

I400/H400 and I561 Combined Syllabus
Visual Thinking, Meaning & Form



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Summary

In this class, we will investigate interaction design along three primary dimensions, namely (i) *themes* that may endow forms with meaning—*understanding and motivating what is worthwhile*, (ii) *forms* that serve as an expression of meanings—*designing things that are worthwhile*, and (iii), *interactive functions* of meaningful forms—*things that things do that are worthwhile*.

Meaning Themes

The themes we will consider are *seeing each other* (identity, beliefs, tolerance, and inclusivity), looking after each other (well-being), and *preserving life* (sustainability).

Forms

We will design various forms of interactive wearables according to these themes. Being deliberately provocative, we may say that we are designing everything *from hoodies to hijabs*. That is a good place to start thinking about the design space. We will also design other wearable forms, in addition to things designed to be worn on the head.

Interactive Functions

Many examples of corresponding forms and functions are given in the Schedule tables that follow.

Class	Date	Project			Theory		
		Themes (Meanings)	Forms	Interactive Functions	Readings/Media (Subject to Change)	Guest (TBC)	Project Steps
1	1.11 1.13	Seeing each other (identity, beliefs, tolerance, and inclusivity)	interactive wearables, for example: headscarves, veils, amulets, hoodies, hijabs, masks, ...	translation, signification, membership, bridging cultures, honoring heritage, finding common ground, understanding unique individual qualities, ...	Harrison, 1968 Shankar & Lynne, 2002 Lao Tzu, ~600 BCE Presentations		Introductions New Groups
2	1.18 (MLK)				Blevis, 2012		research
3	1.20 1.25 1.27				Blevis, 2012 (I/H400) Whitney, 2015 (I561)	Kyle and the PIT crew (I400/I561)	insights
4	2.1 2.3				Kim, 2015	Jeremy Wu (I561)	concepts/prototypes
5	2.8 2.10	First presentations					
6	2.15 2.17	Looking after each other (well-being)	interactive wearables, especially clothes that create affinity, clothes that promote health and safety, ...	health, privacy, safety, security, community, signals, mechanisms of awareness, augmented reality, civil responsibilities, ...	Blevis, Hauser, & Odom, 2015 Akou, 2015	Heather Akou (I561)	New groups
7	2.22 2.24				Max-Neef, 2005		research
8	2.29 3.2				Willis, 2006		insights
9	3.7 3.9				Bardzell, 2010	Shaowen Bardzell (I561)	concepts/prototypes
	3.14- 3.16	Spring Break					
10	3.21 3.23	Second Presentations					
11	3.28 3.30	Preserving life (sustainability)	interactive wearables, especially utility clothes, environmental protections, repurposed clothes, ...	food, shelter, air, water, governance, practices, behaviors, ...	IPCC AR5 Synthesis Report 2014 <i>*I561 ends at 5:30 for WIC event</i>		New groups
12	4.4 4.6				Blevis, 2007	Allison Fish (I561)	Must Do
13	4.11 4.13				Pan et al., 2015 or Norman & Stappers, 2016	Yue Pan or David Roedl	Want to Do
14	4.18 4.20				Tomlinson et al., 2013 or Preist et al., 2016		Can Do & Can Know
15	4.25 4.27	Final Presentations					
16	5.2 5.4	Exam Week (No class)					

Assigned Readings

Heather Akou. 2015. Becoming Visible: The Role of the Internet in Dress Choices among Native-Born Converts to Islam in North America. *Hawwa*, 13, 279-296 (2015), DOI:<http://dx.doi.org/10.1163/15692086-12341283>

Shaowen Bardzell. 2010. Feminist HCI: taking stock and outlining an agenda for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '10)*. ACM, New York, NY, USA, 1301-1310. DOI=<http://dx.doi.org/10.1145/1753326.1753521>

Eli Blevis. 2012. The PRInCiPleS Design Framework. In John M. Carroll (ed.). *Human-Computer Interaction Series, 1, Volume 20, Creativity and Rationale*, Springer, Pages 143-169.

