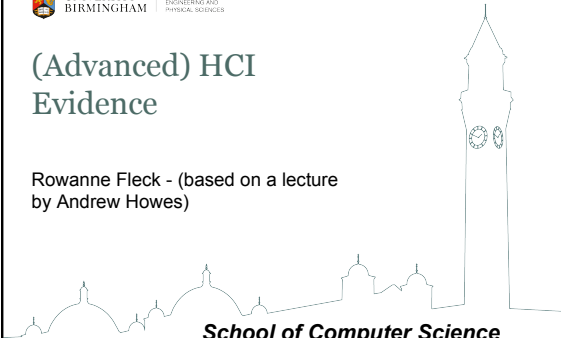
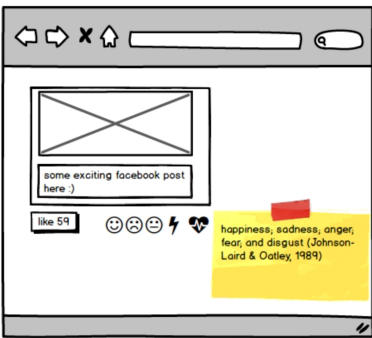

UNIVERSITY OF BIRMINGHAM
COLLEGE OF ENGINEERING AND PHYSICAL SCIENCES

(Advanced) HCI Evidence

Rowanne Fleck - (based on a lecture by Andrew Howes)




**School of Computer Science
University of Birmingham 2016/17**



Design justifications can be expressed on postits

- ☐ Traditional authority: Science is NOT about trusting what scientists claim.
- ☐ Science isn't about trusting what scientists claim are the facts.
 - quality of method?
 - quality of data.
 - mutated facts.
- ☐ Science is about evidence based argumentation.



Quality of data

- **Claim:** Virtual Reality provides a better platform for e-commerce than traditional picture and text web sites.
- How might this claim be supported by data?
 - **Verbal reports** e.g. 9 out of 10 people said that they preferred QTVR.
 - **Performance data** e.g. In a recall study Howes et al. (2001) found that users of Virtual Reality had better memory for products.

getting the facts right...

http://www.timesonline.co.uk/tol/comment/columnists/david_aaronovitch/article5834725.ece

- Some data is nothing of the sort. If you look on the web you will find the following statistic:
"the average Brit is caught on security cameras some 300 times a day"



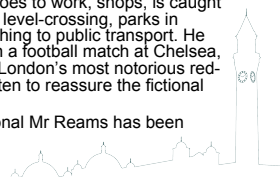
- For example, this claim was published in The Sunday Times almost exactly three years ago, and referred "to the results of a study by the Government's privacy watchdog" (the Office of the Information Commissioner), which "found people were caught on a national network of 4.2 million CCTV cameras an average 300 times a day"

mutated facts...

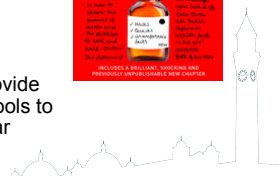
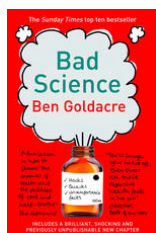
- Aaronovitch (2009) shows how the "300 times" had become viral: "It now occurs all over the place, and is the standard statistic used for the number of times Britons may or will be captured by CCTV cameras daily."
- He also shows the tendency for the statistic to mutate, as in the transformation from "can be captured" to the completely different "the average Briton is captured". A British boy can have a baby at 13. That is clearly not the average age of first fatherhood.
- A New Statesman columnist had it as the "average Londoner going about his or her business... may be monitored by 300 cameras each day", and a Daily Mail report that "it has been calculated that each person is caught on camera an average of 300 times daily".

where does the statistic originate...

- The source was a book "The Maximum Surveillance Society", published in 1999, by two academics, including a C. Norris.
- It wasn't a fact at all, but a fiction. Norris had imagined a "day in the life of Thomas Reams"
- "Reams is a City type who, rather unusually, lives on a drug-infested estate. He manages to visit two schools, the maternity wing of a hospital, goes to work, shops, is caught speeding in his car, crosses a level-crossing, parks in several car parks before switching to public transport. He goes to Heathrow airport, then a football match at Chelsea, after which he drives through London's most notorious red-light district (by mistake, I hasten to reassure the fictional Mrs Reams)."
- by the end of the day the fictional Mr Reams has been observed 300 times.



