Designing Technology for People:
Ethnography in the Human-Centered Design Classroom

SESSION III: Supporting STEM Students

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Incorporating ethnographic methods into the design technology classroom is one way to equip students with the tools needed to more effectively practice human-centered design. This approach fosters a deeper understanding of how broader cultural factors shape user experiences and highlights the importance of empathy in the innovation process. Given the value ethnography can bring to design, at Purdue University, the Department of Anthropology and the Polytechnic Institute have co-created and co-teach the undergraduate course, *Designing Technology for People*. Based on a convergence education model, this course exposes students to the use of ethnographic research as they work with a user group to develop a design mock-up.

At last year's 1909 Conference, presenters from Purdue had the opportunity to introduce the basic structure of this course[1], using the "Squirrel Squad" as a case study for outlining how ethnography and design are creatively brought together in the design process. This year's paper aims to dive deeper into the ethnographic portion of this course, by providing an overview of the specific pedagogical approaches used to teach ethnography. Specifically, we will review how we introduce ethnographic research, participant observation, semi-structured interviews, fieldnotes,

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[1] Article based on this conference paper will be published in *Design and Technology Education: An International Journal*.

and ethics. This will include a review of the fieldnotes templates used by students and the engaged activities students participate in throughout the learning process.

Designing Technology for People has benefited from being taught by both anthropologists and design technology educators, as each brings their expertise to the convergence education classroom. By presenting this paper, we hope to share the anthropological approaches and materials we have developed to provide practical ideas for integrating ethnography into the design technology classroom experience. We hope that by sharing these pedagogical strategies, we will support the ongoing development of human-centered design approaches that are responsive to cultural contexts and grounded in real-world experiences.

What is ethnography?

Before introducing how we teach ethnography, it is important to quickly review what we mean by ethnography. The term ethnography comes from the Greek word "ethnos," "meaning a people, nation, or cultural group etc. and 'graphy' meaning writing" (University of Exeter Library, 2024). In this traditional sense, ethnography is a "descriptive work of a particular group/culture based on the immersive observations of the research" (ibid). Today, ethnographic writing remains a critical component of ethnography, but in a broader sense, it is now considered a methodology, engaging both the "process" (research) and the "product" (writing/presentation) (Kramer & Adams, 2017). Additionally, the final "product" is rarely limited to description but rather, ethnographers seek to interpret and/or apply their research findings.

In our course, a straightforward definition of ethnography that we use is that ethnography is "learning about people by learning from them" (Roper & Shapira, 2000, p. 1). The goal of ethnography is for the researcher to immerse themselves in the lived experiences of the group, organization, or community they are studying. Critical to this "immersion" is participant observation, where the researcher does not try to observe from an unobtrusive distance, but rather, is actively engaging in the social milieu of whatever people they are studying.

While participant observation is generally considered to be a critical component of ethnographic research, other methods are used in tandem. Individual and group interviews are common, as are other multi-modal methods such as community mapping, photovoice, social media analysis, and open-ended questionnaires (Gubrium & Harper, 2013). The inclusion of quantitative methods is also common, including surveys and more cognitive approaches, such as cultural domain analysis. By using a multi-methods approach, ethnographers are able to triangulate their data, confirming patterns and opening new exploratory questions through divergences and nuances in the data (Bernard, 2018).

If at its core, design is intended to improve the human experience, understanding people is critical, and learning how to collect quality data about them is crucial. It is perhaps for this reason that cultural anthropologists and other ethnographers are increasingly being hired in design positions (Jordan, 2013; Otto & Smith, 2020). As Nuzzolillo points out, anthropologists bring to the professional table "empathy and a deep understanding of context, cultural relativism, and systems-

thinking; command of qualitative methodologies; as well as synthesis and storytelling skills" (2020), all of which are critical for students pursuing careers in human-centered design.

