Annotated Bibliography on Human Computer Interaction

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This is my preliminary and not comprehensive annotated bibliography on the subject of interface design and user behavior. Please note that I have completed the annotation for five, as requested, but have included additional papers which, based on their abstracts, are likely to be useful. By the end of the week I will read and annotate the others. All are included to demonstrate that I have found a sufficient number to carry the project.

Thanks to http://tex.stackexchange.com/questions/100594/annotated-bibliography for the automatic annotated bibliography formatting tool for LaTeX.

All articles are written using ACM citation style produced automatically from an ACM Digital Library Binder.

1. REFERENCES

[CG10] Andy Cockburn and Carl Gutwin. A model of novice and expert navigation performance in constrained-input interfaces. *ACM Trans. Comput.-Hum. Interact.*, 17(3):13:1–13:38, July 2010.

> Cockburn and Gutwin examine the literature in human-computer interaction with regard to how users interact with a computing device other than in the classic drag-point-click approach of the desktop computer and mouse. They consider some of the deficiencies of past theoretical models for interaction in what they call constrained-input interfaces (CIN), with specific regard to user performance on mobile and embedded devices. They build on the existing CIN approach with their own KLM model, which aims to increase predictive power. Theirs is a quantitative, carefully reasoned

investigation into such interactions as mobile touchscreens. They conduct a series of experiments with "grid," "linear," and "binary" interfaces and conclude that their theory on human speeds in these interactions match their theory. This is both a more mathematical and a more general paper than Oinas-Kukkonen's, but its greater complexity provides insight into more application-oriented issues in human-computer interaction.

[EWK10] Parisa Eslambolchilar, Max L. Wilson, and Andreas Komninos. Nudge & influence through mobile devices. In *Proceedings of the 12th International Conference on Human Computer Interaction with Mobile Devices and Services*, MobileHCI '10, pages 527–530, New York, NY, USA, 2010. ACM.

[HCK+09] Steven R. Haynes, John M. Carroll, Thomas G. Kannampallil, Lu Xiao, and Paula M. Bach. Design research as explanation: Perceptions in the field. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '09, pages 1121–1130, New York, NY, USA, 2009. ACM.

> The oldest and most general of the papers read to date, this paper's key insights lie more in defining HCI and interface design as academic disciplines in computer science than in their specific applications to user behavior. Haynes et al. in this paper conduct a series of interviews with HCI design researchers about how design facilitates understanding. They describe several established and emerging social theories. Of particular concern in this context is their description of the former category: established, fundamental frames of reference cited by their interviewees. Most important are causality, instrumentality, and prediction, all of which are relevant to considering user responses within a given interface. The designers' insights provide useful direction for

both the research and the software component of the project. Because it focuses on explanation rather than persuasion or behavior, this paper is predominantly of background value rather than bearing directly on the topic.

[KBR13] Vaiva Kalnikaitė, Jon Bird, and Yvonne Rogers. Decision-making in the aisles: Informing, overwhelming or nudging supermarket shoppers? *Personal Ubiquitous Comput.*, 17(6):1247–1259, August 2013.

[KDR16] Ntwa Katule, Melissa Densmore, and Ulrike Rivett. Leveraging intermediated interactions to support utilization of persuasive personal health informatics. In *Proceedings of the Eighth International Conference on Information and Communication Technologies and Development*, ICTD '16, pages 19:1–19:11, New York, NY, USA, 2016. ACM.

[Lÿ5] Jonas Löwgren. Applying design methodology to software development. In *Proceedings of the 1st Conference on Designing Interactive Systems: Processes, Practices, Methods, & Techniques*, DIS '95, pages 87–95, New York, NY, USA, 1995. ACM.

[LRA$^+$14] Jian Liu, Sini Ruohomaa, Kumaripaba Athukorala, Giulio Jacucci, N. Asokan, and Janne Lindqvist. Groupsourcing: Nudging users away from unsafe content. In *Proceedings of the 8th Nordic Conference on Human-Computer Interaction: Fun, Fast, Foundational*, NordiCHI '14, pages 883–886, New York, NY, USA, 2014. ACM.