- This is the study of just one statistic.
- There is plenty of evidence of sloppy reporting and of bad science (e.g. see www.badsience.net for examples).
- The same problems can be found in the academic literature.
- A key contribution of this module will be to help provide you with the intellectual tools to stop you falling into similar traps.



Justifying design is about evidence based argumentation.



The problem

- Argumentation is difficult.
 - Arguments are subject to confirmation biases.
 - They are inattentive to opposing positions (Kuhn, 2007).

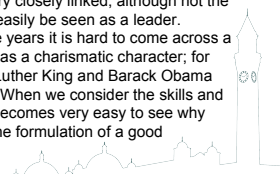


The Layout of Arguments



what not to do...

"What are the characteristics of a good manager? A good manager in my view must possess charisma; an individual without charisma is definitely not going to become a good manager. So why is charisma such an important attribute towards a good manager? Well management and leadership are very closely linked; although not the same usually a good manager can easily be seen as a leader. Looking at good leaders through the years it is hard to come across a good leader who was not portrayed as a charismatic character; for example Winston Churchill; Martin Luther King and Barack Obama were or are seen to be charismatic. When we consider the skills and attitudes which create charisma; it becomes very easy to see why charisma plays such a vital role in the formulation of a good manager."



what not to do..

- This is a more subtle example.
- It is a highly cited paper by a respected author in a scientific conference.
- The citation appears to offer evidence for a claim but the nature of this evidence is not described and may not be present at all.
- Instead a metaphor follows the citation.

Brignull and Rogers (2003): "Social embarrassment has been identified as a key factor, especially in determining whether people will interact with a public display in front of an audience (Rogers & Brignull, 2002). We draw an analogy here with a street performer in a public place, who invites a participant from the audience to 'help out' with their show. Such a person can often be wary of volunteering, not knowing what exactly will be required from them, especially if it entails making them look foolish in the eyes of the on-looking audience."

Brignull & Rogers (2003). Enticing people to interact with large public 13 displays in public spaces.. Proceedings of Interact, 3, 17-24.

What is a good argument?

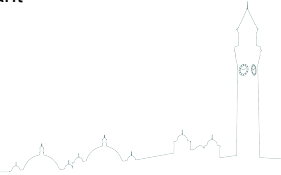
- Toulmin (1958) provides a framework that can be used to help distinguish well-formed from poorly formed or incomplete arguments.
- If you make a claim that is challenged then you will need to make an argument to support the claim. What form should that argument take?

Claim (C) Data (D) Warrant (W)

- **Claim:** Virtual Reality could increase online sales.
- **Data:** Howes et al. (2001) observed that people tend to remember more about the range of available products when using virtual reality.
- **Warrant:** People who remember more about the contents of a store are more likely to return and therefore more likely to purchase more.

Claim (C) Data (D) Warrant (W)

Data → so Claim
|
since
Warrant



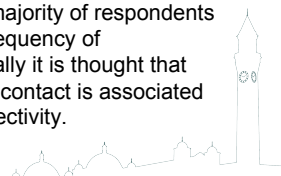
Exercise

- identify the claim, data, and warrant in the following paragraph.



Claim, data, warrant

- The internet has beneficial effects for social connectivity. The Pew internet surveys between 2000 and 2003 asked hundreds of people about the role of email in family communication and a majority of respondents said that it increased frequency of communication. Generally it is thought that increased frequency of contact is associated with higher social connectivity.



Claim, data, warrant

- The internet has beneficial effects for social connectivity. The Pew internet surveys between 2000 and 2003 asked hundreds of people about the role of email in family communication and a majority of respondents said that it increased frequency of communication. Increased frequency of contact is associated with higher social connectivity.



Claim, data, qualification, warrant

- The internet may have beneficial effects for social connectivity. The Pew internet surveys between 2000 and 2003 asked hundreds of people about the role of email in family communication and a majority of respondents said that it increased frequency of communication. Generally it is thought that increased frequency of contact is associated with higher social connectivity.



How does information technology change connectedness?