Eli Blevis. 2007. Sustainable interaction design: invention & disposal, renewal & reuse. In *Proceedings of the SIGCHI conference on Human factors in computing systems (CHI '07)*. ACM, New York, NY, USA, 503-512.

Eli Blevis, Sabrina Hauser, and William Odom. 2015. Sharing the hidden treasure in pictorials. *interactions* 22, 3 (April 2015), 32-43. DOI=10.1145/2755534

George Harrison. 1968. *The Inner Light*. Capitol/Parlophone. [Music]

IPCC. 2014. *Climate Change 2014 AR5 Synthesis Report: Summary for Policy Makers*. www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_SPMcorr1.pdf accessed 01.27.2015

IPCC, 2014: Summary for Policymakers. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

Sojin Kim. 2015. "Unfolding Chinese American History." *The Public Historian* 37, no. 2 (2015): 130-140.

Kathleen Lingo (Curator, Producer). *A Conversation on Race A series of short films about identity in America*. The New York Times. <http://www.nytimes.com/interactive/projects/your-stories/conversations-on-race> @ 4.11.2016.

Manfred A. Max-Neef. 2005. Foundations of transdisciplinarity. *Ecological Economics* 53 (2005) 5– 16.

Tuuli Mattelmaki, Kirsikka Vaajakallio and Ilpo Koskinen 2014. What Happened to Empathic Design. *Design Issues*, 30(1), 2014.

Donald Norman and P.J. Stappers. 2016. DesignX: Design and complex sociotechnical systems. *She Ji: The Journal of Design, Economics, and Innovation*, 1(2). <http://dx.doi.org/10.1016/j.sheji.2016.01.002>

Yue Pan, David Roedl, Eli Blevis, and John C. Thomas. 2015. Fashion Thinking: Fashion Practices and Sustainable Interaction Design. *International Journal of Design* 9(1), 53-66.

Chris Preist, Daniel Schein, and Eli Blevis. 2016 (To appear). Understanding and mitigating the effects of device and cloud service design decisions on the environmental footprint of digital infrastructure. In *Proceedings of the SIGCHI conference on Human factors in computing systems (CHI '16)*. ACM, New York, NY, USA.

Anoushka Shankar and Jeff Lynne. 2002. The Inner Light. In Anoushka Shankar. *Concert for George*. [Music]

Bill Tomlinson, Eli Blevis, Bonnie Nardi, Donald J. Patterson, M. SIX Silberman, and Yue Pan. 2013. Collapse informatics and practice: Theory, method, and design. *ACM Transactions on Computer Human Interaction* 20, 4, Article 24 (September 2013), 26 pages.

Lao Tzu. ~600 BCE. *Tao Te Ching: Chapter 47*.

Patrick Whitney. 2015. Design and the Economy of Choice. *she ji The Journal of Design, Economics, and Innovation*. Issue No.1, Autumn 2015. <http://dx.doi.org/10.1016/j.sheji.2015.09.001>

Anne-Marie Willis. 2006. Ontological designing. *Design philosophy papers* 4, no. 2 (2006): 69-92.

<http://www.nytimes.com/interactive/projects/your-stories/conversations-on-race>

Class Format

The basic form of each regular class is:

Hour 0:00-0:20: Introduction and explanation of the next project step

Hour 0:20-1:00: Readings & Discussion

Hour 1:00-1:20: Guest or Featured Photographer or Skills Exchange

Hour 1:20-1:30: Break

Hour 1:30-2:45: 5 Minute Project Presentations or Break Out Work and Critique Time

For the three presentations classes, the format is always video presentations by each group of duration exactly 6 minutes and 40 seconds, with 5 minutes for questions and discussions.

Readings

For each of the readings, you must submit a sheet of paper with your name, two quotes from the reading that you think are interesting, and for each quote a statement about why you believe the quote is interesting, or a question about the quote that you expect the class discussion to clarify. The submitted papers will be shuffled and several will be drawn at random to be discussed. The readings do not strictly follow the themes. Some are foundational design theory that is more general than the particular themes.

