Comp 388/441 - Human-Computer Interface Design

Week 14 - 16th April 2015

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Testing and evaluating usability - 5

User observation - part 1

- involves testing sessions to observe users operation and reaction to an application
- often considered the most effective way to evaluate a design
    - *whether it is actually usable and learnable*
- may quickly reveal where your users are encountering problems
    - *show if results are outliers or common to most users*
- considerations for the testing session may include
    - *where to host the testing environment?*
    - *how to observe each session and its users?*
    - *how to effectively record notes of your users?*
- more formal testing lab or less formal local environment
    - *try to avoid 'Big Brother' type scenario, create a familiar environment*
- possibly test your app in situ
    - *tourguides whilst conducting a test tour...*
- recording users actions and thought processes whilst performing tasks
    - ***think aloud protocol***

Testing and evaluating usability - video

Usability testing Windows 95 - 1993

Microsoft Usability Testing - Source: YouTube

Testing and evaluating usability - 6

User observation - part 2

- be clear with users what you are trying to achieve in the test session
- ensure user consent and agreement for recorded sessions
- pattern and format of testing session influenced by type of collected data
- standard pattern often emerges for test sessions
    - *we ask test users to accomplish one or more goals*
    - *then observe how they interact with and explore the app to achieve those goals*
- how much help and assistance to offer to users?
    - *avoid trap of **leading** users to complete goals*
- carefully consider test results
    - *not all recommendations need be incorporated in final design*

Testing and evaluating usability - video

A quick history of usability testing

Microsoft User Research - Source: YouTube

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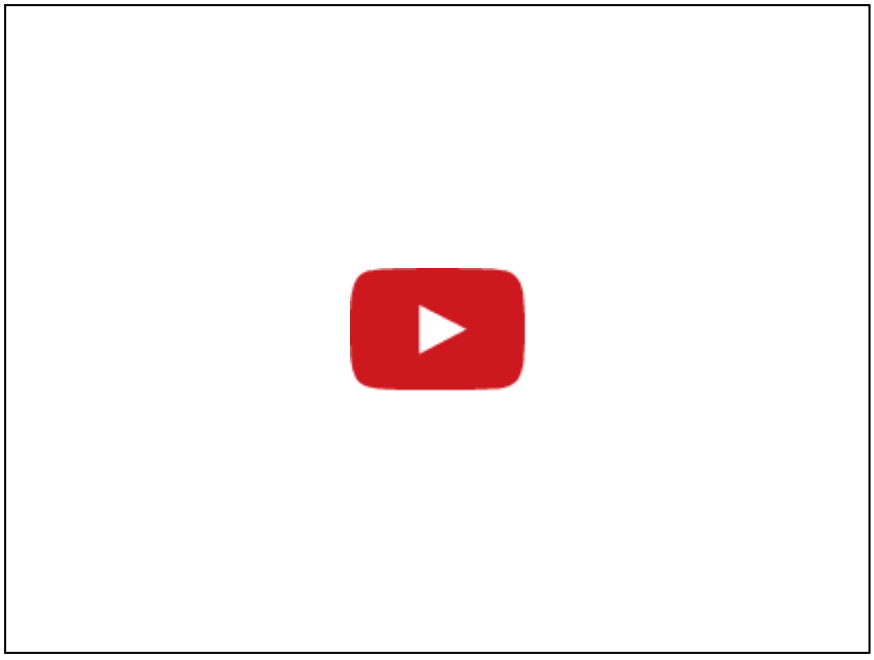
User observation - part 3

- ask test users to complete a quick survey or questionnaire on the testing session
    - *helps inform future test sessions*
- collate our notes and recordings from the test session
    - *review where applicable*
- review test results as well
- calculate any defined test metrics
    - *compare statistics, if available, with any previous testing sessions*
- such analysis allows us to identify problem areas
    - *helps to recommend possible solutions for an updated application design*
- produce a brief report of the test session
    - *summary of test results etc*
    - *set of recommendations for the application's design*

