

# Expanding LogUI: Adding Screen Capturing and a Statistical Analysis Dashboard for Web-Based Experiments

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## 1. Background

# IIR

- Interactive information retrieval.
  - Study and evaluation of user interactions with information retrieval systems [1].



- Logs user interactions on any web application [3].
- Still misses two vital features:
  - Screen capture functionality.
  - Dashboard for statistical analysis and visualization of logs.

## 2. Research Questions

- RQ1. What metrics and visualizations are required for a dashboard with LogUI user logs for IIR researchers, and what features aid in their usability?
- RQ2. How can screen capture be efficiently integrated into the LogUI logging process for use in IIR research?

## 3. Dashboard

Survey → Initial designs → Interview about designs → Dashboard creation → Dashboard evaluation

### Visuals

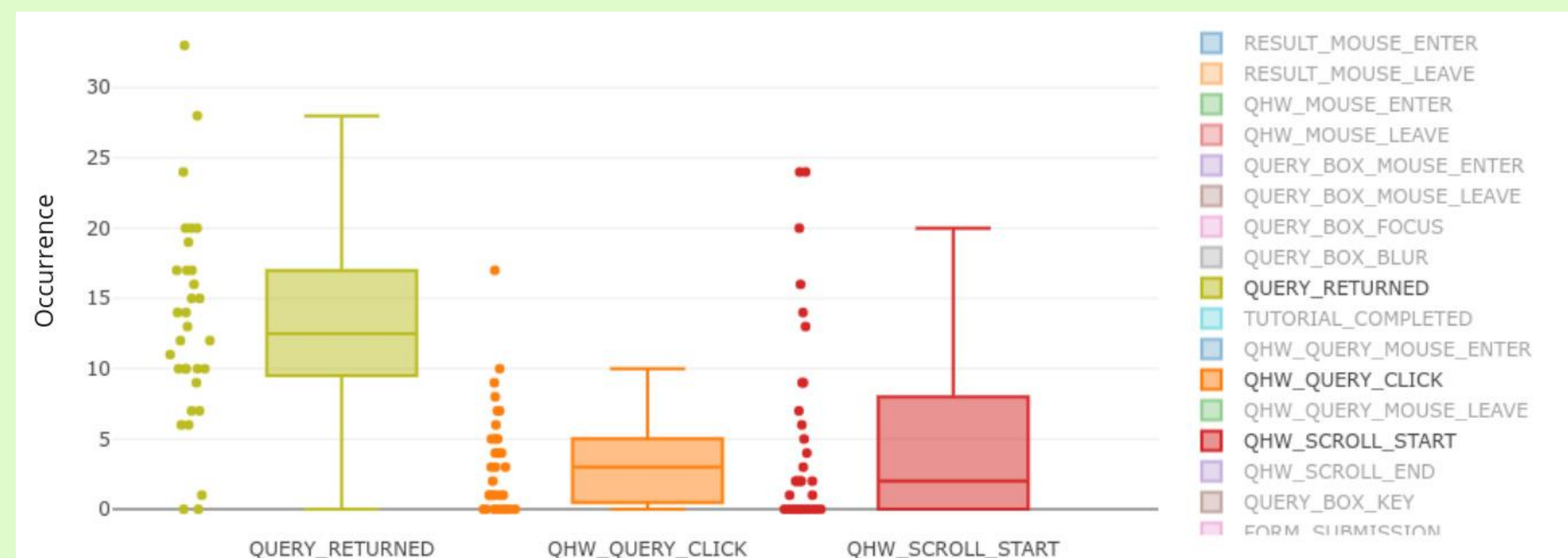
Box plots  
Time series plots  
Event timeline

### Metrics

- Dwell time
- Session duration
- Time between queries
- Event occurrences

### Features

- Group selection
- Aggregated statistics
- Visuals
- Filters
- Statistics table
- Session dashboard



