



Human-Computer Interaction

IS4300

1



14 – Swing!

Due Now

- Implement a Java applet to provide online ordering for your favorite restaurant. The interface need not be functional, but the controls should be laid out on the page in such a way that it could actually work if completely implemented.
- Minimum requirements. Your interface need not implement the entire menu, but must contain at least the following:
 - Two JLabels, one with an icon.
 - Two JButtons, one with an icon.
 - One JButtonGroup with at least 3 JRadioButton options (with toggling functional).
 - Two JCheckBoxes.
 - One JComboBox with at least two items.
 - One JTextField
 - One JPanel with a titled border enclosing at least one other component.
 - One tool tip on one component.
 - One Menu with at least two options.

3

Projects P3 *due Monday*

- Convert task scenarios and hierarchical task analyses into a conceptual design.
- Metaphors.
 - Make a list of possible interaction metaphors for your interface (per the examples in class). For each of your task scenarios list at least two options for interaction metaphors and some of the implications of your choice.
- Activity Scenarios
 - Transform each of your problem scenarios into an activity design scenario, documenting analyses of design features
- What to Post
 - three detailed activity scenarios and a list of the metaphors you considered. If you have updated your task models during this exercise please provide them as well.

4

Scenario-Based Interactive UI Design Kusano, et al

Highlighting related tags, nodes & scenarios interactively

Scene: Watching some videos on the train.
 KUSANO thinks that he wants to watch some video, when he has free time on the train.
 He takes his smartphone in his pocket, and he starts video application.
 VideoApp lists up some videos that are today's recommendations.
 A video has information that contains title, view-counts, thumbnail.
 Since he hasn't used this app recently, he can find a lot of attractive videos.
 He selects one from recommendations.
 And then, display is changed to video mode, and shows a video.
 Video is started by tapping a title or a thumbnail
 He watch the video a short while, but he doesn't like it.
 So, he turns back to recommendations list.
 He scrolls the list and try to finds funny video.
 He selects new one, and watches it. q
 He think this video is so fun, and he can enjoy it.
 Thanks to this App he can have satisfaction on the train.

Scene: Searching the video with a keyword.
 KUSANO wants to watch a video that is recommended from his friend.
 He takes his smartphone in his pocket, and he starts video application.
 VideoApp shows search form on the top of the display.
 He writes a keyword with software keyboard.
 He inputs a keyword, and request to search.
 App lists up the results.
 A video has information that contains title, view-counts, thumbnail.
 He selects one that seems to have been recommended from his friend.
 And then, display is changed to video mode, and shows a video.
 Writing, structuring & tagging the scenario.
 So he adds the video to his bookmark in app.

UI stencils

Designing rough UI with stencils

Visualizing the scenario-structure automatically by tags.

Scenario Editor Tags UI Editor

Design probes

- direct observation
 - sometimes hard
 - in the home
 - psychiatric patients, ...
- probe packs
 - items to prompt responses
 - e.g. camera, postcard, diary
 - given to people to open in their own environment
they record what is meaningful *to them*
- used to ...
 - inform interviews, prompt ideas, enculture designers



Making Design Probes Work

Wallace, et al



Figure 1. Self Tree probe det. of individual elements and ex.

Please use these objects to tell me about some of the people who make you who you are...

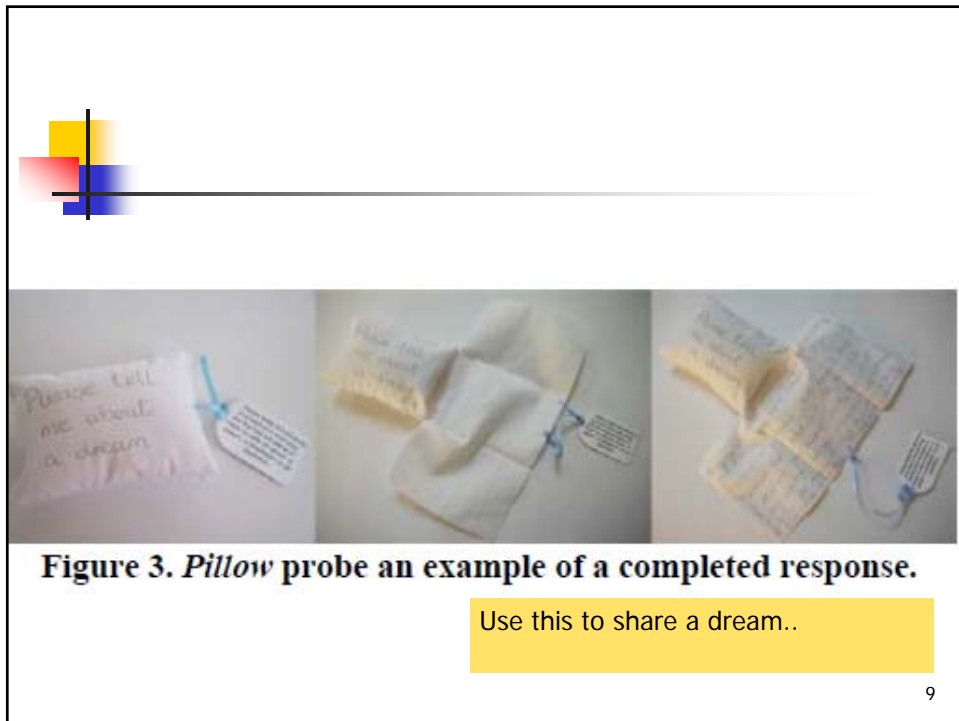
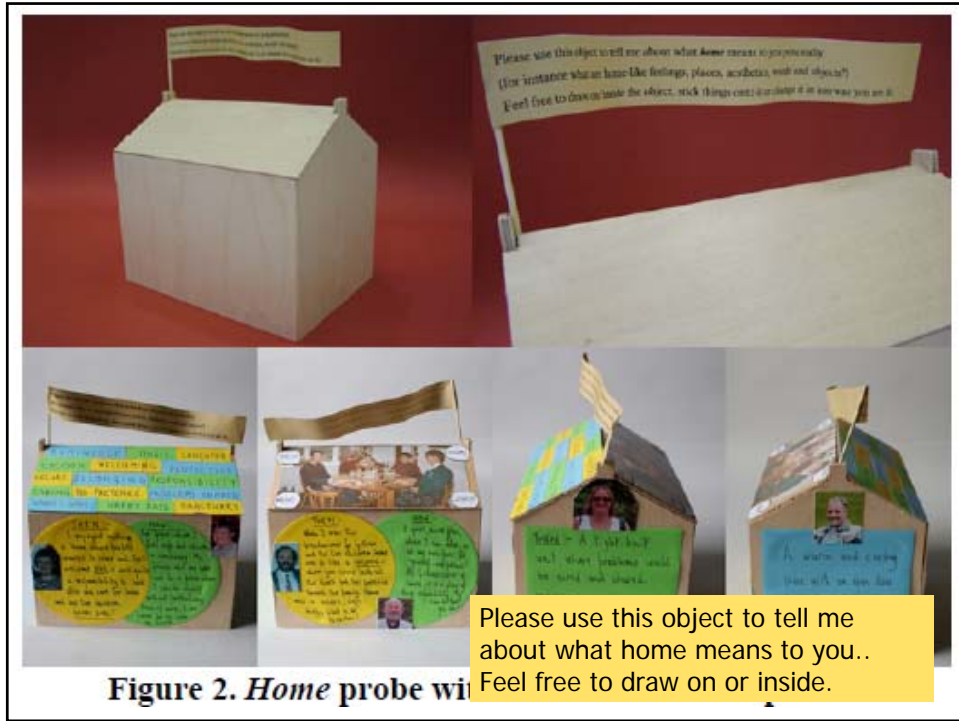




Figure 4. *Pot of Clay* probe with an example of a response.