Introducing Ethnography

Ethnography, as a methodology, is introduced on day one of the course, when students are asked to read Alan S. Brown's article "Designing for Technology's Unknown Tribes" (2012). In this article, Brown discusses how anthropologists are being hired by companies to study how people use technology and design in real life, via participant observation. For example, Brown describes how an MP3 company hired the anthropologist Christina Keibler to study why athletes were not purchasing their MP3 player. To investigate the issue, Keibler immersed herself in the gym environment, joining athletes as they worked out. There, she discovered that the buttons on the company's device were too cumbersome for athletes who needed to quickly pause their music to chat with others. Although this example is now dated (who uses MP3 players anymore?), it highlights what ethnography does best. By actually spending time with people, learning their daily practices, social interactions, and values, Keibler was able to provide the company with concrete solutions for improving their product.

During this first class session, we expand on the MP3 by showing two YouTube videos highlighting the value of participant observation in human-centered design. These videos include "It's not you. Bad doors are everywhere,[2]" which is about Norman Doors, and "Transforming healthcare for children and their families[3]" a TED Talk by Doug Dietz, on his journey of developing child-friendly MRI machines, after learning how terrified children were of these machines. Guided by the readings and these videos, students begin discussing the value of ethnographic research (although the term ethnography may not be familiar yet).

During our third-class session, students are formally introduced to ethnography and ethnographic methods. This class is always led by the anthropologist or ethnographic specialist who is co-teaching the course. Each professor will take their own approach to leading the lecture (a dynamic process often changing semester to semester[4]), but several activities have come to be staples of this learning process.

Before coming to class, students are asked to read Rick Zollo's "Friday Night at Iowa 80: The Truck Stop as Community and Culture," which he wrote for an anthropology undergraduate course (Zollo, 2011). While this reading does not have a design component, it is an excellent model for how students should document detailed observations, informal conversations, and sensorial experiences in their fieldnotes. See Figure 1 for the discussion questions students collectively answer in their teams about the Zollo reading. These questions have served as a useful catalyst for introducing students to ethnographic approaches to observing, documenting, thinking, and analyzing. The final question, "How could we use Rick's data to innovate?" has proven to be

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[2] It's not you. Bad doors are everywhere: https://www.youtube.com/watch?v=yY96hTb8WgI
[3] Transforming healthcare for children and their families:
https://www.youtube.com/watch?v=jajduxPD6H4&t=1s
[4] Renkert will be teaching the class in Spring 2025. She will be making modifications to the current PPT in use but would be happy to share slides with anyone who is interested.

particularly fruitful, as students creatively think about how Zollo's interactions with truckers and attendants can move from ethnography to design.
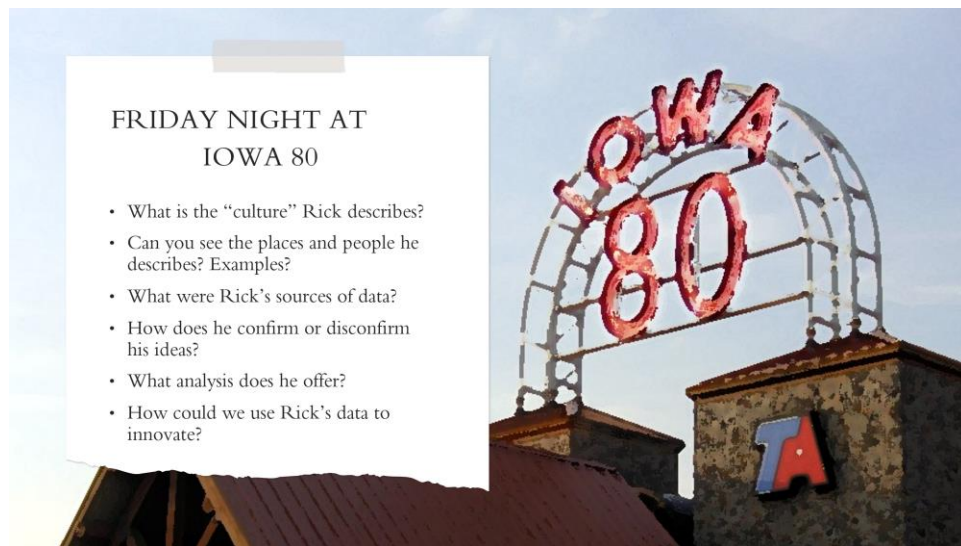