Projects

For the projects, the forms are always one of research, or insights, or concept/prototypes. The form of research is always diagrams or images. The form of insights are always diagrams or annotated images. The form of concept/prototypes is always a sequence of images or a video. The project presentations always take the form of a five minute video that must stand alone without accompanying spoken commentary (mp4 or avi). The project presentations integrate the materials of research, insights, and concepts/prototypes into a single video of exactly 6 minutes and 40 seconds in length.

This is not a class about sketching. In general in this class, primitive concept sketching or screen display wireframes are not acceptable forms of finished work. The primary outputs are diagrams, or photographs which may be annotated, or video. The use of text should be minimal. You will create or use physical forms as needed in the service of image making or video. You do not need to make interactive features work, but rather you need to illustrate how they will work in images and/or video narratives. You do need to be able to explain what technologies are needed to implement your designs, if they are available or will be, and how they will work. Production values—that is the quality of your diagrams, images, and videos matter significantly in this class.

The projects are done in groups of 3-5 depending on class size. Every project presentation must clearly attribute who contributed which parts. It is possible for different people in the same group to receive different grades.

Grading

You will be judged on (1) the combination of your reading preparations and contributions to the discussion, (2) your group project work, and (3) your attendance and attitude, especially relating to your tolerance, openness, and rigor. You will receive a mid-term grade and a final grade only in the form of a letter grade. For detailed feedback, kindly make an appointment to speak with the appropriate Associate Instructor.

Contacts

For nearly all questions, kindly contact the Associate Instructor(s) for your section:

Haodan Tan haodtan@indiana.edu Associate Instructor I/H400
Zhijian (Owen) Shi zhijshi@indiana.edu Associate Instructor I561
Yi (Daisy) Wang wyywang@iu.edu Associate Instructor I561

You may contact the Instructor or the Advisor if you have questions that cannot be answered by the Associate Instructors:

Eli Blevis eblevis@indiana.edu Professor of Informatics
Kyle Overton overtonk@indiana.edu Advisor

Texts, Required Software

There is no textbook for the course. The readings are primary source as indicated under "Assigned Readings." You must have a camera which can be manually controlled, or purchase an app that allows your smart phone camera to be manually controlled. Several such apps are available. I paid \$1.50 for mine, an app called "manual." Other applications we will use include Adobe InDesign, Lightroom, and Photoshop, MS Powerpoint or a more sophisticated video creation tool of your choosing. These are available at iuware.iu.edu.

VTMF I400/H400 Sections

VT: VISUAL THINKING, MEANING & FORM

10928 RSTR 04:00P-06:30P M I2 150 Blevis E

Above class open to undergraduates only

Above class meets with INFO-H 400

VT: VISUAL THINKING, MEANING & FORM

10916 RSTR 04:00P-06:30P M I2 150 Blevis E

Above class open to Hutton Honors College students only

Above class meets with INFO-I 400

VTMF I561 Sections

INFO-I 561 MEANING AND FORM IN HCI (3 CR)

8278 RSTR 04:00P-07:00P W I2 150 Blevis E

Above class open to HCI Design Master's only

non-HCI Design Masters require permission of instructor

Accommodations & Feedback

We welcome your feedback. We will do our best to accommodate specific requests if they are reasonable and have merit.

Academic Misconduct

The class is morally and procedurally bound by IU's policies on academic misconduct, the details of which you can read about at the following website: www.indiana.edu/~code/code/index.shtml

Religious Observance

In accordance with the Office of the Dean of Faculties, any student who wishes to receive an excused absence from class must submit a request form available from the Dean of Faculties for each day to be absent. This form must be presented to the course professor by the end of the second week of the semester. A separate form must be submitted for each day. The form must be signed by the instructor, with a copy retained by instructor, and the original returned to the student. Information about the policy on religious observance can be found here: www.indiana.edu/~vpfaa/holidays.shtml

English

If English is not your native language or you are otherwise shy about speaking in class, please do not worry. You will not be penalized in any way for making contributions to the class in less than perfect English or for taking time to compose your answers. You are welcome to say what you want to say in your language of choice first and then ask for help from others to translate to English. I will frequently emphasize to the class the need for all of us to be supportive of each other when it comes to contributing to the discussions. There is no need to feel rushed when responding to questions in class—an important part of the class is the construction of a feeling of community with the faculty and your peers.

