHR 1.0 Usability Test **Moderator's Guide**

Administrator _____

Data Logger _____

Date _____ **Time** _____

Participant # _____

Location _____

Prior to testing

- Confirm schedule with Participants
- Ensure TALKEHRlab environment is running properly
- Ensure lab and data recording equipment is running properly

Prior to each participant:

- Reset application
- Start session recordings with *tool*

Prior to each task:

- Reset application to starting point for next task

After each participant:

- End session recordings with *tool*

After all testing

- Back up all video and data files

Orientation (15 minutes)

Thank you for participating in this study. Our session today will last **45 minutes**. During that time you will take a look at an electronic health record system.

I will ask you to complete a few tasks using this system and answer some questions. We are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. You will be asked to complete these tasks on your own trying to do them as quickly as possible with the fewest possible errors or deviations. Do not do anything more than asked. If you get lost or have difficulty I cannot answer help you with anything to do with the system itself. Please save your detailed comments until the end of a task or the end of the session as a whole when we can discuss freely.

I did not have any involvement in its creation, so please be honest with your opinions.

The product you will be using today is TalkEHR 1.0. Some of the data may not make sense as it is placeholder data.

We are recording the video session of today's call. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time.

Do you have any questions or concerns?

Preliminary Questions (5 minutes)

What is your job title / appointment?

How long have you been working in this role?

What are some of your main responsibilities?

Tell me about your experience with electronic health records.

Task 1: CPOE – Medications

The users were asked to perform the following tasks for the usability testing for CPOE of Medications Order:

- **Record medication via CPOE**
- **Change medication via CPOE**
- **Access CPOE medication orders**

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations/Cycles: Describe below
- Major Deviations: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 2: CPOE – Labs

The users were asked to perform the following tasks for the usability testing for CPOE – Labs.

- Record Lab orders via CPOE
- Change Lab orders via CPOE
- Access CPOE Lab orders

Success:

- Easily completed
- Completed with difficulty or help Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles Describe below
- Major Deviations Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 3: CPOE – Imaging

The users were asked to perform the following tasks for the usability testing for **CPOE – Imaging**

- Record Imaging orders via CPOE
- Change Imaging orders via CPOE
- Access CPOE Imaging orders

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:

Task 4: • Drug-drug, drug-allergy interaction checks for CPOE

The users were asked to perform the following tasks for the usability testing for **Drug-drug, drug-allergy interaction checks for CPOE**

- Using CPOE, trigger drug-drug interaction by entering a new medication order
- Using CPOE, trigger drug-allergy interaction by entering a new medication order
- Adjust the severity level of drug-drug interactions

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 5: • Demographics

The users were asked to perform the following tasks for the usability testing for Demographics

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → "OK" Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 6: • Problem List

The users were asked to perform the following tasks for the usability testing for **Problem List**.

- Record a problem to the problem list
- Change a problem on the problem list
- Access and display the active problem list

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 7: • Medication list

The users were asked to perform the following tasks for the usability testing for **Medication list**

- Record a medication to the medication list
- Change a medication on the medication list
- Access and display the active medication list

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 8: • Medication allergy list

The users were asked to perform the following tasks for the usability testing for **Medication allergy list**.

- Record a medication allergy to the medication allergy list
- Change a medication allergy on the medication allergy list
- Access and display the active medication allergy list

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 9: • Clinical Decision support

The users were asked to perform the following tasks for the usability testing for **Clinical Decision support**.

- Configure CDS interventions and reference resources
- Trigger CDS interventions using data elements from the problem list, medication list, medication allergy list, demographics, lab tests, and vital signs
- Access diagnostic and therapeutic reference information using the Infobutton standard for data elements in the problem list, medication list, and demographics
- Receive CDS interventions based on data elements in the problem list, medication list, and medication allergy list after incorporating a CCDA
- Access the following attributes for a CDS intervention: bibliographic citation, developer, funding source, release/revision date

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 10: • Implantable Device List

The users were asked to perform the following tasks for the usability testing for Implantable Device List

- Record UDI and Status
- Change UDI and Status
- Create a list that contains UDIs, description, and method to access UDIs
- Access UDI, device description, UDI identifiers, and UDI attributes

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 11: • Clinical Information Reconciliation and Incorporation

The users were asked to perform the following tasks for the usability testing for **Clinical Information Reconciliation and Incorporation**.

- Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record
- Create new CCDA with reconciled data

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: *Screen A → Screen B → Drop Down B¹ → "OK" Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 12: • ePrescribing

The users were asked to perform the following tasks for the usability testing **ePrescribing**

- Create new prescription
- Change prescription
- Cancel prescription
- Refill prescription
- Obtain fill status
- Request /receive medication history information

Success:

- Easily completed
- Completed with difficulty or help :: Describe below
- Not completed

*Comments:***Task Time:** _____ Seconds**Optimal Path:** *Screen A → Screen B → Drop Down B¹ → “OK” Button → Screen X...*

- Correct
- Minor Deviations / Cycles :: Describe below
- Major Deviations :: Describe below

*Comments:***Observed Errors and Verbalizations:***Comments:***Rating:**

Overall, this task was: _____

*Show participant written scale: “Very Easy” (1) to “Very Difficult” (5)***Administrator / Notetaker Comments:**

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 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?

Administer the SUS

Appendix 5: SYSTEM USABILITY SCALE QUESTIONNAIRE

Disagree	Strongly Agree	Strongly			
1. I think that I would like to use this system frequently.	1	2	3	4	5
2. I found the system unnecessarily Complex.	1	2	3	4	5
3. I thought the system was easy to use. .	1	2	3	4	5
4. I think that I would need the support Of a technical person to be able to use this system.	1	2	3	4	5
5. I found the various functions in this system were well integrated.	1	2	3	4	5
6. I thought there was too much inconsistency in this system.	1	2	3	4	5
7. I would imagine that most people would learn to use this system very quickly.	1	2	3	4	5
8. I found the system very cumbersome to use .	1	2	3	4	5
9. I felt very confident using the System.	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this system.	1	2	3	4	5