Figure 1

After concluding the conversation on Zollo's text, the professor leads a formal lecture on ethnography and ethnographic research design. See Figures 2 and 3, for a sample of some of the previous slides used.
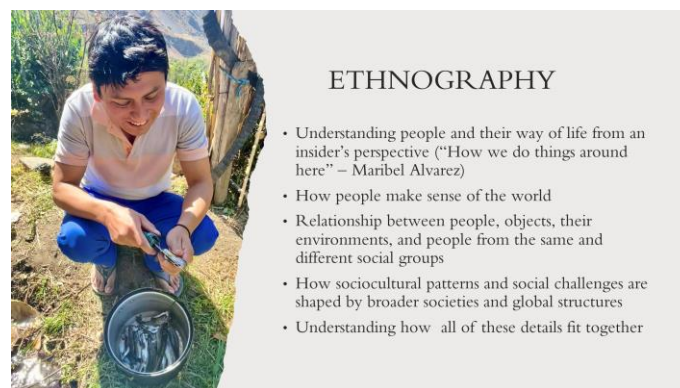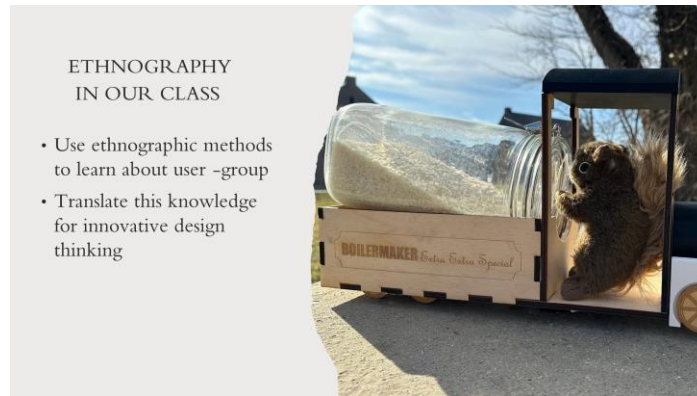

Figure 2

Figure 3

Learning to See I: Block Exercise and Participant Observation

After introducing the basics of ethnography, students engage in the "Block Exercise," one of a series of activities focusing on "Learning to See." The goal of this activity is to move students a step closer to understanding the value of participant observation. For the Block activity, the teaching professor shares a photo they have taken of a street block (see Figures 4, 5, and 6 for examples). In teams, the students carefully analyze the photos, addressing the following questions:

- Where is the block?
- What is the time and day of visit?
- What kinds of buildings/structures exist?
- What do you see, hear, smell, etc.?
- What is going on?

Working together in teams, students address each of these questions, attempting to decipher exactly what is happening in the photo. After a few minutes, we reconvene as a class, and the professor guides the discussion by posing each question. While considering a range of hypotheses, the professor gradually steers students toward the correct interpretation. By the end, most classes can approximate what is happening.

Figure 4

Figure 5

Figure 6

Once students complete the activity, we reflect on what key takeaways from this exercise are, asking "What did this photo offer us?" and "What other information did we need?" For the first question, students will often note the importance of paying careful to small details. For example, in Figure 4, there is a police traffic stand with an Inka Kola advertisement on it. While not everyone may know that there is only one country in the world that widely sells Inka Kola, a quick internet search would likely tell you that this photo was taken in Peru. Students will also often talk about the value of working in a group, as they have diverse experiences and interpretations, allowing them to sometimes notice distinct details. They may not get to the exact answer, as they lack significant context, but by brainstorming as a group they expand the possibilities under consideration.

For the second question, on the information they lacked, students often will note that it would be helpful to talk to people and to have more contextual information. The discussion of these limitations is meant to highlight the importance of immersion. What do you gain by being at the block when compared to seeing an image from a distance? We also discuss at length the risks of jumping from data to conclusions. Immersion, perspective, and context are all critical. Without these, you cannot confidently offer an analysis. See Figure 7 for a copy of the post-activity slides used to highlight key takeaways from this discussion.