Figure 5. *Bodymapping* probe with an example of a response.


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Figure 6. *Top Trumps* probe with examples of responses.



Figure 7. *Preserves* probe with examples of responses.

	<p>REJECT</p> <p>BAD CONCEPT</p>	<p>CO-CREATE THE DESIGN</p>
	<p><i>"I'd never use this. Ever. Even in a different setting."</i> (P6)</p>	<p><i>"The design would be much more useful if I could customize how the city talks to me.."</i> (P3)</p>
<p>BAD STORY</p> <p><i>"I would use this when visiting my friend in NYC who is always too busy to hang."</i> (P4)</p> <p>CO-CREATE THE WORLD TO IDENTIFY DESIGN PRINCIPLES</p>	<p>GOOD STORY</p> <p><i>"I would definitely use the City Channel, whether I was new or had lived in a city for years.."</i> (P1)</p> <p>CONSUME</p>	
<p>GOOD CONCEPT</p>		<p>14</p>




A Conversational Agent-based Clinical Trial Search Engine

By Dina Utami, Barbara Barry, Timothy Bickmore and Michael Paasche-Orlow

HCIR 2013



Motivation

- Nearly 90 million people in the US have difficulty understanding and acting upon health information.
- 34% of clinical trials recruited less than 75% of their planned sample
- Information-related barriers to clinical trial participation:
 - 85% of cancer patients were unaware that there were clinical trials they could participate.
 - Difficulties with clinical trial search process.




Health Literacy and Usability of Clinical Trial Search Engines

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Objective: Increase Participation in Clinical Trials

- Several web-based search engines available.
 - National Cancer Institute
 - ClinicalTrials.gov
 - Etc

- Are these usable by individuals with inadequate health literacy?

In English | [Español](#)

We Can Answer Your Questions
1-800-4-CANCER

SEARCH

[NCI Home](#) | [Cancer Topics](#) | [Clinical Trials](#) | [Cancer Statistics](#) | [Research & Funding](#) | [News](#) | [About NCI](#)

Search for Clinical Trials

Search NCI's list of 8,000+ clinical trials now accepting participants, or use more search options to search the set of 19,000+ clinical trials that are no longer recruiting.

Search Tip: Skip any items that are unknown or not applicable.

Cancer Type/Condition ?

Stage/Subtype

- All
- stage 0 colon cancer
- stage I colon cancer
- stage II colon cancer
- stage IIA colon cancer
- stage IIB colon cancer

Location

Near ZIP Code At Hospital/Institution ?
 In City/State/Country At NIH

Near ZIP Code

Show trials located within:

of ZIP Code:

[ZIP Code Lookup](#)

Clinical Trial Questions?
Get Help:
1-800-4-CANCER
[LiveHelp online chat](#)

Video Guide:
How to Use the NCI Clinical Trials Search Form

Popular Resources

[Help Using the NCI Clinical Trials Search Form](#)

[Learn About Clinical Trials](#)

[About NCI's List of Cancer Clinical Trials](#)

[NCI Dictionary of Cancer Terms](#)

[NCI Drug Dictionary](#)



Usability Across the Health Literacy Spectrum

- We conducted a usability study of the National Cancer Institute (NCI) clinical trial search engine with individuals who had varying health literacy levels.
- Measures
 - Health Literacy via Rapid Estimate of Adult Literacy in Medicine (REALM), split using a REALM score of 9th grade and above.
 - Search engine skill was assessed using a single self-report scale measure.
 - 1="I've never used one." to 4="I'm an expert."
 - Satisfaction, 7-point scale
 - Ease of use, 7-point scale



Protocol

- **Part 1: Usability**
 - Participants given 3 standardized tasks of increasing complexity to perform using the NCI search engine.
 - For each task, participants were asked to find at least one trial that satisfied stated criteria.
 - e.g., "Amy is a 66 year old appendix carcinoma cancer patient. She would like to participate in a clinical trial that is related to her condition. Location of the trial does not matter."
 - Measures: completion, time to complete
- **Part 2: Clinical Trial Preferences**
 - To understand decision making processes, participants were shown three pairs of trial descriptions from the NCI site.
 - For each pair a participant was asked to choose which of the two trials they would prefer and why.
 - Measures: Qualitatively evaluation



Participants

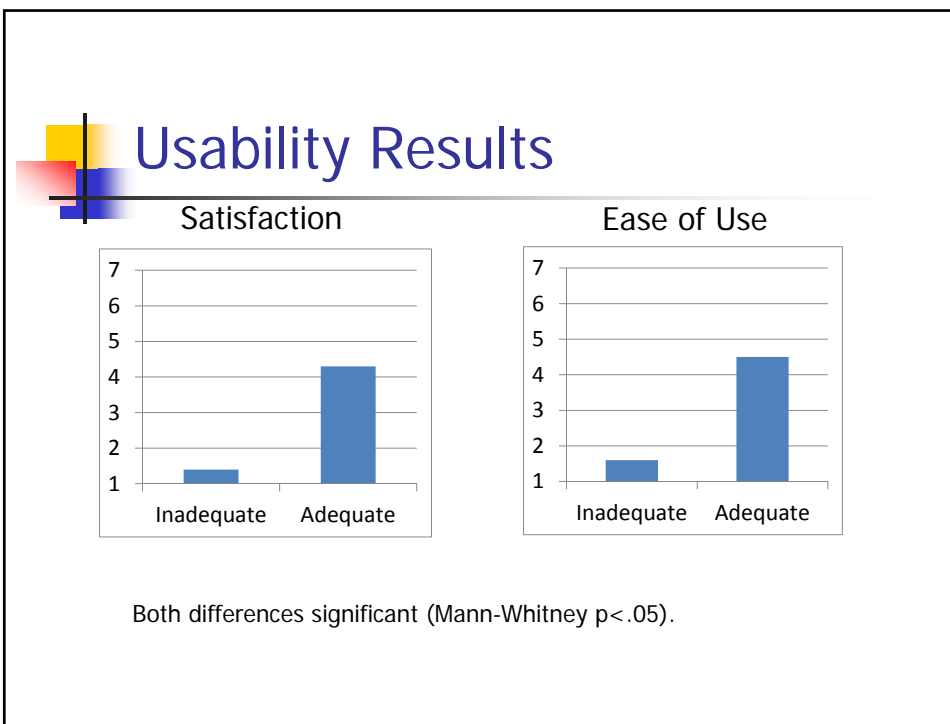
- N=23, recruited from an online recruiting site and an urban, older adult apartment complex
- 23-76 years old (mean 50.3)
- 65% female
- 17 adequate health literacy; 6 inadequate

- Participants with low health literacy scored significantly lower on self-reported search engine skill (Mann-Whitney $p < .05$).



Usability Results

- Participants with adequate health literacy completed 1.25 search tasks on average.
- Participants with low health literacy failed to complete any of the tasks.
- Difference is significant (Mann-Whitney $p < .05$).