Important Notice

As your instructor, one of my responsibilities is to help create a safe learning environment on our campus. Title IX and our own Sexual Misconduct policy prohibit sexual misconduct. If you have experienced sexual misconduct, or know someone who has, the University can help. I encourage you to visit <http://stopsexualviolence.iu.edu/> to learn more. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with a Mental Health Counselor on campus (contact information available at <http://stopsexualviolence.iu.edu/employee/confidential.html>).

It is also important that you know that federal regulations and University policy require me to promptly convey any information about potential sexual misconduct known to me to our Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, they will work with a small number of others on campus to ensure that appropriate measures are taken and resources are made available to the student who may have been harmed. Protecting a student's privacy is of utmost concern, and all involved will only share information with those that need to know to ensure the University can respond and assist.

Detailed Grading Rubric

40% Project Work (Teams*)

40% Assigned Readings and Discussion (Individual)

20% Attendance and Participation (Individual)

For your project work (40%), our assessment of your work to date is:

(A+) You are doing exceptional work.

(A) Your work is excellent.

(A-) Your work is very good. There is room to improve your contributions.

(B+) Your work is good, and there are opportunities to improve your contributions.

(B) Your work is satisfactory. Many improvements are possible.

(B-) Your work may be improved.

* Please note that not everyone on each team necessarily receives the same assessment. We can do this because we have been asking who has done which work during the presentations in some instances and in some other instances it is evident.

For your assigned readings and contributions to discussions (40%), our assessment of your work to date is:

(A+) Your contributions to the discussion and evidence of having read the materials are exceptional.

(A) Your contributions to the discussion and evidence of having read the materials are excellent.

(A-) Your contributions to the discussion and evidence of having read the materials are very good. There is some possibility to more fully contribute to the discussions.

(B+) Your contributions to the discussion and evidence of having read the materials are good. There are more than a few possibilities to more fully contribute, or your contributions could be more thoughtful.

(B) Your contributions to the discussion and evidence of having read the materials are satisfactory.

There is some evidence that you have not done all of the readings, or your contributions could be more thoughtful.

(B-) Your contributions to the discussion and evidence of having read the materials may be improved.

There is evidence that you have not done the readings on more than one or two occasions.

For your attendance and participation (20%), our assessment to date is:

(A+) Your attendance is perfect and you are always checked-in.

(A) You have only one or zero unexcused absences, and you are always checked-in.

(A-) You have one or two unexcused absences, and you are nearly always checked-in.

(B+) You have one or two unexcused absences, and you are not always checked-in.

(B) You have more than two unexcused absences, and you are not always checked-in.

(B-) Your attendance and participation needs improvement

Overall, you can calculate your summary grade according to the following scheme:

A+ = 100

A = 95

A- = 90

B+ = 88

B = 85

B- = 80

$0.4 \times \text{ProjectWork} + 0.4 \times \text{ReadingsAndDiscussion} + 0.2 \times \text{AttendanceAndParticipation}$

It is possible to receive a grade lower than B-.

Additional References

The following are optional readings. I may refer to these time to time in class, but they are not required. I will add to this list from time to time.

Jeffrey Bardzell and Shaowen Bardzell. 2013. What is “critical” about critical design? In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13)*. ACM, New York, NY, USA, 3297-3306.

Shaowen Bardzell and Jeffrey Bardzell. 2011. Towards a feminist HCI methodology: social science, feminism, and HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11)*. ACM, New York, NY, USA, 675-684. DOI=<http://dx.doi.org/10.1145/1978942.1979041>

Shaowen Bardzell. 2010. Feminist HCI: taking stock and outlining an agenda for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '10)*. ACM, New York, NY, USA, 1301-1310. DOI=<http://dx.doi.org/10.1145/1753326.1753521>

Eli Blevis, Sabrina Hauser, and William Odom. 2015. Sharing the hidden treasure in pictorials. *interactions* 22, 3 (April 2015), 32-43.

Eli Blevis. 2014. Stillness and motion, meaning and form. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 493-502.