Figure 7

This activity acts as an introduction to participant observation. By moving through the opportunities and challenges of studying a scene from a distance, we can more explicitly talk about the value of participant observation as a method. With the necessary permissions, our goal is to encourage students to actively take part in whatever it is that they are studying through embodied participation. Examples of participant observation from our course include (the bold text is the "User Group" studied by the students).

- **Firefighters:** Students participated in ride-alongs on firetrucks and spent time in the first station conversing with firefighters and learning about their daily lives.
- **Pilots:** Students spent time in the Purdue University Airport's hangar, where they were able to interact with mechanics and pilots.
- **Electric Scooters:** Students joined fellow students on e-scooters, riding around Purdue's campus.
- **Exotic Pets**: Students visited the homes of exotic pet owners to interact with the pets and understand caretaking routines. They also attend an exotic pets conference.
- **Debilitating Menstrual Pain**: Students went shopping for menstrual products with menstruators and engaged in exercises/yoga intended to reduce pain during menstruation.

See Figures 8 and 9 for examples of slides used when teaching participant observation.

Figure 8

TIPS AND TRICKS

- Gain rapport – build trust and show -up
- Be present and engaged
- Let go of your "comfort zone" (when appropriate)
- Jotting and Memos: the setting, the people, conversation, quotes, behaviors, emotions, etc.
- Transparency and honesty (don't over –promise)

Figure 9

Learning to See II and III: Fieldnotes

After introducing participant observation, students move on to learning about fieldnotes. In ethnographic research, quality fieldnotes are critical, as they become the raw data used for analysis (Emerson, 2011). Students engage in two activities (Learning to See II and Learning to See III) to practice writing strong fieldnotes. In the first activity, students are presented with a "foon." As a class, we discuss what it is and where it might be convenient to use (e.g., camping, hors d'oeuvres, sack lunch). The goal is to have students think creatively about how this seemingly odd design can be used in anticipated and unanticipated contexts, ultimately, discussing the value of the design. Students are then presented with a fieldnote example, where a student describes their experience using a foon to eat lunch. Having thought through all of the details of the foon, we take a critical approach to analyzing the fieldnotes, noting strengths (e.g., where did the students provide details?) and weaknesses (where should the student have elaborated more?). See Figure 10 for the fieldnotes example.

Figure 10

After discussing the foon, students are introduced to the fieldnotes templates we will use during the course. We have two separate fieldnotes templates, one for participant observation and one for interviews. See Table 1 for the questions prompts provided to students. In using a template, our goal is to encourage students to provide ample details: What was said? What was observed?

How did people interact? What was the broader context in which the researcher found themselves? We encourage students to take us on a "journey," where the readers can feel what it was like being there. This level of detail is critical because as mentioned above, students will use these fieldnotes to conduct data analysis.

Participant Observation	Interviews
Setting, Date, Context: Where are you? When is this happening? What's going on?	**Interview Focus:** What is the focus of this interview? Provide a description.
Description of Participants: Who is there? Describe them.	**Setting and Context:** Where are you? How are you conducting this interview?
Chronology of Events: Document what goes on while you are there; be detailed.	**Description of the Interviewee(s):** Who are you interviewing? Describe who they are. Why are you interviewing them?
Describe technology being used: What technology is employed? How is it used?	**Interview Questions and Responses**: What questions did you ask? How did they respond? (List in order)
Conversations: What gets discussed verbally or otherwise?	**Self-Reflection:** What are your key takeaways, insights, feelings, thoughts? Keep in mind, this is your initial analysis.
Self-Reflection: What are your takeaways, insights, feelings, thoughts? Keep in mind, this is your initial analysis.	**Design Ideas**: Share ideas about how technology use is going, what may be missing, innovation possibilities, etc.
Design Ideas: Share ideas about how technology use is going, what may be missing, innovation possibilities, etc.	**Other Important Notes / Photos / Sketches:** (Optional)
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Table 1

After reviewing the fieldnotes templates in class, students are sent home to practice taking fieldnotes in our Learning to See III activity. In this activity, student teams are asked to collectively watch the same YouTube video. We have been using Daniel Hale's "Cooking With Kids – Banana Bread.[5]" However, other videos, including design-specific ones, could easily be used. The students are asked to watch the video and complete the "Participant Observation" fieldnotes template. While this activity does not engage the "participant" element of participant observation, our goal is for students to concentrate on the details. We want them to write down as much data-rich information as possible.