Testing and evaluating usability - video

Touring a Usability Lab



Touring SOE's Usability Lab - Source: YouTube

Testing and evaluating usability - 8

Cognitive walkthrough - part 1

- technique defined by **Wharton et al** in 1994.
- effective way of recognising and detecting various types of usability defects
- technique developed as a less involved option compared to user observation sessions and testing
- may be equally conducted by a single evaluator or a within a group setting
- to conduct a **cognitive walkthrough**
    - *select a task scenario, eg: a typical goal that a user may have in the application*
        - carefully outline actions required to complete tasks necessary for the defined goal
        - actions typically optimal sequence for an average, intermediate user
        - alternative sequences may be worth evaluating in separate test scenarios
    - *select a user profile for the test*
        - begin role-playing as a member of this user group
        - test the application scenario as a user for the first time
    - *step through the defined sequence of actions*
        - carefully inspect the application or prototype with questions and checks
        - consider each question in the role of the defined user profile
        - questions based upon concept that users learn by trial and error...
        - questions also test how well user can interpret and learn each step
        - answers to questions may reveal weaknesses or opportunities to improve application

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Cognitive walkthrough - part 2

- Wharton et al originally recommended four primary questions for the **cognitive walkthrough**
    1. ***Will the users try to achieve the right effect?***
    2. ***Will the user notice that the correct action is available?***
    3. ***Will the user associate the correct action with the effect to be achieved?***
    4. ***If the correct action is performed, will the user see that progress is being made toward solution of the task?***
- some evaluators prefer to focus solely upon questions 2 and 4
- perceived limitations include
    - *does not test the interface with real users - may lead to false assumptions by evaluators compared to users*
    - *evaluators may find an unusually high number of defects and issues*
    - *may be disproportionate to actual issues perceived by a real user*
    - *technique often favours ease of learning for beginners over options and efficiency for experienced users*

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Consider analytics

- monitor application's performance in real day-to-day use
- **analytics** allows developers to monitor data on usage statistics
    - *analyse data to detect and predict potential patterns, trends, preferences...*
    - *eg: validation of design decisions, assumptions, choices...*
    - *help determine usage for app functions*
    - *identify problem areas, interaction issues, bugs, slow working methodologies...*
- example collected data can include
    - *time spent per usage session - averages, longest, shortest, frequency of visits...*
    - *recurring errors and bugs within the app*
    - *regularly used functionality, common interaction elements, menu items, popular shortcut combinations, general viewing habits*
    - *popular places visited, including pages, tabs, screen sections, including time spent*
- analytics can be applied for many different application types
    - *desktop, web, mobile, server...*
- other features can include
    - *contextual and geographic data, frequency of visits, visit repetitions, search terms...*

