

SWEN 422 Lecture 2

Study Design

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Agenda

- Why studies?
- Scientific process
- Rigour
- Examples of study design
- Glassick criteria
- Intro to assignment 1

Why bother with studies?

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- Computer artefacts are *artificial*
- People are *unpredictable*
- Intuition is *unreliable*
- We need evidence for our argument if anybody is to be convinced of our ideas

Answering a question

- **Example Question: How should a user be notified when they are mentioned in a LinkedIn post, someone likes their post, or they get a new follower?**

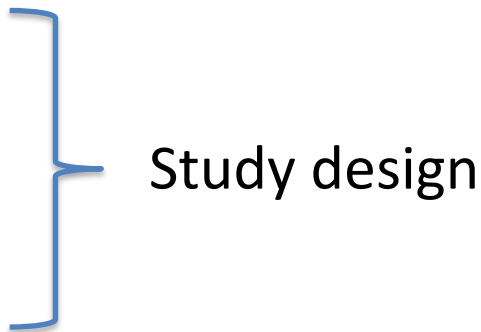
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 - Pick a method(s)
 - Collect and analyse data
 - Report the results

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Study design



Critique!

Scientific Process

- Reality: Tradeoffs (cost, time, effort)
 - Sample participants
 - Pick a method(s)
 - Collect and analyse data
 - Report the results
- } Study design
- 
- How do we know this is a “good study” or that we can trust the results?
 - It’s about **rigour**, not about right or wrong
 - “We say that the **process** was rigorous, and therefore validates the claim of the outcome. We would not say the **outcome** was rigorous.” ([Biggs & Buchler, 2007](#))
 - Ethical, Moral, Legal

Has this question already been answered?

Effects of push notifications on learner engagement in a mobile learning app

[XL Pham, TH Nguyen, WY Hwang...](#) - 2016 IEEE 16th ..., 2016 - [ieeexplore.ieee.org](#)

... We evaluated how push **notifications** effect learner engagement in our **app** by analysing ... and **app** retention. The disadvantages of notification were also a concern since **notifications** ...

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Consumer acceptance of app push notifications: systematic review on the influence of frequency

[A Wohllebe](#) - 2020 - [learntechlib.org](#)

... papers: "**app notifications** frequency", "push **notifications** frequency", "**app** marketing frequency" and "mobile marketing frequency". "**App notifications**" and "push **notifications**" are used ...

☆ Save [Cite](#) Cited by 9 [Related articles](#) [All 5 versions](#)

[HTML] To prompt or not to prompt? A microrandomized trial of time-varying push notifications to increase proximal engagement with a mobile health app

[N Bidargaddi, D Almirall, S Murphy...](#) - JMIR mHealth and ..., 2018 - [mhealth.jmir.org](#)

... were 2.5% more likely to engage with the **app** (95% CI 0.98 to 1.07). ... **app**. Results suggested that users are more likely to engage with the **app** within 24 hours when push **notifications** ...

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Stop annoying me! an empirical investigation of the usability of app privacy notifications

[N Micallef, M Just, L Baillie, M Alharby](#) - Proceedings of the 29th ..., 2017 - [dl.acm.org](#)

... Our results suggest that **app** designers should implement privacy nudges which cede the ... , low priority **notifications** should not be delivered using salient modalities (ie, audio or speech)....



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IF YES:

- Modify the question/hypothesis
- Conduct a Systematic Literature Review
- Do it anyway (replication)

IF NO:

- Design, conduct, report your study

Rigour in **Qualitative** and **Quantitative** Research

- **Quantitative**

- Math/stats measurement of *something* (e.g. length of time to complete a task)
- Data translated into numbers (e.g. a count of subjective opinions).

- **Qualitative**

- Analysis of phenomena often with non-numerical observation, interviews, images, or other complex data.
- Consists of themes, patterns, or stories that relate to participants' experiences and meanings.