During the following class, student teams will collectively compare fieldnotes using our Team Memo Template (see Table 2). This is the same template they will use when comparing their ethnographic observations with their assigned "user group." In comparing fieldnotes, we want them to think about what patterns did they observe? What difference in notes were there? What details did not everybody notice? Were there any contradictions? In completing this exercise, we

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[5] Cooking With Kids – Banana Bread: https://www.youtube.com/watch?v=m0spBJwqSEg

encourage students to collectively think about what good fieldnotes can look like and how they can improve their own documentation process.

Team Memo Template

Patterns of Behavior: What was similar / different in what you observed?
    List 3-5 things that everyone observed (backed with evidence from the fieldnotes)
    List key different findings of interest (backed with evidence from the fieldnotes)

Group Reflection: What was similar / different about our fieldwork experiences?
    What are we learning from doing fieldwork, individually and as a team?
    What is interesting and/or surprising about our different information, insights, and ways of
        working?
    How can we make the best use of team-based ethnography going forward?

Design Ideas: Share ideas about how technology use is going, what may be missing, innovation possibilities, etc.

Table 2

Once students move into the ethnographic research portion of the course, there is a second stage to this data analysis process. After completing the Team Memo, students also work on a Team Report Out, where they will respond to a series of questions to create a plan ("Our Plan") for their next phase of research (see Table 3). Once this is complete, they will meet with another team. In this meeting, each team will present their Team Memo findings and the "Our Plan" section of the Team Report Out to another team. This team will then provide feedback documented in the Team Plan Report Out (and vice versa). Based on this feedback, teams will make final decisions about their next steps.

Team Plan Report Out *Use the 5W's below to draft your plan. You will use this plan on Wednesday to get feedback from two other teams.*
OUR PLAN
Who? Who will you be working with?
What? What will you be doing and asking?
Where will you be observing? Finding other information?
When and **why** – When and why will you be using this strategy?
How to move forward – How will you use these activities to learn about the user group, develop design ideas, and make progress?
Team Feedback *Wednesday in-class: Based on your plan, what specific feedback did you receive from other teams? Be as specific as possible to the 5W's and 'How we move forward' elements of your plan.*

Feedback – TEAM X

<p align="center">Table 3</p>

Semi-Structured Interviews: Miracle on the Hudson

Ethnographic interviews are the second most common method used by students in this course. To prepare, students read selections from Russell Bernard's chapter "Interviewing I" in his book *Research Methods in Anthropology* (2018). They also read Whitney Hess's article "How to Conduct Yourself While Conducting Interviews" (2013). During class, we think through how to effectively conduct an ethnographic interview and how to select participants for interviews. To initiate conversation around these topics, we watch several videos about the "Miracle on the Hudson," when Sully Sullenberger (a Purdue grad!) was able to successfully land US Airways Flight 1549 after experiencing engine failure in 2009. The first video we watch is the original audio from the landing with an animated simulation of the event.[6] Based on this video, students brainstorm questions they would ask the pilot if they were able to interview him. We then review the quality of the question structure, order, and content.

