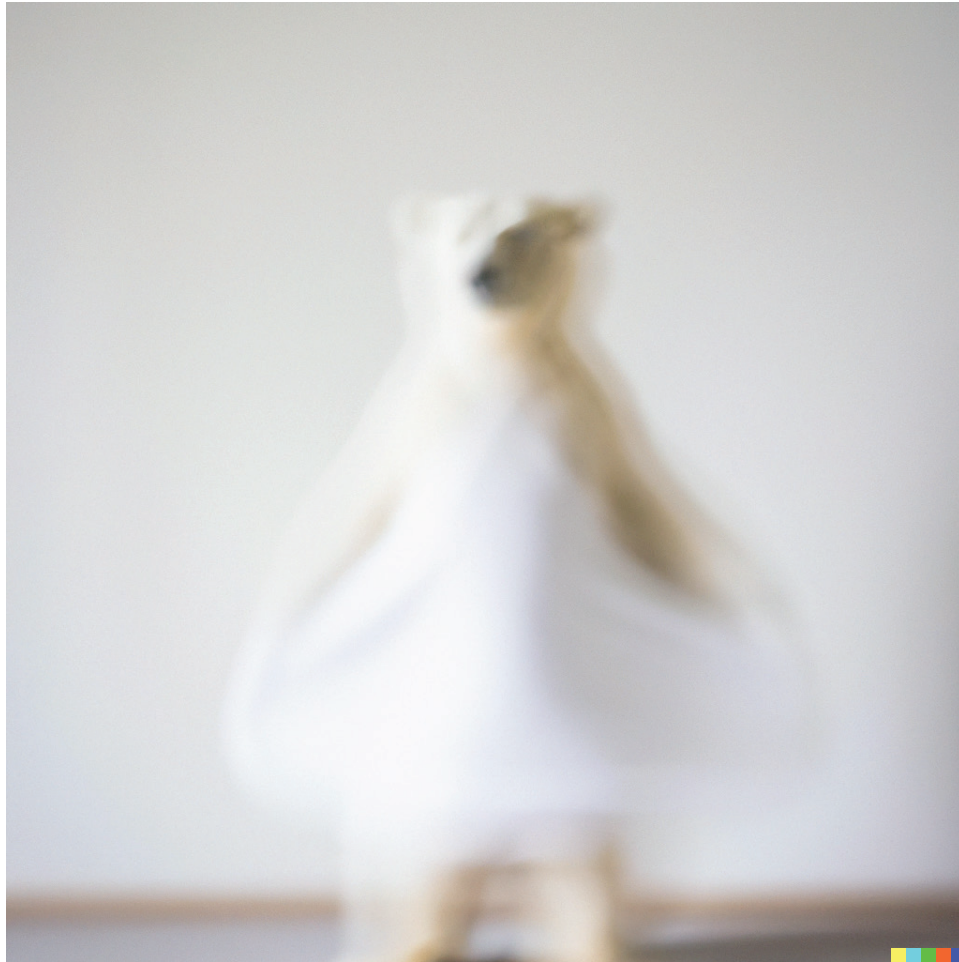


I561 FALL SPRING 2024 SECTIONS 10062, 10063 VERSION 0205  
2024

# Meaning & Form in Human-Computer Interaction Design



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*Luddy School of Informatics, Computing, & Engineering  
Indiana University at Bloomington*

Wednesdays, Thursdays 6:30 PM – 9:05 PM Room I E150 1.29.2024-5.3.2024



## Preamble

*What has been is what will be, and what has been done is what will be done, and there is nothing new under the sun.  
There is a thing of which [someone] will say, "See this, it is new." It has already been for ages which were before us.*

*Kohelet (Ecclesiastes) Chapter 1: 9-10. Circa 450-180 BCE.*

## Cover Image

DALL·E 2023-01-17 13.32.10 - *A motion-blurred polar bear wearing a dress in the style of photographer Francesca Woodman*  
[DALL-E AI Generated Image]. Variations, below and back cover.