Clinical Trial Preferences Thematic Coding

Theme	Theme Description	Example from transcripts	#
Medication	A preference for or against taking pills / medications	No medication, I don't take, I don't even take aspirin; Medicine, medicine just makes it worse	31
Invasiveness	Degree of intrusion of devices or medications in the body	it sort of wears me out the thought of a direct delivery to the site of cancer with something like directly being delivered like interdermally it sounds like it's going through your skin into the cancer site; It's easier, non-invasive	30
Existing Condition Self	A current or past health condition of the participant	I have Chrons's disease; Because I am a diabetic	29
Procedure Familiarity	Participant has experienced one or more of the trail procedures before	I'm not familiar with the technology in this one; cause well every time you go to the doctor you give a urine sample anyway	26

Clinical Trial Preferences

Thematic Coding

Theme	Theme Description	Example from transcripts	#
Procedure Perceived Discomfort	Estimating how much pain, embarrassment or discomfort the procedure will inflict	I might injure my back; the days leading up you have to like go on this weird medical diet, and it's the worst medicine ever; I think the electrolysis is more comfortable but it's like I'd still prefer the shot	23
Treatment Benefit	Health improvement from intervention	I would like to know what works what medicine works on what I have; they find out what is going on with your body, it could save you and they can give you treatment for it	19
Existing Condition Other	A current or past health condition of a friend or family member	Diabetes is running is running in my family; what my father-in-law has	15
Medical / CAM	A preference for either medical or alternative treatments	the mind body connection which this one represents and this one could be helpful in a nontraditional way; I	15

Clinical Trial Preferences

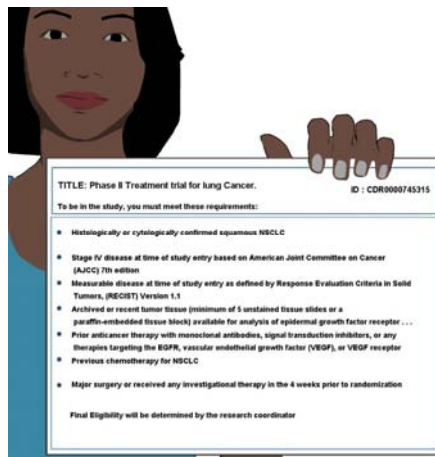
Thematic Coding

Theme	Theme Description	Example from transcripts	#
Study Duration	Time commitment for total participation or for a specific procedure	How long is the trial?; It's just long and annoying	14
Procedure Complexity / Quantity	Complexity of intervention or sheer number of steps in procedure	Like you already have to go through so many tests when you have that; But I like the way 3 months would be a lot more going on, more stuff.	12
Curiosity / Novelty	Interest in learning about a new health subject or technology, or learning a new skill for better health	And the electrostimulation from what I read seems different; I'm fascinated with the ideas of being about to get rid of the pain.	11
Description Lack of Detail	Study description did not give adequate information about procedures or eligibility	it's not clear what's involved in this study ; Because this doesn't really provide a lot of information	11
Risk	Relative risk of a side effect or risk of no benefit due to randomization	I guess the first one would be more risky because you could be placed in the placebo group	11

Addressing the Issue

- In this work we have focused on developing a conversational agent based search interface to allow individuals with low health and computer literacy to find cancer-related research clinical trials.
- Approach?

Design: Conversational Agent Interface



TITLE: Phase II Treatment trial for lung Cancer. **ID :** CDR000745315

To be in the study, you must meet these requirements:

- Histologically or cytologically confirmed squamous NSCLC
- Stage IV disease at time of study entry based on American Joint Committee on Cancer (AJCC) 7th edition
- Measurable disease at time of study entry as defined by Response Evaluation Criteria in Solid Tumors (RECIST) version 1.1
- Archived or recent tumor tissue (minimum of 5 unstained tissue slides or a paraffin-embedded tissue block) available for analysis of epidermal growth factor receptor ...
- Prior anticancer therapy with monoclonal antibodies, signal transduction inhibitors, or any therapies targeting the EGFR, vascular endothelial growth factor (VEGF), or VEGF receptor
- Previous chemotherapy for NSCLC
- Major surgery or received any investigational therapy in the 4 weeks prior to randomization

Final Eligibility will be determined by the research coordinator

Yes. Who should I contact to participate?

No, I don't meet the requirement.

Show me more details of the study

Save this for later Viewing

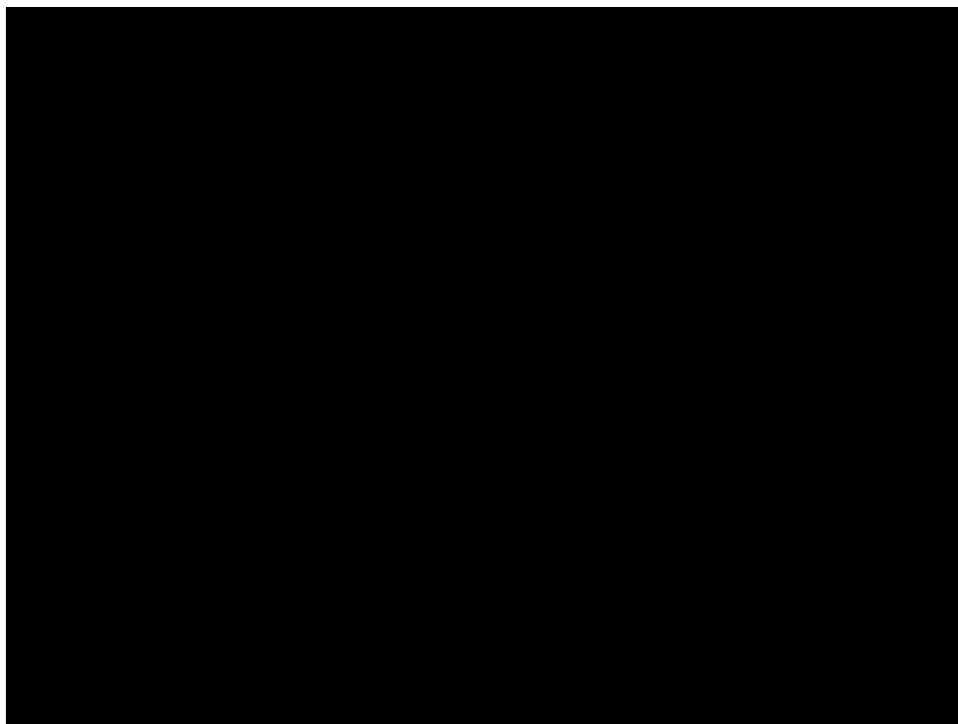
No thanks! Show me something else.

Explain it to me.

Show me the trials I have looked at.

Could you repeat that please?