- The computation of a Bacon number for actor X is a "shortest path" algorithm, applied to the co-stardom network:
- Kevin Bacon himself has a Bacon number of 0.
- Those actors who have worked directly with Kevin Bacon have a Bacon number of 1.
- If the lowest Bacon number of any actor with whom X has appeared in any movie is N, X's Bacon number is N+1.
- Here is an example, using Elvis Presley:
- Elvis Presley was in *Change of Habit* (1969)
- with Edward Asner
- Edward Asner was in *JFK* (1991) with Kevin Bacon. Therefore, Asner has a Bacon number of 1, and Presley (who never appeared in a film with Bacon) has a Bacon number of 2.



https://en.wikipedia.org/wiki/Six_Degrees_of_Kevin_Bacon

- Dodds et al. (2003) report on a global social-search experiment in which more than 60,000 e-mail users attempted to reach one of 18 target persons in 13 countries by forwarding messages to acquaintances. They find that successful social search is conducted primarily through intermediate to weak strength ties, does not require highly connected "hubs" to succeed, and, in contrast to unsuccessful social search, disproportionately relies on professional relationships. By accounting for the attrition of message chains, they estimate that social searches can reach their targets in a median of five to seven steps, depending on the separation of source and target, although small variations in chain lengths and participation rates generate large differences in target reachability. They conclude that although global social networks are, in principle, searchable, actual success depends sensitively on individual incentives.
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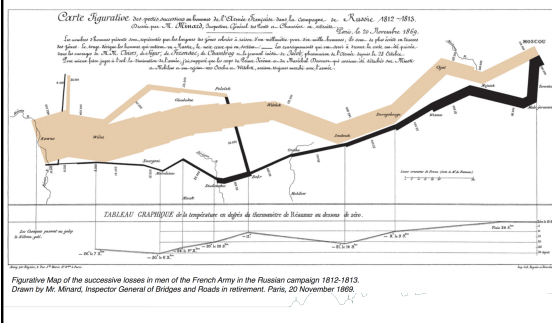
Sproull and Kiesler (1986) examined electronic mail in organizational communication. Based on ideas about how social context cues within a communication setting affect information exchange, it argues that electronic mail does not simply speed up the exchange of information but leads to the exchange of new information as well. In a field study in a Fortune 500 company, they used questionnaire data and actual messages to examine electronic mail communication at all levels of the organization. Based on hypotheses from research on social communication, they explored effects of electronic communication related to self-absorption, status equalization, and uninhibited behavior. Consistent with experimental studies, they found that decreasing social context cues has substantial deregulating effects on communication. And they found that information conveyed through electronic mail was information that would not have been conveyed through another medium.

Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organizational communication. *Management science*, 32(11), 1492-1512.

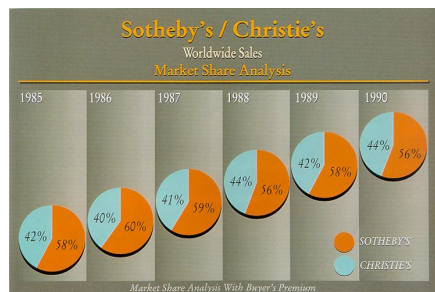
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Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organizational communication. Management science, 32(11), 1492-1512.

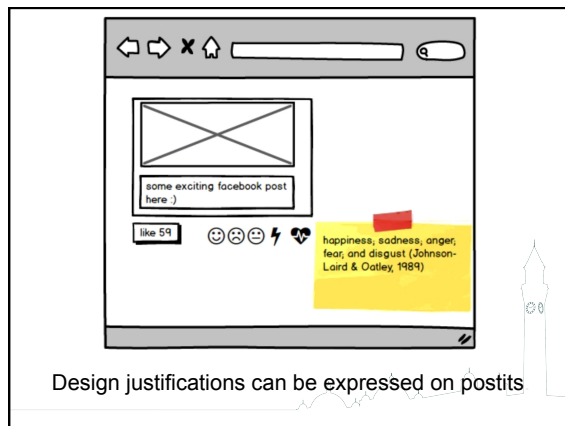
Minard was a pioneer of the use of graphics in engineering and statistics. He is known for his depiction of Napoleon's losses suffered during the Russian campaign of 1812



terrible visualization...



