



# IDeATe Gallery

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Insights on  
opportunity for learning  
through open portfolios

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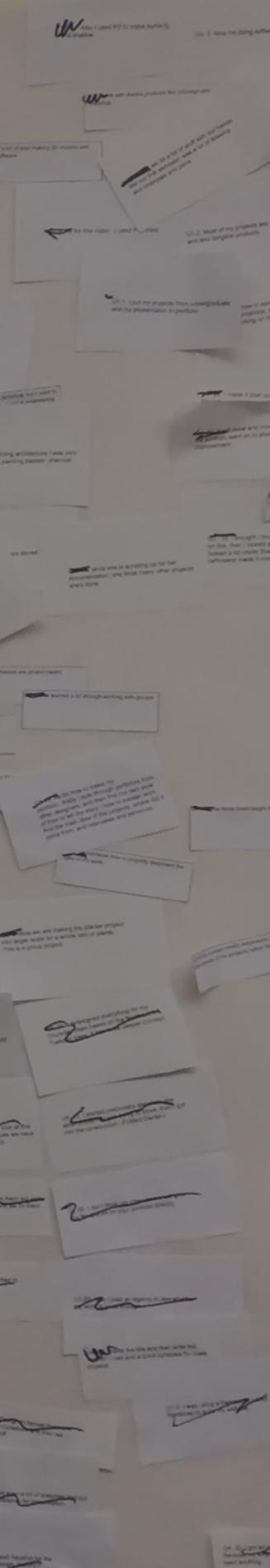
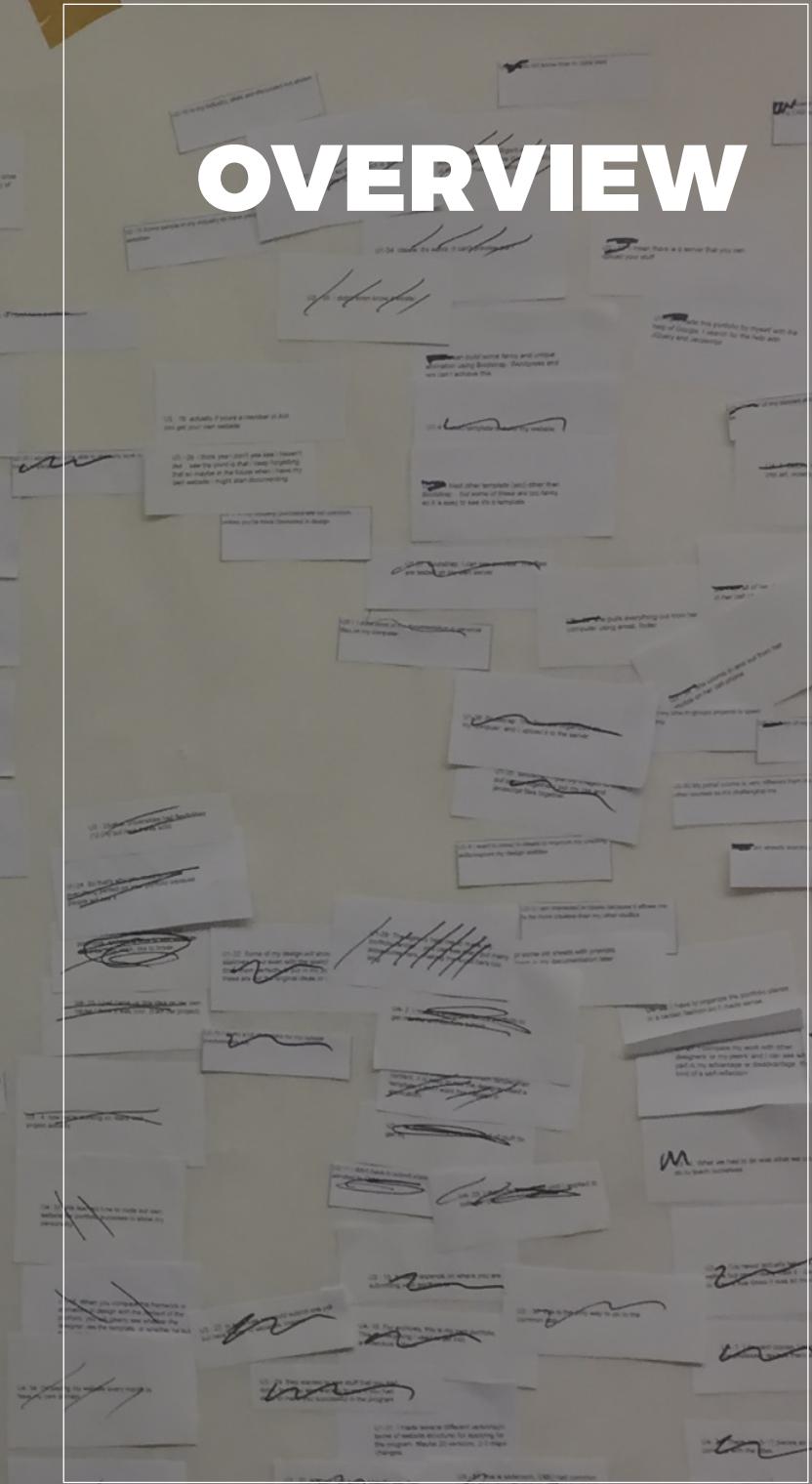
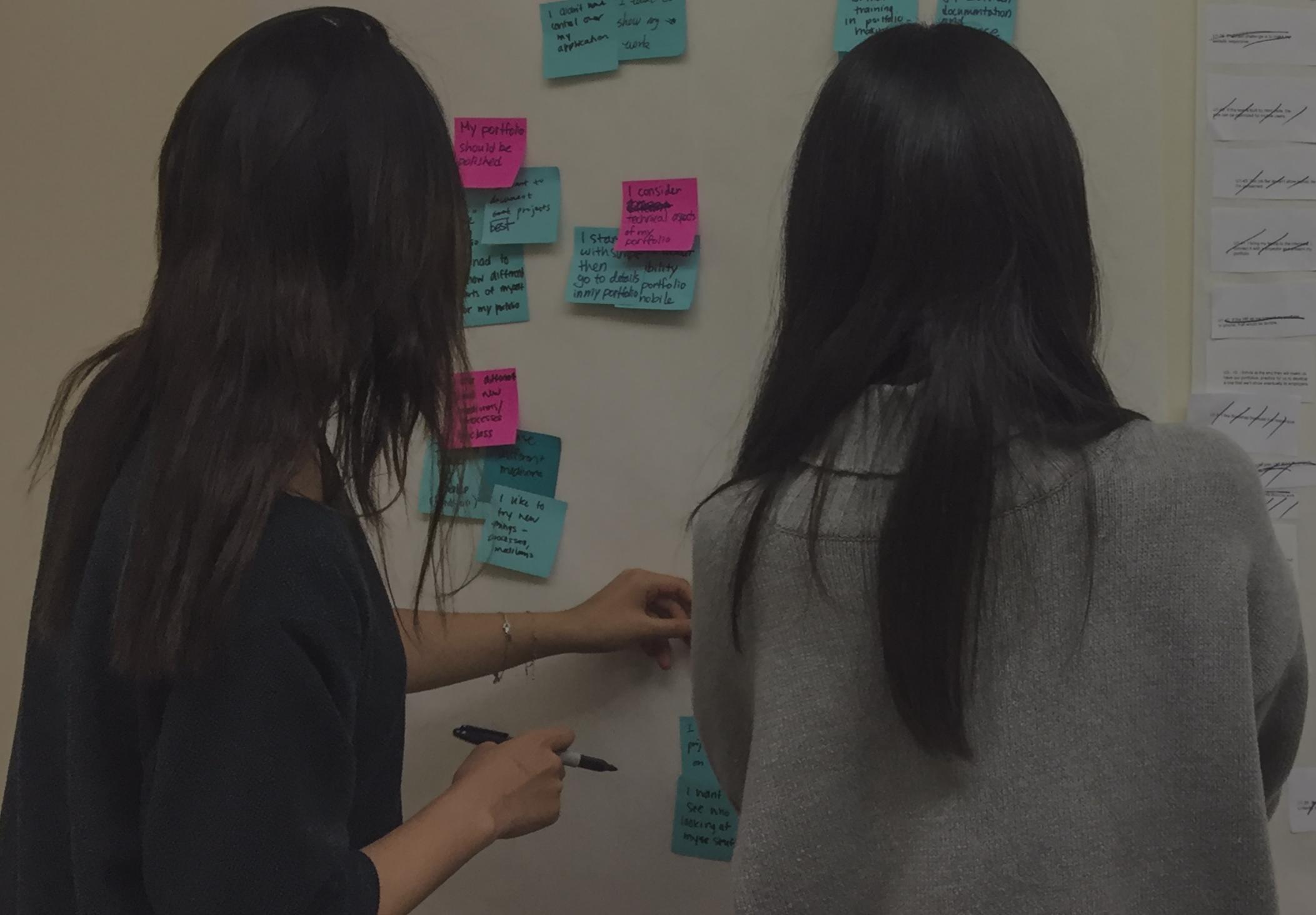
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# OVERVIEW



**OVERVIEW**

## Portfolio Making Process

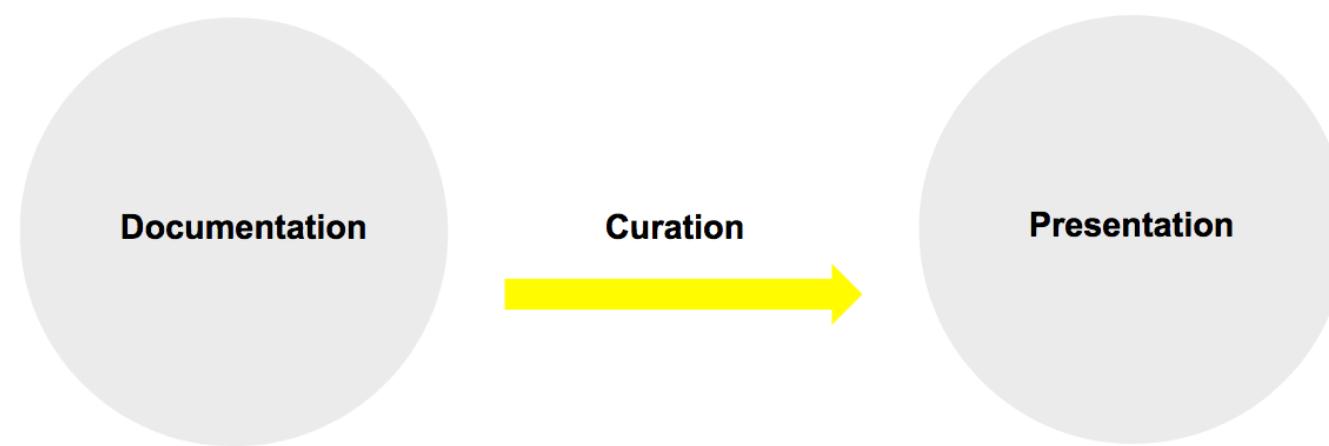


Figure 1.1. Diagram for documentation process in context of college students

**Documentation**

The documentation step involves cultivation of information, and artifacts that demonstrate the learning/making process

**Curation**

The curation stage involves purposeful cherry picking and reflecting of documented information to guide the presentation process

**Presentation**

The presentation step involves polishing and sharing with a targeted audience in mind

## Maker Ed Open Portfolio Challenge

In our Discovery 1 phase we examined the ways in which individuals with different backgrounds participate in the portfolio making process. In interviewing individuals from different levels in expertise in portfolio making we arrived at generalizable process. Through our initial inquiry we found that, in its simplest form, the portfolio making process entails the steps of documentation, curation, and presentation.

In the context of the digital age, there are apparent complications with most standard practices of portfolio-making. Standard, physical portfolios, in comparison to digital alternatives, lack the scope and breadth of audience as well as the compilation of evidence and artifacts of learning across platforms. As digital tools and social networks become more utilized and interwoven in the learning and making process new needs in portfolio-making are beginning to arise. Digital, open portfolios have much to offer in the realms of more intentional and streamlined documentation as well as connectivity in feedback, to name a couple. Maker Ed presents the design challenge of integrating open portfolios into the learning process. We aim to explore the potential of bringing the considerations and practices of open portfolio-making to the learning space of Carnegie Mellon University's Integrative Design, Arts and Technologies (IDeATe).

## IDeATe

Carnegie Mellon's IDeATe programs are interdisciplinary, bringing together students and faculty from all the six colleges (College of Fine Arts, Tepper School of Business, Dietrich College of Humanities and Social Sciences, College of Engineering, School of Computer Science, and Mellon College of Science). IDeATe currently offers eight undergraduate minor programs that draw on diverse, but complementary skills and practices from different departments. IDeATe aims to give students respect and better understanding of different disciplines through highly collaborative courses.

## IDeATe Gallery

IDeATe gallery is an online platform where IDeATe students can upload and share the work they have completed in their courses. IDeATe allows students the opportunity to practice documentation as well as giving and receiving feedback. IDeATe gallery as it exists right now serves mostly a presentational tool. Given the resulting insights of our Discovery 1 phase, we identified two main needs in the portfolio-making process for students that we must address, guidance and interaction. As it pertains to IDeATe and more specifically IDeATe gallery, we must address the following areas in which IDeATe students currently struggle:

- Offering more progressive, constructive feedback in a way that offers feedback throughout the various phases of development
- Participating in the supportive IDeATe community through a shared process of portfolio-making
- Reflecting on their work and projects as individuals and given peer feedback

## Insights

### **Mind the Gap**

Students we interviewed believe Gallery is place where the best work gets selected and presented. The word “Gallery” makes them become cautious in uploading their works. To them, Gallery represents a highly-curated portfolio tool. But from the interview we did with Gallery’s creator Daragh, we learned that Gallery is process-led and it allows students to explore and practice documentation. It’s positioned somewhere between a learning portfolio and a professional portfolio, but it’s ultimately a learning tool.

### **Experts and Novices**

Our definition of “expert” and “novice” -- is based on skills and experiences of documentation and curation. Experts give novice progressive feedback through each phase of documentation and curation. We also want to point out “novices” have expertise in their own areas and could help “experts” with their knowledge and skills in those areas.

### **Our goal for IDeATE Gallery**

Promote IDeATE gallery as a learning tool with a supportive feedback system

Students get progressive feedback from a diverse group of users in IDeATE Gallery.

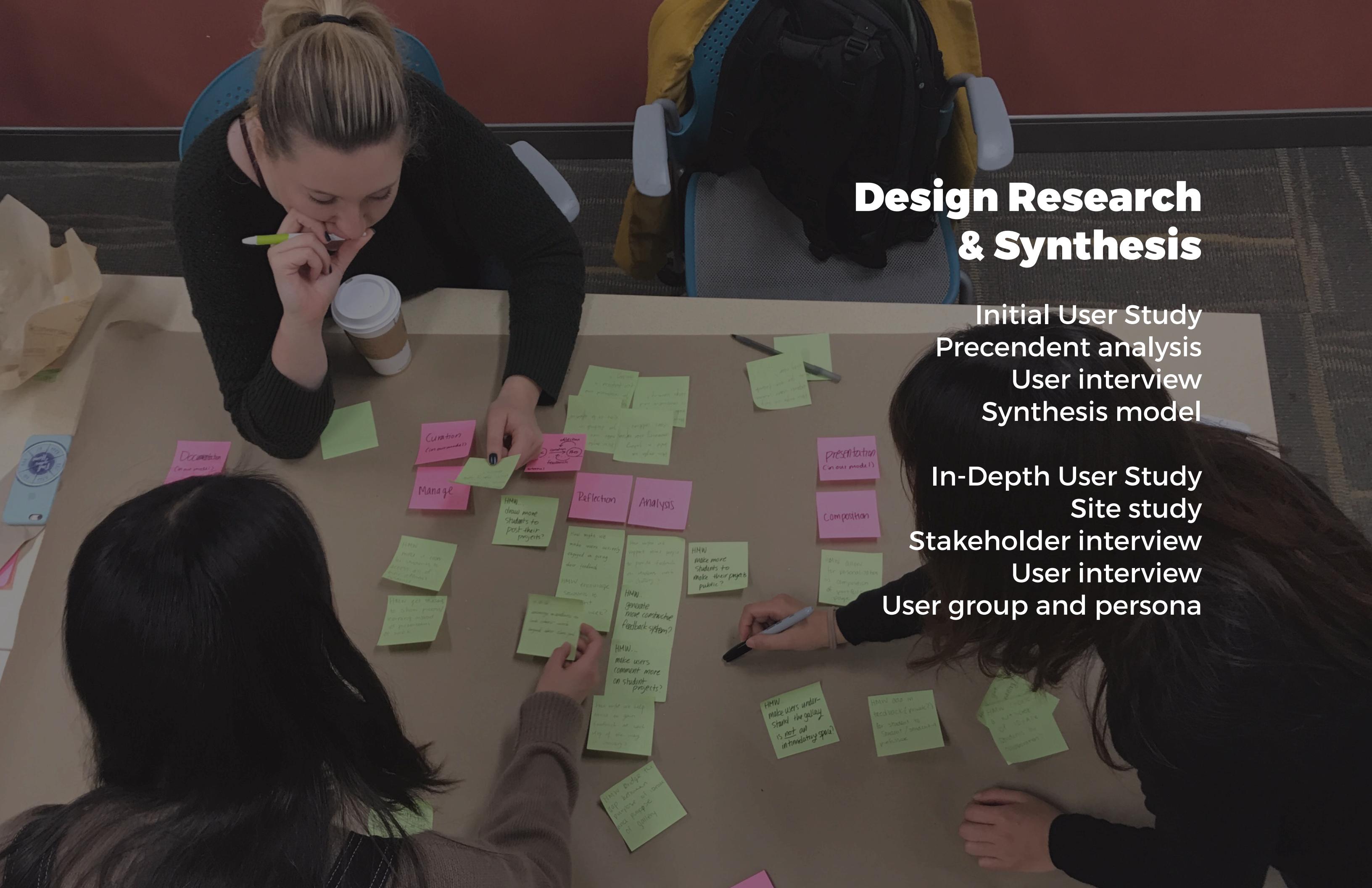
We believe that by building in **better opportunity for feedback and collaboration** into IDeATE gallery, both **novice and expert** IDeATE students will be able to build and expand upon their overall learning experience **through sharing** their unique expertise and skills with others in the IDeATE program.

We will know we have achieved this by observing not only an **increase in the number of users** on IDeATE gallery but more importantly an **increase in the user-to-user interactions**.

# Design Research & Synthesis

Initial User Study  
Precedent analysis  
User interview  
Synthesis model

In-Depth User Study  
Site study  
Stakeholder interview  
User interview  
User group and persona



**INITIAL USER STUDY**

# Precedent Analysis

We conducted our heuristic analysis for three portfolio making platforms: SeeSaw, Portfolium and IDeATE Gallery. Our heuristic analysis is conducted based on what Maker Ed OPP Qualities Valued. The heuristics can be categorized in three dimensions:

- Instructional methods to promote the development of exper practices
- Social characteristics of the learning environment
- Motivational Strategies

**Heuristic evaluation**

Heuristic evaluation is a usability engineering method for finding the usability problems in a user interface design so that they can be attended to as part of an iterative design process. Heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles. (Nielsen 1994)

**SeeSaw****Instructional Methods**

Students can use Seesaw's built-in audio recording, drawing and caption tools to explain how they got their answer and reflect on their learning. Instructors use task cards to scaffold learning and also help students draw and do voice record on SeeSaw. They can ask students to make edits and resubmit their work if needed.

**Social Characteristics**

Seesaw supports situated learning in that students can do voice recording or put text on the photo they took from classes or anywhere. For example, they could document learning in math class and capture a photo and do descriptive writing immediately after that. Seesaw also supports community of practice by publishing student's posts to a class blog to share with classrooms around the world.

**Motivational Strategies**

Students can see how much they have learned by looking at their journals to gain internal satisfaction. Teachers tag students' journals with a set of skills or goals, assign a star rating to give extrinsic motivation.

**Portfolium****Instructional Methods**

Portfolium effectively uses scaffolding, which enables all types of users (even those who are not familiar with portfolio making) could start making portfolios. By making users choose on what types of project they want to document, it guides and shapes the project's title, direction, and content.

**Social Characteristics**

Taggins system, along comments, is very useful in the website to see others works and get inspired. Tagging is not only for the theme but for the tools as well, which works as a nice resume element when presenting.

**Motivational Strategies**

There are featured works, challenges of the month sponsored by companies with prizes, which could draw users to participate in such activities and put more projects under their profile.

**IDeATE Gallery****Instructional Methods**

IDeATE Gallery acts as a supplement of IDeATE. Teachers can use IDeATE Gallery as a "pool" to collect students' work, which encourages them to document their work and do the reflection.

**Social Characteristics**

IDeATE Gallery has a unique social character that it targets at CMU students only, which may be bad for broader communication but good for building a closer relationship and sense of belonging.

**Motivational Strategies**

IDeATE Gallery has some motivation strategies like highlighting the works and showing the recent discussion on the homepage.

**INITIAL USER STUDY**

# User Interview

"Thinking aloud may be the single most valuable usability engineering method."

— Jakob Nielsen

Based on the literature review we did a series of interviews with master portfolio makers. We recruited four students who are involved in portfolio making process, by university's curriculum or personal motivation. We made sure to choose our subjects to be distributed in terms of their experience in portfolio making, expertise in different domain – coding, researching, sketching, and prototyping.

For each interview we spend about thirty minutes on structured interview, followed by another thirty minutes on walking through their own projects and portfolios and think aloud on process of project documentation.