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Relational Agents Group



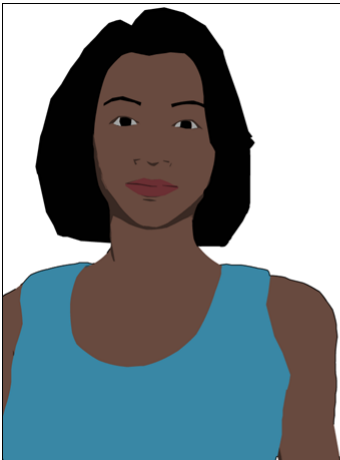
Design: Search Criteria

- To define the search criteria, we leveraged qualitative findings from our usability study.
- User criteria:
 1. age, sex, cancer type, geographic location, trial type and phase, medication use → available from protocol data.
 2. pain tolerance, invasiveness tolerance, time commitment → Inferred through text classification.
 3. Other comprised of heterogeneous collection of individual user beliefs or personal facts that could not be generalized into search criteria.
- Readily indexable search criteria are used to filter while inferred criteria are used to sort results.


Design: Search Interface Features

- Several agent capabilities is implemented to scaffold search.

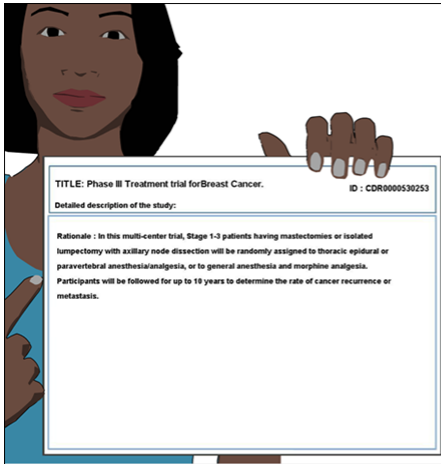
Search Interface Feature: Education modules



- OK, help me find a trial.
- What is a clinical trial?
- Why volunteer?
- Excuse me?

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Search Interface Feature: Read-aloud



TITLE: Phase II Treatment trial for Breast Cancer. **ID :** CDR0000530253

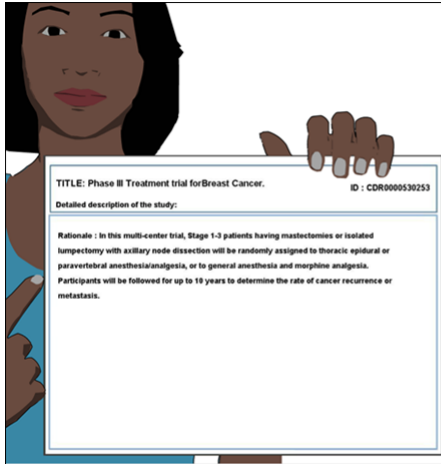
Detailed description of the study:

Rationale : In this multi-center trial, Stage 1-3 patients having mastectomies or isolated lumpectomy with axillary node dissection will be randomly assigned to thoracic epidural or paravertebral anesthesia/analgesia, or to general anesthesia and morphine analgesia. Participants will be followed for up to 10 years to determine the rate of cancer recurrence or metastasis.

- Read more
- Show me a different trial
- I want to learn more about the trial
- Who should I contact to participate?
- I don't understand the word anesthesia
- I don't understand the word axillary
- I don't understand the word lumpectomy
- I don't understand the word analgesia
- I don't understand the word epidural

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Search Interface Feature: Dictionary



TITLE: Phase II Treatment trial for Breast Cancer. **ID :** CDR0000530253

Detailed description of the study:

Rationale : In this multi-center trial, Stage 1-3 patients having mastectomies or isolated lumpectomy with axillary node dissection will be randomly assigned to thoracic epidural or paravertebral anesthesia/analgesia, or to general anesthesia and morphine analgesia. Participants will be followed for up to 10 years to determine the rate of cancer recurrence or metastasis.

- Read more
- Show me a different trial
- I want to learn more about the trial
- Who should I contact to participate?
- I don't understand the word anesthesia
- I don't understand the word axillary
- I don't understand the word lumpectomy
- I don't understand the word analgesia
- I don't understand the word epidural

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Search Interface Feature: Simplified Title

Original title: "Phase IV Randomized Study of Doxorubicin Hydrochloride Liposome Versus Capecitabine as First-Line Chemotherapy in Women With Metastatic

TITLE: Phase II Treatment trial for Breast Cancer. ID: CDR000581437

To be in the study, you must meet these requirements:

- All subjects must be female
- Postmenopausal status, defined as any one of the following criteria: Documented history of bilateral oophorectomy
- Age 65 years or more
- Age 45 to 59 and satisfying one or more of the following criteria: Amenorrhea for at least 12 months and intact uterus
- Amenorrhea for less than 12 months and a follicle stimulating hormone (FSH) and estradiol concentration within postmenopausal range including: patients who have had a hysterectomy...
- Patients must have histologically confirmed invasive breast cancer with a primary tumor of 3 cm or more in greatest dimension as measured by clinical examination
- Estrogen receptor and/or progesterone receptor positive disease

Final Eligibility will be determined by the research coordinator

Yes. Who should I contact to participate?

No, I don't meet the requirement.

Show me more details of the study

No thanks! Show me something else.

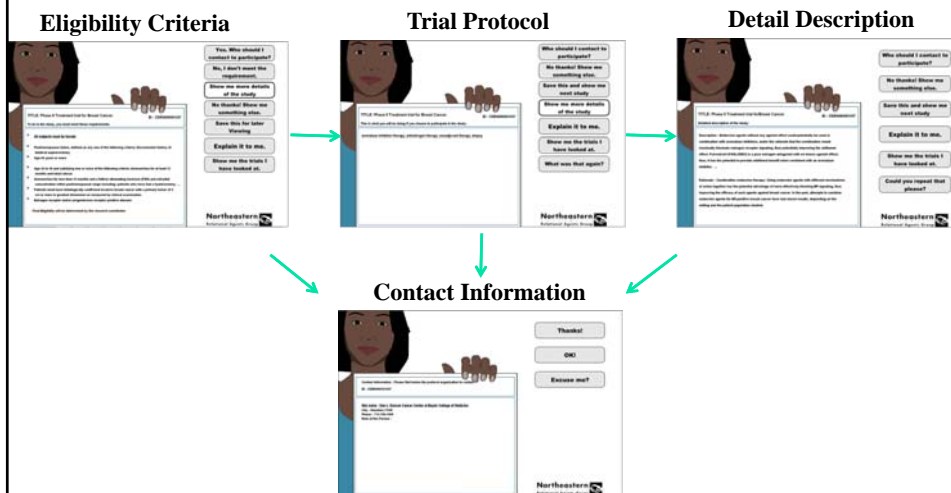
Save this for later Viewing

Explain it to me.

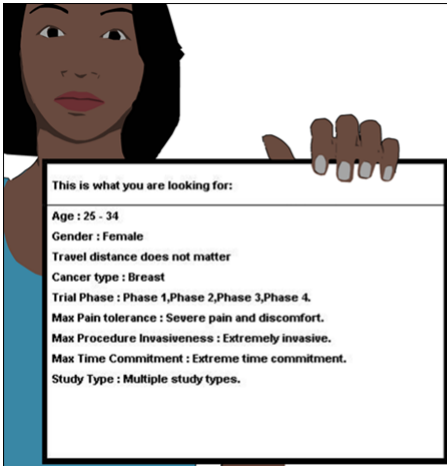
Show me the trials I have looked at.

