

OrionNet System UDC Design Process

The design process that we use is based off of the **Participatory Design** process.

Participatory Design

- An approach to design attempting to actively involve all stakeholders (e.g. employees, partners, customers, citizens, end users) in the design process to help ensure the result meets their needs and is usable. The term is used in a variety of fields as a way of creating environments that are more responsive and appropriate to their inhabitants' and users' cultural, emotional, spiritual and practical needs. Participatory design is an approach which is focused on processes and procedures of design and is not a design style.

While we use much of what is in this design process there are things we do differently. Having customers whose primary focus is Mental Health/Behavioral Health/Substance Abuse makes using other standard process hard because we focus on the customer and objects/process we are delivering for them. People in mental health industry are more focused on output/the thing at the end, then the design of how a user might use it. So, in our design process participants are invited to help with designing new parts of the system. The users can work with our team to hammer out details, discuss rules, final output, design flow, etc. They work with us during several stages but we begin the initial exploration and design and bring to the table at the start a rough process to begin the conversation. Dealing with many agencies mean we have to kick off the process then everyone can be part of the process by starting with the same base. The user helps us with problems, building on the initial design, ideas to that add to the solution, etc. The users do not help with the development but they continue to be part of the process as we roll out prototypes, screen shots of design, and initial testers to evaluate the solution.

Outline of how we use our design:

- OrionNet System team gathers details on a new function
 - We lay out the details of the new function
 - Describe a general flow of the function as it would fit into our system
- Details we create are sent to our full user community
 - Users come together with OrionNet System team to discuss the function
 - User work with our team on the initial details to make sure we know all the
 - Rules
 - Processes
 - Needed data elements
 - Discuss the propose flow
 - Discuss how screens can be used to make the user job easier
 - Discuss other areas in the system that the new function would be tied to

- OrionNet System takes details from these meeting and layout new screen design and program flow
- OrionNet Systems brings back to the user group the propose changes
 - Mockups are shown to the users
 - Prototypes are created so users can try the flow
 - Users comments and concerns are taken and evaluated
- OrionNet System then build into our system the new function
 - Users can sign up for beta testers of the new function
 - User receive the new function before others to use and try out
- We roll the new function to all users once the design looks good.

EHR Usability Test Report of ThinkHealth – Practice Management Software (EHR) Version 3

Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports

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EXECUTIVE SUMMARY

A usability test of ThinkHealth – Practice Management Software (EHR) Version 3 was conducted on June 19th, 22nd and 23rd 2020 Makati Philippines by OrionNet Systems, LLC. The purpose of this test was to test and validate the usability of the current user interface, and provide evidence of the usability of the EHR Under Test (EHRUT). During the usability test, 10 healthcare providers and other office workers matching target demographics criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on 17 tasks typically conducted on an EHR:

170.315(a)(1) Computerized provider order entry

Select a Patient Record and Record Medication Order
Select a Patient Record and Change Medication Order
Select a Patient Record and Access Medication Order

170.315(a)(2) Computerized provider order entry

Select a Patient Record and Record Laboratory Order
Select a Patient Record and Change Laboratory Order
Select a Patient Record and Access Laboratory Order

170.315(a)(3) Computerized provider order entry

Select a Patient Record and Record Radiology/Imaging Order
Select a Patient Record and Change Radiology/Imaging Order
Select a Patient Record and Access Radiology/Imaging Order

170.315(a)(4) Drug-drug, drug-allergy interactions checks

Create drug-drug and drug-allergy interventions prior to CPOE completion
Adjustment of severity level of drug-drug interventions

170.315(a)(5) Demographics

Record Demographics
Change Demographics
Access Demographics

170.314(b)(2) Clinical information reconciliation

Reconcile patient's active medication list with another source
Reconcile patient's active problem list with another source
Reconcile patient's active medication allergy list with another source

During the 3 hour 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 all previously received some basic end-user system instruction. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the tests, along with data logger(s) recorded user performance data on paper and electronically. The administrator did not give the participants assistance in how to complete the tasks. Participant screens, head shots and audio were recorded for subsequent analysis.

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 and were compensated with \$45 for their time. 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 EHRUT. Following is a summary of the performance and rating data collected on the EHRUT.