# Schedule\*

<i>Week/Date</i>	<b>Lecture/Discussion (Prompt to subsequent week's Design Challenge/Activity, Guest)</b>	<b>Design Challenge/Activity (Based on Prior Week Lecture/Discussion)</b>	<b>Format**</b>
1. 1.31, 2.1	Welcome (Woodman & Self-portraits)	Basic Readings, Introductions	Individual
2. 2.7,8	Seeing and Noticing	Self-portraits	Individual
3. 2.14,15	Accessibility, Yash Mittal: Pathways	Photographic Fly-in	Pair
4. 2.21,22	Design for Respect	Accessibility Critiques	Pair
5. 2.28,29	Making Data Physical	Critical Design	Pair
6. 3.6,7	Design Frameworks	Data Sculpture	Pair
7. 3.13,14	Spring Break		
8. 3.20,21	Predispositions (Robert Henschel, Yash Mittal & James Damico)	Team Project*** Initial Project Decisions: Should do, Can do, Can know, Forms	Team
9. 3.27,28	Research	Predispositions	Team
10. 4.3,4	Insights (Don Norman 4.3)	Research	Team
11. 4.10,11	Concepts	Insights	Team
12. 4.17,18	Prototypes	Concepts	Team
13. 4.24,25	Portfolio Final Forms	Prototypes, FINAL PRESENTATIONS	Individual/ Team
14. 5.1,2	Exam Week	No Class	

## General DCBL Class Format\*

<i>Time</i>	<b>Activity</b>
18:30-20:00	Design Challenge Presentations and Critiques
20:00-20:10	Break
20:10-20:25	Basic HCI/d Knowledge Challenge
20:25-21:05	Lecture, Discussion, New Challenge

\* Subject to change as needed to improve and tailor learning experiences, or to accommodate Guest speakers.

\*\* Format (i.e., individual, pair, team) may vary between sections depending on enrollments.

# Learning Partners

\*\*\* We are very privileged to have two external learning clients this semester (Spring 2024), namely

Yash Mittal, James Damico: *YouVet.net*

Robert Henschel: *Super-Computing for All*

# Design Studio Class

This is a design studio class. We will explain this in class.

## Deliverables

Each week, expect to show some slides of your work for Design Challenge presentations and critiques. The exact format for each week's slides will be explained in each class prior to that week. The number of slides will vary. Your slides will always emphasize minimalist aesthetics; accessibility; original authentic visual forms; everything essential, nothing inessential; clear and professional in every detail; properly attributed sources and tools; Your work will be graded each week using the following rubric:

- Quality
- Production Values
- Originality

For each of these rubric items, AI's will assign either a "+" for professional, publishable quality work, a "=" for quality work that meets the standard of a valuable contribution, and a "-" for work that may need improvement. So, for example, the string "++=" denotes standard quality, high production values, and standard originality. The reason for this notation system is that the class is large, and the AI's need a consistent, tractable way to give feedback within the time constraints of giving feedback to every individual in a larger class environment.

<i>Rubric Notation</i>	<b>Letter Grade</b>
+++	A+
++=, +=+, =++	A
+==, =+=, ==+	A-
==, +=, +=, -+=, =+-, -+=, =+	B+
-==, =-=, ==-, +--, -+-, --+	B
--, -=, -=, --=	B-

During the course you will submit (exactly) 3 tiles in weeks 2-13 in response to the readings according to the project descriptions. You will also submit a Best-of Portfolio in week 16.

You may attend by Zoom or in-person. In-person is preferred. However, if you are unwell or suspect you may be unwell, do not attend in-person. Attending by Zoom or attending in-person count the same apropos of the participation grade. The final grade will be calculated as follows

- Weekly Projects 78%
- Participation 12%
- Final Project 10%

The standard for an A grade is excellence. The standard for an A+ grade is publishable and professional in every detail.

Be sure to include clearly labeled contributor names. Expect to commit 10 hours per week including class time to this class—no more, no less. In past years, many student teams have made short videos in addition to slides. This is welcome and highly recommended, although not strictly required.

## Generative AI

**You can use generative AI tools for some of your work!** The rules are the same as for any other source—that is, you must attribute each and every tool that you use and explain any and all source materials using standard (ACM) academic referencing conventions and other conventions to be discussed in class.

## Inventories and Concepts

For the projects you will present in weeks 2-6, there will be an inventories component and a concept component. These will be explained in class.

## Prerequisites

You are assumed to have taken I541 and expected to know the materials taught in that class. If you have been allowed to register in this class without having taken I541, please refer to those syllabi for prerequisite knowledge.

## Office Hours

Eli Blevis – Thursdays 14:30-16:10. Additional times, by appointment. Myles Brand Hall West, 200.

# Texts\*

Eli Blevis. 2021. Three Key Competencies and Other Frameworks for HCI and Design Education. IU ScholarWorks.