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Search Interface Feature: Levels of information detail



Search Interface Feature: Search criteria confirmation & Refinement

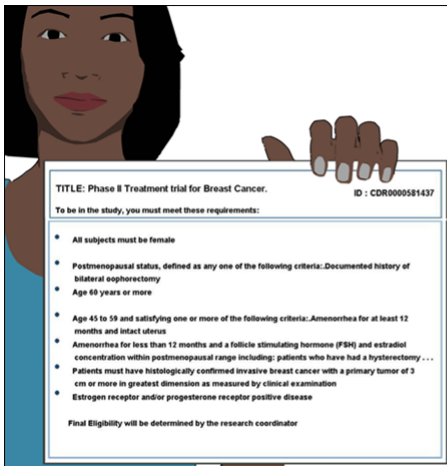


This is what you are looking for:

- Age : 25 - 34
- Gender : Female
- Travel distance does not matter
- Cancer type : Breast
- Trial Phase : Phase 1,Phase 2,Phase 3,Phase 4.
- Max Pain tolerance : Severe pain and discomfort.
- Max Procedure Invasiveness : Extremely invasive.
- Max Time Commitment : Extreme time commitment.
- Study Type : Multiple study types.

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Search Interface Feature: Bookmarking



TITLE: Phase II Treatment trial for Breast Cancer. ID : CDR0000581437

To be in the study, you must meet these requirements:

- All subjects must be female
- Postmenopausal status, defined as any one of the following criteria: Documented history of bilateral oophorectomy
- Age 66 years or more
- Age 45 to 59 and satisfying one or more of the following criteria: Amenorrhea for at least 12 months and intact uterus
- Amenorrhea for less than 12 months and a follicle stimulating hormone (FSH) and estradiol concentration within postmenopausal range including: patients who have had a hysterectomy...
- Patients must have histologically confirmed invasive breast cancer with a primary tumor of 3 cm or more in greatest dimension as measured by clinical examination
- Estrogen receptor and/or progesterone receptor positive disease

Final Eligibility will be determined by the research coordinator

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Search Interface Feature: Summary of views

The screenshot shows a search interface with a list of clinical trials. A woman's hand is shown pointing at the list. To the right, there are two buttons: "I am finished looking at this." and "What was that again?".

These are the trials that you have looked at:

The last trial you have looked at:
 ID : CDR0006575471 - Supportive care trial for Breast Cancer.
 Cognitive Changes Associated With Breast Cancer Treatment;

The other trials you have looked at:

ID : CDR0009573471 - Supportive care trial for Breast Cancer.
 Cognitive Changes Associated With Breast Cancer Treatment

ID : CDR000741293 - Diagnostic trial for Breast Cancer.
 Computed Optical Margin Assessment for Breast Cancer Surgery

ID : CDR000643454 - Phase IV Biomarker/Laboratory analysis trial for Breast Cancer.
 A Pilot Study of Varying Doses of Tamoxifen in the Setting of Genetic Polymorphisms of CYP2D6 ...

ID : CDR000581437 - Phase II Treatment trial for Breast Cancer.
 Arimidex With or Without Faslodex In Postmenopausal Women With HR Positive Breast Cancer ...

ID : CDR000673565 - Natural history/Epidemiology trial for uterine cervix Cancer.
 Childhood Cancer Survivor Study

ID : CDR000697266 - Phase I Supportive care trial for Breast Cancer.
 Alpha-Ripic Acid in Patients at Risk for Paclitaxel Induced Neuropathy

ID : CDR000697262 - Treatment trial for Breast Cancer.
 Evaluation of the Use of AZD5363 to Induce Increased ER Expression and Anti-Estrogen Response in ...

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Preliminary Evaluation

- Between subject randomized trial

The comparison shows two search interfaces side-by-side, labeled "AGENT" and "CONTROL". The "AGENT" interface is a simplified version of the one shown in the previous slide, with a list of trials and a few buttons. The "CONTROL" interface is a more complex, multi-page search interface with many buttons and options. The word "VS" is placed between the two interfaces.

- The agent used the same data from the NCI database of clinical trials



Preliminary Evaluation

- Search Tasks:
 - T1: search for trials with user's own criteria
 - T2 (standardized task): search for trials with specified criteria
- Measure:
 - Self-report scale measures
 - Number of trial examined
 - Number of trial that met criteria
 - ID of trial found
 - Elapsed time

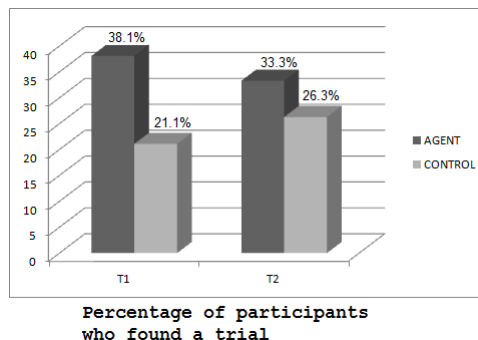


Participants

- 40 participants:
 - 21 in the AGENT condition, 19 in CONTROL
- Age:
 - Mean: 58.6 years (SD: 10.1)
- Gender:
 - 68% male
- Health literacy:
 - 39% low health literacy
- Computer Experience:
 - I've never used one: 17%
 - I've used one a few times: 34%
- Search Engine Experience:
 - I've never used one: 34%
 - I've used one a few times: 29%

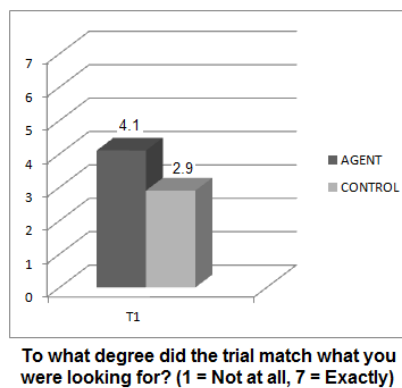
Results: Success Rate

- The AGENT is at least as effective as the web-based search engine
 - T1: 38.1 vs. 21.1 (ns.)
 - T2: 33.3 vs. 26.3 (ns.)



Results: Matching of Result and Criteria

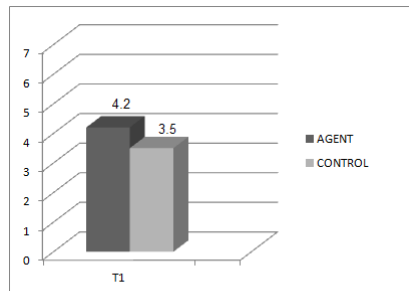
- Those in the AGENT group felt that the trials they found matched their criteria to a greater degree than those in the CONTROL group.
 - T1: 4.1 vs. 2.9, $p=.07$ (approaching significant)



Results:

Likelihood to Sign Up for Trials

- Participants in the AGENT group reported being more likely to actually enroll in the study they found compared to those in the CONTROL group,
 - T1: 4.2 vs. 3.5, $p=0.08$ (approaching significant)

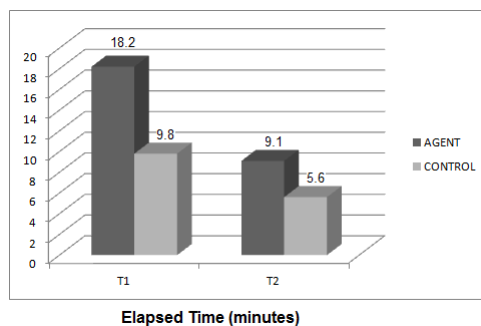


How likely are you to sign up for the trial that you found? (1 = Not likely, 7 = Very likely)

Results:

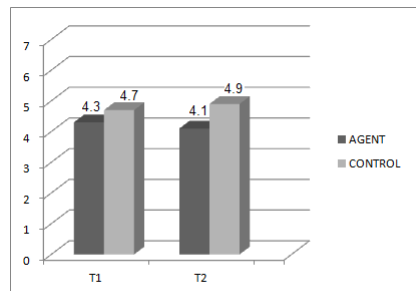
Search Time

- Those in the AGENT group spent significantly more time using the system, compare to the CONTROL group.



