How Task Types and User Experiences Affect Information-Seeking Behavior on Web: Using Eye-tracking and Client-side Search Logs

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Objectives

- How do task types affect information-seeking behavior?
  - We compared informational and transactional tasks [1].

- How do knowledge and experience affect search behavior?
  - We compared undergraduates with graduate students.

Participants

- 11 Undergraduates
- Ages: between 19 and 21
- Males: 5; females: 6

Tasks

- Reported task: User plan to take a trip with
- The season you are traveling in
- You must give your trip partners such useful information as transit points, accommodation, locations, and events.
- Participants selected their own topics.
- Participants selected travel partners, season, and destination.

Results of Behavioral Data

- Categories of Web search behaviors:
  - Click on link
  - Click on page
  - Bookmarks
  - Change of one tab to another
  - Close tab

Summary of Results

- How do task types affect information-seeking behavior?
  - Task types affect user eye movements and clicking pages
    - Trip task: Users looked more at sponsored links.
    - Report task: Users looked more at snippets
      - Users clicked and viewed lower rankings

- How do knowledge and experience affect search behavior?
  - User search patterns differed by experiences
  - Graduates quickly searched in parallel by switching tabs or windows
  - Undergraduates searched sequentially by alternating between links

Results of Eye Movement Data

- Location of blocks in lookzone
- Eye-gaze points for each ranking

User Differences

- Graduates more likely to:
  - Submit more forms
  - Change close more tabs or windows

- Undergraduates more likely to:
  - Read non-results pages
  - Click on more links
  - Return to more previous pages

User and Task Differences

- Graduates performed more actions on:
  - Search bar
  - Sponsored links

Task Differences

- Trip task:
  - Undergraduates browsed more non-results pages, and performed more actions than in report task

Procedures

- Pre-questionnaires:
  - How much do you use Web weekly?
  - What browsers?
  - What search engines?

- Interview:
  - Information-seeking processes
  - Showed them screen-captured video

- Post-questionnaire:
  - How difficult was task?
  - Satisfied with search results?

- Instructions:
  - You have 15 minutes to collect related information through the Web.
  - Add pages to browser’s book marks if useful.

- Experimental data:
  - Screen captured video
  - Browser Logs
  - Eye movements

- Tasks:
  - Search task
  - Report writing
  - Trip planning

- Tasks:
  - Button bar
  - Out of back button
  - Forward button
  - Back button

- Results:
  - Number of results pages
  - Number of non-results pages

- Actions:
  - Graduates
  - Undergraduates
  - Reading time for results pages
  - Reading time for non-results pages

- Queries:
  - Graduates
  - Undergraduates
  - Number of results pages
  - Number of non-results pages

- User Differences

- Graduates more likely to:
  - Submit bookmarks
  - Perform more actions

- Undergraduates more likely to:
  - Read non-results pages
  - Click on more links

- User and Task Differences

- Graduates performed more actions on:
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- Task Differences

- Trip task:
  - Undergraduates performed more actions on:
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- Undergraduates more likely to:
  - Submit more forms
  - Change close more tabs or windows

- Task Differences

- Trip task:
  - Both groups looked more at Scroll bar and Snippet
  - Both groups tended to look and click lower ranked pages than trip task

- Trip task:
  - Both groups looked more at Sponsor links

- Trips:
  - Both groups looked more at Scroll bar and Snippet

- Trips:
  - Both groups tended to look and click lower ranked pages than trip task

- Trips:
  - Both groups looked more at Sponsor links
About the CRES (Cognitive Research for Exploratory Search) project

The CRES project's goal is to investigate user's behavior and cognitive processes during various information seeking tasks on the web. Various user's activities were collected for analysis by using eye-trackers, think-aloud, etc., for the purpose of designing better interactive IR systems for exploratory searches.

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Outcomes and Activities

- **Categories of action**: We defined 10 categories of action for analyzing of user's behavior on the web.
- **Lookzones**: We defined “Lookzones”, a set of categories indicating which part of the results page that the participants looked.
- **Egozone**: Visualisation service for eye movement data
- **EyeTracker tool**: Experiment tool (somer project): We contributed to the toolbar by reporting bugs and sending patches.
- **EyeTrackingSystem**: We used a non-contact type eye-tracking system.

Publications

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Other Publications

- **2006 domestic conference** Analysis of User Eye Movements during Viewing of Search Engine Results Pages in Web Information Seeking Tasks
  - Masao Takaku, Yuka Egusa, Hitoshi Terai, Hitomi Saito, Makiko Miwa, Noriko Kando
- **2006 domestic conference** Comparative Analyses of User Eye Movements during Web Searching
  - Hitomi Saito, Yuka Egusa, Masao Takaku, Hitoshi Terai, Makiko Miwa, Noriko Kando

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