Measure	N	Task Success	Path Deviation	Task Time		Errors	Task Ratings 5=Easy
Task	#	Mean (SD)	Deviations (Observed/Optimal)	Mean (SD)	Deviations (Observed/Optimal)	Mean (SD)	Mean (SD)
Record Medication Order	10	100 (0)	20/12 = 1.67	19685 (10432)	328.5s / (63s x1.25) = 4.17	1 (1)	3 (1)
Change Medication	10	100 (0)	10/7 = 1.43	9100 (6440)	151.8s / (63s x1.25) = 1.93	0 (1)	4 (1)
Access Medication Order	10	100 (0)	5/4 = 1.25	1985 (795)	32.3s / (10s x 1.25) = 2.58	1 (1)	5 (0)
Record Lab Order	10	100 (0)	20/17 = 1.77	19685 (10432)	149.4s / (50s x 1.25) = 2.4	0 (0)	4 (1)
Change Lab Order	10	100 (0)	15/10 = 1.5	9343 (2974)	94.3s / (35s x1.25) = 2.16	1 (1)	4 (1)
Access Lab Order	10	100 (0)	6/5 = 1.2	5702 (6289)	24.7s / (17s x 1.25) = 1.16	0 (1)	5 (0)
Record Radiology Order	10	100 (0)	9/7 = 1.26	1632 (783)	42.9s / (26.41 x1.25) = 1.30	0 (1)	5 (1)
Change Radiology/Imaging Order	10	100 (0)	10/8 = 1.25	2741 (1906)	34s / (21.82 x1.25) = 1.25	0 (0)	5 (1)
Access Radiology/Imaging Order	10	100 (0)	6/6 = 1	2223 (978)	16.8s / (16.92 x1.25) = 0.79	0 (0)	5 (0)
Create drug-drug & drug allergy interventions prior to CPOE completion	10	100 (0)	30/24 = 1.25	1053 (548)	265.9s / (80s x1.25) = 2.66	0 (0)	4 (1)
Adjustment of severity level of drug-drug & drug-allergy interventions prior to CPOE completion	10	100 (0)	15/5 = 3	15993 (10742)	118.1s (14s x1.25) = 6.75	0 (0)	4 (1)
Record Demographics	10	100 (0)	25/18 = 1.39	7120 (3215)	314.3s / (296s x1.25) = 0.85	0 (1)	4 (1)
Change Demographics	10	100 (0)	10/5 = 2	18894 (8835)	103.1s / (23s x1.25) = 3.59	1 (0)	4 (1)
Access Demographics	10	100 (0)	5/5 = 1	6244 (5864)	14.6s / (12s x1.25) = 0.97	2 (1)	5 (0)
Reconcile patient's active medication list with another source	10	100 (0)	18/8 = 2.25	694 (399)	235.3s / (44s x1.25) = 4.28	0 (0)	3 (1)
Reconcile patient's active problem list with another source	10	100 (0)	15/11 = 1.36	14157 (4101)	79s / (25s x1.25) = 2.53	0 (0)	4 (1)
Reconcile patient's active medication allergy list with another source	10	100 (0)	13/10 = 1.3	4793 (1543)	47.8s / (25s x1.25) = 1.53	1 (1)	4 (1)

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 78%

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

MAJOR FINDINGS

- Participants liked the Thinkhealth System Design and data gathering.
- Most participants found the system much easier when first entering it.
- Some participants thought that the system is like a Microsoft excel that has formula because you just need to fill in or put your data information in the system.

AREAS FOR IMPROVEMENT

- Make the system a little less stressing when filling information, it should have automatic fill in for old data.
- Always update the system and the validation grid and remove bugs on system.

INTRODUCTION

The EHRUT tested for this study was ThinkHealth – Practice Management Software (EHR) Version 3. Designed to present medical information to healthcare providers in Mental Health/Behavioral Health/Substance Abuse Agencies, the EHRUT consists of modules which allow agencies to create Assessments, Staff, Patients, Treatment Plan, Schedules, Clinical Notes, Billing, Reports and manage Documents. Staff log on to the system and based on their access right are allowed to work on various things. Users click on the module buttons at the top and move into those module where to can drill down and look at more data, add new data, change data or delete data. 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 (EHRUT). To this end, measures of effectiveness, efficiency and user satisfaction, such as time to do task and errors encountered, were captured during the usability testing.

METHOD

PARTICIPANTS

A total of 10 participants were tested on the EHRUT(s). Participants in the test were Registered Nurse, Med Tech and some admin officers. Participants were recruited by OrionNet Systems and were compensated \$45 for their time. In addition, participants had no direct connection to the development of or organization producing the EHRUT(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.