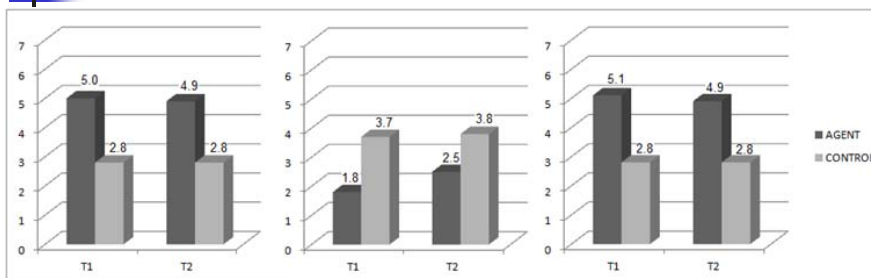
Results: Perceived Search Time

- No significant difference in the **perceived** time spent using the system.
 - T1: 4.3 vs. 4.7 (n.s.)
 - T2: 4.1 vs. 4.9 (n.s.)



How much time do you feel it took to use the system?
(1 = Too little, 7 = Too much)

Results: Overall Satisfaction



How satisfied were you with the clinical trial search system?*

* 1 = Not at all, 7 = Very

How frustrated do you feel right now?*

How pleased do you feel right now?*

- All participants in the AGENT group were significantly more satisfied with the experience compared to those in the CONTROL group. ($p < .05$, in T1 and T2)



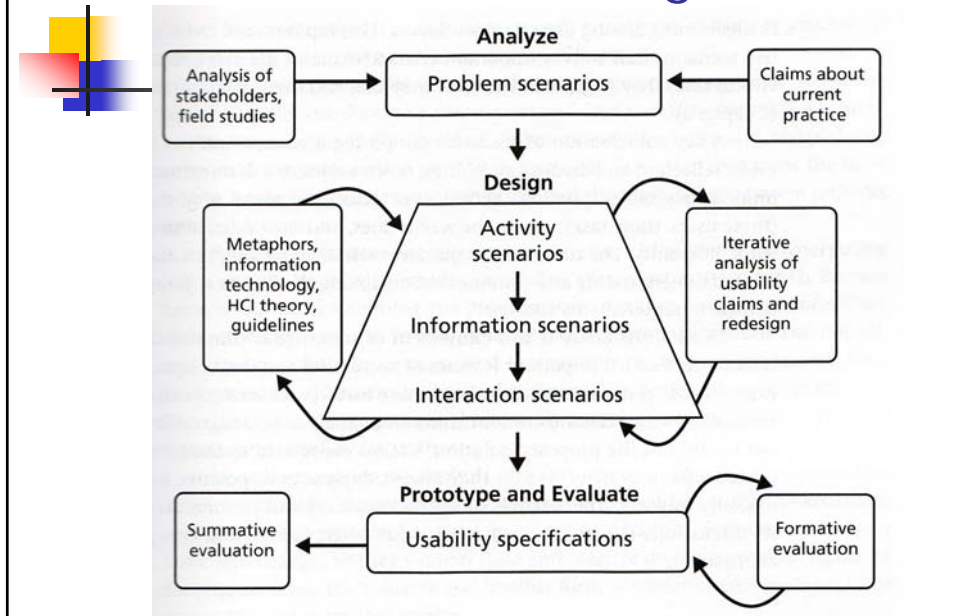
Conclusion

- The agent interface is at least as effective as the conventional interface in helping users find clinical trials.
- Users are significantly more satisfied with the agent interface compared to the standard,
 - despite the fact that it takes significantly longer to perform a standardized search task.