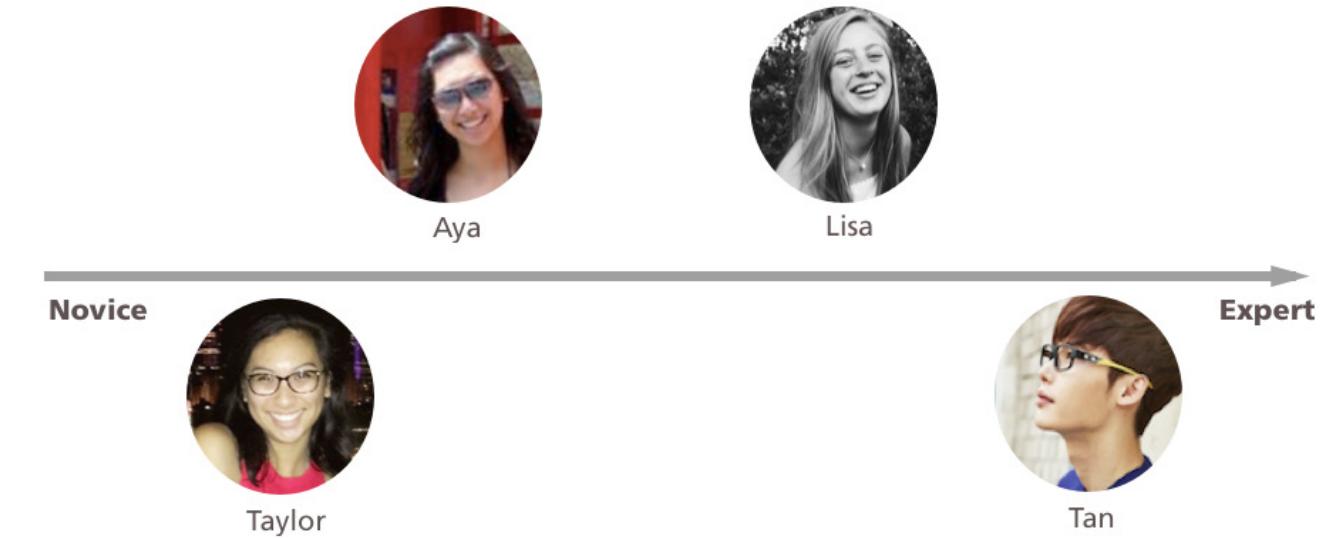
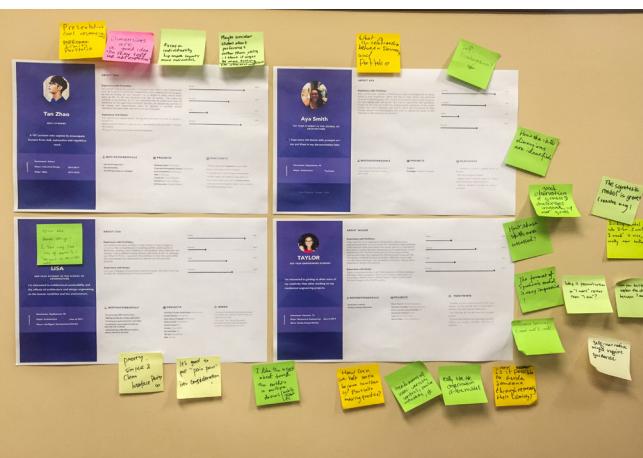
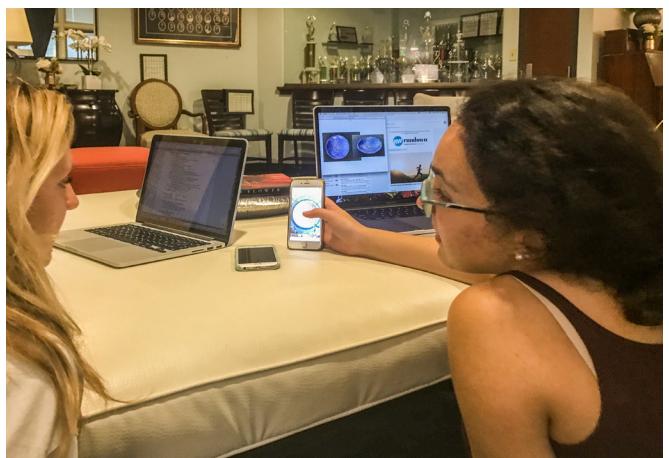
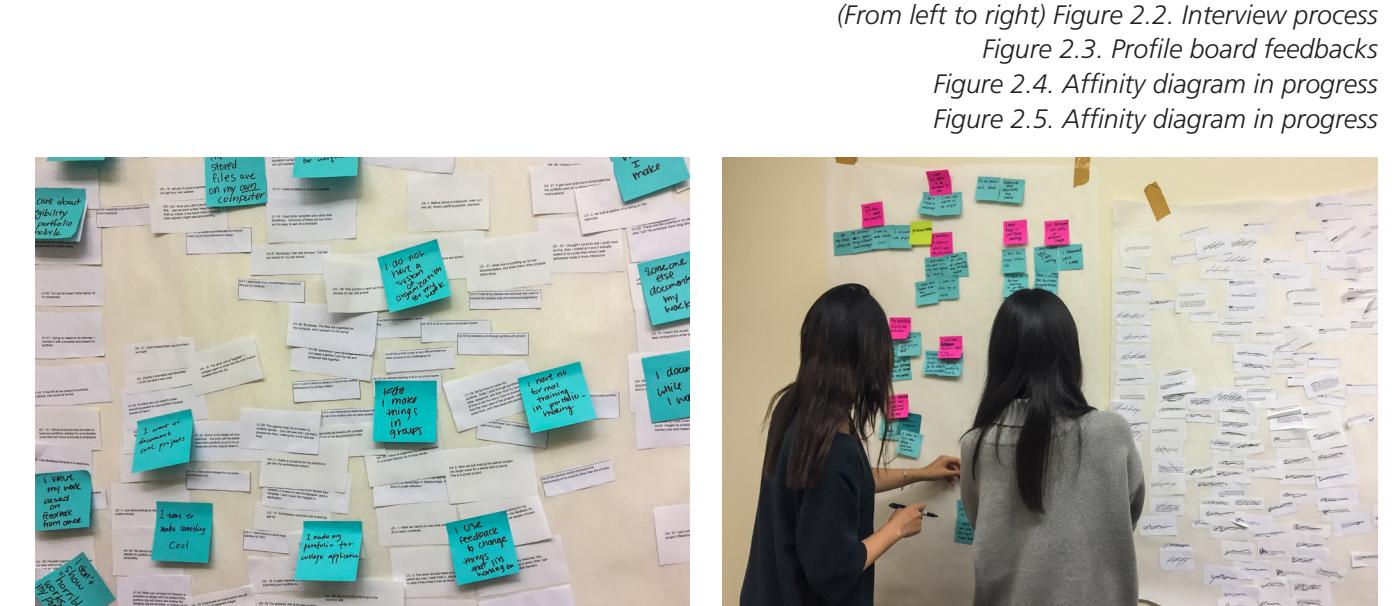


Figure 2.1. Portfolio makers on scale



(From left to right) Figure 2.2. Interview process

Figure 2.3. Profile board feedbacks

Figure 2.4. Affinity diagram in progress

Figure 2.5. Affinity diagram in progress

**Lisa**

1ST YEAR STUDENT IN THE SCHOOL OF ARCHITECTURE

I'm interested in architectural sustainability and the effects of architecture and design engineering on the human condition and the environment.

**BACKGROUND**

Hometown: Doylestown, PA  
Major: Architecture class of 2021  
Minor: Intelligent Environments/IDeAte

### ABOUT LISA

**Experience with Portfolios:**  
Lisa started making her portfolio in high school in order to apply to university. She is experienced in creating portfolio and is good at sketching, drawing, and modeling for her projects. She coded her own website. Lisa is skilled in using various tools such as PS, AI, InDesign, and VRay for Rhino. Lisa wants her portfolio to show her personality. She documented her class works as well as her own personal projects.

**Experience with Ideate:**  
Lisa took Intelligent Environment class from IDeAte. She liked it but had to drop the class because of her busy schedule.

Sketching	Expert
Researching	Expert
Coding	Expert
Prototyping	Expert

**MOTIVATION&GOALS**

- For documenting school works.
- For college application.
- For internship application.

**PROJECTS**

- Wedding Pavilion Final Project: Architecture
- Folded Garden: Architecture
- Hunt Library Proposal: Architecture
- Rediscovered: Architecture
- Uninterrupted: Art
- Analog: Digital Media
- Art portfolio: Art
- My eye: Photography
- Film: Filming

**PAIN POINTS**

- Lisa wants more social connection with people and portfolio is an important identification and expression of herself.
- Lisa values "me" and portfolio which documents what she made and what she thought can greatly show who she is.

**Tan Zhao**

MHCI STUDENT

“ A HCI pursuer who aspires to emancipate humans from dull, exhaustive and repetitive work.

**BACKGROUND**

Hometown: Taiwan  
Major: Industrial Design 2013-2017  
Major: Mhci 2017-2018

### ABOUT TAN

**Experience with Portfolios:**  
Tan started making his portfolio in his senior year and is very experienced in it. He is good at sketching, researching, and modeling for his projects, as well as coding his own website. Tan is skilled in using various tools such as PS, AI, AE and physical tools like 3D-printer. Tan wants his portfolio to be perfect, so it's not surprising that he made more than 20 iterations for his application portfolio. Besides, he desires his portfolio to be unique and personalized, since he believes a portfolio should represent his personality and who he is as a designer.

**Experience with Ideate:**  
Tan hasn't tried IDeAte before. During the interview, he tried to upload a project on IDeAte and he thinks it is easy to use in general but can be better in details, like adding "Preview" function for the files before uploading.

**Past projects:**  
Sleeping Casino—UX Designer; Fingerprint Recognition System—UX Designer; Data Visualization—UX Designer; SOE—UX Designer; Tonebrush—Product Designer; Miswak Cut—Product Designer; Self-Generator—Product Designer

Sketching	Expert
Researching	Expert
Coding	Expert
Prototyping	Expert

**MOTIVATION&GOALS**

- For school application.
- For job hunting.
- For self-expressing as a designer.

**PROJECTS**

- Sleeping Casino: UX Designer
- Fingerprint Recognition System: UX Designer
- Data Visualization: UX Designer
- SOE: UX Designer
- Tonebrush: Product Designer
- Miswak Cut: Product Designer
- Self-Generator: Product Designer

**PAIN POINTS**

- Portfolio needs to be responsive across multiple devices, such as phone, iPad, and laptop. For example, the Toc Job fair does not allow laptop.
- Portfolio needs to be iterated for many times. Tan hopes to find an easier way to do the version control, so he can see the changes he made in every version or come back to a previous version.

**Taylor**

3RD YEAR ENGINEERING STUDENT

I'm interested in getting to show more of my creativity than when working on my mechanical engineering projects.

**BACKGROUND**

Hometown: Houston, TX  
Major: Mechanical Engineering class of 2019  
Minor: Media Design/IDeAte

### ABOUT TAYLOR

**Experience with Portfolios:**  
Taylor has little to no experiences with portfolio making. As an engineering student, it is uncommon for individuals to have portfolios unless they are more interested in the design aspects of engineering. Even then, it is not a standard component of job applications or even admission to CIT. Her first introduction to the concept portfolio making came when she registered for IDeAte portal course, 62-150, Introduction to Media Synthesis & Analysis. While the course does not offer formal training in documentation or portfolio making, she is interested in learning the practice.

**Experience with Ideate:**  
Taylor is currently enrolled in 62-150 Introduction to Media Synthesis & Analysis. Upon completion of this portal course, Taylor plans on declaring an IDeAte minor in Media Design.

Sketching	Expert
Researching	Expert
Coding	Expert
Prototyping	Expert

**MOTIVATION&GOALS**

- Exploring her creativity.
- Working for Disney Theme Parks.

**PROJECTS**

- Mouse Trap Car: Mechanical Engineering
- Astronaut's Coat Rack: Mechanical Engineering
- Dimensional Translation: IDeAte
- Crane: Mechanical Engineering
- Wrench Design: Mechanical Engineering

**PAIN POINTS**

- Portfolios are not a common practice within her industry, but she sees the value in being able to show her work rather than just explaining it.
- Only feels like she can document the successful projects
- No formalized classes on documentation / portfolio making are currently available. She has no guidance.

**Aya**

1ST YEAR STUDENT OF THE SCHOOL OF ARCHITECTURE

I kept some old sheets with prompts so I can put them in my documentation later

**BACKGROUND**

Hometown: Doylestown, PA  
Major: Architecture Freshman

### ABOUT AYA

**Experience with Portfolios:**  
She is a first year student in Architecture, with no background in design (which is very impressive). When she was in high school, she practiced ceramics and photography. She has her past projects documented mostly on her own laptop and cell phone. She has no experiences with portfolio, except for the one she made for undergraduate admission.

**Experience with Ideate:**  
In her studio classes, she makes drawings and models, which she documents by date through scanner and photography. She plans to upload her works on AIA web pages as she develops her projects.

Sketching	Expert
Researching	Expert
Coding	Expert
Prototyping	Expert

**MOTIVATION&GOALS**

- Land a job in the field of Architecture
- Have artworks, not only her projects, documented.

**PROJECTS**

- Ceramics
- Precollege: drawings and images

**PAIN POINTS**

- Everything is stored in separate pieces of hardware
- She only has images, no caption
- Multiple layers of process needed for college admissions process - slide room, pdf, etc
- Different standard of portfolio for different universities

Figure 2.6. Final user profile boards

**INITIAL USER STUDY**

# Synthesis model of portfolio making

From rounds of iterations based on user profile boards and affinity diagrams, we came up with the synthesis model, showing eight essential criteria for making portfolio.

We chose Identity diagram, based on different conceptual, dispositional and motivational needs that emerged from the affinity diagram we made from portfolio makers. Each bubble explains what each title represents, followed by quotes showing the best of those titles.

This identity diagram has set us a direction to dig deeper for the next round of user research.

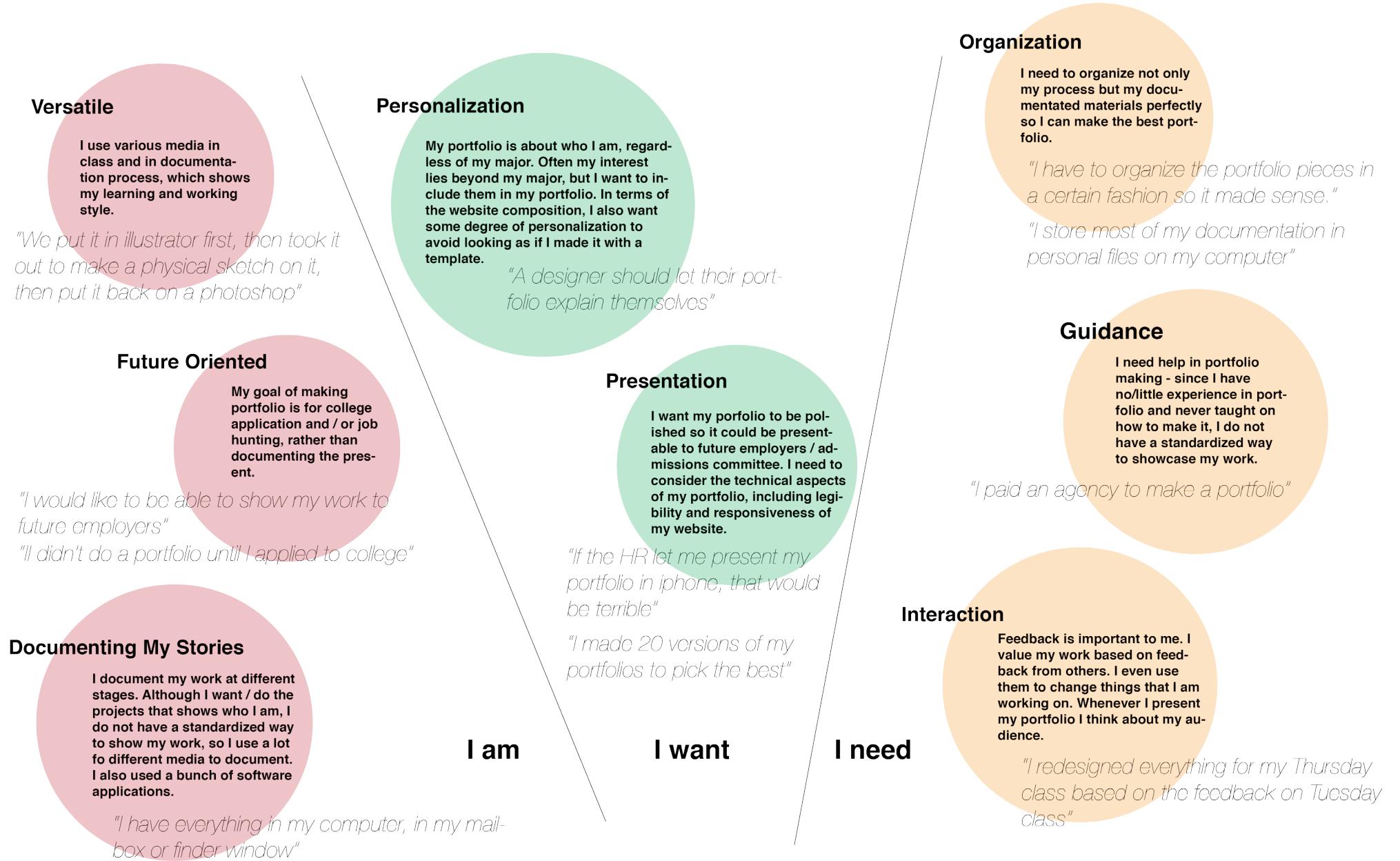


figure 2.7. Synthesis model of portfolio makers

**IN-DEPTH USER STUDY**

# Site study and Pilot interview

**Site Study**

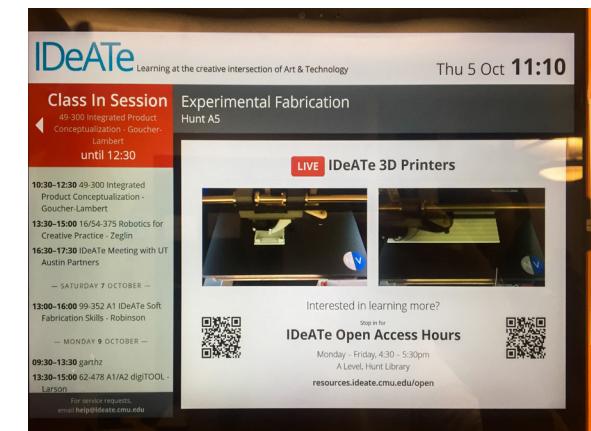
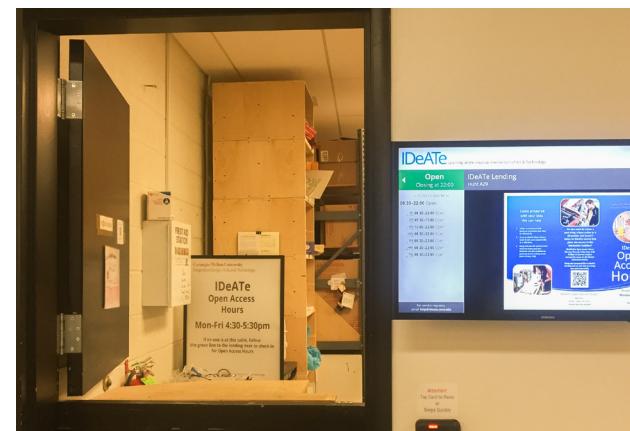
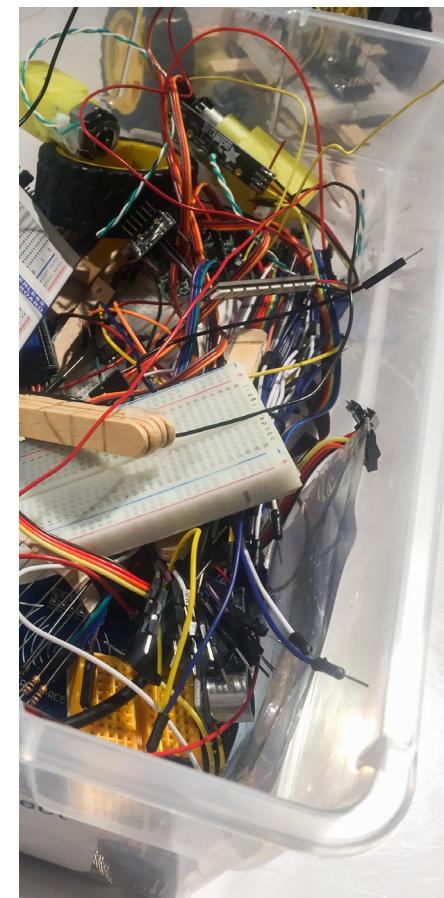
"This methods can be used when you need to learn more about the inner workings and the internal culture of a particular group. It brings direct observations and interviews together".

Muratovski, G. (2015).  
Research for designers:  
A guide to methods and practice.

We conducted a site studies about IDeATE to know more about how the IDeATE students learn and work in the site, which can help us know more about our uses in context. We observed their documentation process like how they use their tools for documentation, how they store their staffs and in-progress works and how they document while making.

We conducted a guerrilla research and participant observation as a pilot interview. We went to IDeATE site and interviewed 3 students and a professor.

- Few IDeATE students use IDeATE Gallery. During our interview, only one of them heard of Gallery and had the misconception that Gallery is only used for showcasing the best student project.
- Few professors use IDeATE Gallery. During our interview, the professor was also not using Gallery for his classes as well because he has already built a class blog to collect students' work.
- It seems that students don't have much difficulty documenting as their professors would instruct them to document, and they would be better at documentation toward the final project, so we decided to focus our research more on Gallery.



(from left to right, top to bottom) figure 2.8. site of IDeATE space  
 figure 2.9. found learning artifacts from the IDeATE space  
 figure 2.10. interview with one of the students in IDeATE  
 figure 2.11. IDeATE space  
 figure 2.12. IDeATE's use of digital media

**IN-DEPTH USER STUDY**

# Stakeholder Analysis

## Meeting with Kelly

Our main motivation in meeting with Kelly Deleany, Assistant Director of the IDeATE program at Carnegie Mellon, was to gather a better understanding of IDeATE. As the assistant director, Kelly interacts with all major IDeATE stakeholders including faculty, administrators, and students. Since Kelly has been apart of IDeATE from its humble beginnings, she has seen how IDeATE has grown and she is a part of the conversation on where it will go next. In our interview, Kelly discussed how important IDeATE is becoming to the university. IDeATE, as Kelly explains it, is a space where the different departments converge, coming together as experts in disparate fields to learn from one another through collaboration. That was one point that Kelly made very clear. IDeATE is about learning through collaboration.

What makes IDeATE different from other larger departments on campus is that IDeATE is not about production, but rather process. Students in design and engineering are taught to design to certain standards and produce reputable work, but in IDeATE, students are encouraged to collaborate and try something new, producing work they would not have in their more formalized primary areas of expertise. IDeATE, as Kelly explains, is a space where students can truly be interdisciplinary. Carnegie Mellon, as a university, prides itself on being interdisciplinary and bring. In this, Kelly explained that IDeATE is important in providing those intercollegiate learning experiences.

In regard to the IDeATE gallery, Kelly shared that as a department, given the growing interest in the program at the university and prospective student level, they are looking to integrate and display portions of IDeATE gallery on the department website.

## Meeting with Daragh

Based on our interviews with IDeATE Gallery students, we prepared some questions for scoping our three main goals.

Goal 1: try to find the design ideas of Ideate Gallery. Why is it designed like this? What iterations or improvements were made since it was created? How did these designs help different users (students / faculty) to achieve different goals (learn / teach / make reflection / peer evaluation) better.

Goal 2: try to find the design ideas / needs / pain points about documentation

Goal 3: try to find the design ideas / need / pain points about collaboration

Daragh hopes that Gallery could stand somewhere in the middle between highly-curated professional portfolio and learning portfolio, but ultimately Gallery is a learning tool, which is quite different from the perception of the students we interviewed. So we think Gallery should be promoted to what it is, a learning tool.

Daragh talks about how we could enable students to gain feedback in order to keep students engaged. We learned that the two drivers of Gallery is documentation function and comment function, but comment is not working. Daragh believes feedback needs to be scaffolded with prompts and guidance, and there are multiple challenges involved in giving feedback online, such as people don't like being harsh online and students don't have time

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to do it. We think the feedback loop is an interesting topic to explore and we want to learn more about how to motivate students to support each other's work by giving progressive feedback. We are interested how to increase engagement in the Gallery space through building a community that reflects IDeATE culture.

We also discussed with Daragh our two possible solutions to increase engagement in Gallery. One is to invite prospective students to join, and the other is to connect Gallery with Handshake, CMU's job-seeking website. We learned from Daragh that prospective students were already looking at Gallery, but he was not sure about their roles in the Gallery. Regarding integrating with Handshake, Daragh emphasized Gallery is in an intermediate state between a learning tool and a highly-curated professional tool. Therefore, it makes more sense if students could learn portfolio-making process from Gallery, and transfer what they have learned from Gallery to other professional portfolio websites to make it presentable to potential employers.

### IN-DEPTH USER STUDY

## User Interview

#### In-Depth Interview

In-depth interview which are open-ended and assume a conversational manner can offer a thorough examination of what the participants might feel about certain issues. Early in the concept phase of designing a website, it is critical to gather the needs of the intended customers: what are their goals, how do they conduct tasks and how are current websites aiding or hampering them. For collecting the richest data, nothing beats in-depth interviews.

We contacted nine students who have experience with IDeATE Gallery, including both alumni and current students. We conducted in-depth interviews with them using story-telling technique to find out their experience with Gallery and their attitudes towards documentation, curation, and the challenges they had with different projects. We also conducted interviews with our stakeholders to understand the value and goal of IDeATE and Gallery. Based on the interview insights we gathered from students, we were able to ask more specific questions towards our stakeholders and learn their perspectives.

We mapped out the users we interviewed. We have carefully chosen our pool to have a balanced sample and made sure they are representative of the students who are from art and tech backgrounds, and students who have experience with portfolio-making.