Eli Blevis, Elizabeth Churchill, William Odom, James Pierce, David Roedl, and Ron Wakkary. 2012. Visual thinking & digital imagery. In *CHI '12 Extended Abstracts on Human Factors in Computing Systems (CHI EA '12)*. ACM, New York, NY, USA, 2715-2718.

Ei Blevis. 2011. Digital imagery as meaning and form in HCI and design: an introduction to the Visual Thinking Backpage Gallery. *interactions* 18, 5 (September 2011), 60-65.

Eli Blevis, and Erik Stolterman. 2009. Transcending disciplinary boundaries in interaction design. *interactions* 16, 5 (September 2009), 48-51.

Ei Blevis and Erik Stolterman. 2008. The Confluence of Interaction Design and Design: from Disciplinary to Transdisciplinary Perspectives. In *Proceedings of The 2008 Design Research Society Conference*. Sheffield, UK: Design Research Society. 344/1-12.

Eli Blevis and Erik Stolterman. 2007. Ensoulment and Sustainable Interaction Design. In *Proceedings of International Association of Design Research Societies Conference IASDR 2007*. Hong Kong Polytechnic University School of Design, Hung Hom, Hong Kong.

David J. Crandall, Lars Backstrom, Daniel Huttenlocher, and Jon Kleinberg. 2009. Mapping the world's photos. In *Proceedings of the 18th international conference on World wide web (WWW '09)*. ACM, New York, NY, USA, 761-770.

Nigel Cross. 2007. *Designerly Ways of Knowing*. Birkhauser.

Anthony Dunne and Fiona Raby. 2001. *Design Noir: The Secret Life of Electronic Objects*. Springer.

Lorenzo Davoli and Johan Redström. 2014. Materializing infrastructures for participatory hacking. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 121-130.

Nick Emmel and Andrew Clark. 2011 (Jan 25). Learning to Use Visual Methodologies in Our Research: A Dialogue Between Two Researchers. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*. [Online] 12:1

Daniel Fallman. 2003. Design-oriented human-computer interaction. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '03)*. ACM, New York, NY, USA, 225-232.

Christopher Frayling. 1993. Research in Art and Design. *Royal College of Art Research Papers 1*, 1 (1993/4), pp. 1-5.

Flickr. www.flickr.com. @ September 23, 2015.

Batya Friedman, Peter H. Kahn Jr., Jennifer Hagman, Rachel L. Severson, and Brian Gill. The Watcher and the Watched: Social Judgments About Privacy in a Public Place. *Human-Computer Interaction, 2006, Volume 21*, pp. 235-272.

William Gaver. 2012. What should we expect from research through design?. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '12)*. ACM, New York, NY, USA, 937-946.

Bill Gaver, Tony Dunne, and Elena Pacenti. 1999. Design: Cultural probes. *interactions* 6, 1 (January 1999), 21-29.

Elisa Giaccardi, Elvin Karana, Holly Robbins, and Patrizia D'Olivo. 2014. Growing traces on objects of daily use: a product design perspective for HCI. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 473-482.

Edward Helmore. 2015. Apple Watch release signals firm's transformation into luxury brand. www.theguardian.com/technology 03.09.2015 @ September 23, 2015.

Kristin Hanks, William Odom, David Roedl, and Eli Blevis. 2008. Sustainable millennials: attitudes towards sustainability and the material effects of interactive technologies. In *Proceedings of the twenty-sixth annual SIGCHI conference on Human factors in computing systems (CHI '08)*. ACM, New York, NY, USA, 333-342.

Elaine M. Huang and Khai N. Truong. 2008. Breaking the disposable technology paradigm: opportunities for sustainable interaction design for mobile phones. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '08)*. ACM, New York, NY, USA, 323-332.

Nadine Jarvis, David Cameron, and Andy Boucher. 2012. Attention to detail: annotations of a design process. In *Proceedings of the 7th Nordic Conference on Human-Computer Interaction: Making Sense Through Design (NordiCHI '12)*. ACM, New York, NY, USA, 11-20.

Heekyoung Jung, Shaowen Bardzell, Eli Blevis, James Pierce, & Erik Stolterman. 2011. How Deep Is Your Love: Deep Narratives of Ensoulment and Heirloom Status. *International Journal of Design* 5(1): 85-98.