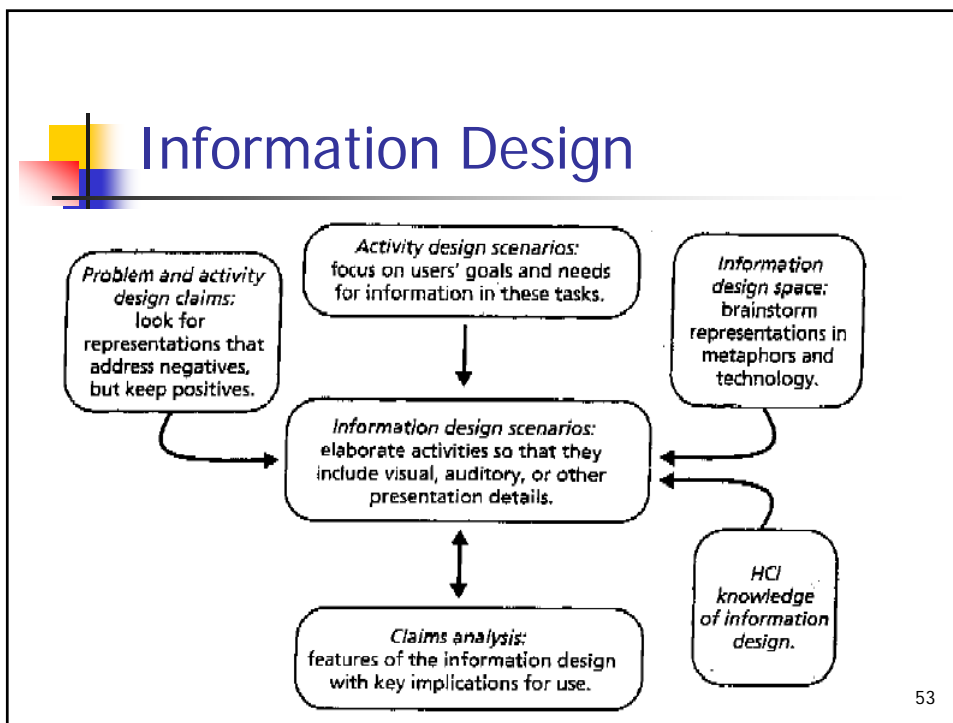


Scenario Based Design

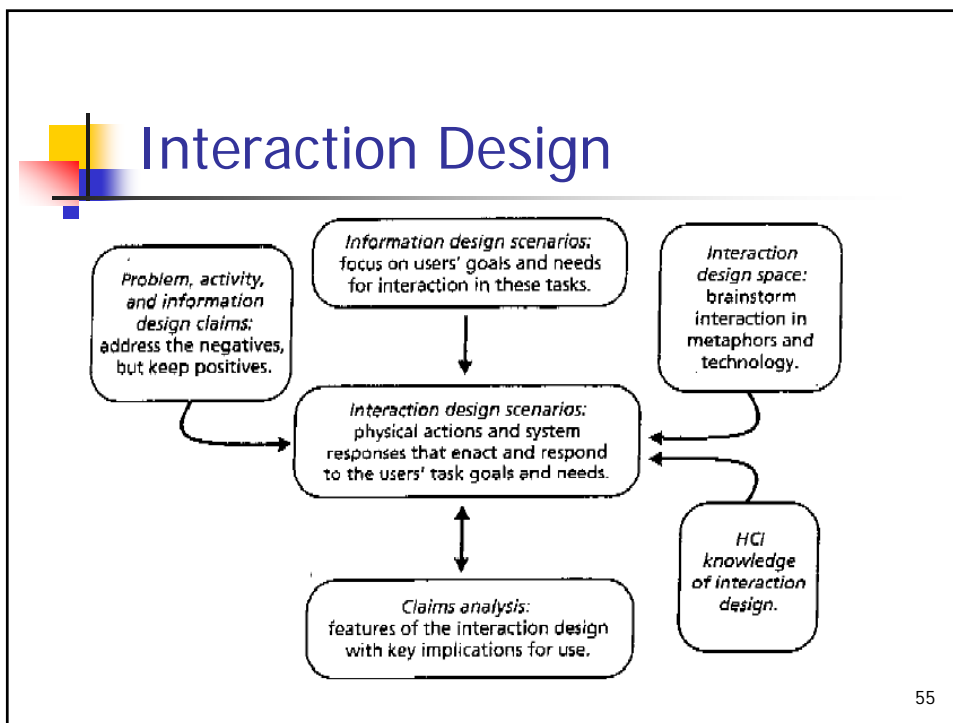
Scenario-Based Design



Information Design



Example Activity Design Scenario	Transformed into Information Design Scenario
<p>3) <i>Alicia and Delia go to the science fair.</i></p> <p>Background on Alicia, Delia, and their motivations, . . .</p> <p>When Delia shows Alicia an email invitation to a virtual science fair (VSF), the two of them decide to follow the link right then and there. They are curious about how this will be different from a regular fair.</p> <p>When they arrive at the VSF, they are able to get an overview of what and who is there and the current activities taking place. They can see that some exhibits are still "under construction," so they figure that one difference may be that this fair is ongoing. A welcome note confirms this, indicating that all virtual exhibits will be complete by next Thursday, when the judging will take place.</p> <p>They decide to look around anyway since they have time, and Delia suggests that they visit the exhibit that already has several people viewing it, thinking it must be</p>	<p>3) <i>Alicia and Delia go to the science fair.</i></p> <p>The email includes a string that Delia recognizes as a URL in MOOsburg.</p> <p>At the VSF they recognize the standard MOOsburg layout—panorama view of the fair, brief list of objects to work with, chat tool, and interactive map.</p> <p>Alicia recognizes the map as a high-school floor plan. She shows Delia where she worked in the office as a peer counselor. They see a green dot in the gym, blue dots in other rooms. Alicia infers they are "in" the gym; she plans to check out the rest later.</p> <p>The main view is crowded. At the back is a large Welcome sign, with thanks to organizers, and other announcements.</p> <p>Exhibits are arrayed around the room, each with a student name attached. Some are covered with a black and yellow banner; Delia suggests that these must be "under construction."</p>



Interaction Scenario

Mr. King can see that Sally is already there when he arrives: The Current Visitors list shows her name. When he arrives, his name is added and flashes briefly in red, so Sally notices him arrive and greets him with a chat message. He quickly notes that she has already added several new items—a title page (which is displayed by default in the main view) and a slide show. He selects her name in the Visitors list, and then uses Control+I to see what she is viewing. The miniature window titled Slide Show flashes in red, so he figures she must be working on her slides. Leaving her name selected in the list, he uses Control+F to synchronize his view with hers. His main viewing area updates to display the message, "Slide show being modified." PowerPoint then opens to the side, positioned at the slide she is working on. Mr. King's view of the slides is now controlled by Sally; when she moves to a new slide, so does he. He watches and makes suggestions as she refines the slides, using the text chat.

Sally tells Mr. King that several elements in the template are still empty, but that she has developed most of her material and is about to upload it. Because he is still synchronized with her, he is able to watch this process. She selects a template icon, then selects Get File from the Construction menu. A familiar file-browsing dialog box appears, and he watches as she selects the files from her PC and then presses the Upload button. After each upload, the miniaturized window updates and flashes in red briefly.

16

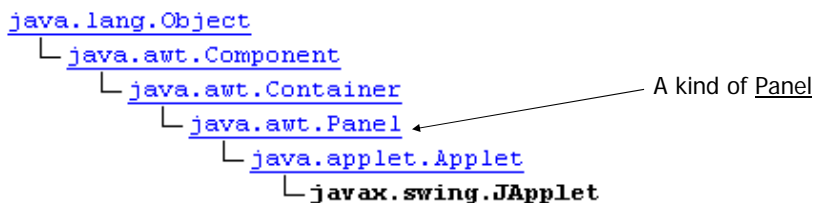
Swing Events & Graphics Primitives





JApplet

Class JApplet




Useful stuff

- Graphics `getGraphics()` *called within JApplet*
 - Returns a 'Graphics' object
 - Device-independent interface to graphics
 - Basics (plus 'fillX' for most of these):
 - `drawLine(x1,y1,x2,y2);`
 - `drawRect(x,y,w,h);`
 - `drawOval(x,y,w,h)`
 - `drawPolygon(int[] xpts,int[] ypts,numpts)`
 - `drawString("a string",x,y)`
 - `drawArc(x,y,w,h,startAngle,endAngle)`
 - `setColor(Color)`
- Notes: 'java.awt' pkg, coordinate system