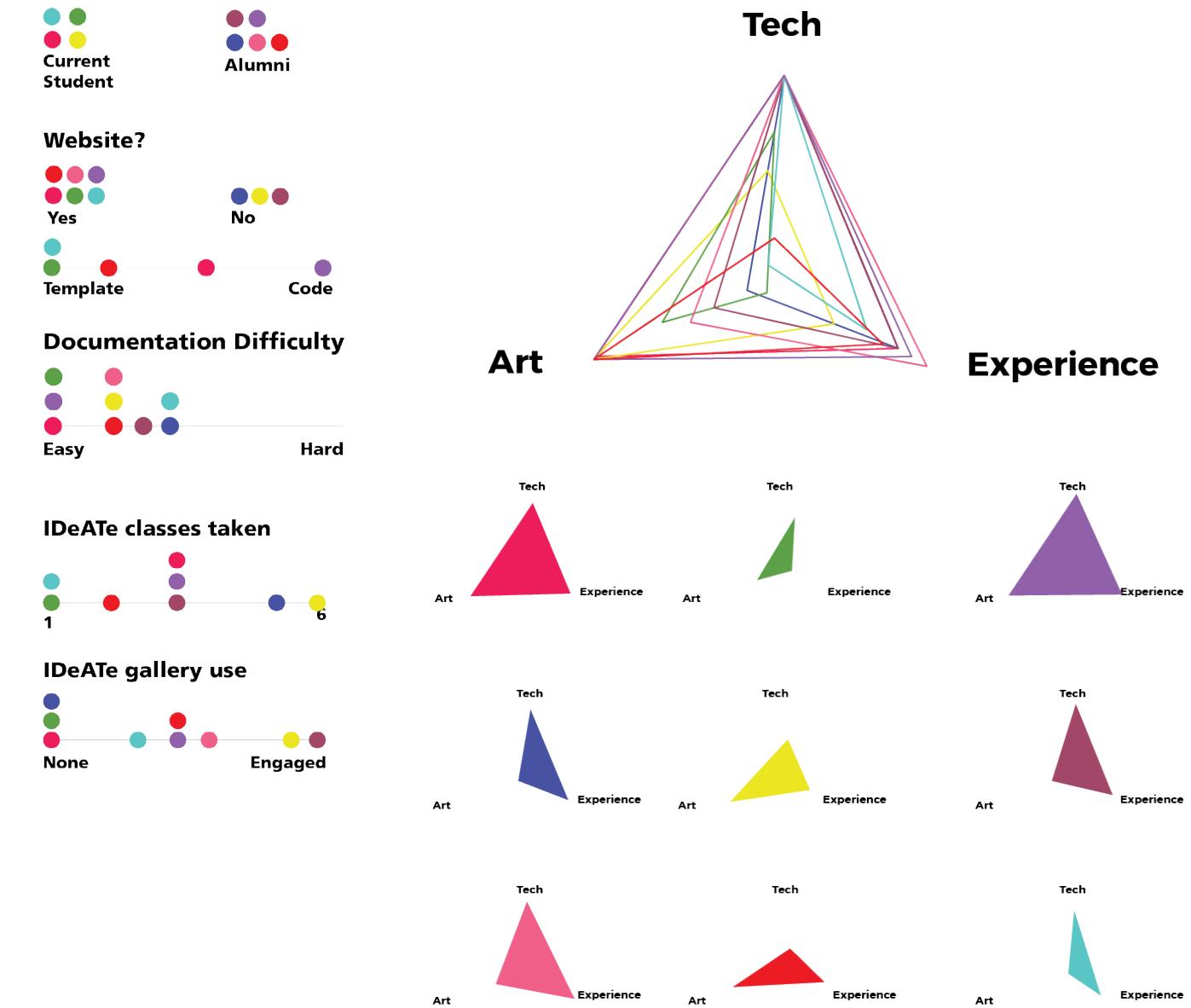


figure 2.13. user group mapping

## User Group and persona

### Persona

These profiles are called “personas”, a design tool that helps ensure that programs, services and systems are designed for real users. Alan Cooper, pioneer of software interaction design, coined the term, defining personas as a “hypothetical individual that takes on the characteristic of real users”, representing real people throughout the process of designing a service or product. “By using personas, we can develop an understanding of our users’ goals in specific contexts.”

(Cooper, A., Reimann, R., & Cronin, D. (2014) Modeling Users: Personas & Goals (Chap 3). In AboutFace 4: The essentials of interaction design. John Wiley & Sons)

We mapped our interviewees into two groups. Pink group represents novice: they seek feedback and care less about site customization. Blue group represents expert: they need more customization and less feedback. They put more value on self-evaluation.

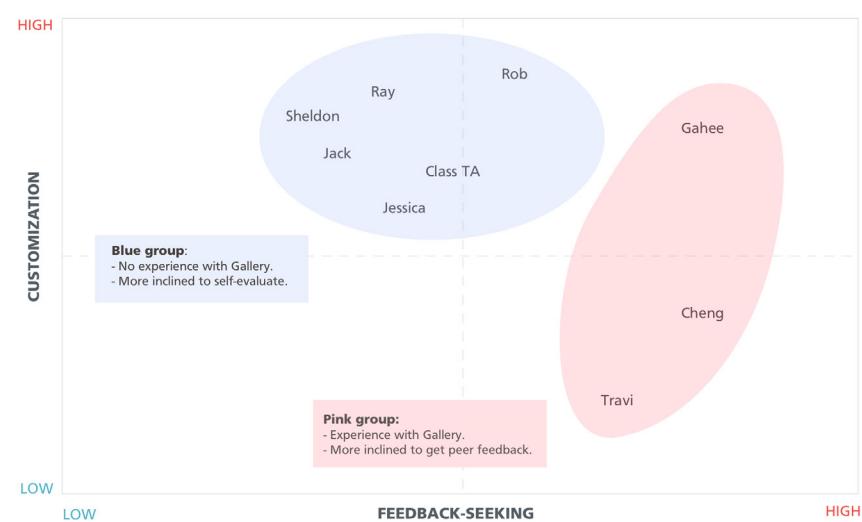
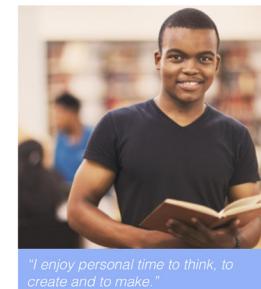


Figure 2.14. User group mapped

## James Taylor

**AGE** 22  
**OCCUPATION** Senior student  
**MAJOR** Media Design



*"I enjoy personal time to think, create and to make."*

*"I want everything on my projects clean and beautiful."*

**Goals**

**Life Goals**

- Constantly make improvements via self-reflection and self-evaluation.

**End Goals**

- more personal space and personal time for thinking. - refine and iterate projects easily.

**Experience Goals**

- eager to be unique.
- eager to build cool stuff.
- have a sense of achievement while building.

**BIO**

James is a senior student taking IDEATE course for this autumn semester. He takes media design and robot design in IDEATE this semester and he did individual projects in both classes. He uses Gallery as well as his personal website for documentation but he prefers the latter one more. He spent much time on designing his personal website. He had no coding background but he self-studied and coded an interactive background for his website, which he feels proud of.

**Likes**

- Projects which look clean and nice.
- Projects which is creative and unique.
- Receive experts' feedback.

**Dislikes**

- Stereotyped template for everybody.
- Less personal space for self-reflection.

**Website Preference**

Gallery  Personal site

**Feedback-seeking**

Low  High

**Personalization**

Low  High

## Katherine Garcia

**AGE** 22  
**OCCUPATION** Senior student  
**MAJOR** Information System



*"Documentation helps me keep track of my progress and show how I got to the final projects"*

*"I want peer feedback in every stage so I can improve quickly."*

**Goals**

**Life Goals**

- want to continue learning and build good products for people to use

**End Goals**

- gain feedback from peers and teachers.
- collaborate with teammates easily
- get inspiration from cool projects

**Experience Goals**

- want to have fun in building stuff
- have a sense of belonging in the community.
- eager to build cool stuff

**BIO**

Katherine is a senior student taking IDEATE course for this autumn semester. She enjoys making stuff and collaborating with students from diverse disciplines. She finds Gallery is simple to use as a documentation and collaboration tool, and she documents files on Gallery while making stuff, in the hope that she could get progressive feedback from peers or teachers to improve her projects throughout the phases. She wants to learn faster. She often browses works from peers in Gallery to get inspired and motivated.

**Likes**

- share projects with others
- receive peer feedback
- browse cool projects in the Gallery and get inspired

**Dislikes**

- be the first person to comment on other students' work
- spend time moving around the content blocks on the Gallery for documentation.

**Website Preference**

Gallery  Personal site

**Feedback-seeking**

Low  High

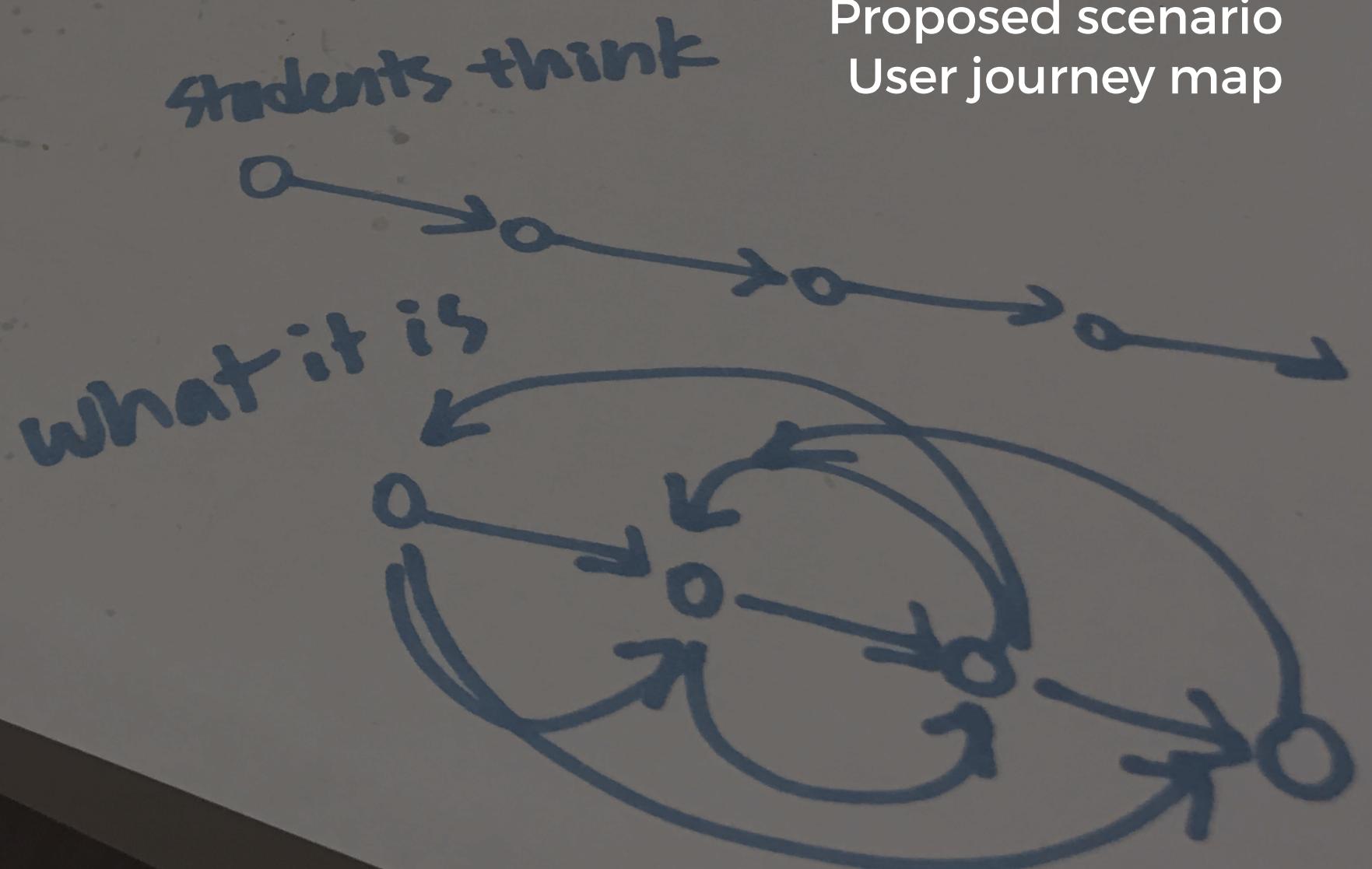
**Customization**

Low  High

Figure 2.15, 16. Persona pages

# Concept Development

How might we...  
Storyboards  
Proposed scenario  
User journey map



## How might we...

Based on our research insights, we started to brainstorm and generate concepts that could promote Gallery as a learning tool with a supportive feedback system and enable students to get progressive feedback from a diverse group of users in Gallery. We used the five phases in the portfolio composition processes to guide our brainstorming.

### Portfolio Composition Processes:

1. CAPTURE - store and collect evidence of learning and performance
2. MANAGEMENT - aggregated and manage that evidence
3. REFLECTION - iterative/sustained reflection on evidence
4. COMPOSITION - synthesis and presentation of evidence
5. ANALYSIS - human and machine review and evaluation of evidence



Figure 3.1. The portfolio composition processes from our class deck

### Our HMW Questions

- How might we ensure students get constructive feedback on their work in Gallery?
- How might we encourage students to give feedback that help other students learn in Gallery?
- How might we support progressive feedback through different stages of learning?
- How might we support feedback for more in-depth projects with multiple deliverables
- How might we encourage more people to comment on the projects?
- How might we make students feel comfortable publishing their works?
- How might we make students to ask directed/right kind of questions to get better answers for their questions?

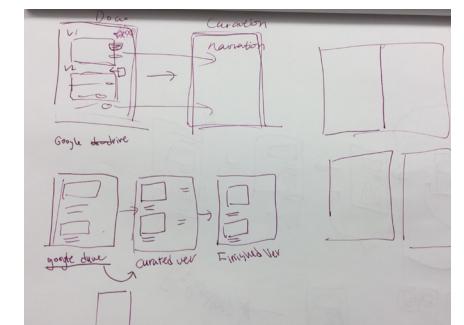


Figure 3.2. Initial sketches for ideas about documentation and curation

## Storyboards

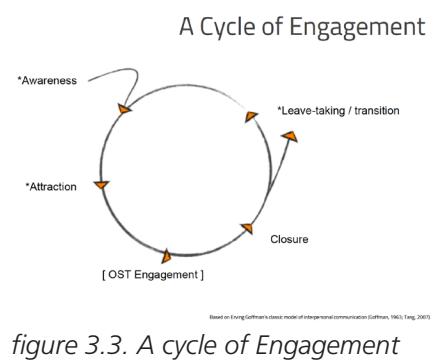


figure 3.3. A cycle of Engagement

Each of our team members drafted a fictional narrative based on our personas that describe how our design could address HMW questions identified for each of the five stages of the portfolios process—capture, manage, reflect, compose, and analyze (see figure 3.3). Then we each selected five promising ideas from our HMW brainstorming and developed these into a set of 3–5 panel storyboards. The following storyboards show two of the best ideas from each team member, and each provides a short context description and explanations for each panel.

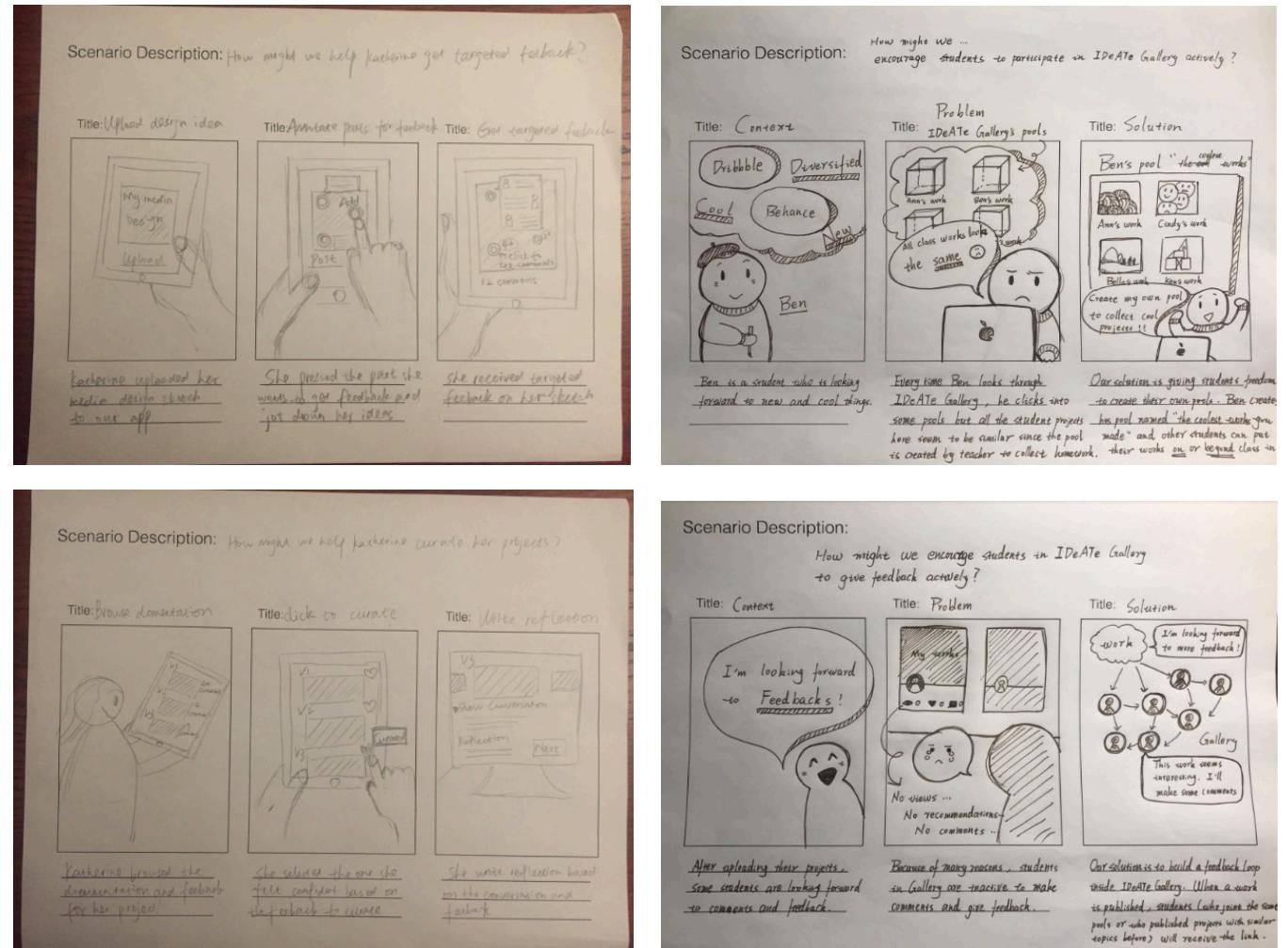


Figure 3.4, 5, 6, 7, 8. Storyboards

## Proposed Scenario

Katherine is a senior student majoring in Information System. Katherine recently joined an IDeATE class called Laser Cutting. The professor in this class encouraged students to try Gallery out because they could receive expert feedback from this community, so Katherine signed up for the site.

On a snowy day, Katherine saw a cat trembling in the cold. She felt so sorry for the cat, and an idea came to mind—“What if I could build a shelter for the cat to stay warm?”. She took a photo and started sketching out her ideas when she got back home. She wanted to learn whether her idea was good for laser-cutting, so she uploaded the photo and her sketch to the Gallery, hoping to get some feedback. Gallery prompted her to articulate her question, and use hashtags to label her question. Gallery also encouraged her to invite people who might be interested or experienced in this topic to review her question. She chose to invite her laser-cutting classmates, students who had used the same hashtag before, as well as members in the “laser-cutting” and “architecture” pools to give her feedback.

All of the people Katherine invited saw a notification when they used Gallery. One of Katherine’s classmates was inspired by her idea and commented on her photo, “This is a lovely idea that could make the world a better place. Just go for it.” Her classmate also annotated on her sketch, suggesting she could use acrylic board to make a window for the proposed shelter. At the same time, Katherine received another comment from a student with a background in architecture. This student commented, “You

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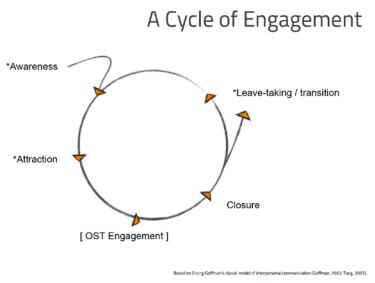
could probably put more columns inside the shelter to make it more sturdy.” As Katherine collected these thoughts, she saw another comment come in. A student with experience in laser cutting annotated on her sketch, “You might want to make the joints to be more precise. A good way to do that is to move the sketched line 11mm to the right.”

Katherine thanked all the people who gave her feedback by clicking on the “thank” button next to the comment, and revised her sketch accordingly. Then she built her prototype using laser cutting. She was happy with the prototype and captured it with a camera. She learned so much from the feedback , so she uploaded the photo to Gallery for another round of feedback. She enjoyed the process of making and receiving feedback from people who are also passionate about the same topic. In this way, Katherine was able to build a nice shelter for the cat with several iterations. She also felt the feedback helped her select her best artifacts and form narratives for her final portfolio. When she wrapped up the project, she also got invited by another student to answer a laser-cutting question. Since she was already an expert in this area, she was more than happy to answer the question to pay it forward.

# User Journey Map

## Design

We layered the cycle of engagement, which is aware, join, use, develop and leave onto the portfolio documentation phases as shown in the above figure. We traced two personas (expert/novice) across the experience with a related set of storyboard panels, action and touchpoints in the channels. The circular elements are suggestive of the iterative process, which is our feedback loop. Both experts and novices could annotate and interact in the process.



*Figure 3.9. The cycle of engagement framework*

# Feedback loop

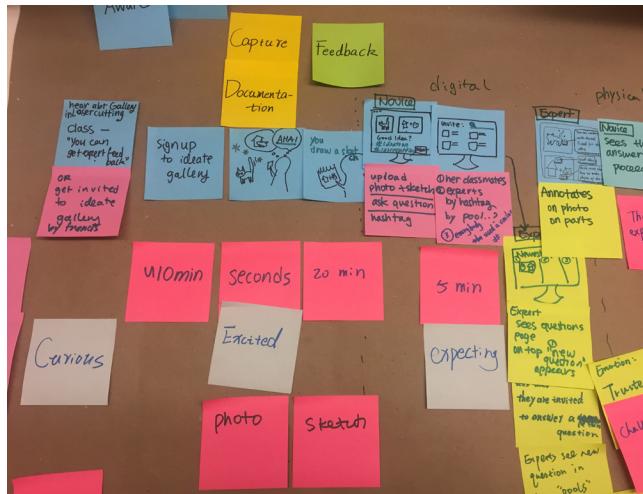
We aim to enable multiple micro-feedback loops that function like a forum and help students build their projects with each feedback loop. We see the whole process as multiple iterations that are growing in scale. There are three rounds of feedback given to novice at different stages in their portfolio-making process. 1) After documenting an idea. 2) After building one project with multiple documentation. 3) After composing different projects into one cohesive narrative. After that students will be more skilled and confident in documenting, curating, and presenting their works. They will understand the design process is messy and iterative, and could transfer their learning and apply it to other projects.

*"Love how it incorporates community and addresses issues of learning and motivations"*

- Feedback from stakeholders for experience map poster session



(Left) Figure 3.10. Mapping out different channels on paper  
(Right) Figure 3.11. Mapping out different channels on paper



(Left) Figure 3.10. Mapping out different channels on paper  
(Right) Figure 3.11. Mapping out different channels on paper

## **Vision and Problem Statement**

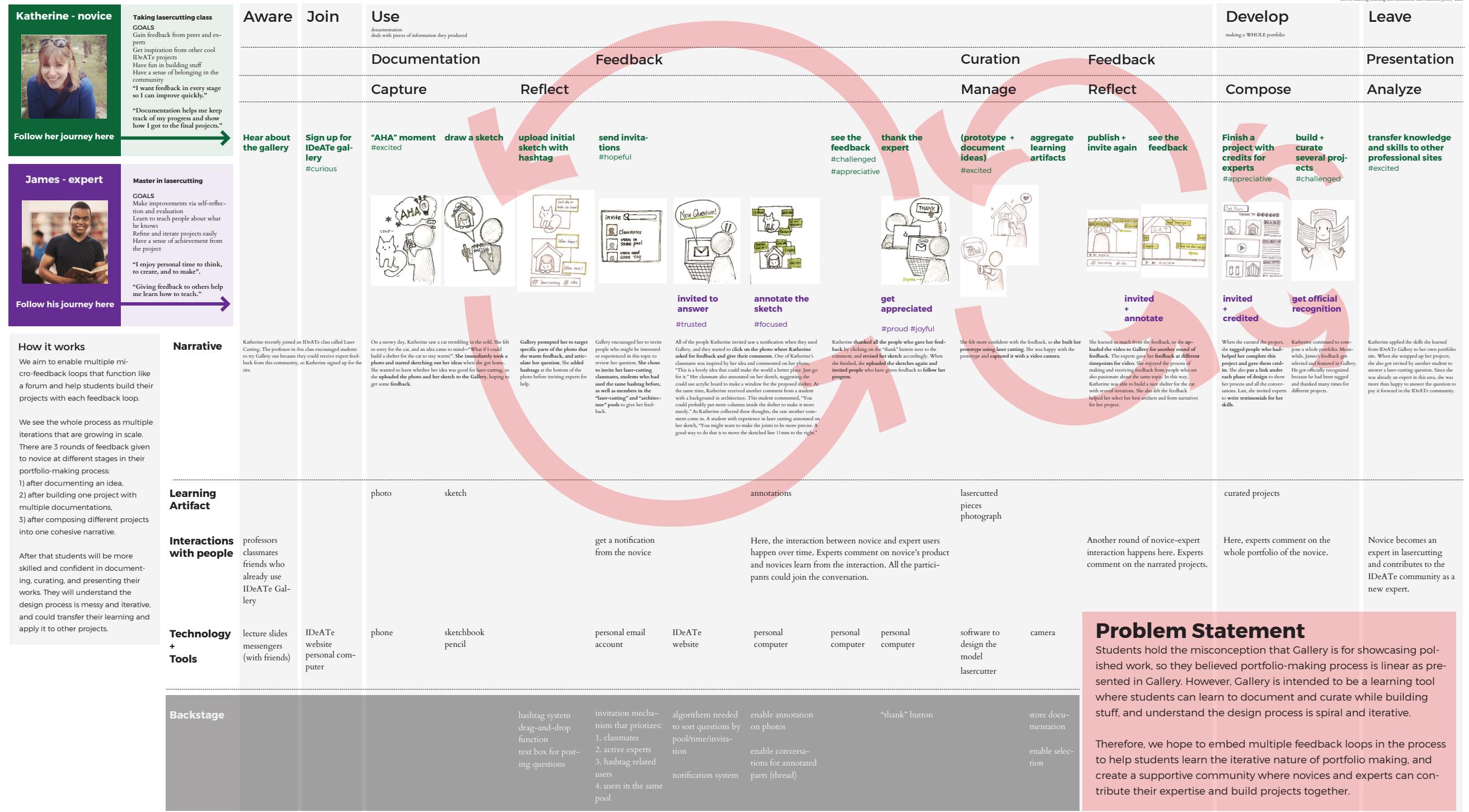
Students hold the misconception that Gallery is for showcasing polished work, so they believed portfolio-making process is linear as presented in Gallery. However, Gallery is intended to be a learning tool where students can learn to document and curate while building stuff, and understand the design process is spiral and iterative.