N	Part ID	Gender	Age	Education	Occupation/Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1	EHR1	Female	20-29	Bachelor	Admin Staff	12 months	120 months	0 months	NO
2	EHR2	Male	20-29	Bachelor	General Office Work	12 months	96 months	0 months	NO
3	EHR3	Male	20-29	Bachelor	General Office Work	108 months	240 months	0 months	NO
4	EHR4	Male	10-19	Bachelor	Front Desk Admin	14 months	96 months	0 months	NO
5	EHR5	Female	20-29	Bachelor	Financials	60 months	60 months	0 months	NO
6	EHR6	Male	30-39	Bachelor	Nurse	24 months	72 months	0 months	NO
7	EHR7	Female	30-39	Bachelor	Nurse	36 months	36 months	0 months	NO
8	EHR8	Female	20-29	Bachelor	Med Tech	3 months	24 months	0 months	NO
9	EHT9	Female	20-29	Bachelor	Med Tech	3 months	36 months	0 months	NO
10	EHR10	Male	20-29	Bachelor	Med Tech	3 months	6 months	0 months	NO

Ten participants (matching the demographics in the section on Participants) were recruited and 10 participated in the usability test. Zero participants failed to show for the study.

Participants were scheduled for 8 hours sessions with 30 minutes 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 as provided by the recruiting firm.

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 one EHR. Each participant used the system in the same location, 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:

170.315(a)(1) Computerized provider order entry

Record Medication Order
Change Medication Order
Access Medication Order

170.315(a)(2) Computerized provider order entry

Record Laboratory Order
Change Laboratory Order
Access Laboratory Order

170.315(a)(3) Computerized provider order entry

Record Radiology/Imaging Order
Change Radiology/Imaging Order
Access Radiology/Imaging Order

170.315(a)(4) Drug-drug, drug-allergy interactions checks

Create drug-drug and drug-allergy interventions prior to CPOE completion
Adjustment of severity level of drug-drug interventions

170.315(a)(5) Demographics

Record Demographics
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170.314(b)(2) Clinical information reconciliation

Reconcile patient's active medication list with another source
Reconcile patient's active problem list with another source
Reconcile patient's active medication allergy list with another source

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 arrival, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. Each participant reviewed and signed an informed consent and release form (See Appendix 3). 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 5 years of experience, Bachelor of Science in Pharmacy, Qa Supervisor and have been testing Thinkhealth and other medical system.

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, comments and time.

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.

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

TEST LOCATION

The test facility included a waiting area and a quiet testing room with a table, computer for the participant, and recording computer for the administrator. Only the participant, administrator and data logger were in the test room. Data logger worked across the room from the participants where they could see the participant's screen and face shot, and listen to the audio of the session. To ensure that the environment was comfortable for users, noise levels were kept to a minimum with the ambient temperature within a normal range. All of the safety instruction and evacuation procedures were valid, in place, and visible to the participants.

TEST ENVIRONMENT

The EHRUT would be typically be used in a healthcare office or facility. In this instance, the testing was conducted in a normal office with desk and computers. This was an multi-story office building. Testers would go up an elevator to the 16th floor to where the testing office would be. The office has been setup with tables, chairs and computers for the test. For testing, the computer used a PC running Windows 10. The computers are average HP desktop comuters. The participants used a mouse and keyboard when interacting with the EHRUT.

The ThinkHealth – Practice Management Software (EHR) Version 3 used would be shown on standard 15 - 19 inch monitors at standard 1024x768 or greater resolution. The application was set up by the vendor according to the vendor's documentation describing the system set-up and preparation. The application

itself was running on a Windows 10 PC using a test database on a LAN 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). Testing area was setup by OrionNet employees.

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
4. Incentive Receipt and Acknowledgment Form

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 EHRUT was captured visually and on paper. A video camera recorded all participants to capture facial expressions and verbal comments. The test session was physically observed by the data logger observing the test session.

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. Our session today will last 8 hours. 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. 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 the ThinkHealth Practice Management system. This is the QA test system use by the quality testers and company support team. Some of the data may not make sense as it is placeholder data.

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

Following the procedural instructions, participants were shown the EHR and were given a time of 20 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. I will ask you your impressions about the task once you are done.

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 ThinkHealth by measuring participant success rates and errors
2. Efficiency of ThinkHealth by measuring the average task time
3. Satisfaction with ThinkHealth by measuring ease of use ratings

DATA SCORING

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

Effectiveness: Task Success	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. 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. Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency. Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for
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	<p>task times in the Moderator’s Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor 1.50 that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was 5 minutes then allotted task time performance was $[5 * 1.50]$ minutes. This ratio should be aggregated across tasks and reported with mean and variance scores</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 a “Failure.” 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. 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> <p>It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.</p>
<p>Efficiency: Task Time</p>	<p>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.</p>
<p>Satisfaction: Task Rating</p>	<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.</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 ThinkHealth 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</p>