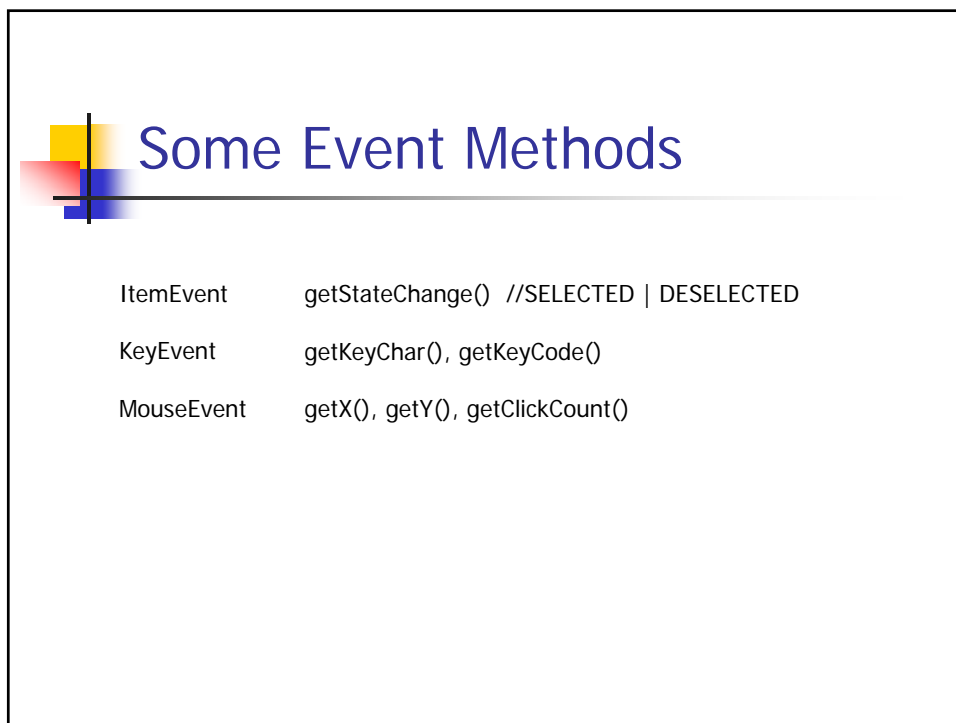
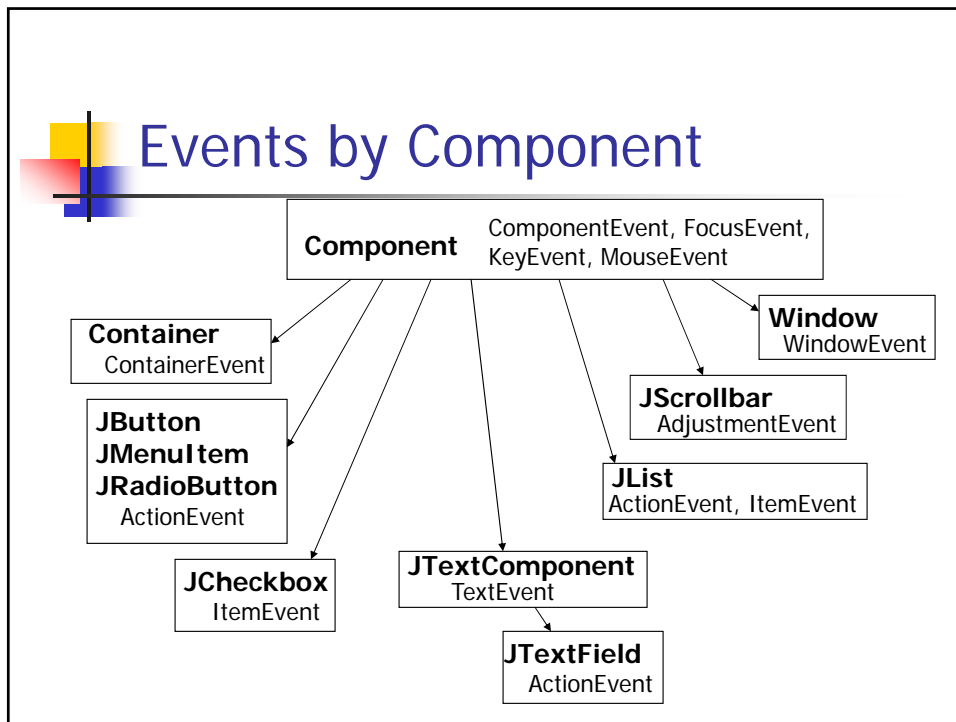
Colors

java.awt.Color

- Constructors
 - Color(int R,int G,ing B) //0..255 ea
 - Color(float R,float G,float B) //0..1
- Pre-defined as constants
 - black,blue,cyan,darkGray,gray,green,lightGray,magenta,orange,pink,red,white,yellow

Event Model

- Swing Events are a subclass of java.awt.AWTEvent (subclass of java.util.EventObject)
 - getSource() -> who produced it





Swing is Notification based

```
class MyActionHandler implements ActionListener {
    public void actionPerformed(ActionEvent event) {
        System.out.println("Somebody pushed me!");
    }
}
```

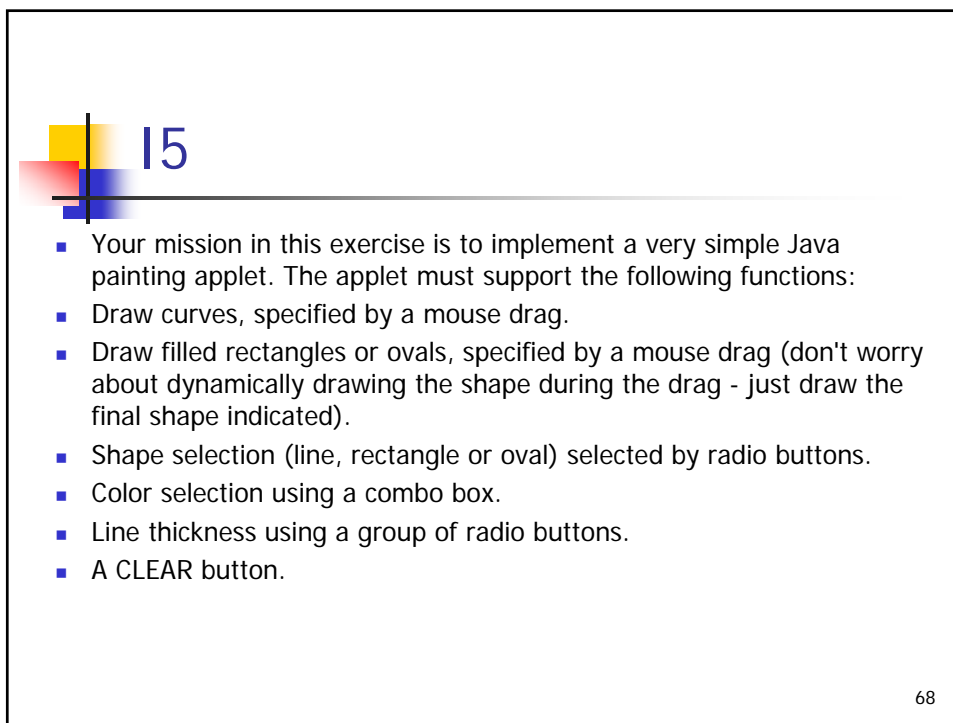
```
Button button1=new Button("Push Me");
```

```
button1.addActionListener(new MyActionHandler());
```



Event Types

<u>Event</u>	<u>Listener Methods</u>
Action	actionPerformed()
Adjustment	adjustmentValueChanged()
Component	componentHidden(), componentMoved(), componentResized(), componentShown()
Container	componentAdded(), componentRemoved()
Focus	focusGained(), focusLost()
Item	itemStateChanged()
Key	keyPressed(), keyReleased(), keyTyped()
Mouse	MouseListener/MouseAdapter: mouseClicked(), mouseEntered(), mouseExited(), mousePressed(), mouseReleased() MouseMotionListener/MouseMotionAdapter: mouseDragged(), mouseMoved()
Text	textValueChanged()



15

- Your mission in this exercise is to implement a very simple Java painting applet. The applet must support the following functions:
- Draw curves, specified by a mouse drag.
- Draw filled rectangles or ovals, specified by a mouse drag (don't worry about dynamically drawing the shape during the drag - just draw the final shape indicated).
- Shape selection (line, rectangle or oval) selected by radio buttons.
- Color selection using a combo box.
- Line thickness using a group of radio buttons.
- A CLEAR button.

68

A slide with a black border. On the left side, there is a decorative graphic consisting of overlapping colored squares (yellow, red, blue) and a black crosshair. To the right of this graphic, the number "15" is written in a blue, sans-serif font. Below the number, there is a list of seven bullet points, each starting with a blue square. The text of the bullet points describes the requirements for a Java painting applet. At the bottom right corner of the slide, the number "68" is written in a small, black, sans-serif font. A thin horizontal line is drawn across the slide, starting from the left edge and ending just before the right edge, positioned below the number "15".



To Do

- due next class
 - P3 – Conceptual design, Activity Scenarios

- Homework: Start
 - I5 – Swing Event handling – due in 1 week (next class meet)