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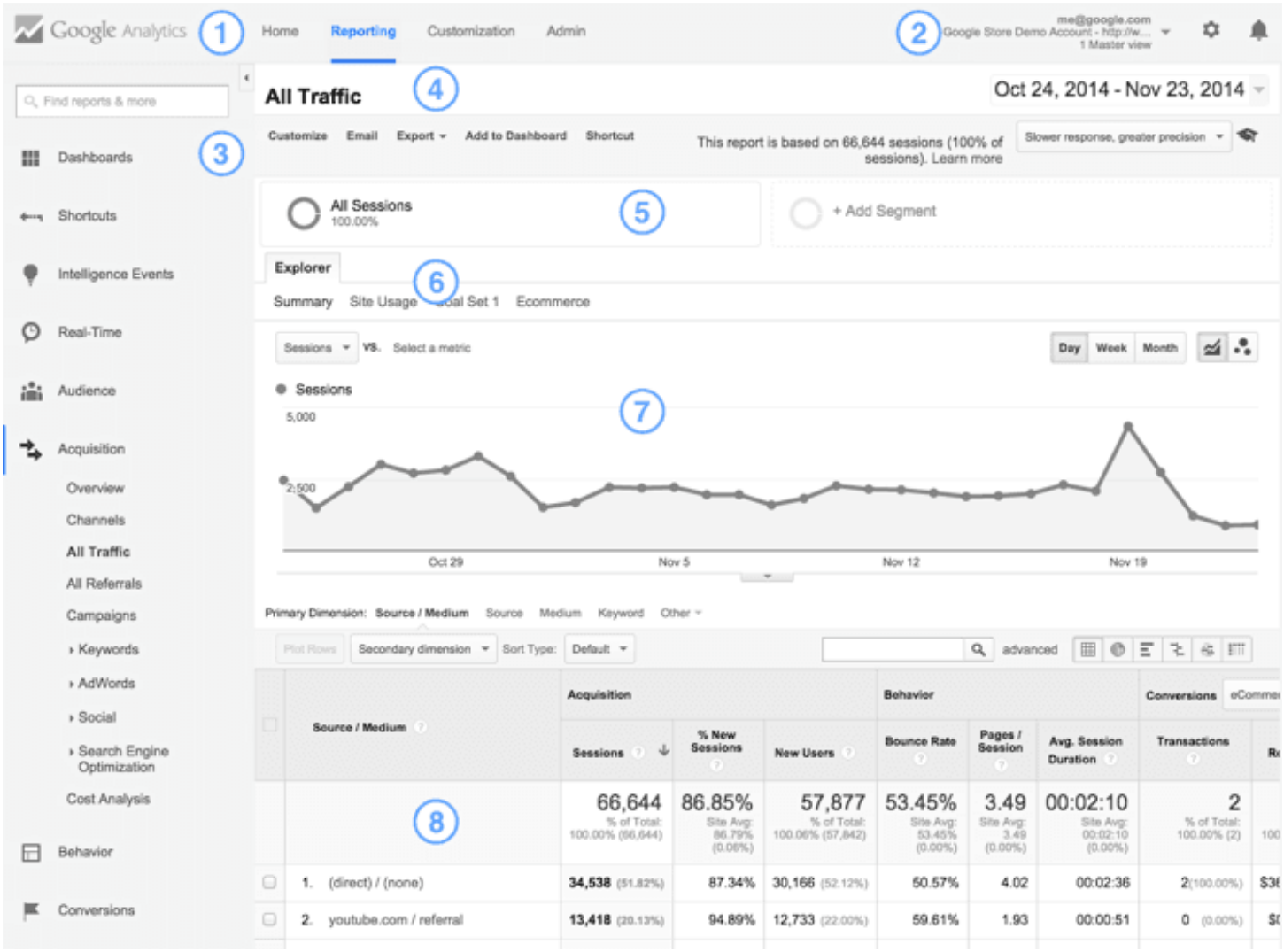
Web analytics

- different forms including self-hosted server-side solutions to online services
    - *eg: Mint and Google Analytics*
- Mint is a self-hosted application
    - *monitors and records site activity, including overall visits*
    - *referrers to your website, common searches*
    - *most popular and recently accessed pages, user agents, and much more...*
- Google Analytics offers a hosted solution for web and mobile applications
    - *monitor and check advertising performance*
    - *check site content, audience data...*
    - *browser and OS statistics*
    - *flow through a site or app*
    - *location specific data, sources of traffic, social reports...*
- useful feature of Google Analytics is option for **content experiments**
    - *compare performance of different web pages or application screens*
    - *use random sampling, define percentage of user to test*
    - *choose required objective for testing*
    - *get regular updates on the performance of the experiment*