Therefore, we hope to embed multiple feedback loops in the process to help students learn the iterative nature of portfolio making, and create a supportive community where novices and experts can contribute their expertise and build projects together.

Figure 3.12. User journey map

## Experience model | Team 4

First row - from Service Blueprint  
Poincaré, A., Lovell, L., Reason, B. (2013) Describing the Service Blueprint  
Design: From Insight to Implementation. Rosedale.  
Second row - from the synthesis model (in process book)  
Cambridge, Dutton (2010) "The Portfolio Process and the Processed Portfolio," Chap. 8 in E-Portfolios for Lifelong Learning and Assessment, San Francisco: Jossey-Bass.



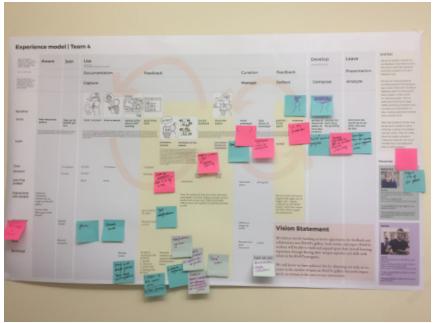


Figure 3.13. We put notes on our initial poster to flesh out our design



Figure 3.14. Explaining our ideas in the poster session

### How to help novices pose questions:

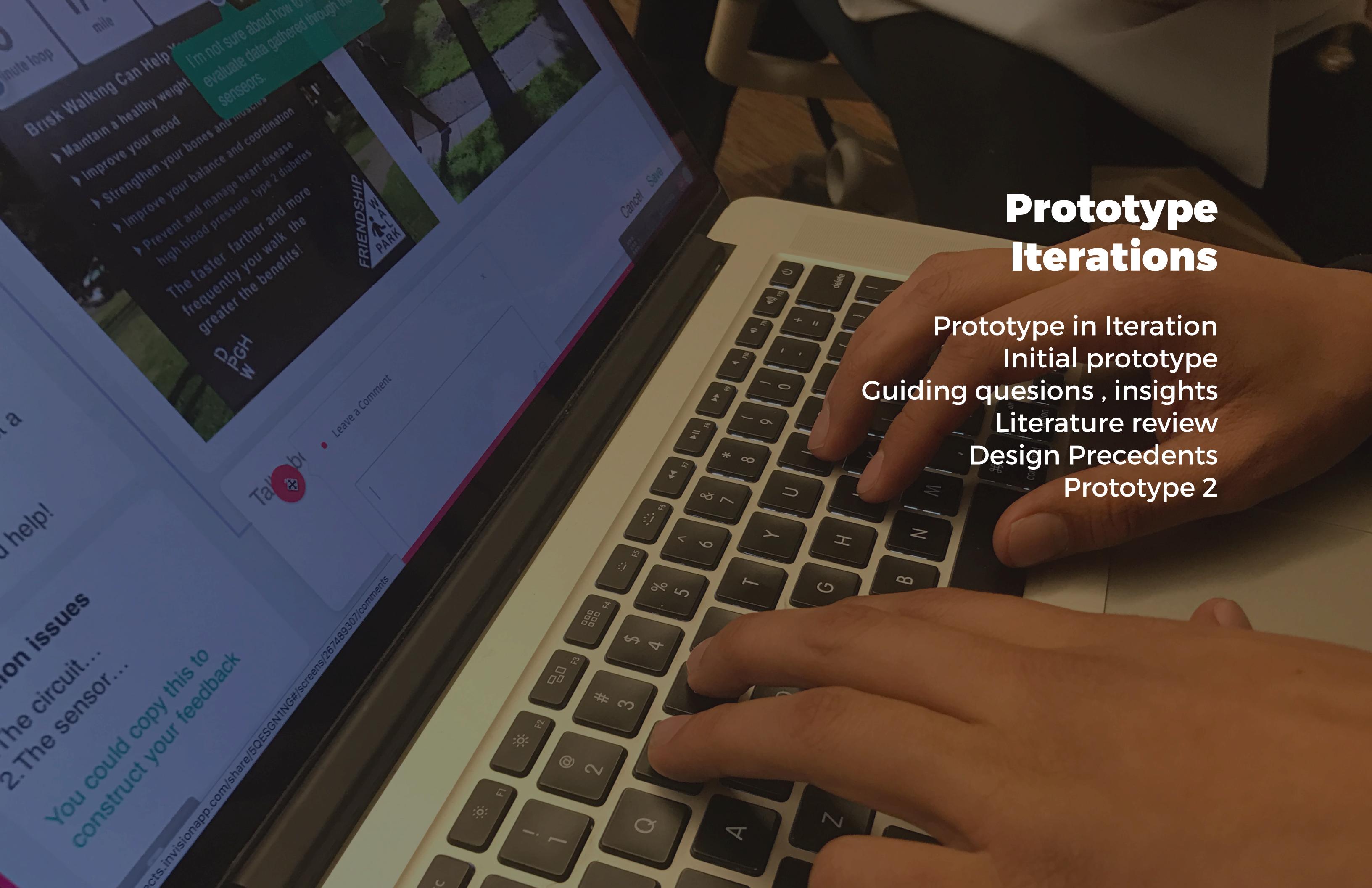
- Hashtag should auto-invite experts
- Thanking should add expert tags to pages, which could help other students to know who to ask for help

### How to motivate experts give quality feedback:

- Permit expert statements on finalized published page
- Created page should link to whole process
- Experts get # of thanks on their profile, for example
- Student resume/rewards for adding to Gallery

# Prototype Iterations

Prototype in Iteration  
Initial prototype  
Guiding questions , insights  
Literature review  
Design Precedents  
Prototype 2



## Prototypes in Iteration

For prototyping, we decided to focus on the first feedback loop, where students get the “Aha” moment.

Cite: role implementation look and feel

MODEL OF WHAT PROTOTYPES PROTOTYPE

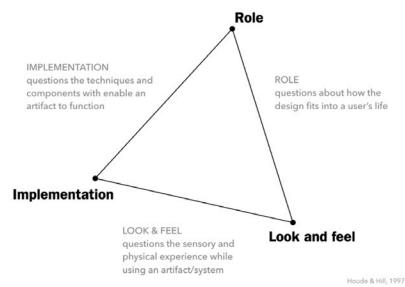


Figure 4.1. Model of what prototypes prototype

## Initial Prototype - Poster

### Overview

We adopted a design probe to try out our feedback idea and understand the subtle qualities of experience. The guiding question for our design probe is “How are students going to engage in feedback?”

### Design

In order to gather feedback from IDeATE students, we used a laser-cutting project as a prompt for the first our poster (see figure 4.2). Our idea was to build a squirrel den because winter was coming. We put “Help us improve our idea!” as heading and “Your feedback matters” and “#improve IDeATE” down below to attract attention. We asked on the poster:

“Does this idea sound good to you?”

“Where could we improve on our ideas?”

“What else could we include on our sketch?”

We designed a second poster(see figure ##) in order to enable students put their own sketches up there and gather feedback using our poster. The second poster shows “Moments of breaking point”, and we put one sketch up there as a model.

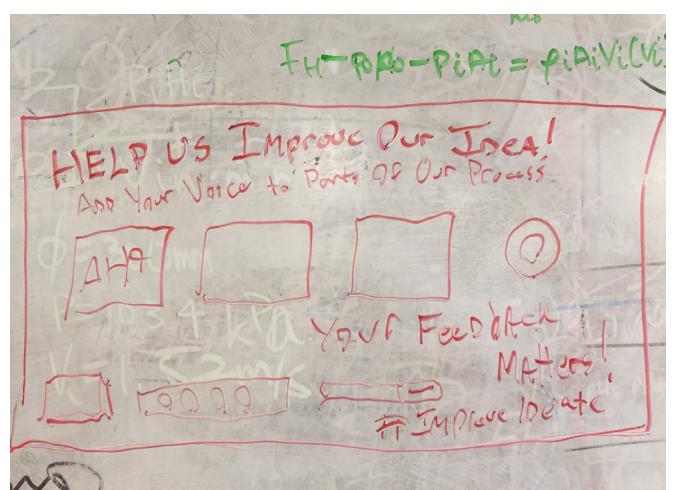
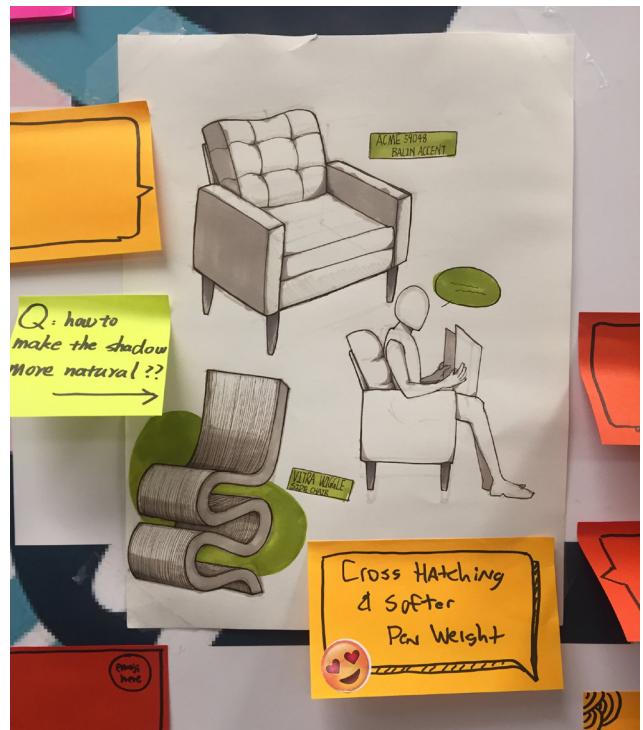
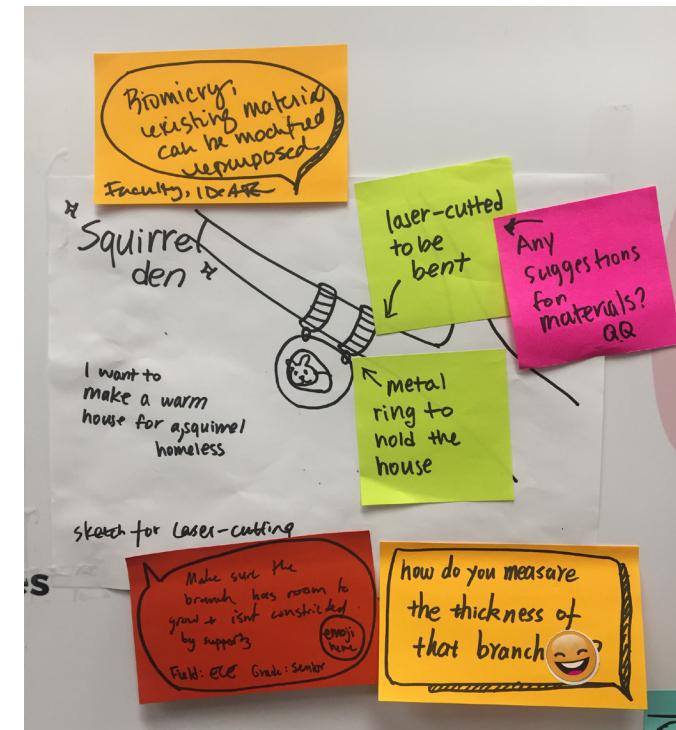
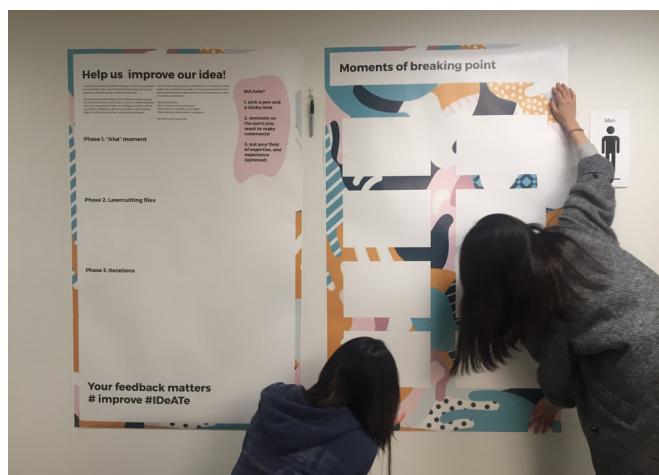
We put the posters in the IDeATE space where students frequently visited (beside the bathrooms). We prepared markers, sticky notes, emoji stickers beside the posters. We also drew conversa-

tion bubbles of different shapes and put them on the posters to make it easier for students to come and give quick feedback.

## Result

We collected our posters after a week. To our surprise, they were torn down from the wall and our emoji stickers and markers were gone. The posters were put on the table opposite the wall, and we were happy that we collected three pieces of feedback. The community did want to help! We found the feedback was very targeted towards the questions we asked, and emojis were used. The feedback stickers were put right on the sketches. Therefore, we decided to continue on this path and design image-based interactions.

- (left to right, then top two)  
 Figure 4.2. Our team putting up the posters  
 Figure 4.3. Feedback on our posters  
 Figure 4.4. Designing a sketch for our poster.  
 Figure 4.5. Our TA helped us develop ideas and layout for our poster.  
 Figure 4.6. Feedback on our squirrel den idea  
 Figure 4.7. Feedback on a sketch in the "Breaking points" poster



# Initial Prototype - Static Wireframes

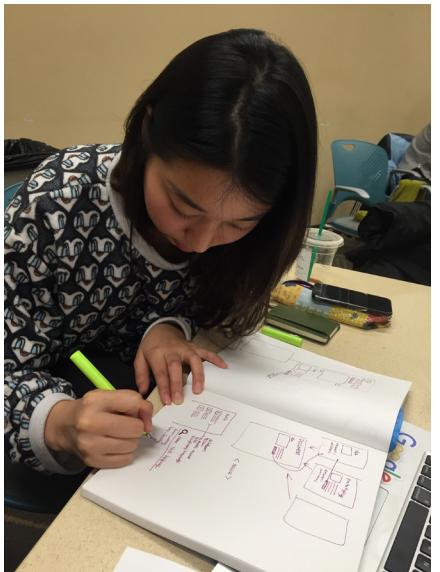


Figure 4.8. Sketching initial wireframing ideas in class



Figure 4.9. Sketched wireframes on paper

## Overview

We developed wireframes for our key screens and used paper prototypes to conduct our testing. We interviewed 5 IDeATE students as 5 users should be able to identify 85% of all usability problems as stated by Jakob Nielson. We used building a cat house as a laser-cutting project to guide our users to test the paper wireframes. Our first user struggled to draw a cat house as a sketch and posed questions based on the sketch she drew,. So we changed our strategy for testing the other students. Instead of using the cat house as a prompt, we asked students to think about a project they want to ask some questions about and get feedback. This time we got to see real IDeATE projects and possible questions students would ask. By giving students some voice, we let them draw something they can relate to and ask questions that matter to them.

He uploaded it and asked, “Is there some chip in the market small enough for such a camera?” “Is this a good idea? Can the camera be 3D printed.?”

Then he added hashtag “MiniCamera”, “CameraBall” , “EyeBall”

The expert student replied, “The idea is great. Totally doable. 3-D printing is not the right choice. It probably is cheaper just to buy it.” “Meet Daniel@cmu.andrew.edu. He will help you with the cameras.” The novice responded “Thank you!!! ” When the expert sees the reply, he told the novice student that “Thank you is the worst thing you can do. You know we are all pretty busy with school projects.”



Figure 4.10. The first user was hesitant about drawing a cat house.

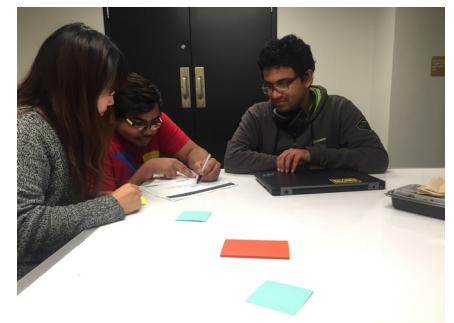


Figure 4.11. These two users acted as expert and novice. They had no trouble drawing something they can relate to.

## Guiding questions and Insights

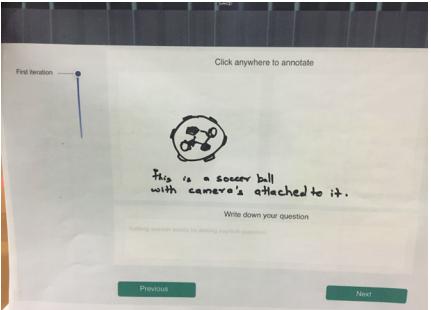


Figure 4.12. The novice drew a soccer ball.

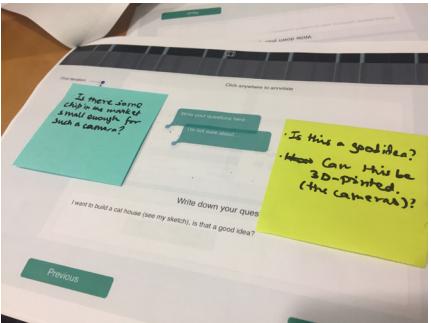


Figure 4.13. The novice asked specific questions.

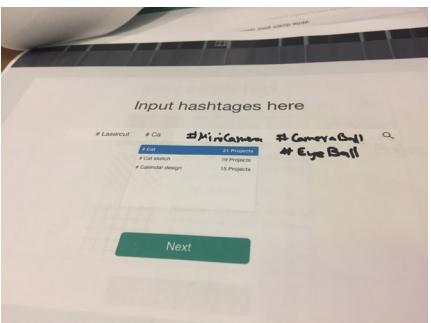


Figure 4.14. The novice was asked to input hashtags

### Do novices feel comfortable uploading sketches for feedback?

- Yes, they are comfortable uploading early work
- As long as they could get feedback.

### What kind of experts do novices want to invite?

- Invite instructor for expert feedback
- Students who have done similar IDeATE projects before
- Students with relevant credentials.
- Friends
- Invite as many people as possible

### What make the experts motivated to give feedback?

- See new ideas
- Pay back the community
- Reply to something experts feel passionate about.
- Feel obligated to reply if invited by friends

### What kind of reply do experts want to see?

- Serious and meaningful reply. Experts want follow-up.

### Fortune cookie feedback system

Kulkarni, Chinmay, et al. "Peer and self assessment in massive online classes." *Design thinking research*. Springer International Publishing, 2015. 131-168.

The authors discuss about the effect of peer assessment on individual learners in online courses. Online courses have automated answer which is beneficial in grading large amount of data, but easily lost when dealing with open-ended questions. Furthermore, it raises a question in fields that require creativity, such as design, which benefits the most from seeing others' works. Driven from this context, the authors ask a research question - How can we scale both evaluation and peer learning in creative domains online?

Peer assessment lets the system to offer open ended assignments, and takes the advantage of human grading - easily provide context appropriate responses, and better handle ill-specified constraints. Also, it creates motivation for students to do their own work as well (supported from surveys in physical classroom setting).

Participants in the courses had to go through pretraining to assess others' works. Pretraining phase for 5 example assignment, with rubrics that experts made. Then they started grading their peers' assignments. They also are asked to grade their own assignment after peer grading.

While rubric offers numerous benefits to assessment, it also has shortcomings. First, it does not include why the student did

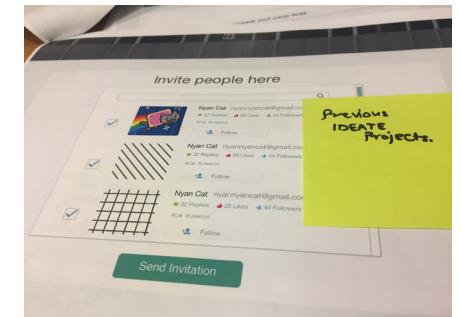


Figure 4.15. The novice wanted to invite experts who have done similar projects

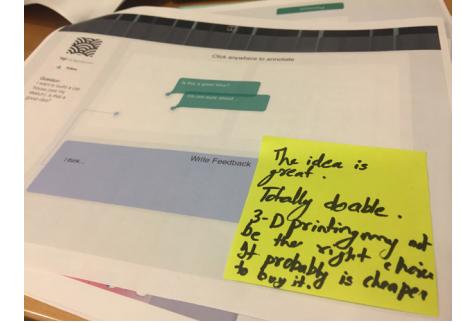


Figure 4.16. The expert gave feedback on the novice's idea.

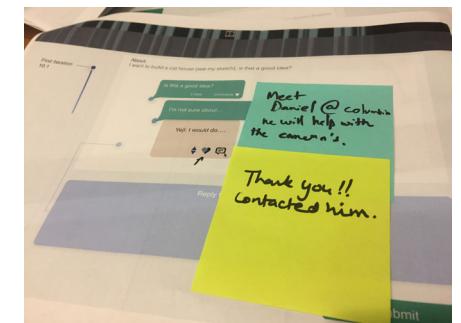


Figure 4.17. The novice replied to the expert.

## Literature review

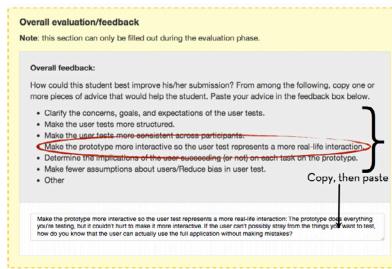


Figure 4.18. Fortune cookie system in use

poorly on one domain. Secondy, it points out only the part that the students did wrong, but not how to improve.

To address these shortcomings, they employed snippets of feedback, as known as “fortune cookie” system. After the grading was done, raters are prompted to pick a snippet the learners need feedback on and explained why – “because -----”. This method provided better quality feedback, because it reduces the cost of feedback. The raters did not have to recall and identify which part of the question was not aligned with learned part – instead they just recognize one of the sample issues presented. Secondly, by seeing all kinds of “common mistakes” students make, the raters’ inhibition was reduced and they were able to see the issues of the learner at hand more critically.

These are the two points of peer feedback we could employ in our design. Giving the peer rater potential parts of the feedback that might require more information to be written, that could also lower the peer inhibition.

In our design model, due to the nature of problems users are tackling, we are prompting the questioners to raise questions that could be a guiding one to the answerers. In this way the questioners could get more targeted feedback than the experts, while taking an advantage of online system, which enables people from different domains of studies could contribute to each others’ works.

## Feedbackstudio

(Kulkarni, C. E., Bernstein, M. S., & Klemmer, S. R. (2015, March). PeerStudio: rapid peer feedback emphasizes revision and improves performance. In *Proceedings of the Second (2015) ACM Conference on Learning at Scale* (pp. 75-84). ACM.)

The paper introduces PeerStudio, an assessment platform that leverages the large number of students’ peers in online classes to enable rapid feedback on in-progress work. Students submit their draft, give rubric-based feedback on two peers’ drafts, and then receive peer feedback. We could employ the findings from the paper in the following ways. First, students could be asked to answer others’ questions after they submit one, which could improve their chances of questions being answered. Second, we could give students prompts for reflection and goal-setting in response to expert’s feedback. Third, the paper talks about embedding heuristic that could catch a large number of low-quality comments using the comment’s total length and compiling a list of relevant words from the student draft and the assignment description. This is a potential solution for IDeATE to consider but not our main focus.