Our next video is Katie Couric's interview with Sully Sullenberger after the event.[7] After the video, students reflect on the quality of Couric's questions and the techniques she uses to elicit good responses. This is followed by slides focused on how to ask good questions (see Figure 11).
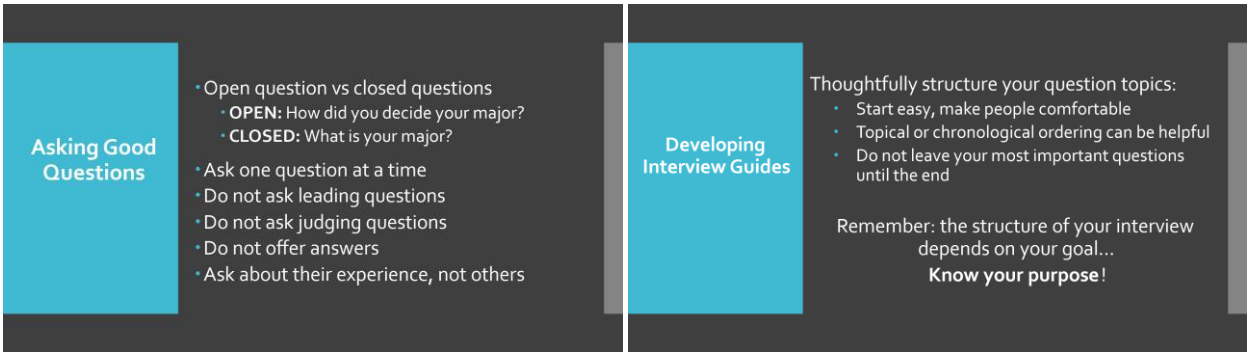
<p align="center">Figure 11</p>

We then ask students who else they would like to speak to (e.g., flight attendants, passengers, flight control, family members, etc.). Students again brainstorm questions for these hypothetical interviews. Once this is complete, we watch Katie Couric's interview with the flight attendants.[8] Before watching, we encourage students to pay careful attention to Couric's "probing strategies," focusing on how she strategically encourages interviewees to continue talking. When

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[6] Landing audio: https://www.youtube.com/watch?v=imDFSnklB0k
[7] Interview with Sully: https://www.youtube.com/watch?v=rZ5HnyEQg7M
[8] Interview with Flight Attendants: https://www.youtube.com/watch?v=egf93x4-rvQ

done, we talk about various effective probing strategies (See Figure 12 for a list of some strategies from Bernard's chapter).
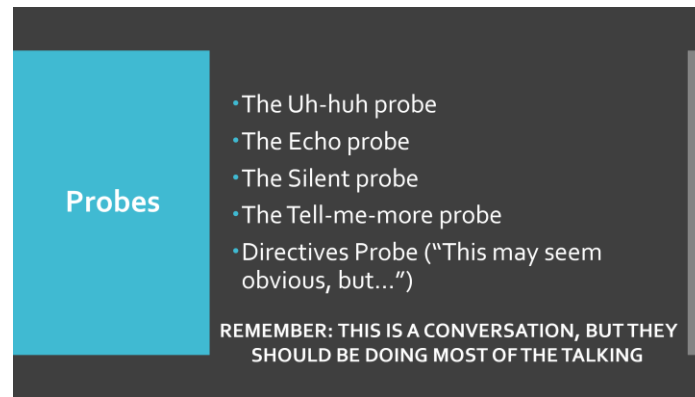

Figure 12

Finally, we again ask students what other information they would like to learn to more fully understand the experience. The majority will mention passengers. At this point, we show them a Ted Talk from Ric Elias, one of the passengers.[9] Although this is not an interview, we show it to highlight that understanding any given social phenomenon requires multiple and diverse perspectives and experiences.

After completing this series of videos, we revisit the Hess article to discuss how interviewers should conduct themselves during an interview (see Figure 13 for our discussion prompts). In discussing conduct, we also emphasize the importance of being culturally aware when conducting the interview. For example, while formal attire is almost always required during a job interview, this is not the same for ethnographic interviews. As an ethnographic interviewer, your goal is to make the interviewee feel at ease. Depending on who you are talking to, casual clothing may be a better option, so that the interviewee does not feel like they are in a job interview setting.
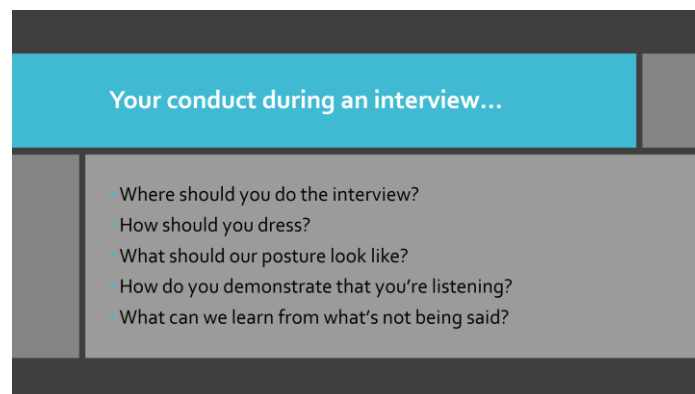

Figure 13

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[9] Ric Elias TED Talk: https://youtu.be/8_zk2DpgLCs

Once we conclude our discussion, student teams work together to develop preliminary interview guides. Their goal is to write at least ten interview questions related to their topic. Once they have interview questions, different teams will work together to provide feedback on the quality of the questions.