Testing and evaluating usability - Mint analytics

Source - Mint | Live Demo

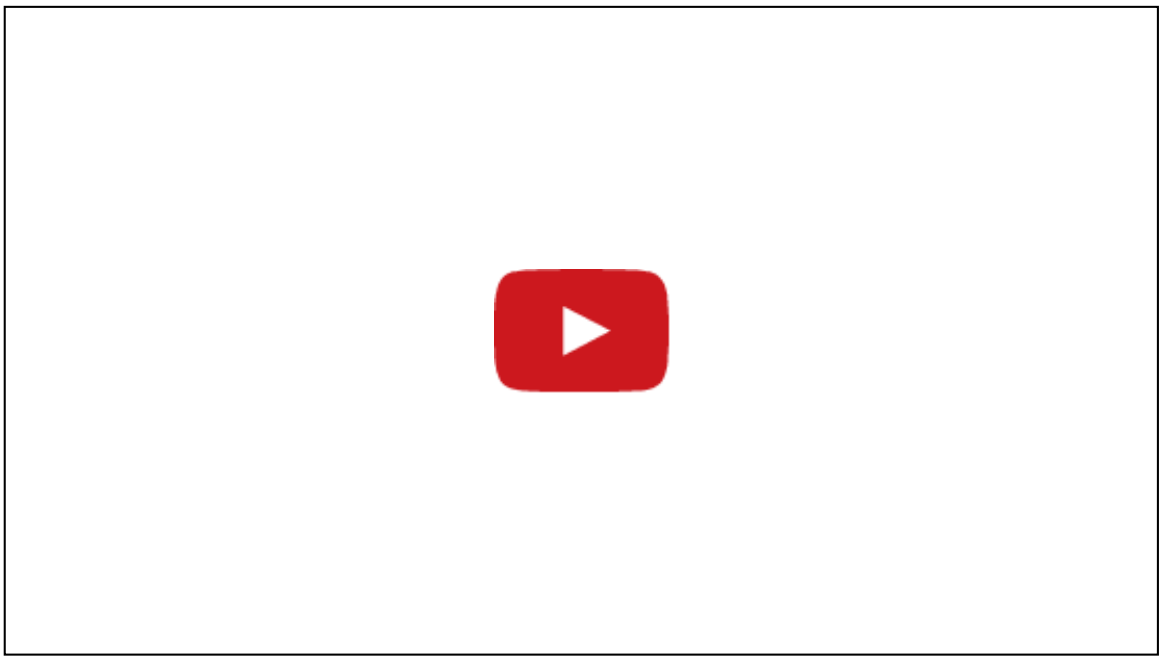
Testing and evaluating usability - Google Analytics



Source - Google Analytics

Testing and evaluating usability - Google Analytics video

Content Experiments in Google Analytics



Create Better Website: Introducing Content Experiments - Source: YouTube

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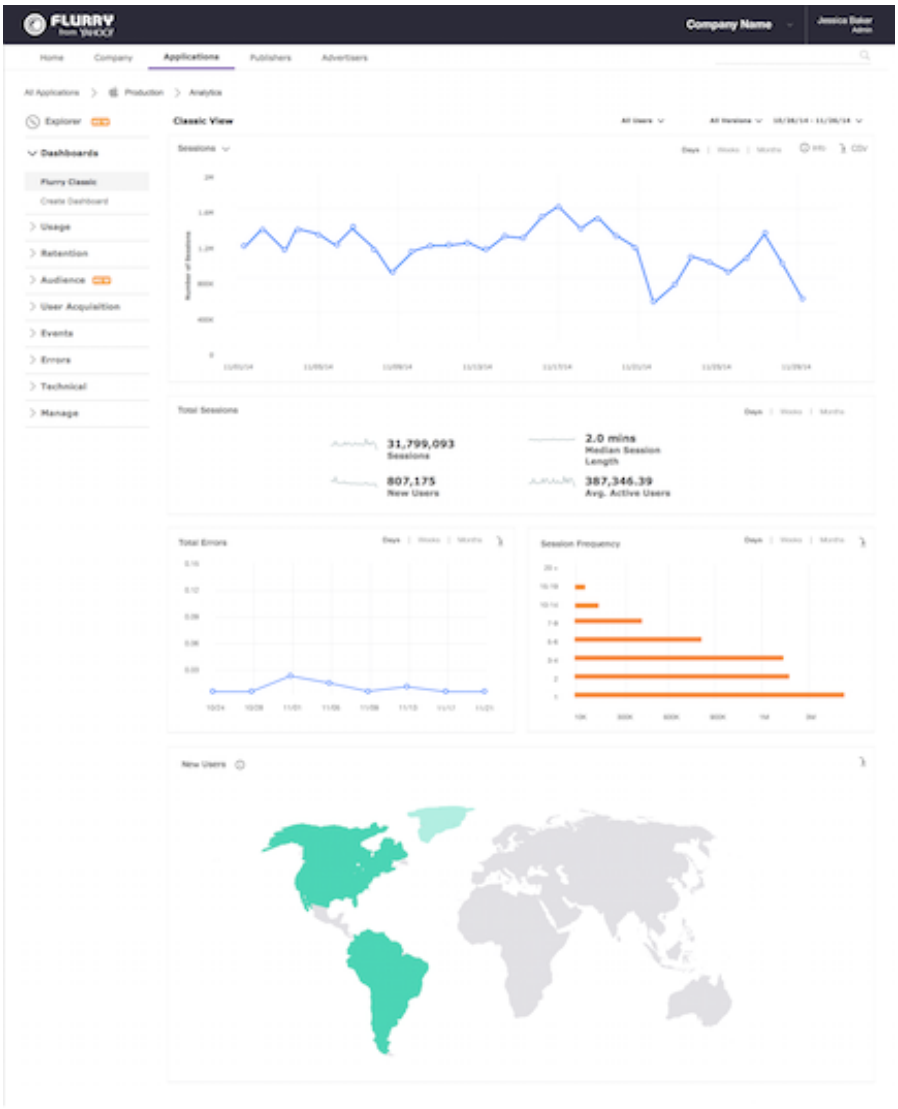
Mobile analytics

