

Influences of Web site Structure, Navigation, and Internet Self-Efficacy on Task Performance and Web site Evaluation

Sarah Greer
Dr. Lauren Scharff

Stephen F. Austin State University

Usability Testing

- Literature suggests a usable Web site:
 - facilitates ease in completing a task/efficiency in reaching a goal
 - user satisfaction with design and experience
- **Inquiry, Inspection, and Formal Testing**

Battleson, Booth, & Weintrop (2001); Hom (1998); Nielsen (2003); Palmer (2002)

Importance of Usability Testing

- Increasing pervasiveness of Internet/Web technology for commercial and personal use:
 - Over 30% of Americans access the Web every day
- Web users:
 - tend to scan pages leaving much of the page unexplored
 - invest about 11 seconds per page
 - “satisfice” or select the first alternative that meets their minimum requirements
 - Leave Web sites in 1 minute 49 seconds if they determined the site did not meet their needs

Cockrell & Jayne, (2002); Krug, (2000); National Telecommunications, (2004); Nielsen, (2004b, 2001a, 2001b, 1997); Shroeder, 1998

Conventions

Examples:

- consistency;
- underlined links,
- body text with san-serif fonts,
- left-handed navigation,
- larger fonts for headlines, and
- logos in upper left-hand corner

Effects:

- Promote familiarity among sites
- Reduces cognitive effort required to navigate
- Users can better predict how sites will behave

Hodgkinson, (2003); Krug, (2000); Nielsen, (2004a, 1997); Powell, (1998); Shroeder, (1998)

Navigation

- Provides users with a sense of location by making the content organization visible
- “Breadcrumbs” show path relative to where user has been – supplement primary navigation
- Important for users who do not enter a Web site through its home page
- Limited research on specific navigational schemes

Krug, (2000); Nielsen, (2000); Rosenfeld & Morville, (1998); Subramanian, (2004); Yu & Han, (2001)

Example

SFASU Psychology Department - Microsoft Internet Explorer

File Edit View Favorites Tools Help

SFA
Psychology Department

STOP

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Candidacy

Admission to Departmental Degree Candidacy is a prerequisite to enroll in PSY 519-Psychology Practicum, PSY 522-Psychology Research Practicum, and PSY 589-Thesis Research.

To be admitted to Departmental Degree Candidacy, students must meet the following degree requirements:

1. Complete the following courses with a B average or better:
 - PSY 501-Adv. Analysis of Behavioral Data - (4 hours)
 - PSY 507- Experimental Design - (4 hours)
 - PSY 517-Professional Issues - (3 hours)
 - One course from PSY 502, 503, 504, 505, 506, 508 - (3 hours)
 - Total: 14 hours
2. Submit a score of 540 or higher on the GRE Psychology Subject Test.

Students who have not obtained a score of 540 or higher upon admission to the graduate program must register to take the GRE Psychology Subject Test during their first semester of graduate work.

If a student has not passed the GRE Psychology Subject Test by the end of the first two semesters of graduate work, he/she will be advised by the graduate program coordinator or the chair of the department regarding remediation courses that must be taken in order to pass the GRE Psychology Subject Test and to continue in the Psychology graduate program.

3. Students must have an overall GPA of 3.00 or higher in all graduate course work completed at the time of applying for Departmental Degree Candidacy. Any graduate course in which a student has an incomplete grade (WH) will be regarded as having 0 grade points and the credit hours will be averaged with all completed credit hours to determine the overall graduate GPA.

Department of Psychology, Box 13046, SFA Station, Nacogdoches, TX 75962-3046
phone: (936) 468 - 4402, fax (936) 468 - 4015, email:

Web site Structure

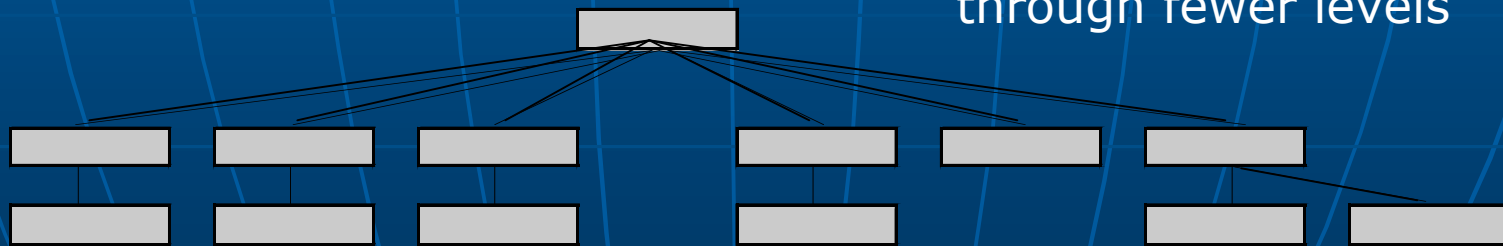
- The hierarchy model is the most common because it allows for both depth and breadth of choices
- Research on how to balance this depth/breadth tradeoff indicates deeper sites (3 levels) negatively impact task performance
- Little research examining structure in conjunction with menu presentation

Larsen & Czerwinski, (1998); Powell, (1998); Rosenfeld & Moreville, (1998); Subramanian, (2004); Yu & Han, (2001)

We site Structure



Deep linking: fewer choices, pass through more levels



Wide linking: many choices, pass through fewer levels

Internet Self-Efficacy

- Users who have been routinely unsuccessful in using the Web may develop low self-efficacy, lacking confidence in their abilities to successfully use the Internet
- Previous research suggests:
 - High efficacy users have better information searching strategies, better conceptualize Web structures, and are more persistent in completing Web-based tasks
 - Low efficacy users tend to read the details and accept rather than question computer systems

Bandura, (1997); Cockrell & Jayne, (2002); Frick, (1999); Liaw, (2002), Tsai & Tsai, (2003)

Goal

- Determine how contextual navigational elements and information structure, in conjunction with user self-efficacy, influence how users:
 - Are able to locate target pages
 - Rate a Web site
- Question accuracy was measured to validate participants' understanding of a page's content organization once the correct page was located.

Method

- 2 (depth) x 3 (navigation) mixed design
 - Target answers located on wide or deep pages (W)
 - Web sites with a context menu, emphasized context menu, or without a context menu (B)
- 52 Participants Completed:
 - Information location test - 10 questions from Web site content
 - Start page varied for each question
 - Web site rating (5 Likert scale questions)
 - Demographics
 - Self-assessment of Web efficacy (6 Likert questions)
 - Years of Internet Experience

Navigation Design

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Undergraduate Program	Candidacy
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Faculty and Staff	To be admitted to Departmental Degree Candidacy, students must meet the following degree requirements:
Research Procedures and Facilities	1. Complete the following courses with a B average or better:
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No Context Menu
(NCM)

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Emphasized Context Menu
(ECM)

Sample Questions

Sample target location test question:

For what times is research room 104D reserved on September 28th?

- a.11-12, 2-3
- b.10-5
- c.10-7
- d.11-4

Sample usability rating question:

Overall, how difficult was it for you to locate the information for the questions?

1	2	3	4
Extremely Difficult	Very Difficult	Somewhat Difficult	Not Difficult

Hypotheses

- Participants would locate more targets and answer more questions correctly when:
 - searching for information located on pages *wide* in a site
 - using a site with a plain context menu
- High Internet efficacy participants would locate more targets and answer more questions correctly as well as provide lower usability ratings

Results

- Target depth significantly affected participants ability to locate target pages and question accuracy