RESULTS

DATA ANALYSIS AND REPORTING

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. Participants who failed to follow session and task instructions had their data excluded from the analyses

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 3.2 Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

Measure	N	Task Success	Path Deviation	Task Time		Errors	Task Ratings 5=Easy
Task	#	Mean (SD)	Deviations (Observed/Optimal)	Mean (SD)	Deviations (Observed/Optimal)	Mean (SD)	Mean (SD)
Record Medication Order	10	100 (0)	20/12 = 1.67	19685 (10432)	328.5s / (63s x1.25) = 4.17	1 (1)	3 (1)
Change Medication	10	100 (0)	10/7 = 1.43	9100 (6440)	151.8s / (63s x1.25) = 1.93	0 (1)	4 (1)
Access Medication Order	10	100 (0)	5/4 = 1.25	1985 (795)	32.3s / (10s x 1.25) = 2.58	1 (1)	5 (0)
Record Lab Order	10	100 (0)	20/17 = 1.77	19685 (10432)	149.4s / (50s x 1.25) = 2.4	0 (0)	4 (1)
Change Lab Order	10	100 (0)	15/10 = 1.5	9343 (2974)	94.3s / (35s x1.25) = 2.16	1 (1)	4 (1)
Access Lab Order	10	100 (0)	6/5 = 1.2	5702 (6289)	24.7s / (17s x 1.25) = 1.16	0 (1)	5 (0)
Record Radiology Order	10	100 (0)	9/7 = 1.26	1632 (783)	42.9s / (26.41 x1.25) = 1.30	0 (1)	5 (1)
Change Radiology/Imaging Order	10	100 (0)	10/8 = 1.25	2741 (1906)	34s / (21.82 x1.25) = 1.25	0 (0)	5 (1)
Access Radiology/Imaging Order	10	100 (0)	6/6 = 1	2223 (978)	16.8s / (16.92 x1.25) = 0.79	0 (0)	5 (0)
Create drug-drug & drug allergy interventions prior to CPOE completion	10	100 (0)	30/24 = 1.25	1053 (548)	265.9s / (80s x1.25) = 2.66	0 (0)	4 (1)
Adjustment of severity level of drug-drug & drug-allergy interventions prior to CPOE completion	10	100 (0)	15/5 = 3	15993 (10742)	118.1s (14s x1.25) = 6.75	0 (0)	4 (1)
Record Demographics	10	100 (0)	25/18 = 1.39	7120 (3215)	314.3s / (296s x1.25) = 0.85	0 (1)	4 (1)
Change Demographics	10	100 (0)	10/5 = 2	18894 (8835)	103.1s / (23s x1.25) = 3.59	1 (0)	4 (1)
Access Demographics	10	100 (0)	5/5 = 1	6244 (5864)	14.6s / (12s x1.25) = 0.97	2 (1)	5 (0)
Reconcile patient's active medication list with another source	10	100 (0)	18/8 = 2.25	694 (399)	235.3s / (44s x1.25) = 4.28	0 (0)	3 (1)
Reconcile patient's active problem list with another source	10	100 (0)	15/11 = 1.36	14157 (4101)	79s / (25s x1.25) = 2.53	0 (0)	4 (1)
Reconcile patient's active medication allergy list with another source	10	100 (0)	13/10 = 1.3	4793 (1543)	47.8s / (25s x1.25) = 1.53	1 (1)	4 (1)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 78. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

DISCUSSION OF THE FINDINGS

EFFECTIVENESS

The participants was able to complete the task without any help and really focus on the task given to be more effective on completing the task they are more focus. They finished the task on time.

EFFICIENCY

Most of the participants finished the task 100% and making sure that there is no errors on the task given and with limited time only.

SATISFACTION

Most of the participants are happy and very satisfied that the system is easy to use and a friendly user and it looks like Microsoft excel that has all the formula and you have to do is fill in the data. Participants said they would like to use the system frequently.

MAJOR FINDINGS

- Participants liked the Thinkhealth System Design and data gathering.
- Most participants found the system much easier when first entering it.
- Some participants thought that the system is like a Microsoft excel that has formula because you just need to fill in or put your data information in the system.

AREAS FOR IMPROVEMENT

- Make the system a little less stressing when filling information, it should have automatic fill in for old data.
- Always update the system and the validation grid and remove bugs on system.

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
- 6: Incentive receipt and acknowledgment form

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 06 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]
8. Do you work in the Medical field
9. Do you utilize a Electronic Health System on a regular basis?