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### Ideas we implemented from the reading

1. Ask students to answer others' questions after they submit one, as everyone is more or less experienced in IDeATe. This could improve their chances of questions being answered and build a supportive community.
2. Give students prompts for reflection and goal-setting in response to expert's feedback

### Validating Concepts

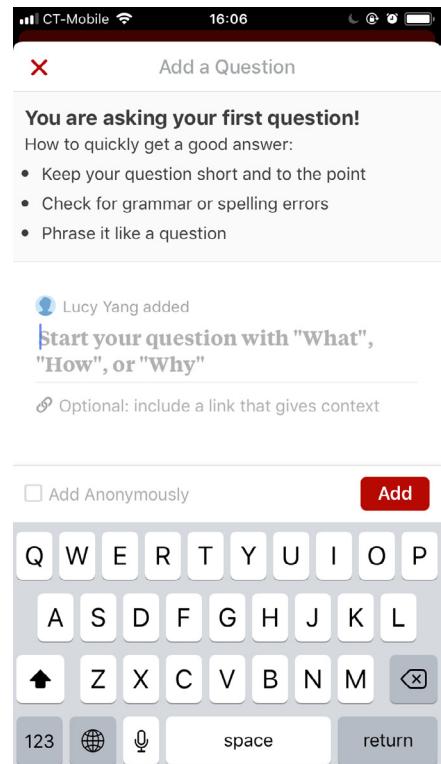
(Hicks, C.M., Pandey, V.C., Fraser, C.A. & Klemmer, S., (2016). *Framing Feedback: Choosing review environment features that support high quality peer assessment*. CHI.)

The paper talks about the importance of carefully structuring online learning environments to ensure high quality peer reviews. There are three key findings. The first one is that numeric scale rating could elicit more explanatory, but lower quality reviews. Second, breaking up peer review tasks in stages to help broaden peer reviews' focus. Finally, drafting process should be shown to deepen feedback. Showing reviewers a draft along with finished work elicited reviews that focused more on the work's goals than aesthetic details.

### Concepts validation

1. Don't use numeric ratings because it could decrease developmental feedback
2. Break up peer review tasks in stages to help broaden peer reviews' focus
3. Drafting process should be shown to deepen feedback

# Design Precedents



Cite: quora, Zhihu

Content-uploading interface for Zhihu

(Title, Tag, Description with images and videos, Anonymous checkbox, submit)

Cite: red pen, Invision

Redpen (point and click to make a com

Invision (comment mode, feedback org

(from left top to right bottom)

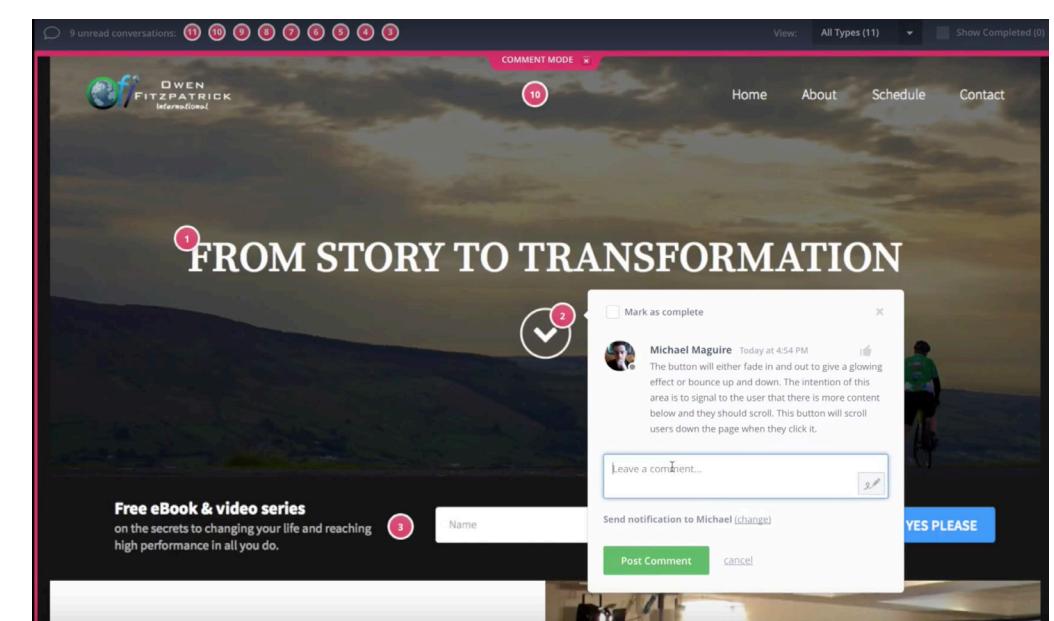
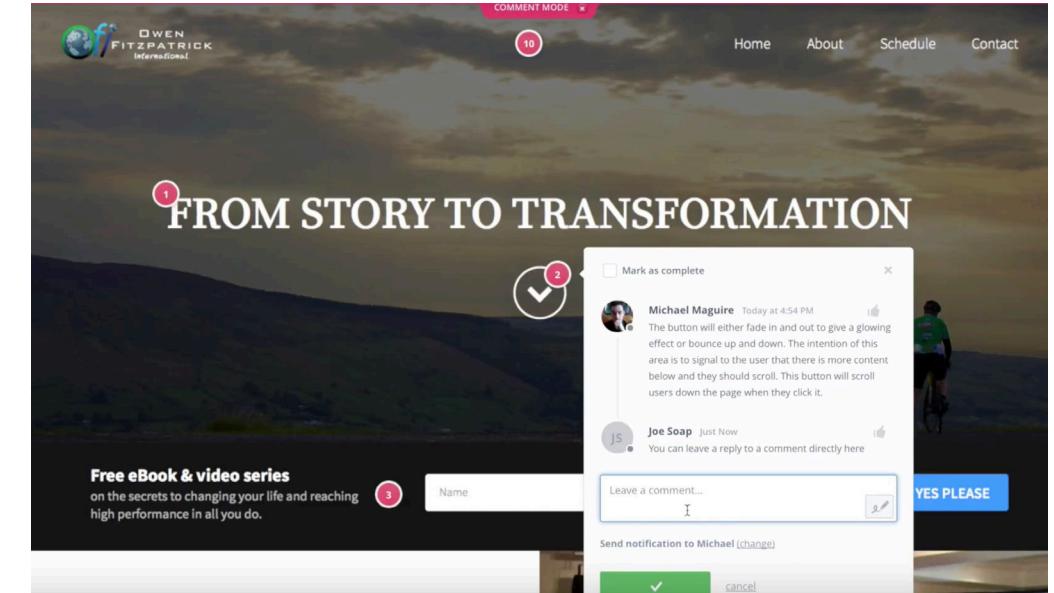
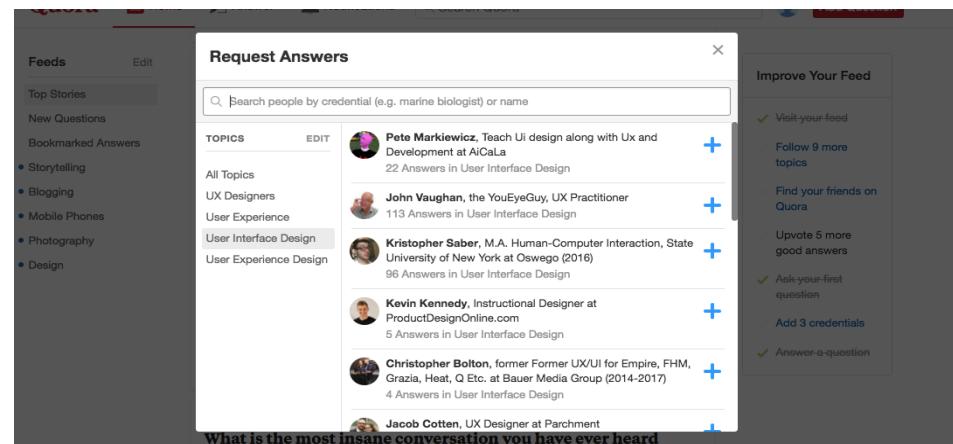
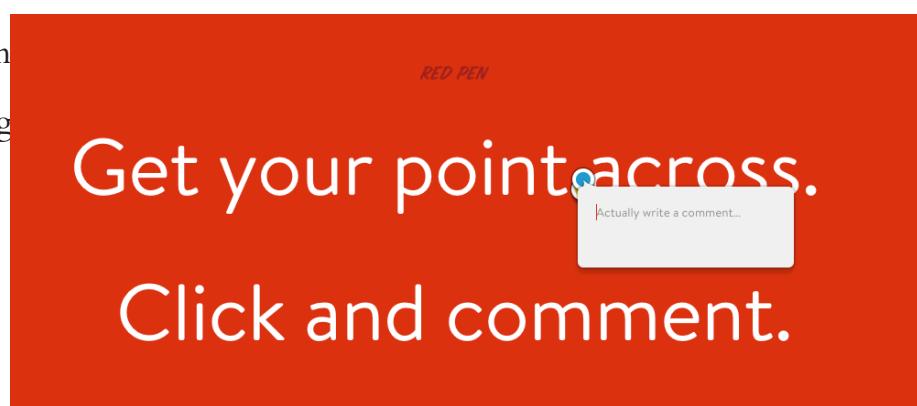
Figure 4.19. Quora interface

Figure 4.20. Quora interface

Figure 4.21. Red Pen interface

Figure 4.22. Zhihu interface

Figure 4.23, 24. Invision interface



# Prototype 2. High Fidelity Mockup

## Overview

Based on the feedback gathered from low-fidelity mockup, literature review and website analysis, we designed hi-fi mockup. For the high-fidelity-fi mockup, we tested it on 3 IDeATE students using Invision. We were mainly looking for feedback on the fortune cookie system and whether students would want to answer more question after submission, as well as usability issues.

Revisions are made based on the Low-fi prototype, literature review and website analysis:

- Revised notification, using pop-up messages
- Added “Select All” for invitation, shareable link to invite friends
- Deleted “downvote” button
- Added a step “Search for similar questions for general questions”
- Added prompt for novice to reply to experts and prompts for experts to give novice feedback.
- Added crown for experts in order to motivate them to answer more questions.
- Added emoji, time posted for the conversation textbox.

- Added a page that encourages students to answer more questions after submitting their answer to earn crown (for experts) or pay it forward (for novices)

## Real projects used for Hi-fi prototype

We also used a real IDeATE project to form our story for testing, as shown below.

## Project Description

This project was installed in Friendship Parklet outside West Penn Hospital and acts as a stimulus to encourage staff, patients and their family members to engage with the local environment by strolling through nature. Signage was developed to promote health outcomes through everyday walking.

The student is taking a physical computing course, so she is looking for feedback on:

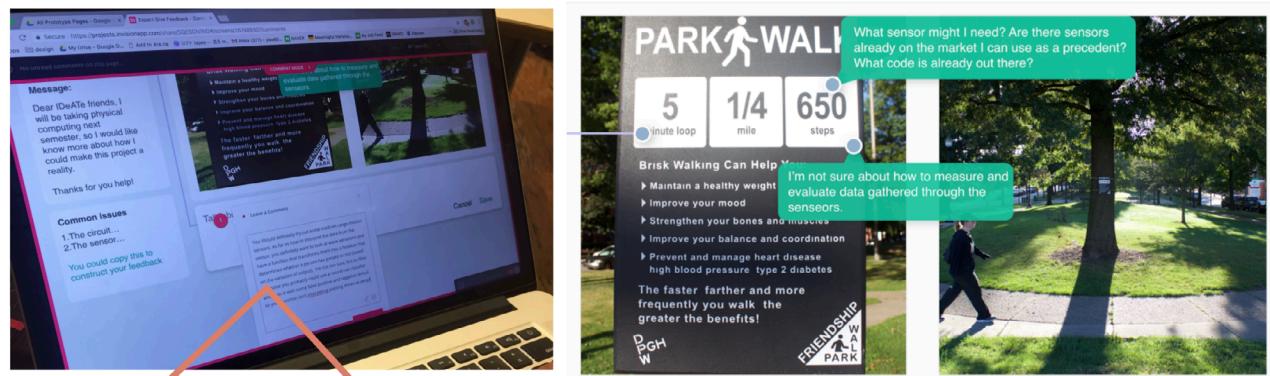
What sensors might I need?

Are there sensors already on the market I can use as a precedent?

What code is already out there?

Additionally, I would like feedback on how to measure and evaluate data gathered through the sensors.

The image shows a user was typing answer to the question “how to measure and evaluate data gathered through the sensors?”



As far as how to interpret the data from the sensor, you definitely want to look at wave variations and have a function that transforms them into a boolean that determines whether a person has passed or not (based on the variation of output). I'm not too sure, but to filter out noise you probably could use a neural net classifier and train it with some false positive and negative stimuli so your function isn't interpreting passing doves as people.

-- A user experienced in Physical Computing

## Feedback on Real Project!

Figure 4.25. User gives feedback on a real project.

## Insights

How do you feel about the fortune cookie system?

“I’m already forming answers in my head.

If I’m lost, I wanna see it. If I’m not, I don’t wanna see it.”

Solution: Put it in a place that would not interrupt the expert.

## Usability Issues

1. Navigation is not clear. The user asks “Where am I”

Solution: add navigation bar and highlight steps the user needs to take to ask a question

2. Language used sounds robotic.

Solution:

Cold: “Christina would see your reply soon.”

Warm: “Thanks for giving Christina advice on her physical computing project.”

Cold: “James would see your reply soon”

Warm: “Pass it on by answering Emily and Dan’s questions.”

3. Feedback management. What would happen if there are multiple feedback under one question.

Solution: Stacked feedback using a bar.

4. No previous button for the onboarding experience.

Solution: added previous button.

5. What is the purpose for “Input hashtags of the projects” and “upload your files”

Solution: added sub descriptions “hashtags help us identify the right experts to help you”

“You can add a screenshot of your code, or an image of your project”

6. Project description should not go after the stage of uploading the files.

Solution: ask for project description when asking the user to upload the file

7. Checkboxes does not look right for adding additional tasks.

Asking novices/experts to answer two more question added too much cognitive load.

Solution: Get rid of the checkboxes after experts or novices submitted the reply. The system only invites them to answer one more question.

8. What is the function of showing “iteration” in the onboarding experience? It might not be a good use of space.

Solution: Get rid of “iteration” part and show iterations in the

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users’ project page, so that students could click on past iterations to get more context and give better feedback.

9. Project description should be at the left/top side: human cognition flows from left to right, top to bottom.

Solution: put project description part from the right to the left.

1

Input Hashtags

2

Check similar questions

3

Describe your project

4

Ask your question

5

Invite experts to answer

## Final Prototype

# Input hashtags of your project

Hashtags help us identify the right experts to help you

Final prototype

Walkthrough

Design Mechanism

Conclusion

Final Reflections

#Physical Computing #Sensor #Park Walk



IDeATE Area

#Physical Computing ×

Tools

#Sensor ×

#Oscilloscopes ×

# Ado

Skills

#Problem solving ×

#Coding/Programm

Projects

#Memory prothesis ×

#Connected ecosystem ×

#Park Walk

21 Projects

#Park Design

19 Projects

#Park Location Data

15 Projects

Next

## Final Prototype

## Walkthrough of the whole experience

### Major Revisions based on hi-fi prototype

- Added home page and profile page.
- Added navigation and highlighted steps
- Added stacked feedback.
- Used personalized language
- Hide “fortune cookie” examples unless experts want to see it.
- Put project description and uploading files on the same page
- Deleted checkboxes and only invited students to answer one more question after submission
- Design homepage and user profile page.
- Design course page to show how IDeATe Gallery can support peer-evaluation and help IDeATe instruction in physical.

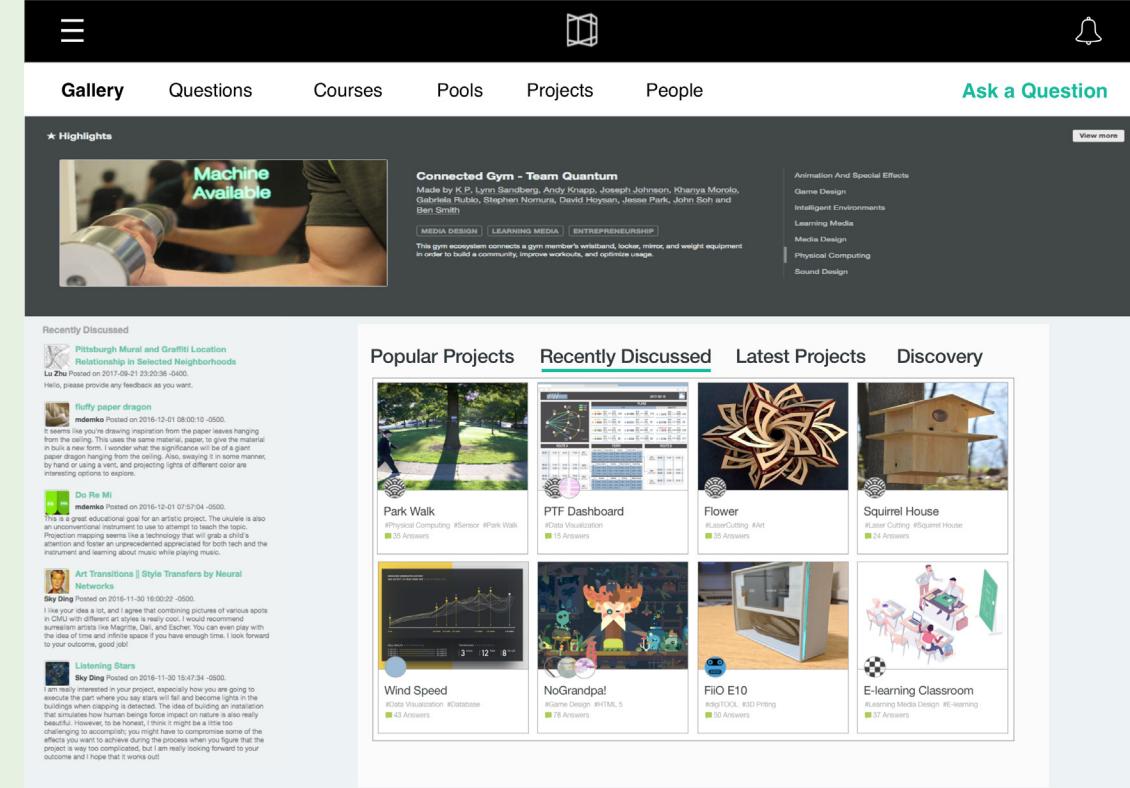


Figure 5.1. Home page of the website

From the homepage, novices could build their projects through asking a question. Suppose Christina is a student in physical computing class and she wants to build a park walk project to promote health outcomes through everyday walking. She has a question about what kind of sensor she might need for the project.

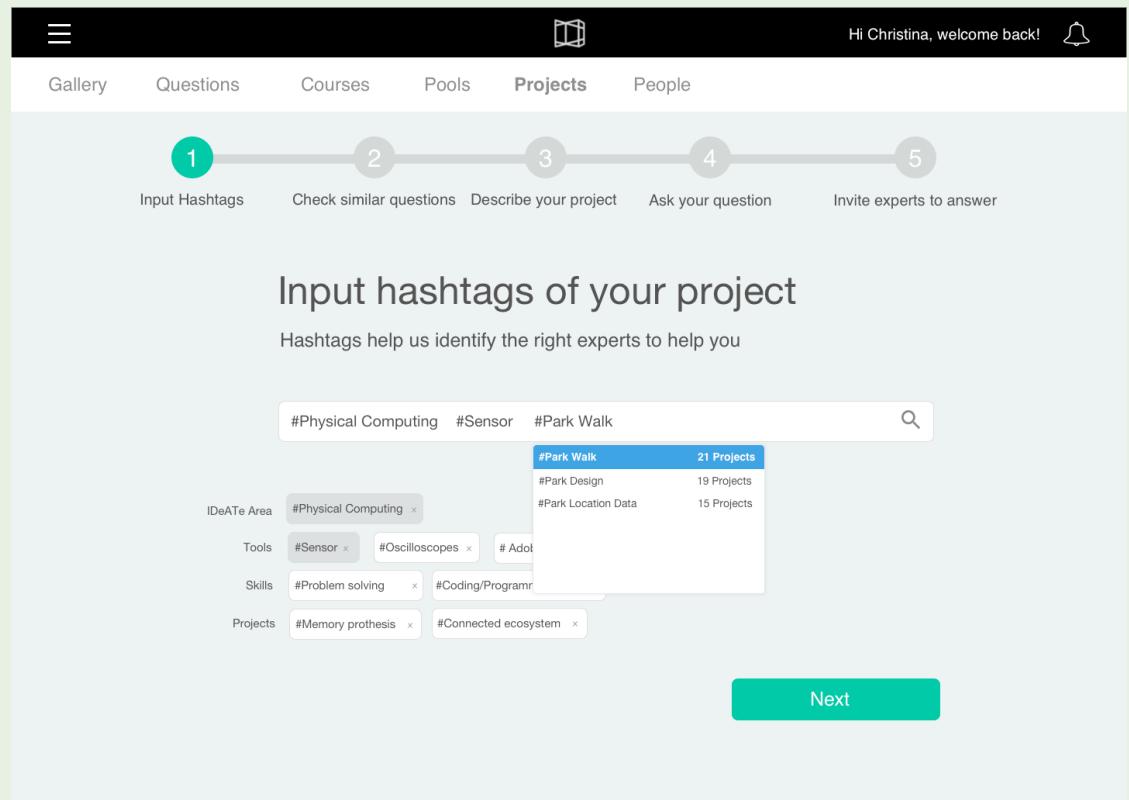


Figure 5.2. Christina input hashtags

Christina first input hashtags so that the system could identify the right experts for her. In this case, since she is taking the physical computing class, the system automatically displayed IDeATE area, tools, skills and projects that might be related. She selected physical computing, sensor, and typed in park walk.

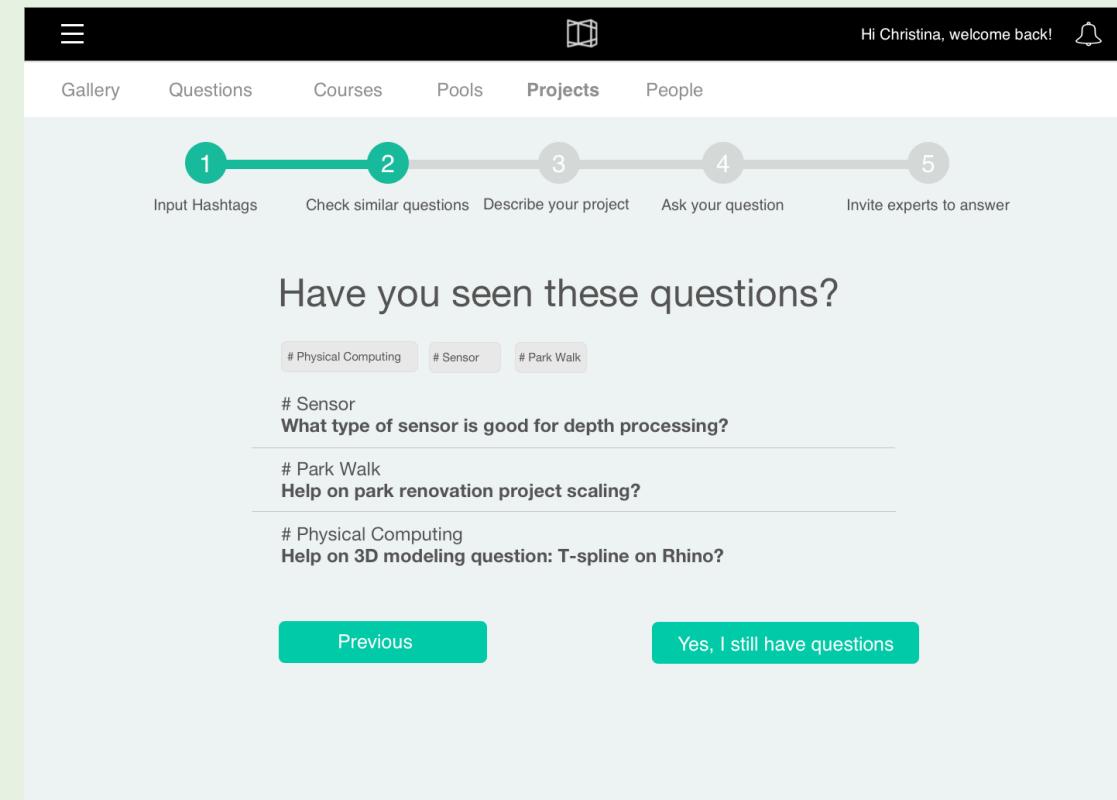


Figure 5.3. Christina checks similar questions

Before inviting experts, Christina could check if somebody has already asked similar questions before. We added this step after our first round of user testing because ideate student told us most people will have the same issue. She could get quick answer.