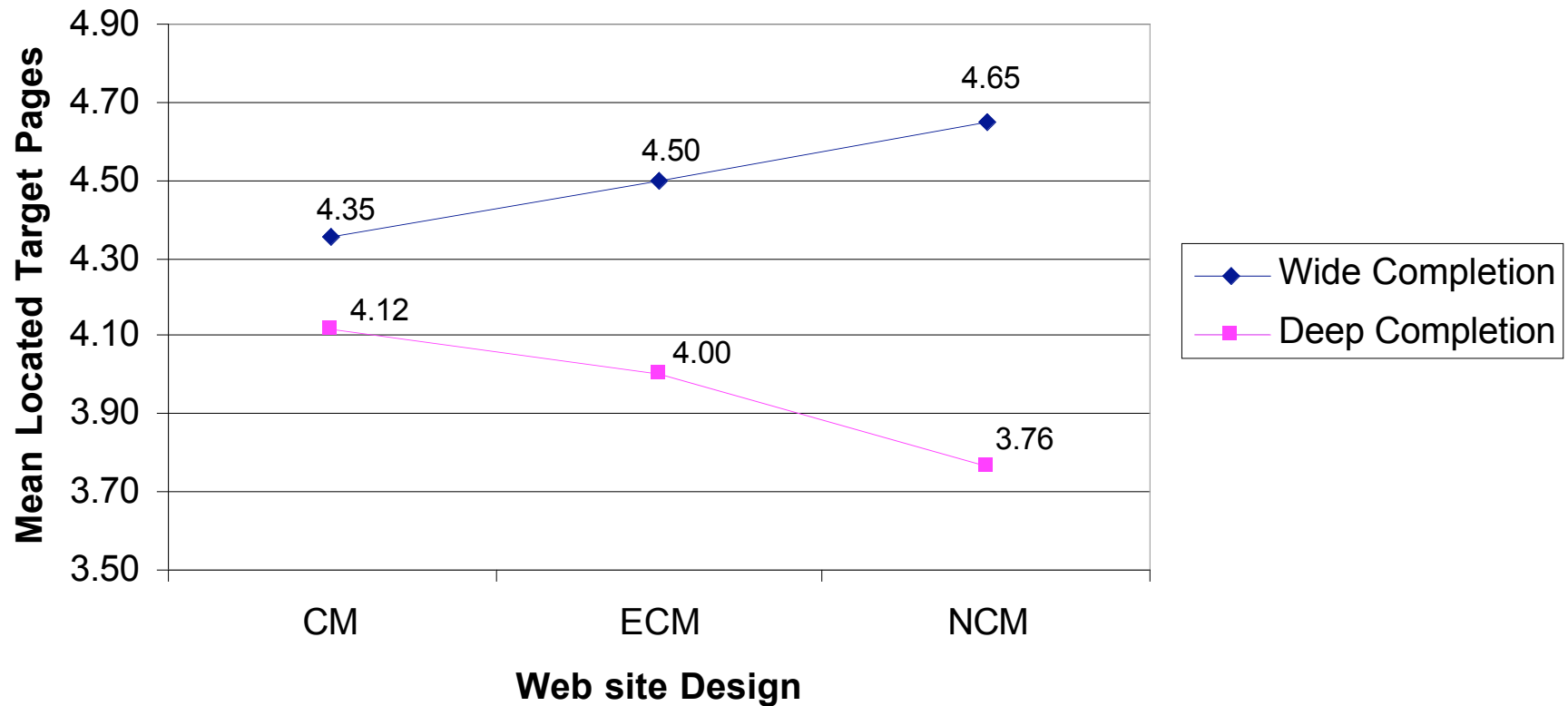
($p < 0.00$)

Mean Scores	Locate Target	Accuracy
Deep	3.96	4.23
Wide	4.50	4.83

- No significant effect of navigation design on ability to locate targets, question accuracy, or Web site rating

Results

Target Depth and Design ($p < .12$)