Rigour in Qualitative and Quantitative Research

- “Under what conditions would we agree that something satisfactory has been said in response to the [research] question.”
- Features that enhances trustworthiness and minimises researcher bias
- Literature search → presence or absence of knowledge
 - Not found?
- Quantitative: *reliability, replication, and validity*
- Qualitative: *credibility, dependability, transferability*

Rigour in Qualitative and Quantitative Research

- **Validity:** “Measurements... we have produced *accurately reflects* the presence/magnitude of the target property in the objects we have measured...at the appropriate scale.”
- **Reliability:** Findings are *robust* i.e. different methods produce similar outcomes
- **Replicability:** if we have validity and reliability

([Hammersley, 1987](#))

Rigour in Qualitative and Quantitative Research

- **Credibility:** Others can recognise the experiences contained within the study
- **Dependability:** Another researcher can follow the decision trail used by the researcher.
- **Transferability:** We can apply the same methods to different demographics and geographic boundaries of the study

<https://online.queens.edu/resources/article/guide-to-qualitative-rigor-in-research/>

Example 1 - BAD

- **Example Question: How should a user be notified when they are mentioned in a LinkedIn post, someone likes their post, or they get a new follower?**
- *Method:* Lab-based study
- *Data collection:* Measure the time it takes for a notification to arrive

Example 1 - BAD

- Example Question: **How should a user be notified when they are mentioned in a LinkedIn post, someone likes their post, or they get a new follower?**
- *Method:* Lab-based study **Ecological validity/
Transferability?**
- *Data collection:* Measure the time it takes for a notification to arrive

Example 1 - BAD

- Example Question: **How should a user be notified when they are mentioned in a LinkedIn post, someone likes their post, or they get a new follower?**
- *Method*: Lab-based study
- *Data collection*: Measure the time it takes for a notification to arrive

**Internal validity /
Dependability?**

Example 1 - BETTER

- **Example Question: How should a user be notified when they are mentioned in a LinkedIn post, someone likes their post, or they get a new follower?**
- *Method*: real-world study, user goes about their normal day, download a logger on their phone
- *Data collection*: logs from the phone, mini diary

Example 2 - BAD

- **Research Goal: “Compare five of the most common input methods on a smartphone (physical Qwerty, onscreen Qwerty, tracing, handwriting, and voice) among a population of younger and older adults.”**
- *Participants: average age 38*

Example 2 - BAD

- Research Goal: “**Compare five of the most common input methods on a smartphone (physical Qwerty, onscreen Qwerty, tracing, handwriting, and voice) among a population of younger and older adults.**”
- *Participants*: average age 38 **External validity?**

Example 2 - BETTER

- Research Goal: **“Compare five of the most common input methods on a smartphone (physical Qwerty, onscreen Qwerty, tracing, handwriting, and voice) among a population of younger and older adults.”**
- *Participants*: split into two groups – younger adults’ average age 24.4 years, older adults’ average age 68.8 years
- Smith & Chaparro (2017) [Smartphone Text Input Method Performance, Usability, and Preference With Younger and Older Adults](#)

Glassick Criteria

Table 1. Glassick's Criteria for Assessing the Quality of Scholarship of a Research Study¹⁸

1. Clear purpose – goal or research question and supporting rationale
 2. Adequate preparation – thorough, integrated review of relevant literature and prior work
 3. Appropriate methods – research approach and methods align to answer research question
 4. Significant results – obtain results that advance knowledge and/or practice in the targeted field
 5. Effective presentation – presented in a way that others can emulate and/or build upon the work
 6. Reflective critique – regular, systematic approach to question and learn from and during research process
-

([Glassick et al., 1997](#))

Further Reading

- Biggs, Michael AR, and Daniela Büchler. "Rigor and practice-based research." *Design issues* 23.3 (2007): 62-69.
- Glassick CE, Huber MT, Maeroff GI, Boyer EL. *Scholarship Assessed: Evaluation of the Professoriate*. San Francisco, CA: Jossey-Bass; 1997.
- Design Flaws to Avoid:
<https://libguides.usc.edu/writingguide/designflaws>
- Common Flaws of Poor Research Design
- <https://scientific-publishing.webshop.elsevier.com/research-process/how-avoid-poor-research-design/>