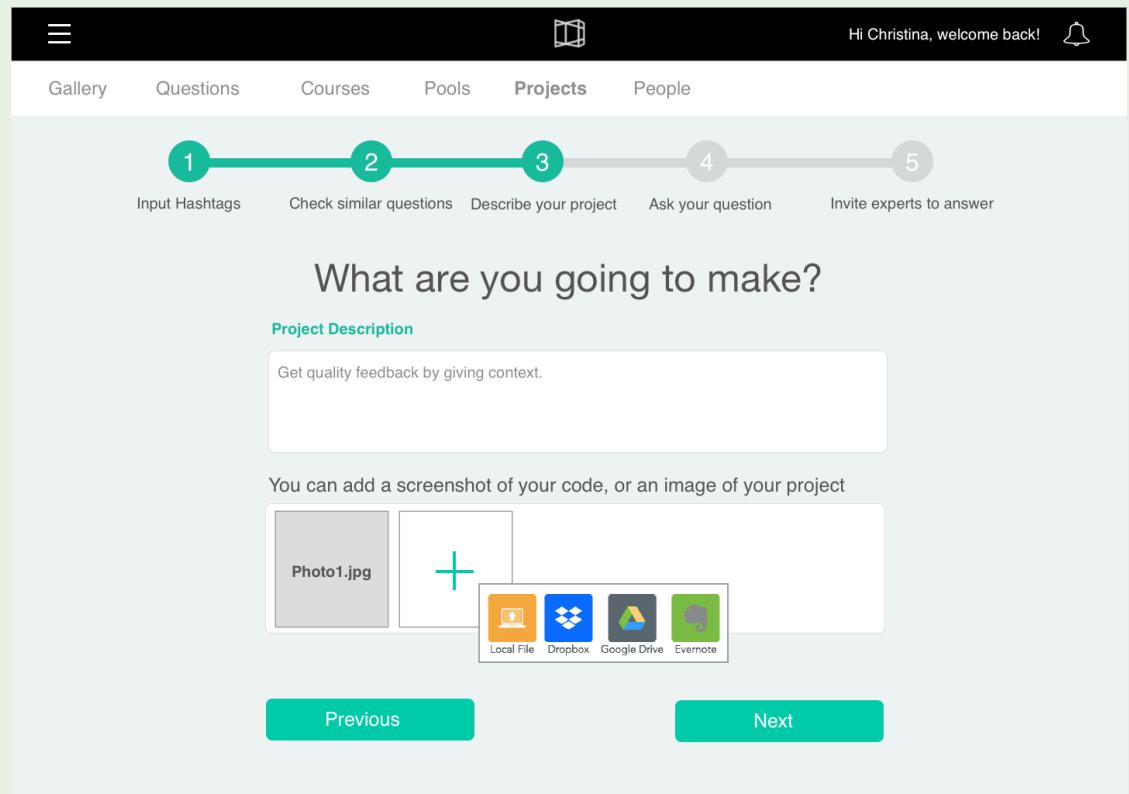


Figure 5.4. Christina describes her project.

Christina types in the project description and add an image of the project to give more context and enable targeted feedback.

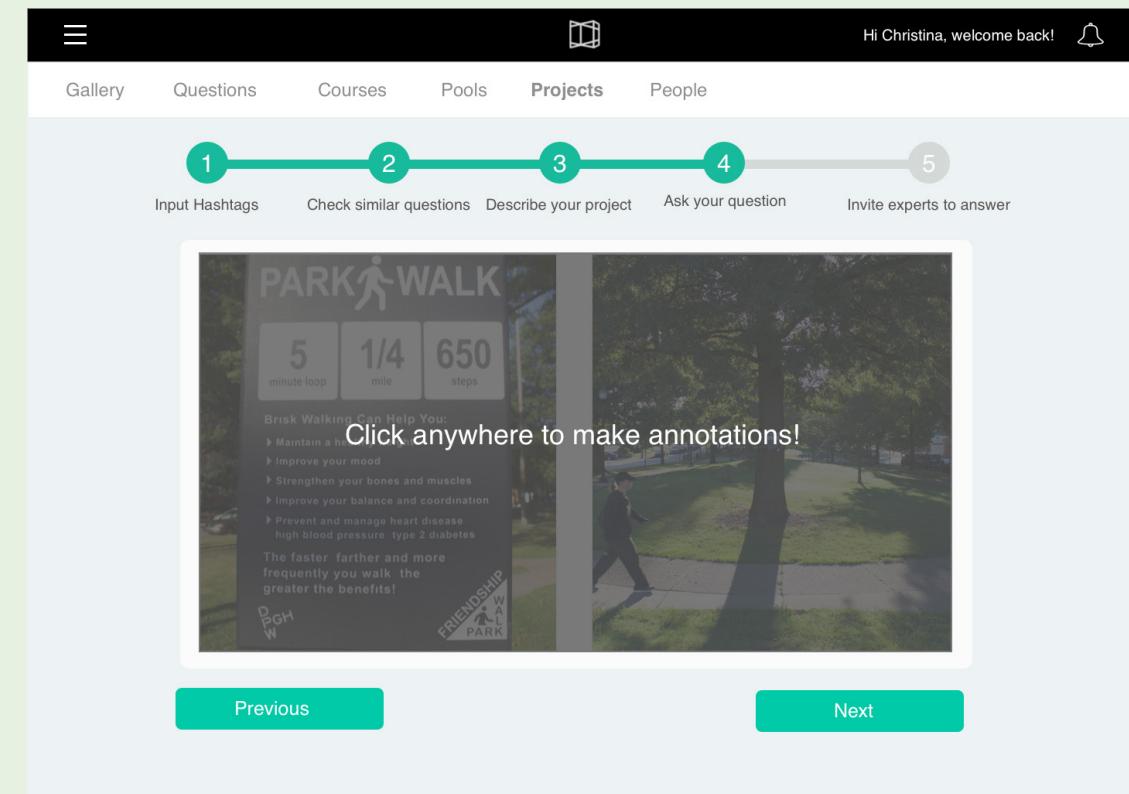


Figure 5.5. Christina could click to annotate.

Christina could annotate on the image to ask her question.

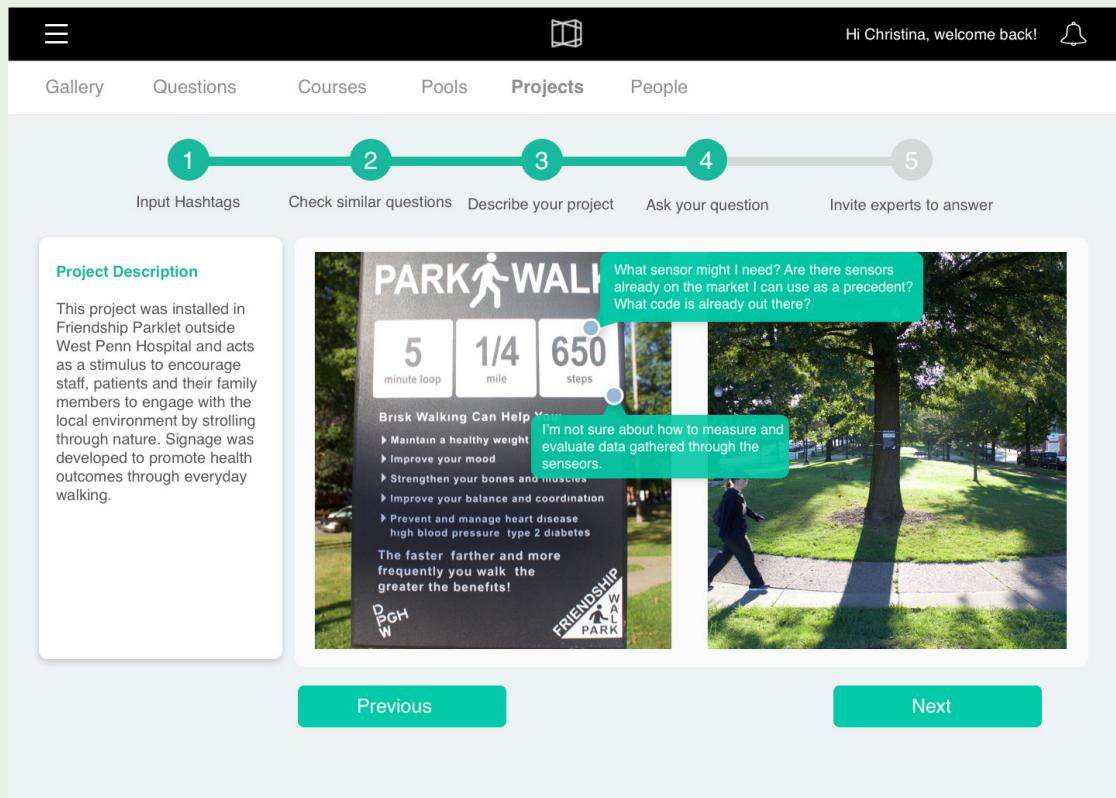


Figure 5.6. Christina asked her question.

She uploaded two images introducing her park walk projects and added questions on the image.

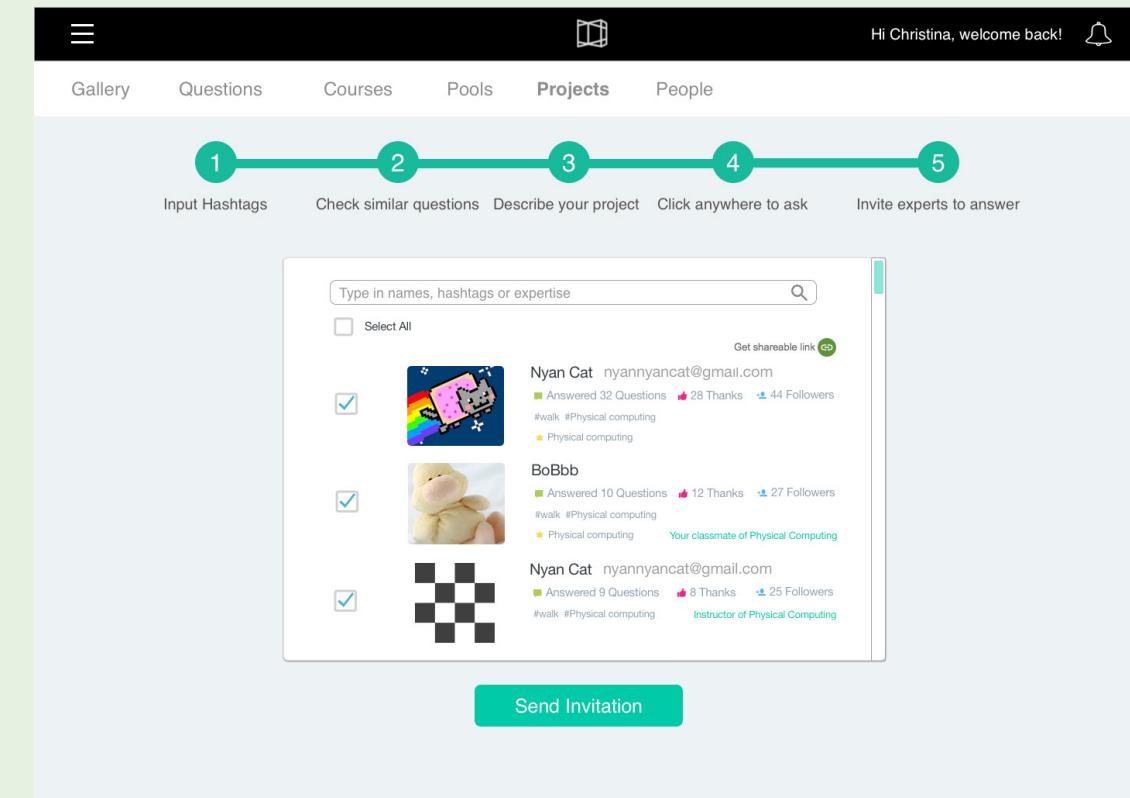


Figure 5.7. Christina invites experts.

At the last step, she invites experts with relevant hashtags to answer the question. Christina could invite all of them to answer. She could also generate a sharable link to invite friends outside of Gallery to answer her question in order to get quick feedback and promote Gallery.

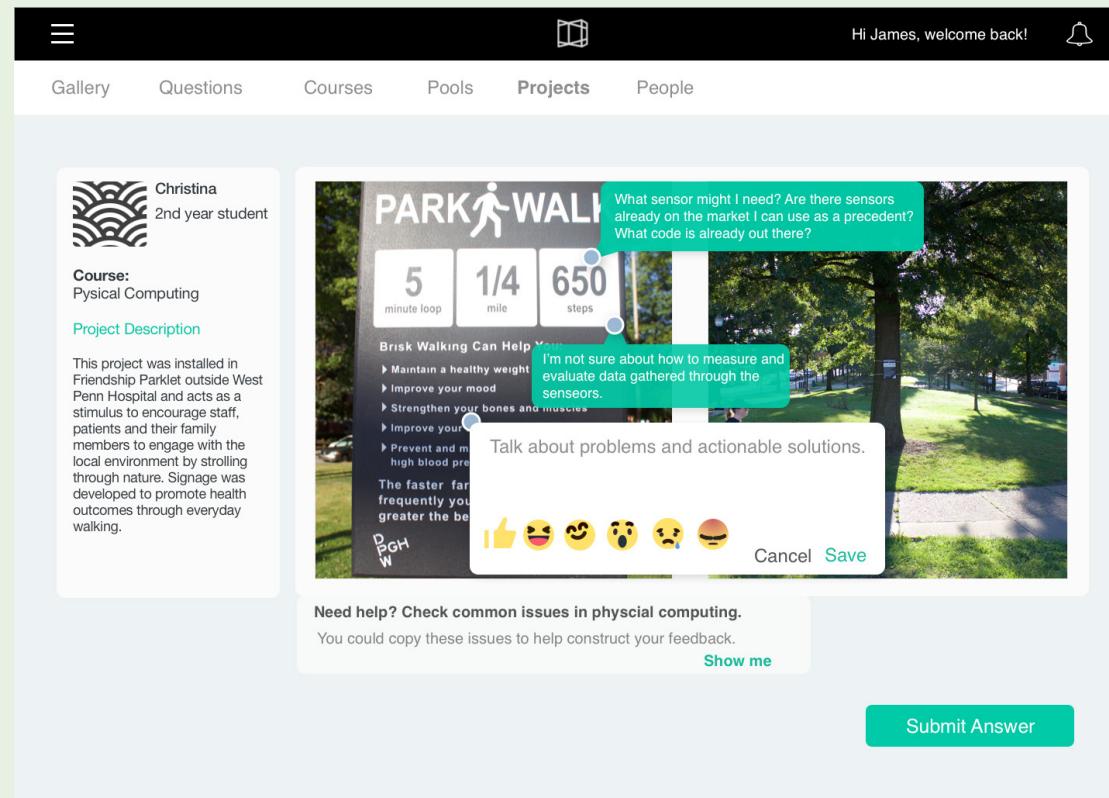


Figure 5.8. Expert responds to the question

In this page, the expert James responded to her question. Experts are prompted to give her actionable solutions and could use emoji in their feedback, which adds delightfulness in our design. When they feel stuck, they could make use of our fortune cookie system, as shown here to scaffold their feedback.

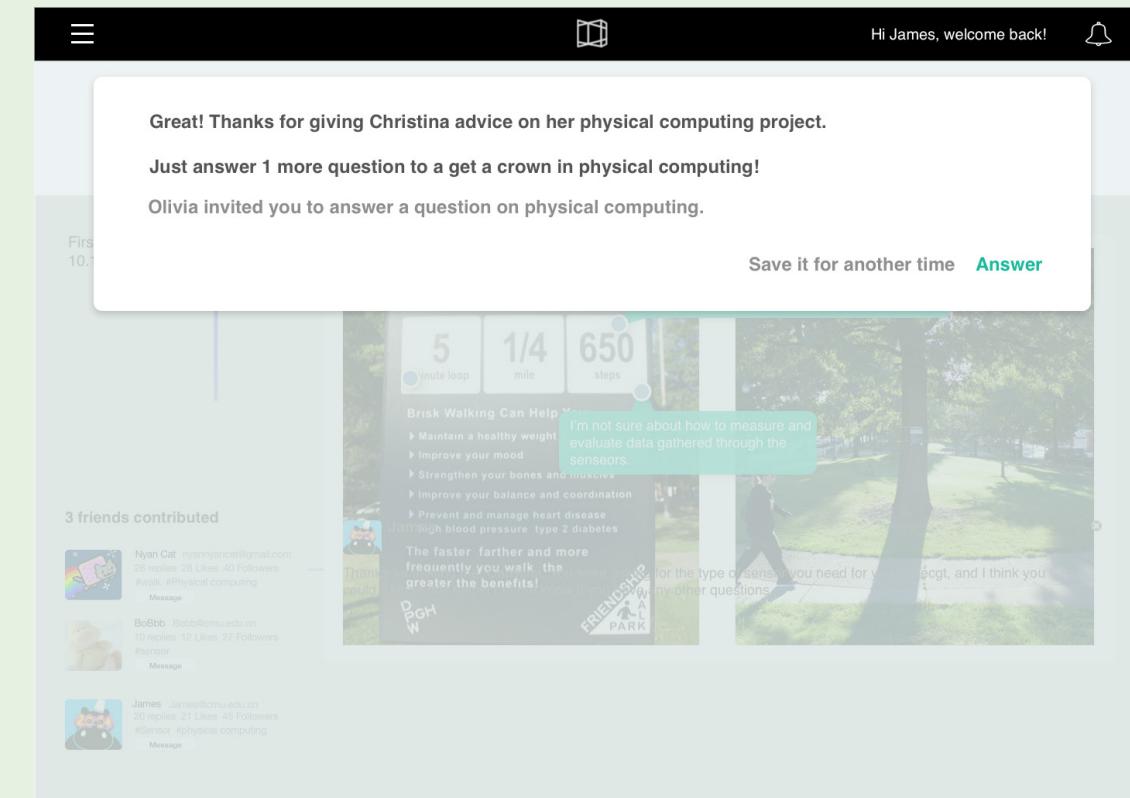


Figure 5.9. James submitted the answer.

After James submitted the answer, Gallery encouraged him to answer one more question to get a physical computing crown.

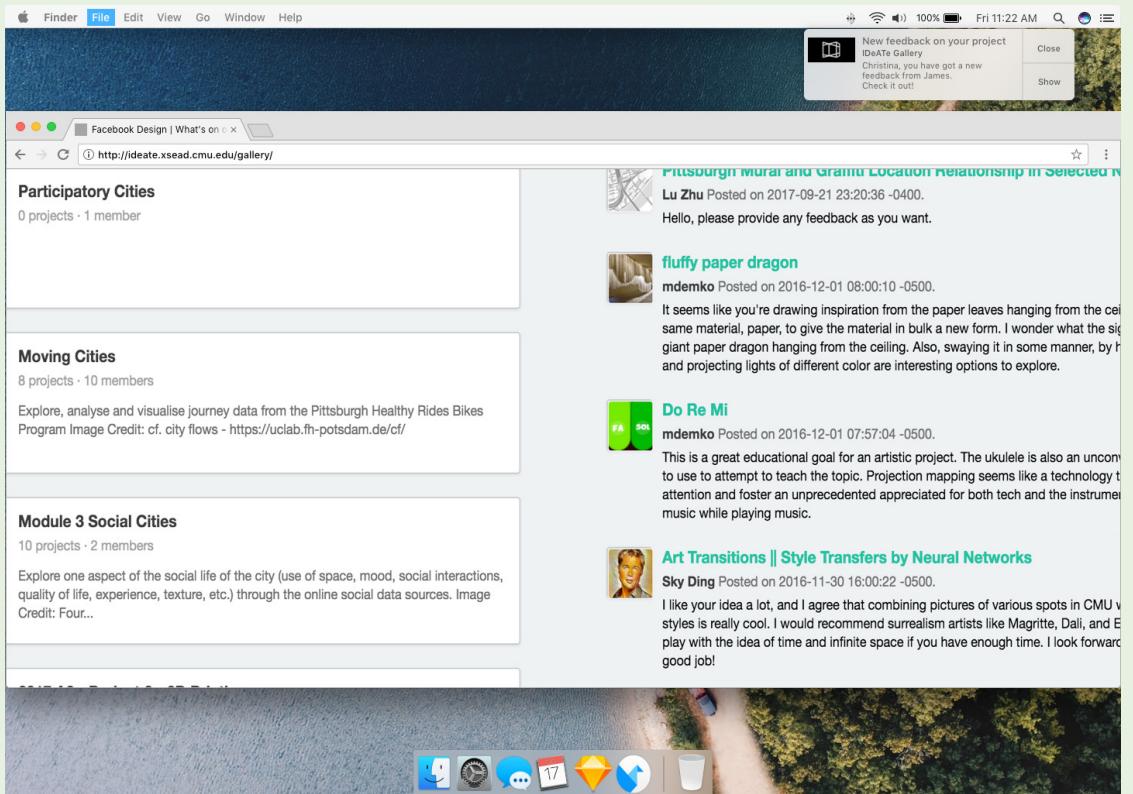


Figure 5.10. Christina receives a notification.

Christina receives a notification in 20 minutes after she posted her question.

Figure 5.11. Christina checks feedback from James

The orange bar on the image shows stacked feedback. She clicks on it.

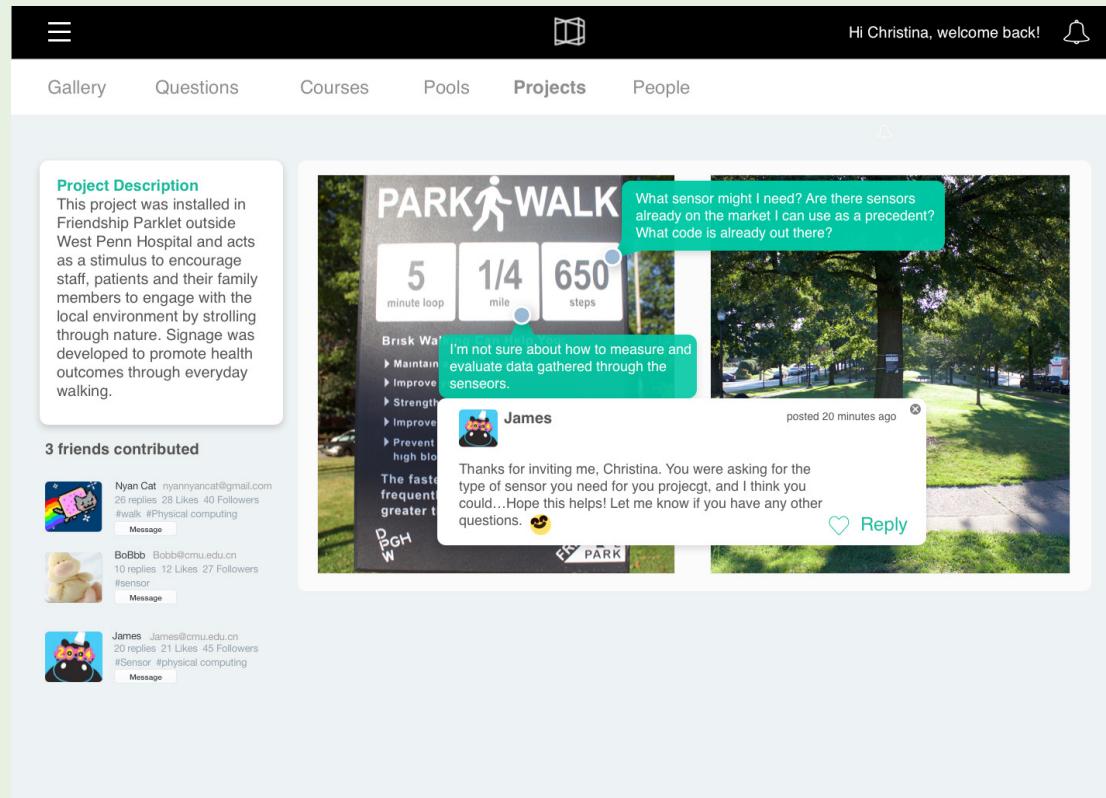


Figure 5.12. Christina reads James' feedback

Christina could check feedback directly under her question, and could click on the heart to like the answer.