<http://hdl.handle.net/2022/26048>

Elizabeth Gumpert. 2011. The Long Exposure of Francesca Woodman. *The New York Review of Books*, 24.

Bella Martin and Bruce Hannington. 2012. *Universal Methods of Design*. Beverly, MA: Rockport.

Donald A. Norman. 2019. The Four Fundamental Principles of Human-Centered Design and Application. *Essay*. JND.org (23 July 2019).

Martin Tomitsch, Cara Wrigley, Madeleine Borthwick, Naseem Ahmadpour, Jessica Frawley, A. Baki Kocaballi, Claudia Núñez-Pacheco, and Karla Straker. 2018. *Design. think. make. break. repeat. A handbook of methods*. Bis Publishers.

Huaxin Wei, Jeffrey C. F. Ho, Kenny K. N. Chow, Shunying An Blevis, and Eli Blevis. 2019. Should Do, Can Do, Can Know: Sustainability and Other Reflections on One Hundred and One Interaction Design Projects. In *Proceedings of the Fifth Workshop on Computing within Limits (LIMITS '19)*. Association for Computing Machinery, New York, NY, USA, Article 6, 1–18.

\* Subject to additions.

## Additional Resources

Most of the following resources should be familiar if you have already taken I541.





# Selected Tables from Blevis (2021): Three Key Competencies ...

Table 1. Layers of Framings

	Should do	Can do	Can know	Forms	Source
<i>How to (process, framework, principles)</i>	Predispositions (A)	Concepts (D), Strategies (F)	Research (B), Insights (C)	Prototypes (E)	<i>Blevis (2012), after Fahnestrom, Prygrocki, &amp; Whitney</i>
	Design Space (Expand)	Concept Space (Expand)	Design Space (Focus)	Concept Space (Focus)	<i>Bardzell's version of Double Diamond</i>
	Be People-Centered	Use an Activity-Centered Systems Approach	Understand and Address the Core Problems	Use Rapid Iterations of Prototyping and Testing	<i>Norman (2019)</i>
	Empathize (A)	Ideate (B)	Define (C)	Prototype & Evaluate (D)	<i>Stanford D-School</i>
<i>Why do (rationale)</i>	Values & Vision (desirability)	Opportunity (viability)	Research (feasibility)	Possibility Trends including Futurism and Retro-futurism	<i>Multiple Perspectives Analysis (MPA), Linstone (1981), Bowonder (1987), followed by Others</i>
	Tolerance	Openness	Rigor	Transdisciplinarity	<i>Transdisciplinary Design, after Nicolescu (2002), Max-Neef (2006)</i>
<i>Tell (presentation, argument, explanation, plan, story, proof)</i>	Values & Vision	Concepts & Strategies	Domain Knowledge*	Names/brand, Products, Services	<i>General</i>
<i>Content Meta-theory</i>	Themes Everywhere (Global) Near (National, Community) Here (Local, Personal)	Approaches Organize Connect Persuade Disrupt	Measures Measurements Collections Needs	Forms Virtual Physical Strategic	<i>Wei, Ho, Chow, Blevis, &amp; Blevis (2019).</i>

\* (From Research literature, Observations, Collections, & Evaluations)

Sustainability and Other Reflections on One Hundred and One Interaction Design Projects." In *Proceedings of the Fifth Workshop on Computing within Limits (LIMITS '19)*. (New York: ACM, 2019), Article 6, 18 pages; Eli Blevis and Erik Stolterman. "FEATURE: Transcending disciplinary boundaries in interaction design." *Interactions* 16, 5 (New York: ACM, September 2009), 48-51.

Table 2. Content Theory, Expanded<sup>11</sup>.

Should do Themes		Can do Approaches	
Everywhere (Global)	Sustainability	Organize	Itinerary
	Preserve Cultural Heritage		Annotate & Link
Near (National, Community)	Inclusivity	Connect	Combine With Utility
	Maintain Social Order		Distance Collaboration
	Connecting People		Match Interests
Here (Local, Personal)	Improving Health	Persuade	Scaffold Behaviors
	Personal Development		Motivate With Metaphor
			Gamification
			Promote Awareness
		Disrupt	Redirective Practice
			Subscription Services

Can know Measures		Forms	
Measurements	Amount And Quality	Virtual	Mobile App
Collections	Inventory		Desktop App
	Cultural Artifact		Web Site
Needs	Psychology		Tablet App
	Travel		Virtual Reality App
	Acculturation Needs		Mobile Game
		Physical	Interactive Product
			Installation
		Strategic	Service

\* This content theory illustrates some of the kinds of should do themes, can do approaches, can know measures, and forms that can instantiate the abstract how to, why do, and tell frameworks in Table 1.