Ilpo Koskinen, John Zimmerman, Thomas Binder, Johan Redstrom, and Stephan Wensveen. *Design research through practice: From the lab, field, and showroom*. Elsevier, 2011.

Jam Kottenko. 2013. Facebook reveals we upload a whopping 350 million photos to the network daily. *www.digitaltrends.com*. 09.18.2013 @ September 23, 2015.

Benjamin March. 1927. "A Note on Perspective in Chinese Painting" *The China Journal*. Vol. VII, No.2 (August, 1927), pp. 69-72.

Manfred A. Max-Neef. 2005. Foundations of transdisciplinarity. *Ecological Economics* 53 (2005) 5– 16.

Per Martin-Löf. 1996. On the Meanings of the Logical Constants and the Justifications of the Logical Laws. *Nordic Journal of Philosophical Logic*, 1(1): 11–60, 1996.

Harold Nelson and Erik Stolterman. 2012. *The Design Way (Second Edition)*. MIT Press.

Basarab Nicolescu. 2002. *Manifesto of Transdisciplinarity*. Translation: Karen-Claire Voss. SUNY Press, Albany NY.

William Odom, James Pierce, Erik Stolterman, and Eli Blevis. 2009. Understanding why we preserve some things and discard others in the context of interaction design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '09)*. ACM, New York, NY, USA, 1053-1062.

William Odom, John Zimmerman, Jodi Forlizzi, Hajin Choi, Stephanie Meier, and Angela Park. 2014. Unpacking the thinking and making behind a user enactments project. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 513-522.

Yue Pan, David Roedl, Eli Blevis, and John C. Thomas. 2015. Fashion Thinking: Fashion Practices and Sustainable Interaction Design. *International Journal of Design* 9(1), 53-66.

Yue Pan and Erik Stolterman. 2015. What if HCI Becomes a Fashion Driven Discipline?. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15)*. ACM, New York, NY, USA, 2565-2568.

James Pierce and Eric Paulos. 2014. Some variations on a counterfunctional digital camera. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 131-140.

Christian Remy, Silke Gegenbauer, and Elaine Huang. 2015. Bridging the Theory-Practice Gap: Lessons and Challenges of Applying the Attachment Framework for Sustainable HCI Design. In *Proceedings of the SIGCHI conference on Human factors in computing systems (CHI '15)*. ACM, New York, NY, USA.

Horst W.J. Rittel and Melvin M. Webber. 1973. Dilemmas in a general theory of planning. *Policy sciences* 4, no. 2 (1973): 155-169.

Donald A. Schön, 1990. The design process. In V.A. Howard (Ed.), *Varieties of Thinking*. Routledge.

Michael Shorter, Jon Rogers, and John McGhee. 2014. Practical notes on paper circuits. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 483-492.

Cooper Smith. 2013. Facebook Users Are Uploading 350 Million New Photos Each Day. *www.businessinsider.com*. 09.18.2013 @ September 23, 2015.

Diego Trujillo-Pisanty, Abigail Durrant, Sarah Martindale, Stuart James, and John Collomosse. 2014. Admixed portrait: reflections on being online as a new parent. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 503-512.

Ron Wakkary, Audrey Desjardins, William Odom, Sabrina Hauser, and Leila Aflatoony. 2014. Eclipse: eliciting the subjective qualities of public places. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 151-160.

Stephan Wensveen, Oscar Tomico, Martijn ten Bhömer, and Kristi Kuusk. 2014. Growth plan for an inspirational test-bed of smart textile services. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. ACM, New York, NY, USA, 141-150.

Wikipedia: Library of Congress. en.wikipedia.org @ 09.10.2015.

John Zimmerman, Erik Stolterman, and Jodi Forlizzi. 2010. An analysis and critique of *Research through Design*: towards a formalization of a research approach. In *Proceedings of the 8th ACM Conference on Designing Interactive Systems (DIS '10)*. ACM, New York, NY, USA, 310-319.

John Zimmerman, Jodi Forlizzi, and Shelley Evenson. 2007. 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)*. ACM, New York, NY, USA.