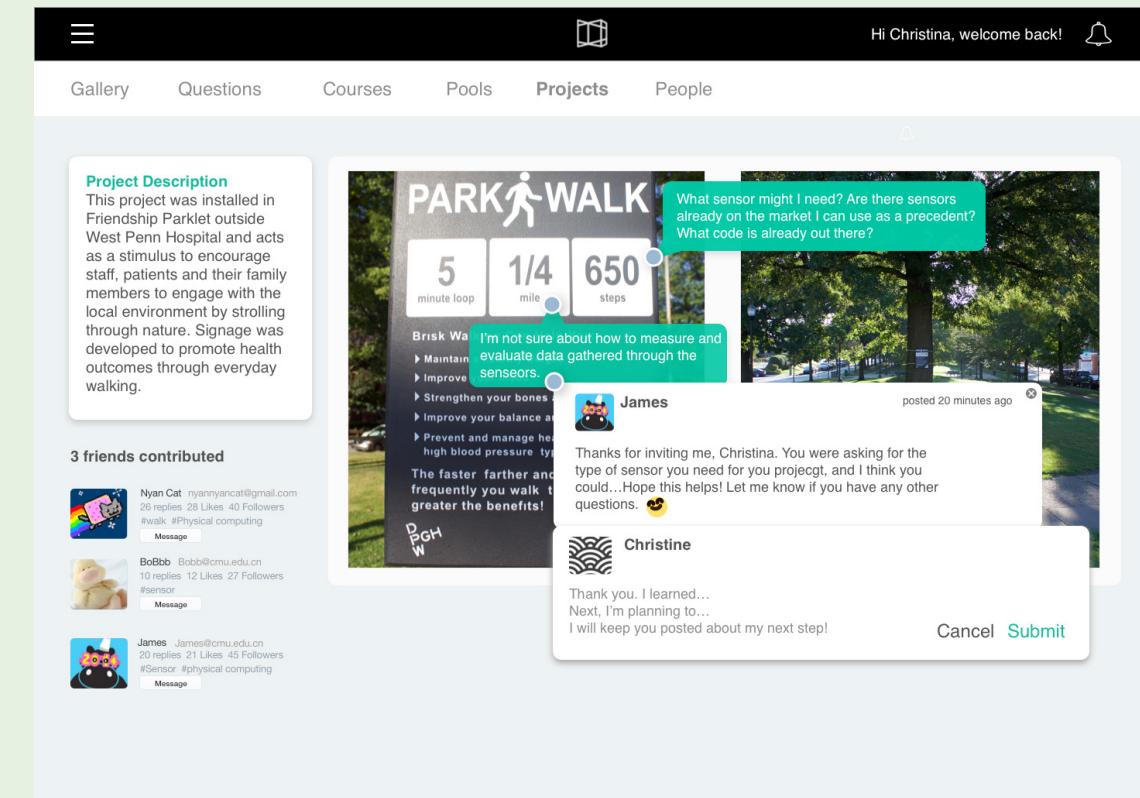


Figure 5.13. Christina replies to James

Last, we added prompts for Christina to reply to James. From user testing, experts don't want to see thank you only, they want follow up. From literature review, we learned reflection and goal setting helps with deliberate practice. So our prompt helps her reflect and set goals to write her reply.

# Design Mechanism

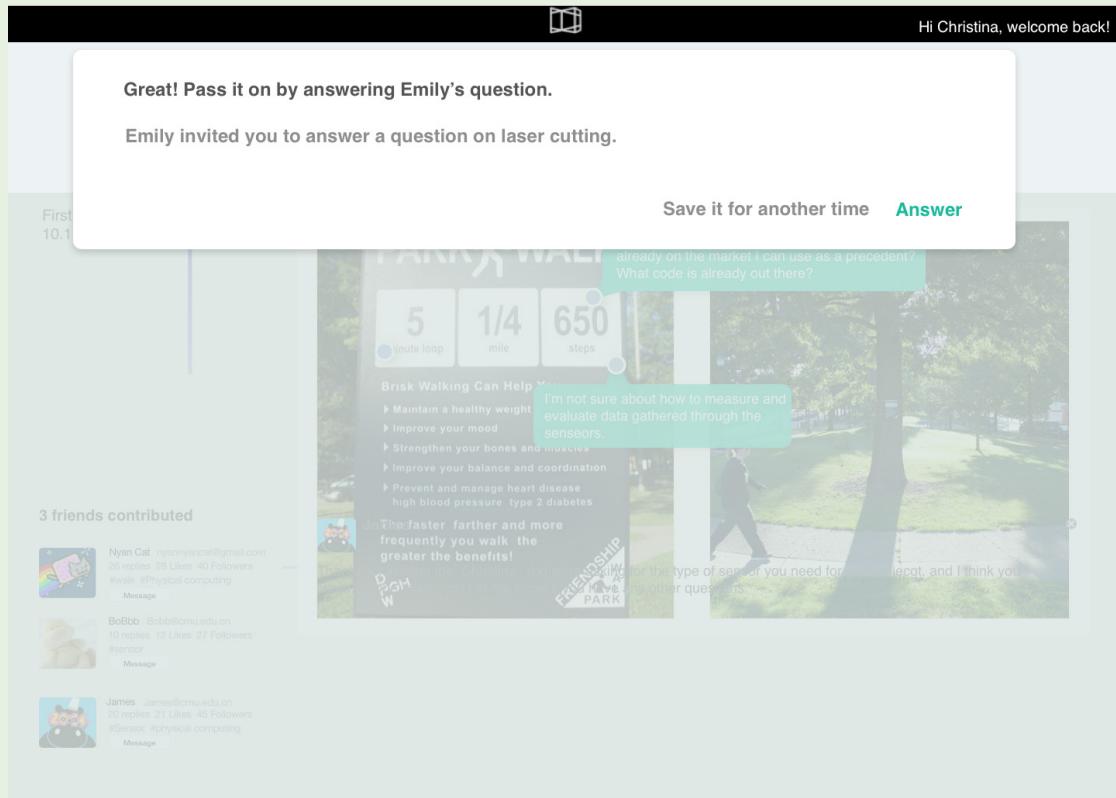


Figure 5.14. Christina is encouraged to pay it forward

Everybody is expert in certain area in IDEATE, so Christina is encouraged to pass it on by answering Emily's question since she is expert in laser cutting.

## Hashtag System

First, we put this the hashtag system in advance. The page “input hashtags of your project” will show as the first step when novice want to upload their project. Because according to Novice CTA, the users want to search for other projects to see if they have questions or solutions in similar subject, before they commit time to such an urgent problem

Second, in the page “input hashtags of your project”, our hashtag system has some automatic recommendation of hashtags. These recommendation can be listed in four categories: Ideate area, tools, skills, projects. Since this student is taking physical computing course in ideate, the system will automatically recommend physical computing in ideate area and tools, skills, projects which are relevant to physical computing.

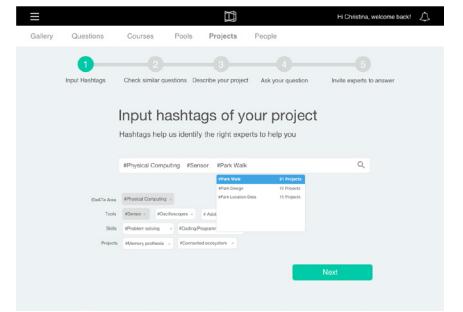


Figure 5.15. Hashtag page

## Invitation System

According to our research about IDEATE Gallery, we found out that IDEATE Gallery has large

First, novice wants to invite more people if possible. So we add a “Select All” checkbox which.

Second, novice wants feedback from their instructors and classmates. Therefore, as long as the novice fills in the course they're taking in their profiles of IDEATE Gallery, our recommendation

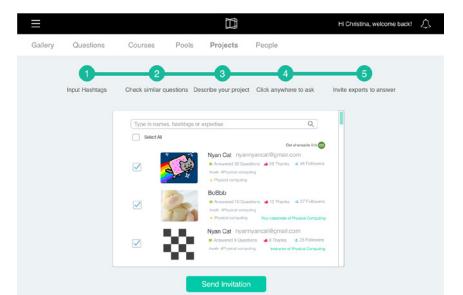


Figure 5.16. Invitation page

# Conclusion

system will automatically put the instructor and classmates of that course in this list of recommendation.

Third, novice wants to share their work with friends even though they may not join IDeATe yet. Therefore, we allow our users to share their work with their friends no matter they are using IDeATe or not by adding a sharable link.

## Credential

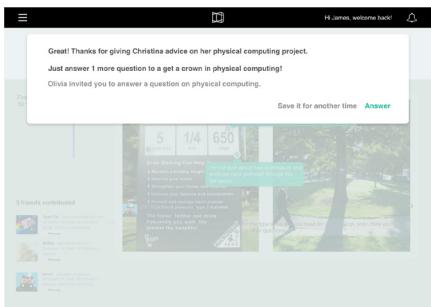


Figure 5.17. credentials to expert

During the user test, we found out IDeATE Gallery already have large audience but less active users. How to make experts motivated to give feedback is one question we are thinking about. Therefore, we design some credentials to engage and motivate experts, such as giving them a crown if they answered more than 5 questions.

## Motivation

### 1. How do we motivate novice to ask question?

According to our user research, what motivates novices most is that their expectation to get more feedback to help them improve and refine their projects. Therefore, we decided to build a progressive feedback loop using annotation, hashtag and invitation system, which can help novices to receive more targeted and high-quality feedback.

### 2. How we motivate expert to give feedback?

#### Credential:

We design some credentials for active expert. For instance, experts will be give a crown after giving feedbacks to more than five projects with same hashtag.

#### Sense of achievement:

First, expert don't want to see a simple "Thank you" after they contributing to one project. Therefore, we give prompts to novice to encourage them to give a more detailed reply to experts.

Second, we add a function to show experts contributions. Experts will be noticed when the projects they gave feedbacks to are updated. Therefore, it will be easier for experts to follow up with the whole project building process, and see how their feedback can have an impact.

## Scaffolding

### 1. How do we scaffold novice to ask questions?

First, when novices want to ask questions about their project, they may feel confused about how to clearly identify their questions in specific area. For instance, if a novice has some questions about her sketch of a cat house - which she plans to use laser-cutting to build later - she may feel struggling because she's not sure the questions are about "laser-cutting", "sketching" or "cat house" itself. Therefore, we design a hashtag system to support novices clearly identity their project based on IDeATE area, tools, skills and project topics.

Second, when novices want to ask specific questions about their project, it's hard for them to make clear and targeted problem description. Therefore, we build an annotation system to help novices ask question easily. This system will support novice to annotate on their projects and ask targeted question in a more direct way.

Third, when novices want to invite experts to see their projects and give feedback, sometimes they may have no idea who to ask and where to find them. Therefore, we build an invitation system which can automatically give recommendation to novice, and can support novice to invite targeted experts to ask for feedback.

### 2. How do we scaffold expert to give feedback?

Sometimes experts may find difficulty to organize and express their feedback. When they feel stuck, our fortune cookie system will provide expert with (such as common issues in physical computing field) for reference and support them to organize their feedback.

In addition, we design many prompts (both text and emoji) for expert to express their thought.

## Credential

### How do we decide who is expert in a specific field?

We use our hashtag system to identify experts in specific field. This is the profile of one user called Christina, who gets a hashtag of "#laser-cutting" in her profile, which means she is an expert in laser-cutting. In that case, when novices want to ask questions about laser-cutting, after they tagging their project with "#laser-cutting", our system will automatically recommend Christina.

So how did Christina get a laser-cutting tag and becomes an expert in this field? We suppose that everyone has their own expertise and can contribute their expertise to the community. Therefore, as a user of ideate gallery, Christina will look through others' projects and answer questions she feels interested and confident to offer suggestion.

If the questions she answered have one same hashtag, such as la-

ser-cutting, that will means she may have more experience in this field. After Cristina answering more than five questions with one same hashtag, she will be given that hashtag which can prove that she has experience and expertise in this field.

### Culture & Environment

#### 1. How to build a supportive and active culture

The homepage greatly shows how we build an active and collaborative culture in IDeATe Gallery. Based on our research on Quora and Zhihu, where users are very active in asking questions and providing feedbacks, we decided four tabs to help users finding more projects to look through. “Popular Projects” will show projects with most feedbacks and discussions. “Recently Discussed” will show projects with the latest discussions. “Latest Projects” will show projects which are recently published. “Discovery” is customized based on user’s interest. These four tabs can greatly engage users in the community.

#### 2. How can IDeATe Gallery help IDeATe in physical setting?

We are also thinking about how IDeATe Gallery experience could be augmented with physical IDeATe space. We imagine students in the same IDeATe course could give feedback on their peers’ questions in their classrooms. The instructors could also showcase students’ projects and interact with the screen to give feedback. Our design is grounded in our research. According to

our first round of prototyping, students are used to putting sticky notes on our sketches to make comments. With our annotation system, this interaction could be moved online but conducted in a physical classroom, where instructors could annotate students’ work to give targeted feedback and facilitate students to evaluate their peers’ work in the work sessions.

## Final Reflections - feedback from stakeholders

### **What did you find compelling about this team's concept?**

Check similar questions feature is great, definitely helps with experts being overused.

Image-based interactions: clearly similar to the various social media platforms that are popular.

Annotation system: great concept.

love "pass it on" prompt

Hashtag expert is a great system for identifying experts

It is effective how you are customizing the experience for novices vs experts

Thinking about the motivation of the experts is important—they need to see the benefit beyond "the greater good"

Identification of gap between final polished projects and messy, iterative process

Embedded feedback loop in process; Progressive feedback

Synthesis model (I am, I want, I need)

I like that it encouraged reflection from the beginning, awkward phases of a project. Really like the idea of Gallery as a scaffolding tool towards later goal of worldwide presentation.

What areas would you suggest they explore deeply and why?

### **Maybe add a layer to prevent people from getting hashtags they are not actually experts on (frequency)**

Actually we thought about this potential problem. Since novices could tag their projects as much as they would like, sometimes experts may get hashtags which can not reflect their expertise, we came up with two solutions to prevent experts from getting redundant hashtags. First, when novices tag their projects, our system will automatically give some recommendation. Therefore, novices are likely to apply the recommended hashtags. Second, experts have the ability to manage their hashtags. If they think one hashtag is not relevant to their expertise, they can delete it in the profile page.

### **Just wondering why expert would be interested in the crown reward system?**

According to our user research, what distinguish IDeATE Gallery with other portfolio website most is that IDeATE targeted at only CMU students. Therefore, students in IDeATE Gallery will be motivated more if they can get credential (such as crown), which is a proof of their expertise and contribution in this community.

I'm curious about the stakeholder map because I noticed that students were clearly the largest stakeholders. However, if the purpose of this portfolio is to "get a job", I would think the

workforce stakeholders would hold greater value.

**Related question: How do you gain adoption vs systems like squarespace?**

We define IDeAte Gallery as a “safe learning space” for students to keep learning and trying. According to our earlier user study, we found out that students who want to use their portfolio for job hunting may move their final completed projects to their personal website or other work space (e.g., dribbble). Therefore, for the novice students in IDeAte Gallery, their main purpose will be learning but not showcasing, which is the reason we didn’t put workforce stakeholders in the stakeholder map.

**Love the hashtag sorting components. My understanding is that you use the hashtag feature to code the type of feedback desired. However, I see great potential in hashtag to code the type of documentation existing in the portfolio.**

Actually, the users can use hashtags to code the type of their documentation in our system. For instance, as shown in the graphic below, users can use tags recommended by the system, or they can input hashtag (e.g., “#Park Walk”) to code the topic or the type of documentation.

**How do you help people make this shift from polished**

**and finished to iterative and messy?**

This is a thought-provoking question. The shift will not be easy to make without the support of the IDeAte instructors. That’s why we introduced

**Does one’s interest in a field necessarily equate with expert status? This could not always be the “truth”.**

This is a reasonable concern since the number of feedback may reflect one’s interest but not absolute expertise. Therefore, for the next step, we plan to consider more about how to decide the expert. Besides the number of feedback, we are also thinking about using the number of “likes” to reflect the expertise.

**Is there a way to convert novice users to experts in documentation/portfolio practices?**

Definitely. That’s the reason why we built feedback loops in our design. We aim to enable multiple micro-feedback loops that help novices build their projects with each loop. There are three rounds of feedback given to novice users at different stages in their documentation/portfolio practices. 1) After documenting an idea. 2) After building one project with multiple documentation. 3) After composing different projects into one cohesive narrative. After that students will be more skilled and confident in documenting, curating, and presenting their works, which means they

are converted to experts.

**Is ask a Question prompt obviously for students looking for advice for projects or might it be mistaken for technical support for the site?**

Good question! We think we can use another prompt for “Ask a Question” button, such as “Upload your project for feedback”.

**Will the “select all” option in the ask for feedback process got out of hand, with everyone getting bombarded with too many requests (many of which are not likely in their area of expertise)?**

This is indeed a legitimate concern. In response to this question, we are thinking about narrowing down the number of experts shown in our recommendation (for instance, we could reduce it to 20 people at most). In order to have a better estimation of the proper number of experts to be suggested, we will conduct more research about the user group of IDeATE Gallery in our next step.

**Do experts really care about status or crowns?**

Crown is just a representation of our motivation mechanism. We think what really matters is the credential, which can prove

experts' expertise and contribution.

**What's the relationship between using Invision/Quora/Zhihu and your prototype?**

We took Invision as a reference to design our annotation system. We took Quora and Zhihu as a reference to design our feedback loop (including hashtag system and invitation system)

## Final Reflections - Group reflection

### **A Brief analysis of what went well for the project through the semester.**

In the first half of the semester, we were able to identify a big gap in the IDeATe Gallery platform from our research and define our problem statement. From the brainstorming and experience mapping, we were able to come up with the idea of embedding feedback loops to scaffold students' learning. We focused on the initial loop because novices need to learn showing their rough sketches in order to keep iterating their work based on progressive feedback. We were also able to experiment with our annotation ideas in the prototyping stage with the poster and paper prototypes. Through second round exploration of literature reviews and design precedents, we validated our concept and designed our high-fidelity screens. And the last round of prototype helped us refine our screen designs and think more deeply about our onboarding experience, hashtag, and invitation systems. We were proud that all of our research, ideation and prototyping combined nicely together and informed our final product.

### **What needs more work? A look at challenges faced that could have been better solved, or needed more time.**

According to the feedback, there are some issues we need to take into consideration:

We need to decide on the number of recommendations the system would display when novice wants to invite experts for feedback.

We need to think more deeply about how to justify the expert status. Currently, if a user answers more than five questions about a specific field with a hashtag, he/she can get this hashtag, which can prove his/her expertise. However, sometimes users may answer questions out of interest but not expertise. Therefore, we need to work on the mechanism. For instance, we can add the number of "likes" in the mechanism to decide expertise.

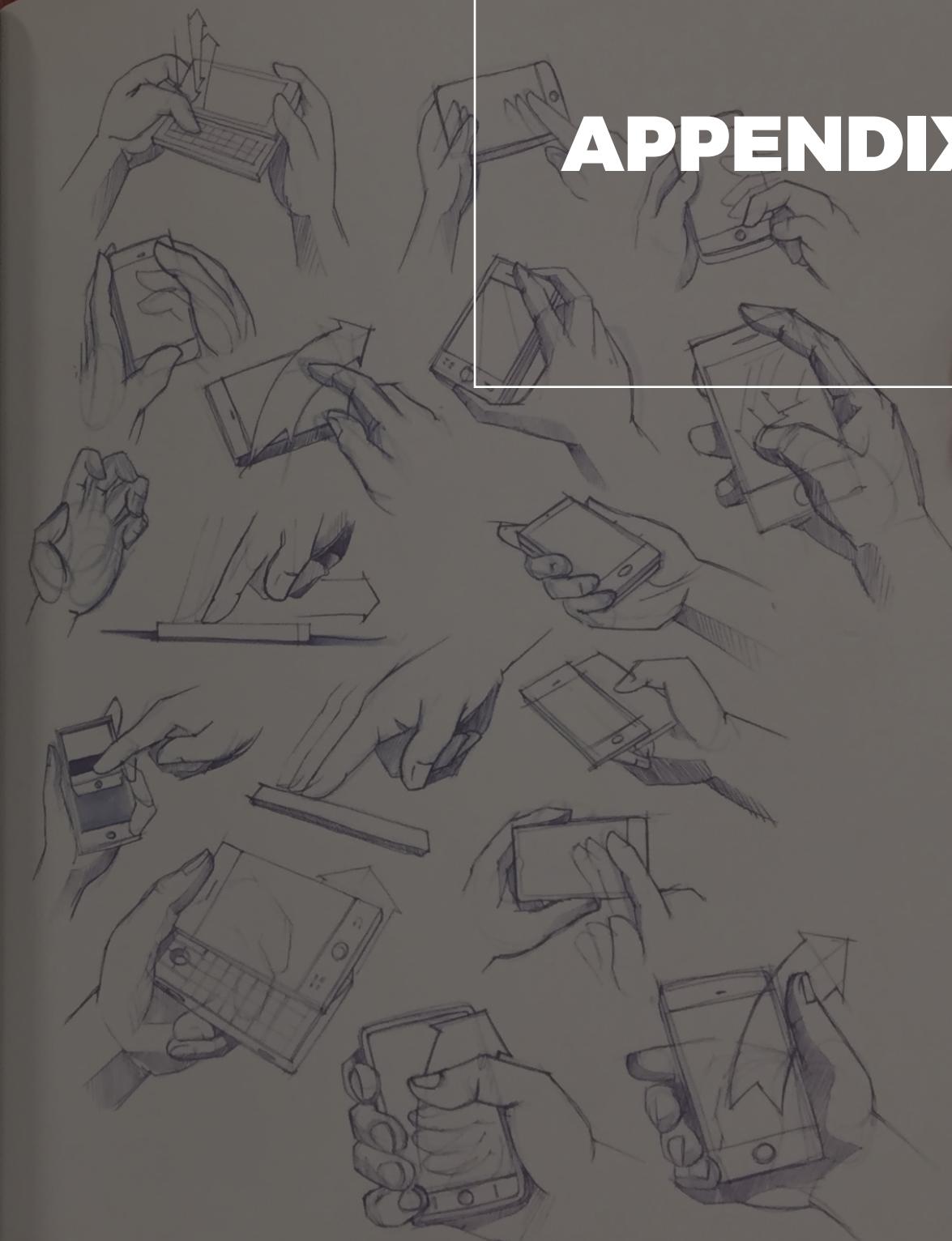
We need to consider more about our design and mechanism in different situations. For instance, we need to consider how to enable feedback loops and make our invitation system work well when IDeATe Gallery does not have many active users, and we need to make sure our expert users would not get bombarded requests when there is an active community.

# APPENDIX

## sketching interaction with hands

Although drawing your hands from a variety of angles is good practice, envisioning how an object fits into your hand and representing the hand moving through space (i.e., in a gestural interface) exercises your mind and forces you to think about the relationship of the object to the hand. Incorporating hands into your sketches provides a sense of scale and further emphasizes the connection between design and people. When sketching hands, it may be best to simplify them into basic shapes, paying careful attention to form and proportion. While hands provide key information, you may not want them to be the prime focus of your sketch, so try variations with line weight and tone to enhance and/or minimize their presence on the page.

Before animating hands in some form of action using two-point perspective, first establish proportional relationships from one or two orthographic views.



## APPENDIX

# Works Cited / Credits

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## APPENDIX

# Protocol for Initial User Research

### Issues

We found out that most students don't get the most out of IDeATE gallery experience due to a lack of communication between users. By interviewing students using this platform / not using this one but other interactive portfolio platforms, we expect to get insights about the following:

Why the gallery is not active.

Which platform the students prefer to use than IDeATE gallery.

The users' motivation / goal to make portfolio.

What challenges the students encounter frequently while making portfolio.

### Objectives

We aim to use the findings of interviews to improve user experience in IDeATE gallery.

### Our assumptions of the interview:

We want the potential students to see the current students' works and say "this is why I want to go to CMU among all others." Also we want the high school / undergrad students to have their own account on IDeATE gallery to showcase their work prior to entering CMU, which would make it easier for admissions committee to see the student's potential.

Also, for job hunting, we are looking for integration with handshake, so the employers could easily see the student works in process.

From this starting point, we will investigate the possibility of implementation.

### Method Selection

We choose to employ contextual inquiry through structured

interviews, which would provide rich qualitative data to analyze.

Cultural probes are ideal for us, if time permits.

### Participants

We are sampling from the pool of design-related / unrelated individuals who are affiliated with IDeATE , HCII or School of Architecture. The specifics of each participants are as follows:

Lisa is a freshman from School of Architecture.  
(Interviewer: Alison Scribe:Yejin)

Aya is first-year student from School of Architecture.  
(Interviewer: Yejin)

Tan is an HCI Masters student from Taiwan and has a design background (industrial design), therefore highly experienced in portfolio making.  
(Interviewer: Lu Scribe: Mengxin)

Taylor is a third-year engineering student who has little experience in portfolio-making.  
(Interviewer: Alison)

### Interviewer Questions / Think aloud tasks

#### Interviewer questions:

What kinds of stuff do you make?  
Do you have any current project going on? Tell me about it.  
What platforms do you use and why?  
Show me your ideate gallery  
What kind of digital / physical tools do you use?  
How do you curate your stuff?  
How do you document?  
How do you decide what to put up and what to discard  
When do you get lost when making a portfolio - don't know what to do?

Who do you share your pf with?

When do you make your portfolio? (answer: right before admission )

Did you have to remake / generate portfolio for admission?

Which platform did you use?

What was the most difficult thing when you used that platform?