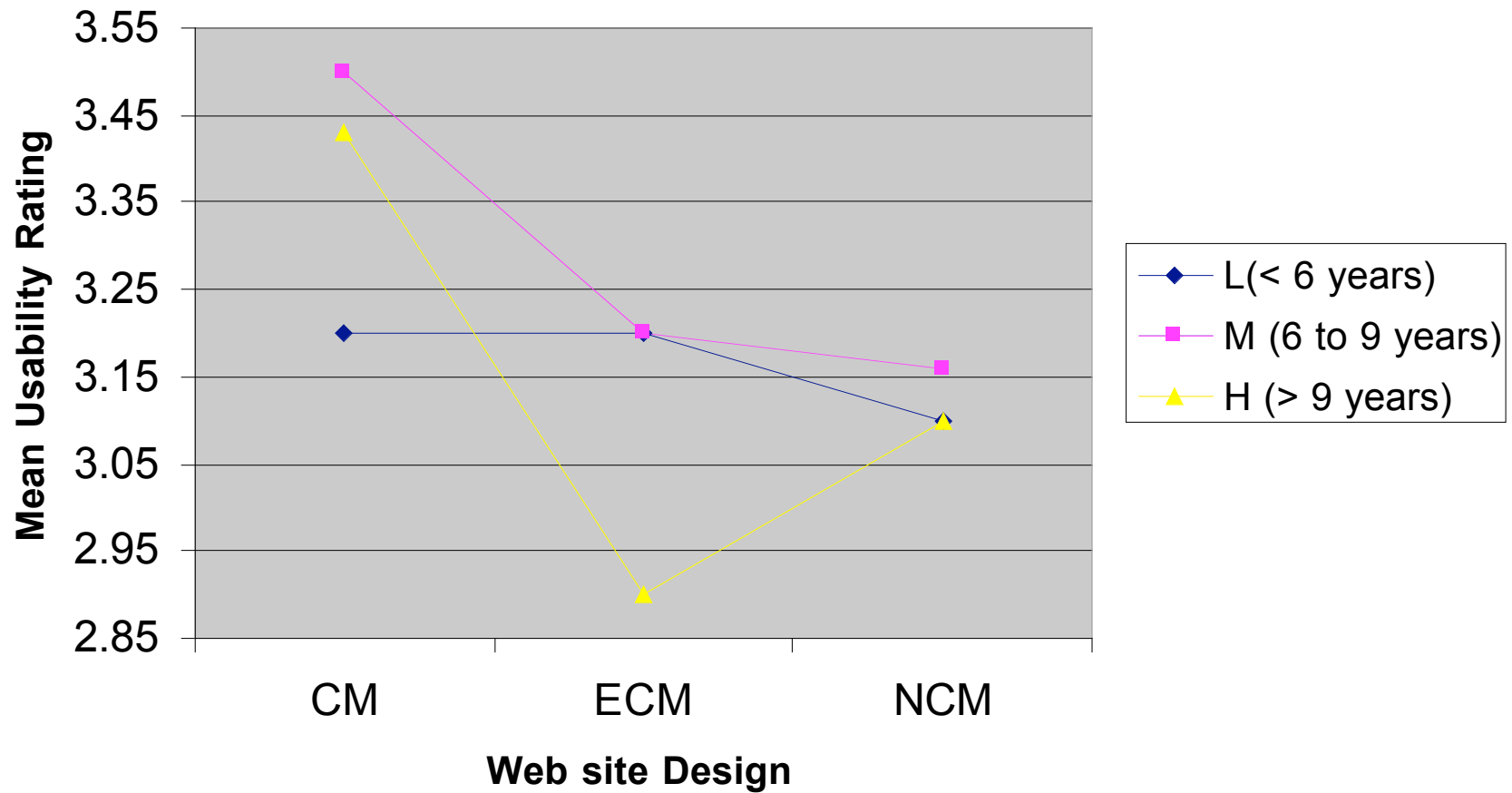


Results

- High Internet efficacy participants answered significantly more questions correctly
 $t(50) = -2.11, p = .04$
- High Internet efficacy participants provided significantly higher usability ratings
 $t(50) = -1.97, p = .05$
- Internet efficacy was positively correlated to:
 - years of Internet experience
 $r(50) = .31, p < .05$
 - participants reported difficulty in locating targets
 $r(50) = .40, p < .01$

Results

Interaction Between Navigation Design and Years of Internet Experience ($p < .075$)



Discussion

- Depth of target information
 - Supports previous research indicating depth negatively impacts task performance
 - 3-5 links even problematic
- Navigation design (context menu)
 - Trend indicating navigation design may affect usability rating – usefulness of subjective data
- Internet self-efficacy
 - High efficacy participants have better overall understanding
 - may develop over time

Future Research

- Use different navigational designs
- Tracking use of specific navigations
- Impact of experience on design preferences and feedback during usability testing

Thank You!

Questions?