Professional Demographics

10. What is your current position and title? (Must be healthcare provider)
 - a. Mental Health Provider: Specialty _____
 - b. Physician: Specialty _____
 - c. Resident: Specialty _____
 - d. Administrative Staff
 - e. Other [Terminate]
11. How long have you held this position?
12. 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.]
13. 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

14. 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]
15. 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]
16. What computer platform do you usually use? [e.g., Mac, Windows, etc.]
17. What Internet browser(s) do you usually use? [e.g., Firefox, IE, AOL, etc.]
18. In the last month, how often have you used an electronic health record?
19. How many years have you used an electronic health record?
20. How many EHRs do you use or are you familiar with?
21. How does your work environment patient records? [Recruit according to the demographics of the intended users]
 - a. On paper
 - b. Some paper, some electronic
 - c. All electronic

Contact Information

Those are all the questions I have for you. Your background matches the people we're looking for. [If you are paying participants or offering some form of compensation, mention] For your participation, you will be paid [\$45].

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 at Makati City Philippines. I will confirm your appointment a couple of days before your session and provide you with directions to our office. What time is the best time to reach you?

Appendix 2: PARTICIPANT DEMOGRAPHICS

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

Gender

Men	[5]
Women	[5]
Total (participants)	[10]

Occupation/Role

RN/BSN	[2]
Med Tech	[3]
Admin Staff	[5]
Total (participants)	[10]

Years of Experience

Years of experience	[23]
Facility Use of EHR All paper	[1]
Some paper, some electronic	[3]
All electronic	[1]
Total (participants)	[10]

Appendix 3: NON-DISCLOSURE AGREEMENT AND INFORMED CONSENT FORM

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of June 19, 2020, between _____ (“the Participant”) and the testing organization OrionNet Systems, LLC located at 510 E Memorial Rd, Oklahoma City, OK 73114 .

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 Test Company, 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 Test Company 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

OrionNet Systems 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 8 hours. 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 OrionNet Systems 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 OrionNet Systems.

I understand and consent to the use and release of the videotape by OrionNet Systems. 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 OrionNet Systems 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 OrionNet Systems and OrionNet System'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: MODERATOR'S GUIDE

EHRUT Usability Test Moderator's Guide

Administrator: Beverley Gavileno

Data Logger: Lady Marie Acuna

Date: June 19, 2020 **Time:** 8AM-4PM

Participant #: _____

Location: _____

Prior to testing

- Confirm schedule with Participants
- Ensure EHRUT lab 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 (5 minutes)

Thank you for participating in this study. Our session today will last 8 hours. 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. 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 the ThinkHealth Practice Management system. This is the QA test system use by the quality testers and company support team. Some of the data may not make sense as it is placeholder data.

We are recording the audio and video of our session today. 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: First Impressions (30 Seconds)

This is the application you will be working with. Have you heard of it? ____Yes ____No. If so, tell me what you know about it.

- *Show test participant the EHRUT.*
- 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 2: Patient Summary Screen (XXX Seconds)

Take the participant to the starting point for the task, this is just example. Task has to be created per criteria area listed. You will have ONE of these task per criteria.

Before going into the exam room and you want to review Patient's chief complaint, history, and vitals. Find this 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 B -> "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 Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Final Questions (10 Minutes)

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?

Appendix 5: SYSTEM USABILITY SCALE QUESTIONNAIRE

In 1996, Brooke published a “low-cost usability scale that can be used for global assessments of systems usability” known as the System Usability Scale or SUS.¹⁶ Lewis and Sauro (2009) and others have elaborated on the SUS over the years. Computation of the SUS score can be found in Brooke’s paper, in at <http://www.usabilitynet.org/trump/documents/Suschapt.doc> or in Tullis and Albert (2008).

	Strongly Disagree				Strongly Agree
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

16 Brooke, J.: SUS: A “quick and dirty” usability scale. In: Jordan, P. W., Thomas, B., Weerdmeester, B. A., McClelland (eds.) Usability Evaluation in Industry pp. 189--194. Taylor & Francis, London, UK (1996). SUS is copyrighted to Digital Equipment Corporation, 1986.

Lewis, J R & Sauro, J. (2009) "The Factor Structure Of The System Usability Scale." in Proceedings of the Human Computer Interaction International Conference (HCII 2009), San Diego CA, USA

Appendix 6: INCENTIVE RECEIPT AND ACKNOWLEDGMENT FORM

Acknowledgement of Receipt

I hereby acknowledge receipt of \$ 45 for my participation in a research study run by OrionNet Systems, LLC.

Printed Name: _____

Address: _____

Signature: _____ Date: _____

Usability Researcher: Beverley Gavileno

Signature of Usability Researcher: _____

Date: _____

Witness: Lady Maria Acuna

Witness Signature: _____

Date: _____