<sup>11</sup> From Huaxin Wei, Jeffrey C. F. Ho, Kenny K. N. Chow, Shunying An Blevis, and Eli Blevis. "Should do, Can do, Can know: Sustainability and Other Reflections on One Hundred and One Interaction Design Projects." In *Proceedings of the Fifth Workshop on Computing within Limits (LIMITS 19)*. (New York: ACM, 2019), Article 6, 18 pages.

Table 3. The PRICPS design framework<sup>12</sup>.

Analysis			Synthesis		
<b>P</b>	<b>R</b>	<b>I</b>	<b>C</b>	<b>P</b>	<b>S</b>
Predispositions	Research ↓ Observations Literature Collections	Insights	Concepts & Concept Systems	Prototypes ↓ Exploratory Appearance Usability	Strategies ↓ Social Value Technology Enterprise
Predispositions are the things we believe to be true at the outset of a design process or explanation.	Research comes in three <i>forms</i> , namely (i) observations—or primary research, (ii) literature review—or secondary research, and (iii) collections—or knowledge about cultural <i>forms</i> .	Insights are the design issues that arise out of research.	Concepts and systems of concepts are the things, services, communications, or strategies that we envision in response to insights.	Prototypes come in three <i>forms</i> , namely (i) exploratory—or behavioral or low fidelity prototypes, (ii) appearance—or look and feel prototypes, and (iii) usability—or proof of concept or high fidelity prototypes.	Strategies come in three <i>forms</i> , namely (i) social value—or social desirability planning, (ii) technology—or technological feasibility planning, and (iii) enterprise—or economic viability planning.
↕ ↑	↕ ↑	↕ ↑	↕ ↑	↕ ↑	↕ ↑
Initial Hypothesis	Literature Search	Research Hypothesis	Experiment Design	Experiment	Results

<sup>12</sup> From Eli Blevis. "The PRInCiPeS Design Framework." In John M. Carroll, Ed. *Human-Computer Interaction Series, 1, Volume 20, Creativity and Rationale*, (Springer, 2012), 143-169.

Table 4A. Methods mapped to PRICPS, A-L

<i>Design Component</i>	Design Space			Concept Space		
	Predesign	Research	Insights	Concepts	Prototypes	Strategies
<i>AEIOU</i>			●			
<i>Affinity diagram</i>			●			
<i>Annotated photograph</i>	●	○	●	○	●	
<i>Appearance prototype</i>					●	
<i>Behavioral prototype</i>					●	
<i>Collection</i>		●				
<i>Competitive intelligence</i>		●				
<i>Cultural Probes</i>		●			●	
<i>Design fiction</i>				●		●
<i>Disposable Camera study</i>		●				
<i>Enterprise plan</i>						●
<i>Exploratory prototype</i>					●	
<i>High fidelity prototype</i>					●	
<i>Hypothesis</i>	●					
<i>Interview study</i>		●				
<i>Iteration</i>				●	●	
<i>Journey map</i>			●	●		●
<i>Literature report</i>		●				
<i>Look and feel prototype</i>					●	
<i>Low fidelity prototype</i>					●	

Table 4B. Methods mapped to PRICPS, P-Z

<i>Design Component</i>	Design Space			Concept Space		
	Predesign	Research	Insights	Concepts	Prototypes	Strategies
<i>Persona</i>		⊗	○	●		
<i>Personal inventory</i>		●				
<i>PRICPS</i>						●
<i>Primary observations</i>		●				
<i>Proof of concept prototype</i>					●	
<i>Research hypothesis</i>			●			
<i>Research through Design (RtD)</i>		●			●	
<i>Semantic differential</i>			●			
<i>Shadow study</i>		●				
<i>Should do, Can do, Can know</i>	●		●			
<i>Sketch</i>				●		
<i>Social value plan</i>						●
<i>Stakeholder diagram</i>			●			●
<i>Storyboard</i>				●		
<i>Survey study</i>		●				
<i>Technology development plan</i>						●
<i>Think aloud protocol</i>		●				
<i>Usability prototype</i>					●	
<i>Use case diagram</i>					●	●
<i>Vision statement</i>	●		●			
<i>What-if scenario</i>			●			
<i>Wizard of Oz prototype</i>					●	
<i>Working prototype</i>					●	

# About the HCI and Design Literatures

Since HCI and Design are dynamic areas of scholarship and practice, there is not a strict canon of classic literature that one can read, once and for all. It is better to read current sources and to keep reading throughout your career. I suggest allotting 2 hours a day to reading from the sources described below and others in addition to the curricular content.