One of the major challenges students often face in developing these guides is that the interviews often sound more like a survey than an interview. In working with students to prepare these questions, we try to emphasize that students want to elicit stories with the goal of learning about people's lived experiences (again, "take us a journey").

When students begin conducting interviews for this research, they must document their notes in the Interview Fieldnotes Template featured in Table 1. Even if students record the interview and have a full transcript, we require the template. We want them to practice taking interview notes, while also processing and thinking through what they learned during the interview. In addition to the value of practice, we always remind students that it is imperative to take good notes during an interview. Even when you have a recording, transcribing can be a long and tedious process and sometimes, tech fails (I have, admittedly, had interviews where the recording did not work, was accidentally deleted, or the sound quality ended up being too poor to use). If students take quality notes focused on the content of the interview, there is not always a need for the recording (although it's great to have for double-checking!).

Ethics

It is important to note that ethics is iteratively addressed throughout the ethnographic learning process. Students are required to read Alexander M. Ervin's chapter "Ethics in Applied Research and Practice" in his book *Applied Anthropology: Tools and Perspectives for Contemporary Practice* (2005). Critical issues on ethics that are discussed in class include:

- **Informed consent:** Individuals who are engaging with the researcher during participant observation or an interview, among other methods, should be aware that the student is collecting the data and give their consent to participate in research. Student researchers cannot conduct covert research.
- **Confidentiality:** We encourage students to use pseudonyms for all participants. In cases where research participants would like to be identified, they must explicitly give their permission for this and understand any possible risks.
- **Consent to the use of audio recordings/photos/videos:** If the students are going to audio/video record an interview or take photos/videos of people during participant observation, they must have consent from participants. The participants must also understand how the data will be used. For example, is a photograph or video simply for analysis, or will it also be used in a PowerPoint presentation? If the latter, permission must be given by the participant, as they are consenting to being identified.
- **Sharing Research:** Oftentimes, people want to know what the end results of the research findings are. Student researchers are encouraged to share their final designs with research participants. Reaching out to participants can also be a critical component in getting good stakeholder feedback.

In addition to our in-class discussions on ethics, students are also required to complete CITI's Responsible Conduct for Research training as a part of our IRB for this course. By completing CITI training, students gain a broader understanding of the dangers of research and the imperative for conducting ethical research.

Why use ethnography in the human-centered design classroom?

Integrating ethnographic methods into the design technology classroom is not just a pedagogical enhancement but a critical strategy for fostering human-centered design practices that are culturally aware and contextually relevant. By engaging students with ethnographic tools such as participant observation, semi-structured interviews, and fieldnotes, the co-taught *Designing Technology for People* course at Purdue University empowers students to go beyond assumptions and surface-level understanding, enabling them to design technologies that genuinely meet the needs of diverse user groups.

Ethnography helps bridge the gap between abstract design concepts and real-world human experiences, fostering empathy, cultural sensitivity, and systems thinking, skills that are essential for the next generation of designers. The convergence of anthropology and design in this course highlights the power of interdisciplinary collaboration, offering students a robust framework for understanding how sociocultural factors influence technology use and how design can respond to these complexities. By incorporating these ethnographic practices, design students not only learn to create more effective and compassionate solutions but also contribute to an ongoing shift toward more inclusive, context-driven approaches in the design industry. Ultimately, the integration of ethnography into design education strengthens the capacity of students to innovate in ways that are truly reflective of the people they are designing for, ensuring that the technologies of the future are shaped by the diverse realities of the users they aim to serve.

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