- Google Analytics also provides mobile statistics and analysis
    - *developers can learn*
    - *who is using their apps, on which devices, geographical locations...*
    - *includes integration with Google Play*
    - *learn how a user discovered an app, the path that led to a developer's app*
    - *includes real-time analytics to show how users actually use an app*
    - *event tracking, application flow*
    - *visualisation show places and user interaction, commonly used features...*
    - *developers can also learn about application crashes, bugs*
    - *help determine isolated and recurrent errors and bugs*
    - *set goals for analysis of an application*
    - *track purchases, user clicks, click rates and conversions*
    - *e-commerce tools allow tracking of real or virtual goods*
- Apple has promised analytics for iTunes Connect
    - *use iOS SDK for Google Analytics*
    - *Flurry by Yahoo*

Testing and evaluating usability - Flurry mobile analytics



Source - Flurry Analytics

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Questionnaires

- questionnaries still useful under the right circumstances
- allows us to guide test users through a series of questions and survey points
- primary benefit can be control over test parameters and required responses
    - *inherent option to open questions and feedback to broad responses*
- use feedback questions to calculate limited quantitative data
    - *collect responses to boolean questions*
    - *ask participants for a numerically based satisfaction score*
        - standard **Likert** scale - 1 to 10
    - *then calculate the average of the returned results*
- numerical responses useful when considered over multiple product iterations
    - *compare and contrast each iteration's results*
    - *determine if bugs, issues, design flaws continue per iteration*
    - *track satisfaction patterns as well*
    - *changes per iteration may not always be perceived as positive by users*

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Heuristic analysis - Part 1

- heuristics are a set of **rule of thumb** principles or guidelines
    - *may help guide or influence our decision making for design and development*
- inherently broad in scope and terms, may be perceived as difficult to specify precisely
    - *assessing heuristics is inherently a subject decision*
- conducting a **heuristic evaluation**
    - *Jakob Nielsen, 1994*
- benefit is quick, inexpensive, and often remarkably effective testing
- useful initial check of an application
    - *helps identify problems, issues, potential defects, oversights...*
- predicated on the assumption of underlying expertise in usability, interaction, design...
    - *may be helpful to co-opt a group of testers and compare results*
- define heuristic rules, then define series of potential user scenarios
    - *work our way through each scenario checking defined rules...*

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Heuristic analysis - Part 2

- Jakob Nielsen introduced the concept of **heuristic evaluations** in 1994
    - *defined ten general rules to consider in such evaluations*

1. visibility of system status
2. match between system and the real world
3. user control and freedom
4. consistency and standards
5. error prevention
6. recognition rather than recall
7. flexibility and efficiency of use
8. aesthetic and minimalist design
9. help users recognise, diagnose, and recover from errors
10. help and documentation

Further details

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Heuristic analysis - Part 3

- heuristic evaluation creates a list of potential usability issues, problems, and potential oversights
- inherent weakness is the use of usability experts and not real users
    - *becomes difficult to abstract onself from domain knowledge*
    - *responses to evaluation tempered by pre-existing knowledge*
- consider such heuristic evaluations as potentially biased, skewed, or based upon incorrect user assumptions
- heuristic evaluation is still a very useful initial testing method
    - *combine with other testing options and tools*

References

- Nielsen, J. *Heuristic evaluation.* Usability inspection methods. New York. John Wiley and Sons. P. 30. 1994.
- Wharton, C. et al. *The cognitive walkthrough method: A practitioner's guide.* Usability inspection methods. New York. John Wiley and Sons. PP. 105-140. 1994.