Share a story of your admission process (if you want) with us please!

What about job hunting? Have you worked on it before?

Same as before - platform, difficulty, story age/level/major/gender

#### Think aloud 1 - making / updating an item in portfolio

Ask them to show the portfolio

Ask them to show a work in process (current project)

#### Think aloud 2 - make an account and log into ideate

Ask them to make an account

Ask them to simulate putting up a work on the page

Observe which functions / buttons they use

### Logistics / Data collection plan

Where and How long

We are going to interview in the interviewee's main space of work to see the context.

Each interview is scheduled to take about 0.5 hour to an hour.

Voice record - iphone voice memo, tools from ideate

Export? Yes i think so

Youtube to generate quick transcription

DSLR for shots

Field notes for scribes to observe

Screen Capture

We plan to use Quicktime, an application that records the screen activities

### Data Analytics & Reporting

We plan to use Cognitive Task Analysis, with coding behaviors and words. Then we will move on to affinity diagram.

CTA

Affinity Diagram

### Appendix

Shot list

Headshot

Close up shot of interviewee's artifacts/tools

## APPENDIX

# Protocol for In-Depth User Research

## Section 1: Study Purpose

Include problem/issues statement, the objective of the study, and how it intends to shed light on the problem identified.

Understand the current portfolio-making process of the students involved in IDeATE Gallery.

Explore how students think of IDeATE Gallery and why they document on the site.

Identify stakeholders' perspectives on the goals and values of the IDeATE space and Gallery.

Find out how Gallery can aid in the portfolio-making process and promote learning.

We will conduct a guerilla research in the IDeATE space with this protocol, define and narrow down the problem area. We have two ideas that we want to validate. The first one is whether IDeATE Gallery would be useful for prospective CMU students, and the second one is if Gallery could cooperate with Handshake to aid in students' professional development.

## Section 2: Study Design

### Guerilla research on IDeATE space and in-depth interviews with Gallery users.

First, we plan to do some pilot interviews with IDeATE students who is now using IDeATE Gallery. We hope to narrow down our focus and generate insights from the interviews. We plan to recruit at least 5 users to participate in this process. We pick some active students on IDeATE Gallery (whose works are highlighted or shown in homepage) and send them emails for invitation. Before the interview, we do some researches on the ideate gallery and come up with possible questions listed as follows to understand their skills, motivations, documentation and curation process:

#### Activities:

What and how do you document?  
How frequent are you documenting and curating your projects?

#### Attitudes:

What do you think about documentation?  
Why do you pick Ideate Gallery for documentation?  
Tell me about your experience with the Ideate gallery/the class blog?  
What other portfolio sites are you using and what do you think about those sites?  
Pick one feature that you like the most of Ideate Gallery & Why?  
Pick one feature that you dislike the most of Ideate Gallery & Why?  
If you could change one thing about the Gallery, what would it be?

#### Motivations:

Why do you want to document your projects? (What is the value of documentation for you)  
What is your long-term goal?  
Who might look at your work?  
Skills: (can be asked in Directed Storytelling part)  
What was your role in your projects? (coding? Designing? documenting?)

#### Directed storytelling:

Describe your biggest challenges and any surprises that arose during the build. What are you proudest of? If you had to do it again, what would do differently?  
Interviews with stakeholders  
After doing a base research we will conduct interviews with 3 stakeholders: Kelly, the program director, Daragh, the creator of the IDeATE Gallery. We prepare questions as follows to

#### Kelly: advisor of Ideate

logistics: we will ask for a mailing list to recruit participant. We will ask if it is possible to obtain card access data and get permission for time-lapse and observe class.

#### Content:

What is the purpose of the Ideate Gallery?  
How the Ideate Gallery got started?  
What types of students are using it?  
What Ideate can offer for students from different majors?

#### Daragh: professor

Daragh created gallery and frequently used it. He will have the most idealistic view of what the gallery. Therefore, for Daragh we prepare more deeper questions for better understanding IDeATE Gallery. Firstly we generate our goals about what we hope to learn from Daragh and then we design questions to achieve these goals. In addition, we will refine these questions after our interviews with IDeATE Gallery student:

Goal 1: try to find the design ideas of Ideate Gallery. Why it is designed like this? What iterations or improvements were made since it was created? How did these designs help different users (students / faculty) to achieve different goals (learn / teach / make reflection / peer evaluation) better.

What's your expectation of Ideate? What value do you think Ideate provide to the students? Is the Gallery intended for lifelong learning?

What's your expectation of Ideate Gallery? How Gallery got started? What is the value proposition of the Gallery?

Why these expectations share similarities / have differences?  
Would you like to give a grade on the level Ideate Gallery meets your expectation? (0 to 10)

Why do you give this grade? Which part do you think Ideate Gallery meet your expectation? Which part does not?  
Would you like to tell the whole process of your design of Ideate Gallery? Are there interesting stories lying behind?

Did you make any iterations / refinements / changes after that? Why?

How the "Highlights" projects of the Gallery got selected?  
(How does the website assess students' work)

Full Semester Courses cover a lot of information and require heavy collaboration. How does Gallery support student's collaboration?

How does Gallery enable easy upload, capture, and showcase the processes of making? (mobile platform available?)

How might you encourage students to reflect on the learning through portfolio-making?

How does Gallery facilitate discussion both in class and out of class?

How does Gallery help students build creative confidence?

Goal 2: try to find the design ideas / needs / pain points about documentation

Goal 3: try to find the design ideas / need / pain points about collaboration

How do you think Ideate Gallery will help students with different background with better communication and collaboration?

Relationships with Ideate? Complementary, Focus on same or different aspect?

Goal 4: try to get data of IDeATE Gallery for quantity analysis

Could we have access to the website data since Ideate Gallery was born?

Tell us about the iterations Ideate Gallery has gone through and how each iteration helped documentation process. What area do you think the website could improve on?

#### Cultural Probe

From the interviews with users and stakeholders, we will get insights and know what to observe for proving our problem

area and finding a window of opportunity. Furthermore, we plan to do more researches to learn the culture of IDeATE, which is necessary for us to learn Gallery's users in context and find out practical solutions.

We plan to do the culture probe. We are going to post some pictures under the topic of "IDeATE is ..." in IDeATE working space and let students here write down their thoughts, ideas and emotions.

### Section 3: Analysis Plan

Since we are before the interview process, we would need to narrow down the scope of analysis methods. Here are some examples we may use for analysis and synthesis of gathered data. First, we want to define our users and answer the questions like - Who they are? What they need? How they feel about IDeATE Gallery? Then, we will generate representative patterns and model their identities.

Affinity diagram

User Group

User Map

Persona

Cross-cultural comparisons (different majors, perspectives from students and professors)

Synthesis model - identity diagram for past and future



Examples of Cultural probe

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## Stakeholder Interviews

### Kelly

IDeATe is less about producing good things and more about the experience of learning and collaborating across majors and disciplines.

IDeATe brings students of different academic backgrounds to work together to learn and create

Prospective students are showing interest in our IDeATe program since its so unique to CMU

### Daragh Byrne: Creator of IDeAte Gallery

#### 1. What is the goal of the gallery?

The primary goals of IDeAte Gallery are to let students practice documentation and get feedback and visibility on the work.

Some projects are short creative war-mups, and in other projects there were scaffold or kind of milestone-based feedback process. They are more in-depth projects with multiple deliverables. I would love to see it better supports some progressive feedback and scaffold the feedback process throughout the phases of development. Gallery is process-led and kind of exploration.

#### 2. What do you think of Gallery as a collaboration tool? Some student wishes it could have the

### collaboration function like Googledrive.

- If we don't force people to make choices about what they represent, they will represent everything. Put 500 artefacts there. Googledrive is well suited to sharing files and doing pre-work. Does that really belong in a presentational tool, something where you narrate the outcome or the project process.

- Depending on your notion about portfolio

\*Highly-curated\*, representation of the work that you make VS \*Learning portfolio\* which is all of the artifacts involved in the learning process. I

would like Gallery to be somewhere in the middle. I don't think it's totally a learning portfolio where you can capture everything and explain everything. There should be labor involved in constructing representation. It's part of the design process to be thoughtful about how you review your process, and about how you express what you made. There is danger in the google drive where you can easily throw everything into a folder. The Gallery is ultimately a learning tool. Sometimes it's good to have a little bit of a friction. Those bottlenecks could be really good things.

It's very difficult for students to understand how feedback works without some prompts and guidance.

We are going for a 4-pointer likert scale that they rate first.

#### 4. What group of students are you targeting this feature for?

Research says that people who can give feedback the best are the people who are closest to the problem and also going through it by themselves.

#### 3. What's your take on the comment function of the Gallery?

The comment function is important

only if it is scaffolded. Comments were originally used for students to type in feedback for their peers. In year one we asked each student to review at least two pieces of work from the same group and give feedback. They treated it like online comment, saying "this is cool" "I really like it", and there is no criticality. They don't like giving negative feedback. We wanted to give them instructions on how to give the comments, so in later years, we did a very specific instruction on things they should look for. In each project to build their own critical response. We will replace comments with something new in January.

Rubrics introduced, it didn't work. The rubrics for critique (numerous shortcomings, give disciplinary or theoretical rationale, actionable next steps, informed by the domain, clearly articulated and professional)

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#### 4. What group of students are you targeting this feature for?

Research says that people who can give feedback the best are the people who are closest to the problem and also going through it by themselves.

The challenge is that people who have gone through the assignment has the least time to do it as they have deadlines and face the same pressure. What they suggest is like a uber style model, where you would request feedback, and it would look for the people with the least social distance to you, the people in the same assignment group or the people in the same course, and then no one responds in two hours it will move to the next line of social circle, until it could find two or three people to give you feedback. It kind of worked.

#### 5. We have two ideas. Have you considered including prospective students into this process?

I don't think prospective students should be burdened with giving feedback. But looking at the other side of it, what about the alumni? They might have more time at their hands and want to be engaged in this process. These strategies could be used in assessment. MIT invited alumni to review the portfolio that they received. Other types of population could be incentivized to participate in the review and give feedback. You can also imagine having a super reviewer come in and be the critic for the week. It could be exciting to have three people external to CMU to review these projects.

There are real benefits to review online, but it will not replace in-class review. strengths: review quickly, do a lot of

them weakness: lose context, lose the ability to ask questions in a real way, big gulf of communication there. People don't like being harsh online, especially when it's open.

One thing I like about ubercitation is that someone wants feedback and pushes the button, and opens it up. The fact that they requested it makes it seem more ok to give feedback as opposed to just being like a cold call when you peruse a portfolio.

Making it more active saying I need feedback now and making that a visible request changes the nature of what's going on in a real significant way. Something I'm eager to experiment with.

#### 6. Some students think Gallery only selects the best work to showcase. What do you think?

Gallery was never intended to be purely a showcasing tool. A lot of people feel nervous putting up rough work there, so we gave students control over who can see their work. I think it's valuable to put your rough work there because it helps you to articulate your work and to go through the process of rehearsing the presentation. It's valuable just to be vulnerable. You can not get feedback if the work isn't there. People are really reticent to put bad work there.

Being vulnerable is also important in

the long term, so they can look back and see their growth. You just have to get over the hump and do it.

Maybe the terminology is also lost? like portfolio seems like a grander thing it should be more polished and documentation is ok because it can be lame things. I think it's kind of a syntax thing more than a vulnerability thing.

#### 7. Another idea we have is to integrate Gallery with Handshake to make students find job more easily. What do you think?

Gallery gives students who do not come from a creative discipline a portfolio for free. It's a useful thing to be able to point to, but I think there is an intermediary process in between the learning portfolio and the gallery, and what we call the professional portfolio. Gallery is still primarily a learning tool as opposed to professional tool. It requires a bit of a narration beyond the project documentation. Two things, some curation, and some narration is needed for external audiences. It pushes for a different use case.

#### 8. Do you have any other suggestions?

One idea I haven't explored yet but I think is kind of important is putting the work back the spaces it's made in, so having public displays that would be in Studio A in Ideate. You could digitally

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showcase the projects from the Gallery, either they are in process or completed so you get sense of what students are undertaking in the spaces. To increase engagement, newsletters would also be a wonderful thing to add. Kickstarters and all those platforms do a good job like here is the top three projects kind of thing. How do we build a supportive community through the right touchpoints like what kinds of the user journey that bring people back to participate. That's something I haven't really solved yet. There are multiple ways of designing that.

Individual reflection is another aspect of going back to the work, not just waiting for other people to give feedback but also being able to look at what they got out of it. We talked about milestone based projects, and have more of a process-driven approach. There are elements like integrating to Canvas and other platforms so we are at the early stage of looking at what would be the right kind of integrations and cross-overs. I also think it's interesting to look at what happens when it grows to multiple places in CMU, maybe MHCI and METALS have their own Gallery. What does that look at cause it's really complex then.

I think the questions of why someone would participate and some of the implicit barriers to putting up work are interesting to explore. Some of the implicit barriers to responding and giving

feedback are interesting to explore. Developing a seamless user journey, like it became a rewarding experience to be involved in. Looking at how it could critically help the learning take place better. \*I'm interested in doing more with less.\* 80% of the features in Gallery are not being actively used.

### 9. What are the features that got used mostly?

Documentation definitely, and the comments come secondarily. That's the two primary drivers. There is a question like what scaffolds them to documentation, like progressive milestones that help them get there. They could have check-ins and we could send emails to remind them to do certain things at certain time.

Another thing that could be orchestrated is that at the pool the instructors could highlight the works that are excellent so that could give recognition to the good projects.

How to keep people coming back? It seems to be simple but they are really nuanced social problems. How does Gallery integrate in a landscape where Google drive and slack are being used.

### 10. What are the other things that could keep people coming back besides feedback?

I think money. Some people will do it

for the pride. I think recognition, like here are a list of alumni reviews for the month, having some kudos to the status or explicit recognition in the platform could be a nice of doing it. There are also social engineering approach that could be worth exploring, like in the foursquare approach of like "You are the mayor of physical computing. You give all the feedback." Also status, as you go through the project, your skills get validated, you are like an expert-level brainstormer. The skills they have could potentially make the feedback they give more valuable. It's a good idea, and it has the potential to say I become the super ambassador for arduino or something else.

Besides official recognition, everyone could pick and vote for their favorite work, and you are top three, that means something too. It's kind of a community pick. Lots of opportunities there.

### Jesse Stiles: a Professor who teaches six classes in IDeATE

### 1. What is your class like?

My class is quite diverse, music, art, drama, architecture, computer science. It's really anybody who is interested in the topic take the class.

Most of the projects are done in group so you end up working with people from different academic backgrounds you learn a lot just from seeing how

think about our problem and how they do their work.

The learning goals for that class are about developing a vocabulary for manipulating sound whether you are making artwork or music or you are designing software apps that have sound elements. It's good to be exposed to different work people make.

There are terminologies we adopt that makes it easier to talk about abstract sound.

### 2.What do you think of documentation?

"My students make a music performance, so the final product is a performance that takes place over 20 minutes, and the only people who get to hear it are people who are there at the performance.

(showing a student's work)  
This student takes a photo of somebody's eyes and turns it into sounds.  
This is the video recording. They describe how they created these sounds from these images.

I explain at the beginning that they should document their process. During the first couple weeks of the class if they didn't have good documentation I would tell them like you could do a better job.

### 3. How do you give feedback?

In class we review the projects and critique. (no comment on the project on the website)

### 4. Have you heard of Gallery?

"My students submit the work using the wordpress website, so if they were using the Gallery, it will be adding another website to the course. It's preferable to have everything just on one website instead of many different websites. Wordpress is fairly intuitive and students can quickly know how it works."

## Guerilla Research with Three IDeATE students

### Jessica: Designer

"I thought Gallery was the place where the best class projects are selected and uploaded"

"I document to brand myself."

"I think these templates in squarespace are good-looking and easy to use. You see, I made an interaction background of my website, which is pretty cool."

"Since this website is unfinished, I haven't made it public yet."

"I hope Ideate course could be one of the majors for undergraduate. It's so useful. I collaborated with many other students with different backgrounds and I really learned a lot from them."

### Rob: Engineer

"Gallery only presents the final projects, and we have class critique to get feedback."

"We have to have a video like how things work, but we don't have to do very much process. For things that are complicated I take pictures at different steps so I know how to put things together."

"I think it's interesting. My friends look at my projects on my website. They think it's pretty cool."

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### Class TA

(about documentation)

I just borrow camera from the library. There is a studio down the hall where you can do nice things. I do it just once in the end. Take them all, curate them, and take pictures.

I make my own website for companies and show the skills I have. It's not only the stuff I make here but also my other work.

### In-depth Interview with both current IDeATe students and alumni

#### 1. Cheng: current IDeATe student

##### Quotes on documentation:

“Documentation provides me with a good opportunity to look at what I have done in the past. I hope to document my process and get feedback in time.”

##### Quotes on curation:

“It’s hard to change the size of the font and font style. Hard to change the order of different modules.”

##### Quotes on feedback:

“I don’t want to be the first one to make comments.”

“I don’t want to be harsh on the internet.”

“I did not comment because we give feedback in class.”

“I hope my peers could comment on my projects so I could learn fast. I really want more feedback.”

##### Quotes on Presentation:

“I posted one of my projects on linkedin when a competition I joined required me to post my stuff online. I did not have time to do a personal website so I chose to upload the pdf into my linkedin page.”

“I want to show my works to employers and my friends.”

##### Quotes on Gallery:

“We used Gallery for class requirement. We uploaded all of the individual projects in the pool so it would be easier for teachers to look at our projects.”

“It takes time to learn how to use Gallery. I didn’t know I could drag the photo directly inside it.”

“I like to browse cool projects in Gallery.”

“Ideate Gallery looks academic and art-oriented.”

“We used Wordpress for some class projects. Compared to Gallery, Wordpress is not solely focused on portfolio.”

“I hope people can add more personal profiles in it. I hope Ideate Gallery can show personal profile (e.g., skills, interests, goals, etc) under their image.”

#### 2. Gahee: Alumni

##### Quotes on documentation:

“We used Googledrive to share some photos.”

##### Quotes on curation:

“I want to curate at the end of the project.”

“It’s validation of my final project.”

“I’m a designer and I did most of the curation.”

“When I documented with another

person, we discussed it first. Each of us put something on Gallery. We have to meet together to discuss what content to put.”

“I want to be able change the size of the image and the layout.”

##### Quotes on feedback:

“I can go and ask people around me for guidance.”

“I didn’t know there was a comment function in Gallery. No one noticed that it has a button that’s called “start a conversation” I would feel awkward to put a comment. I don’t want to be the person who starts the conversation when no one is talking.”

“We discussed a lot about the projects but not curation. We shared feedback with each other in class.”

##### Quotes on Presentation:

“I’m not a coding person. For that project it was the first time that I did some coding, so I chose that project to put in my own portfolio.”

“I’m using wordpress for my own site. I purchased a theme and customized it. I did a little bit coding. It took me long time to figure out how it works.”

##### Quotes on Gallery:

“I look at other students’ projects in Gallery to get inspired.”

“Only people in the same CMU com-

munity will look at this.”

“What I like most about Gallery is that I can share my projects with others and also I can see lots of cool projects from other students. It’s really a great place where I can get motivated by other people’s creativity.”

“I really don’t like Gallery’s blocks. I wish it could be more customizable.”

#### 3. Travi: current IDeATe student

##### Quotes on documentation:

“In the first few class assignments, we didn’t document a lot but for the final project we all thought ‘we need to take photos’”

“Sometimes you just wanna things get built and you were not thinking like I should take a picture. In those instances we take the pieces apart and take pictures, like in Clink we ended up taking pictures along the way. That’s pretty nice because you could get the actual look of what we were working with rather than the look from the end piece.”

“Sometimes, we document after the product is built, so we have to disassemble a part of done product just for documentation.”

“We did a lot of projects in that class and clink was a later project, so by that time we knew we should take pictures throughout this because we know we need to be good at documentation at

the end.”

“When you first started documentation it was like a drag because you might just have finished a project for a really long time so you feel like I’m done with it but you are not actually having the right documentation. Gallery helps reflect on parts of the process as a whole because you could forget a lot of the stuff at the beginning. When you go back and write it down, those are things you can learn for the future.”

“I document definitely when the project is done. I was really focused on just getting it to work so I didn’t have to do something that’s not contributing to that.”

##### Quotes on curation:

“It broke down into what people has the most experience with. People who are less experienced in making stuff did documentation and narration.”

“One person had ownership over documentation and curation, but the people who worked on more specific parts had more insights into how this works. Those people end up writing those parts of the documentation because they understood it better.”

“We made a bandana for the pig because of this joystick. The picture just made it cleaner than it actually looks.”

“I like this project (Clinks) because it

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has the best casing for it. You could enclose the whole handle and not see the wiring and circuitry basically. In lots of other projects we don't really get to that point. The handle itself was brilliantly enclosed."

### Quotes on feedback:

"After we finish the project we demo it and the teacher and rest of the class would be there. They don't really get the full presentation on this stuff we went through to build it, process of writing the code."

### Quotes on Presentation:

"I'm ok with publishing something that is not completely finished just because I knew that before the due day the teacher was not gonna be looking at it, and my classmates would not really look at it. And people who are gonna look at it are my teammates. I would want them to be able to look at it."

"I never really thought about having my own websites. I was not trying to build a portfolio or anything like that. It's just for fun. I like building things."

### Quotes on Gallery:

"We used Gallery a lot just as a way of submitting work."

"Everyone works on the same thing it's almost like googledrive but you don't see someone editing it at the same time."

"I had to use the up arrows to get the text block or images to the right spot and that took me a lot of time. kind of annoying."

"I did not know that you could comment on others' projects."

"Collaboration is a good part of the Gallery."

"Adding videos is hard. I don't know if it's just me. I was trying to upload mp4 videos and it wouldn't work sometimes."

### Quotes on feedback:

"The professor and TA gave us feedback."

"We did feedback in person."

"I prefer to give feedback in person than online."

"If it's a personal project and it's just for fun. Usually I don't get feedback and would call it a day. Otherwise I just send it to these guys. (pointing the other two interviewee) I usually show it before I publish it."

"We sit in the same room and there is a constant flow of interaction."

### 4.Ray: Alumni

#### Quotes on documentation:

"There is a lot of effort that goes into documenting work."

#### Quotes on curation:

"I curate to remember what I did"

"My projects have to be robust enough that if somebody clicks it they don't wanna be disappointed when they see one image."

"Curation takes as much time as producing work, sometimes it's more."

"I produce those images because I know I'm gonna use it later for curation."

"On my own platform I could create a brand, and create a unit that feels cohesive."

### 5.Sheldon: Alumni

#### Quotes on documentation:

"I'm in class with my peers. That tells me more than what's online. What we document is different than what happens throughout those six weeks. I'm sitting next to somebody and they are banging their head at the table because they can't figure out how to solder, and then they figured something else out. That's interesting. They may not convey that online but I saw it because I was sitting ten feet from them for six weeks. I can have a conversation with them that isn't curated, but everything that is documented is curated."

#### Quotes on feedback:

"We do our feedback through slack."

"I don't have to edit my work based on other people's feedback necessarily."

"When someone gives me feedback, I would ask myself what I already know, What I'm trying to change, Does this matter, what does this person know."

#### Quotes on curation:

"The satisfaction comes from the grade itself."

#### Quotes on Presentation:

"If my projects look like everyone else's project why would I get hired."  
"I have to differentiate myself."

#### Quotes on Gallery:

"The gallery is only successful when

there are tons of people on it."

better."

"I don't want to be influenced by others' opinions."

"I like to give feedback online that do it personally. Students will be hesitate to give feedback because they are the people they know."

#### Quotes on curation:

"I think it's more important to curate content than to curate layout."

#### Quotes on Presentation:

"I need a room for little anonymity online."

#### Quotes on Gallery:

"I think it's easy to use, which is good."

"The 'pool' seems like Behance, it's pretty cool."

"If there will be more cool templates, that will be better for me."

"I haven't used Gallery before. But it's not appealing or impressed enough at first sight. It looks like another website called Instructables."

"I wonder can I give feedback anonymously?"

"Marketplace. Facebook/Twitter/Ebay only works because you have tons of people on it."

"This has a similar problem with Behance. You live in a structure."

"I go to school of design's student population list, and just click through their links."

"I look at dribbble's projects because I can gain more knowledge. Dribbble is global and highly visual. Having an image can do a lot. Dribble is more of an art piece or art gallery than it is a process."

"Ideate Gallery probably helps people with a technical background better."

### 6.Jack: Current IDeATe student

#### Quotes on documentation:

"Making a documentation is not that of a hinderance."

"I document by taking photos of each steps and finally I make a book to show my projects."

"The biggest issue for documentation is... even though I realize it's necessary, sometimes I just have no time to do that because I'm very busy."

#### Quotes on feedback:

"I think fact to fact feedback is much