## 5. Screen Capture

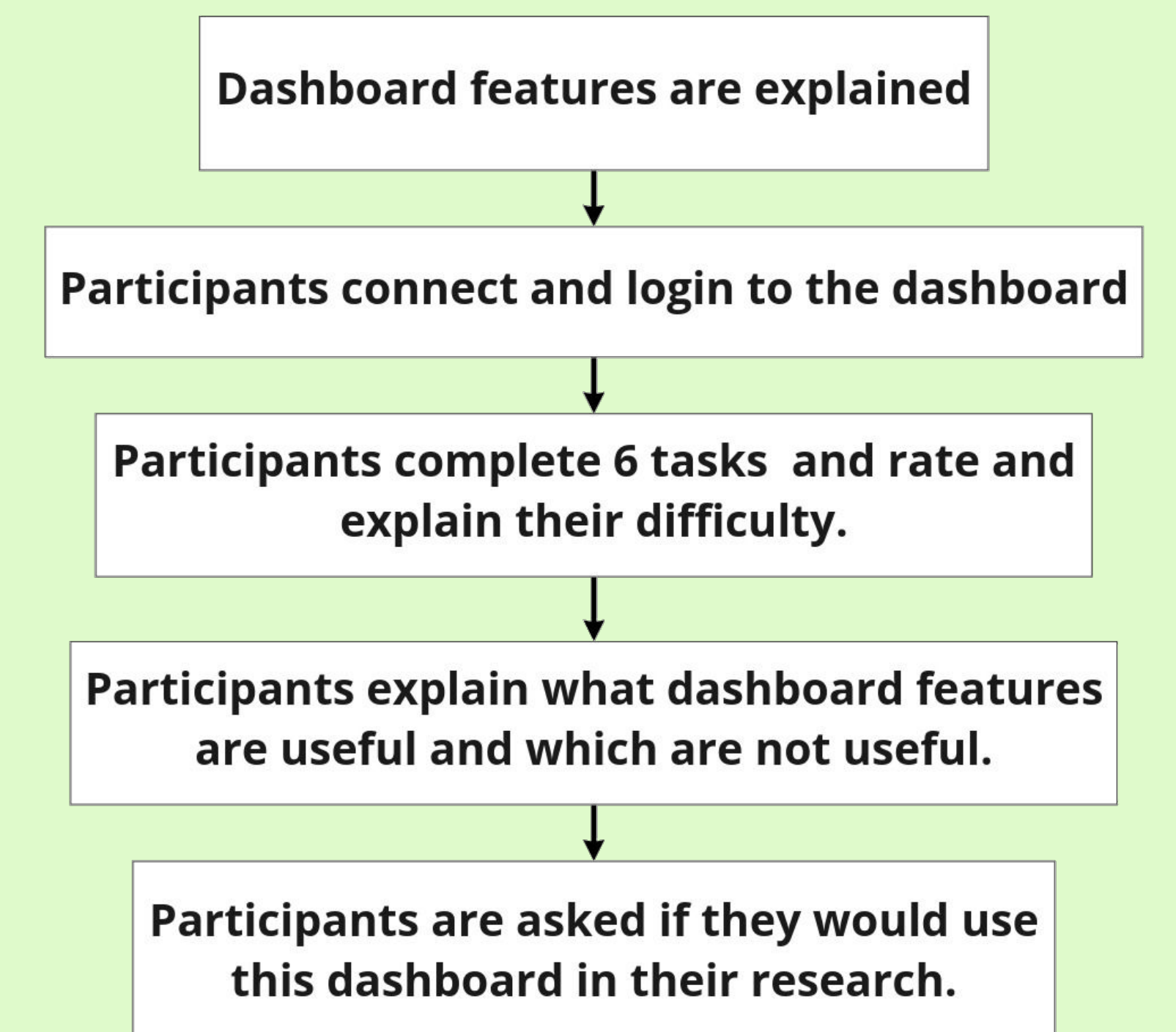
- Bandwidth-efficient:
  - Single tab recording.
  - H.264 video format.
  - Low bitrate.
    - Negative impact on video quality.
- Session Dashboard: Click on log to show occurrence in screen recording.

## 4. Dashboard Evaluation

- Evaluated with 5 IIR researchers.
- Most **tasks** completed with **little difficulty** on average.
- Coherency issues.
- **5/5 participants said they would use the dashboard in their research.**

### Example task

Create two box plots for the `QUERY_RETURNED` event and the `FORM_SUBMISSION` event side by side and download this plot.



## 6. Future Work

- Make predictions in the dashboard.
  - e.g. result evaluation strategy [4], human performance [5]
- Reduce loading times.
- Evaluation of screen capture robustness.
- Screen capturing for mobile devices.
- Machine learning on screen recordings.
- Recording webcam for eye-tracking [2,6].

## References

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- [3] David Maxwell and Claudia Hauff. 2021. LogUI: Contemporary Logging Infrastructure for Web-Based Experiments. In Advances in Information Retrieval (Proc. ECIR). 525–530. (Mar. 2021) [https://doi.org/10.1007/978-3-030-72240-1\\_59](https://doi.org/10.1007/978-3-030-72240-1_59)

- [4] Mark D Smucker. 2011. An Analysis of User Strategies for Examining and Processing Ranked Lists of Documents. Proc. of 5th HCIR. (Jan. 2011).
- [5] Mark D Smucker. 2009. Towards timed predictions of human performance for interactive information retrieval evaluation. Proc. of HCIR (Jan. 2009), 3.
- [6] Vu Tuan Tran and Norbert Fuhr. 2012. Using eye-tracking with dynamic areas of interest for analyzing interactive information retrieval. In Proceedings of the 35th international ACM SIGIR conference on Research and development in Information Retrieval. 1165–1166. (Aug. 2012) <https://doi.org/10.1145/2348283.2348521>