## Places to Look First

Check these first:

<https://dl.acm.org/>

<https://www.semanticscholar.org/>

<https://scholar.google.com/>

## Places to Browse: ACM Best Papers List

One strategy is to be sure to read the best papers listed here:

*Jeff Huang's List of Best Papers*

## ACM Exemplary Papers

Each of the ACM conferences lists exemplary papers. I recommend looking at these exemplary papers which are constantly being updated in order to be sure your reading about HCI is up to date. ACM SIGCHI conferences are listed here:

<https://sigchi.org/conferences/upcoming-conferences/>

## ACM CHI Exemplary Papers by Thematic Areas

ACM CHI conference papers are grouped by thematic areas called sub-committees that represent a broad view of HCI. Check each of the links to see the exemplary areas for each subcommittee:

- \* *User Experience and Usability*
- \* *Specific Applications Areas*
- \* *Learning, Education, and Families*
- \* *Interaction Beyond the Individual*
- \* *Games and Play*
- \* *Privacy and Security*
- \* *Visualization*
- \* *Health*
- \* *Accessibility and Aging*
- \* *Design*
- \* *Building Devices: Hardware, Materials, and Fabrication*
- \* *Interacting with Devices: Interaction Techniques & Modalities*
- \* *Blending Interaction: Engineering Interactive Systems & Tools*
- \* *Understanding People: Theory, Concepts, and Methods*

- \* *Critical Computing, Sustainability, and Social Justice*
- \* *Computational Interaction*

## Technology in Practice

In some ways, keeping up with the technology and other sections of major high integrity new sources is the best way to be current. It is important to triangulate these readings—that is, to read from a great variety of sources in order to see what is important to different constituencies. Notwithstanding, reliable and high integrity sources are key. Here is a list:

- \* *Technology Section of The Economist*
- \* *Technology Section of the New York Times*
- \* *Technology Section of the Guardian*
- \* *Technology Section of Reuters*
- \* *Technology Section of the Atlantic*
- \* *Technology Section of NPR*
- \* *Technology Section of the Wall Street Journal*
- \* *Technology Section of the Washington Post*
- \* *Technology Section of the BBC*

## Pictorials

At the intersection of HCI and Design are pictorials. These are a good source for design inspirations that bridge between scholarship and practice:

- \* *C&C 2017 to Present*
- \* *DIS 2014 to Present*
- \* *TEI 2020 to Present*

## Additional Details about Grading

Note that there is no specific grade for attendance. You may attend by Zoom or in-person. If you are unwell or suspect you may be unwell, do not attend in-person. Attending by Zoom or attending in-person count the same apropos of the participation grade.

*As a matter of ensuring that all voices are heard*, I will call on participants in a random but systematic order to present, comment, or ask questions. If you attend regularly and learn the names of all participants because you have listened to them carefully as well as having thoughtful things to say yourself, your participation grade should be high.

The standard for an A grade is excellence. The standard for an A+ grade is publishable and professional in every detail.

## Important Note about Third Party Materials

In this class, your use of third party materials must conform to ACM policy:

Third party material Fair use

<https://www.acm.org/publications/authors/guidance-for-authors-on-fair-use>

Sample permission request letter

<https://www.acm.org/binaries/content/assets/publications/permissionsformtemplate.odt>

The reason for this policy is to underscore the goal of producing professional quality, publishable work, as you will be expected to produce in real-world practice. In your professional career, you will be expected to adhere to copyright laws. It is also a matter of ethics and respect for the work of others.

Moreover, since this class emphasizes visual thinking, most of your evidence of such thinking must be your own original work.

## Reference Formats

You must use ACM referencing formats: <https://www.acm.org/publications/authors/reference-formatting>

## 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.



## 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](http://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](http://www.indiana.edu/~vpfaa/holidays.shtml)

## 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.



*Variation of a DALL-E generated image from the prompt: motion-blurred polar bear wearing a dress in the style of photographer Francesca Woodman.*