In one of two papers here that studies user behavior in the context of social media, the authors of this paper consider the security implications of user interface design. They conduct an experiment studying how to prevent Facebook users from opening dangerous links, using phishing as an example. They acquire information about whether a link is dangerous from both Facebook globally and the participants' own individual networks. They seek a series of both automatic and manually-produced responses from users. The most relevant component to this research topic is their discoveries about click-through rates for dangerous links. When applying a visual warning nudge, users were less likely to click through and more likely to employ a "dismiss" feature than when no warning is activated. This and the Wang et al. study face the limitation of having been executed on Facebook around three years ago, and their sample sample sizes are similar, but the principles hold generally. This paper's quantitative investigations of click-through rates in particular are potentially valuable.

[OK13] Harri Oinas-Kukkonen. A foundation for the study of behavior change support systems. *Personal Ubiquitous Comput.*, 17(6):1223–1235, August 2013.

Oinas-Kukkonen presents an ambitious and comprehensive theoretical approach to how interfaces on a variety of platforms change human behavior, with an emphasis on the human's side of the interaction. After a brief description of some behavioral models in the social sciences, he defines a series of specific changes an interface may want to produce: changes, for example, in attitude, behavior, or compliance. He provides some detail for each of them along with a more comprehensive analysis. Finally, he uses health as an example of the research prospects of a persuasive computing framework. He argues that his model offers a more specific and empirically-driven approach than past approaches to the same topics. Except for the health example, there is little in the way of applications. It is largely a road map to a producing a robust research domain in the future, though he emphasizes repeatedly that his approach applies across platforms and specialties.

[RHM$^+$10] Yvonne Rogers, William R. Hazlewood, Paul Marshall, Nick Dalton, and Susanna Hertrich. Ambient influence: Can twinkly lights lure and abstract representations trigger behavioral change? In *Proceedings of the 12th ACM International Conference on Ubiquitous Computing*, UbiComp '10, pages 261–270, New York, NY, USA, 2010. ACM.

[WBB$^+$11] Xiaoyu Wang, Eric Bier, Thomas Butkiewicz, William Ribarsky, and Wenwen Dou. Designing visual analytics systems for organizational environments. In *Proceedings of the 2011 Visual Information Communication - International Symposium*, VINCI '11, pages 1:1–1:9, New York, NY, USA, 2011. ACM.

[WJB10] Xiaoyu Wang, Bill Janssen, and Eric Bier. Finding business information by visualizing enterprise document activity. In *Proceedings of the International Conference on Advanced Visual Interfaces*, AVI '10, pages 41–48, New York, NY, USA, 2010. ACM.

[WLS$^+$13] Yang Wang, Pedro Giovanni Leon, Kevin Scott, Xiaoxuan Chen, Alessandro Acquisti, and Lorrie Faith Cranor. Privacy nudges for social media: An exploratory facebook study. In *Proceedings of the 22Nd International Conference on World Wide Web*, WWW '13

Companion, pages 763–770, New York, NY, USA, 2013. ACM.

> This paper largely eschews a theoretical focus in favor of an experimental approach. It is one of several to explicitly focus on the notion of the "nudge," in which small design decisions are implemented to encourage, but not mandate, a particular user behavior. The authors focus on improving what users wish to post on Facebook. They implement three nudges for their interface: photos of a subset of their friends, a timer to offer users some short time interval in which to cancel a post, and a "sentiment" analyzer to tell users if the post may be seen as positive, negative, or something else. They briefly describe their recruitment process and participant set and then review the three interventions. Participants felt the sentiment nudge was the weakest and showed some preference for the timer. A sample size of just 21 participants and technical difficulties described in the paper make some of its specific outcomes questionable, as the authors acknowledge, but in general the others conclude that such changes matter. In this sense their findings are in accord with those of the other papers.

[WRSK06] Tracee Vetting Wolf, Jennifer A. Rode, Jeremy Sussman, and Wendy A. Kellogg. Dispelling "design" as the black art of chi. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '06, pages 521–530, New York, NY, USA, 2006. ACM.

[ZFE07] John Zimmerman, Jodi Forlizzi, and Shelley Evenson. Research through design as a method for interaction design research in hci. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '07, pages 493–502, New York, NY, USA, 2007. ACM.