<http://www.datavis.ca/gallery/say-something.php>



Johnson-Laird & Oatley (1987) used, "... a theory of the emotions to motivate a semantic analysis of English words referring to emotions. The theory assumes that emotions have a two-fold communicative function, both externally amongst members of the species, and internally within the brain so as to bypass complex inferences. It implies that there is a small number of basic signals that can set up characteristic emotional modes within the organism, roughly corresponding to happiness, sadness, fear, anger, and disgust. ... According to this "communicative" theory, there should be a set of terms that refer to basic emotions, and these terms should have no internal semantics, since they cannot be analysed into anything more basic, such as a prototype or a set of semantic features. Other terms should refer to states that combine a basic emotion with a propositional content. Finally, the theory implies that any emotional term should devolve upon one of the five basic emotion modes, or some subset of them, and that there will be no need to invoke any other emotional states. These predictions were borne out by the semantic analysis of 590 emotion words.

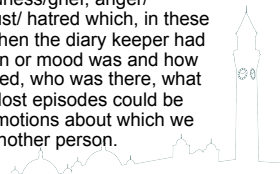
Johnson-Laird, P. N., & Oatley, K. (1989). The language of emotions: An analysis of a semantic field. *Cognition and emotion*, 3(2), 81-123.

Evidence for the Communicative Theory

Since the theory proposes that emotions mediate between goals and the world, an important source of evidence is the emotion diary. Only the person concerned can record the interaction between events that are often external and goals that are always internal. The keeper of an emotion diary records emotions and their outward and inward contexts. The first person we know to have kept an emotion diary was Dante (1292–1295/1995). He recorded the results in his small book *Vita Nuova* (The New Life). He described his emotions at meeting Beatrice, falling in love with her, and thinking intensely about her. He also recorded his thoughts in a series of poems ...

Oatley, K., & Johnson-Laird, P. N. (2011). Basic emotions in social relationships, reasoning, and psychological illnesses. *Emotion Review*, 3(4), 424-433.

We have used diaries to test the communicative theory. Our first method derived from that of Averill (1982), and results were reported by Oatley and Duncan (1992, 1994). We asked participants to look out for, and record, emotions, or moods (which we take to be extended emotions), that occurred in their daily lives. The diary had pages structured as questionnaires, one page for each emotion or mood to be recorded. Participants were asked to name each one, to say whether it was an example of happiness/joy, sadness/grief, anger/irritation, fear/anxiety, or disgust/hatred which, in these studies we took to be basic. Then the diary keeper had to say how intense the emotion or mood was and how long it lasted, how it was caused, who was there, what the effects were, and so on. Most episodes could be classified into the five basic emotions about which we asked, and most concerned another person.



Studying for your exams

Previous years:

- ☐ Part A: multiple choice questions
- ☐ Part B: 2 written questions



Multiple choice: MAY NOT BE INCLUDED THIS YEAR

1. Why is consistency important?
 - a. Increases errors
 - b. Increases learnability
 - c. Increases flexibility
 - d. Increases robustness
2. What does a persona least help a designer to do?
 - a. Test ideas
 - b. Communicate within design team
 - c. Generate new ideas
 - d. Produce a prototype



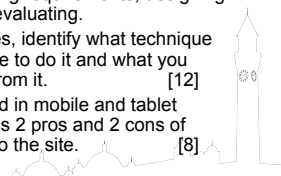
Multiple choice: MAY NOT BE INCLUDED THIS YEAR

1. Why is consistency important?
 - a. Increases errors
 - b. Increases learnability ✓
 - c. Increases flexibility
 - d. Increases robustness
2. What does a persona least help a designer to do?
 - a. Test ideas ✓
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Longer Answer Questions – EXAMPLE ONLY – THE SCORING/FORMAT OF YOUR EXAMS WILL BE DIFFERENT

1. A provider of online gaming has approached you and asked you to redesign their whole product range. The four basic activities of interactive design can be summarized as: establishing requirements; designing alternatives; prototyping; evaluating.
 - a) For each of the activities, identify what technique and tools you would use to do it and what you would expect to learn from it. [12]
 - b) They are also interested in mobile and tablet access. List and discuss 2 pros and 2 cons of having mobile access to the site. [8]



How to do the reading...

- ☐ Read to *understand* the core reading
 - It is not a memory game, and I will not be trying to trick you!
- ☐ Further reading/additional reading – will give you a more in-depth knowledge, which will help you understand some of the lecture examples better, and also understand the core better.
 - Not required to pass, but can be used to answer exams/complete assignments to a higher standard.
 - Hopefully interesting!