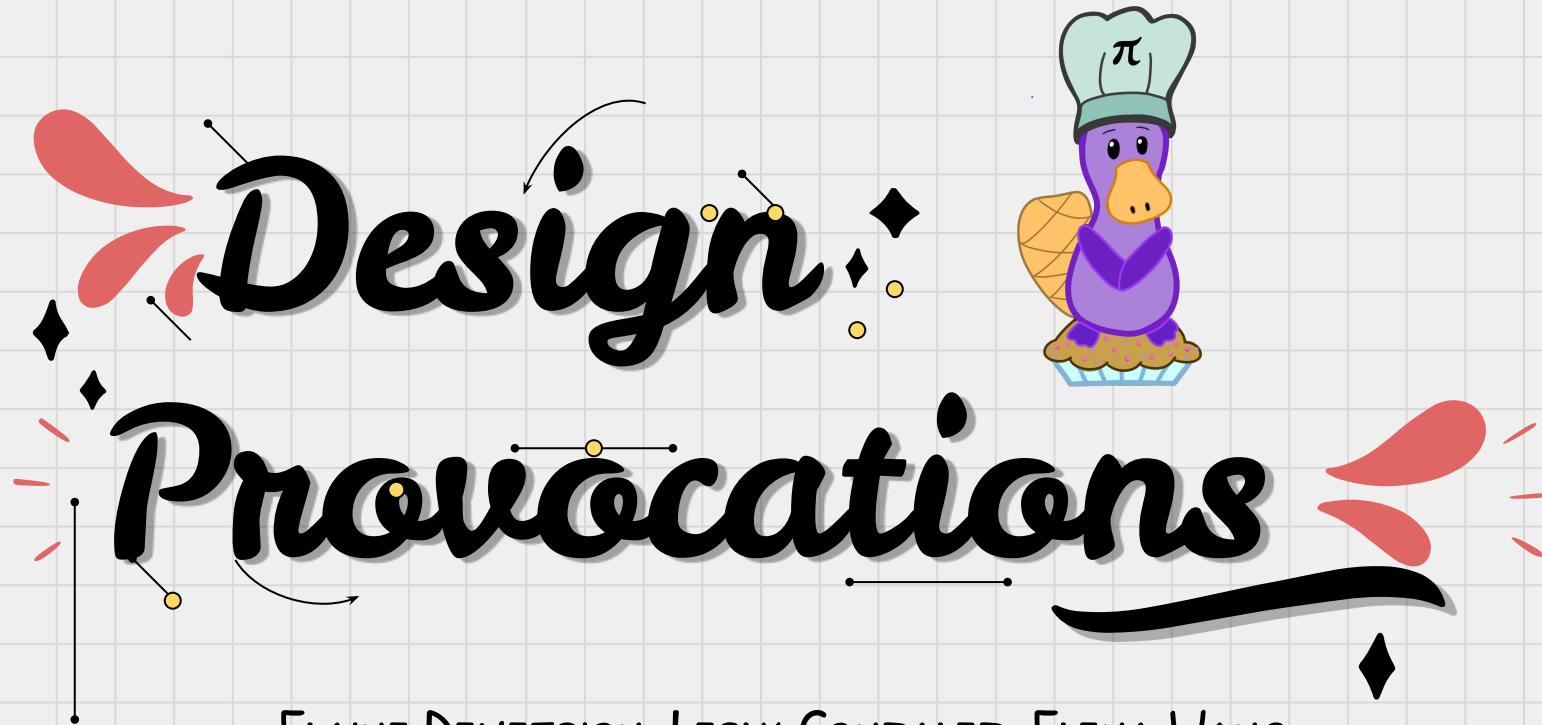


Design: Provocations



A large, bold, black cursive font title 'Design: Provocations' is centered on a grid background. The word 'Design' is above 'Provocations'. The title is surrounded by various hand-drawn style elements: red petals with black stems and dots, yellow stars with black outlines, and black dashed lines with small circles at the ends.



ELAINE DEMETRION, LESLY GONZALEZ, ELENA WANG

GROUP I: PLATYPI

04.14.2024

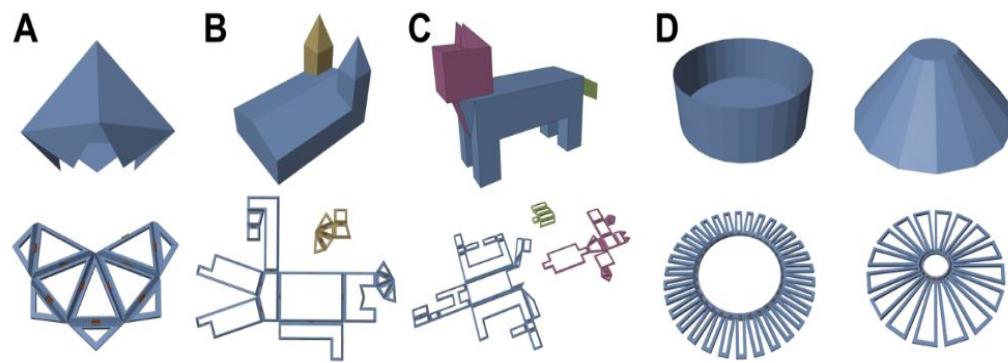
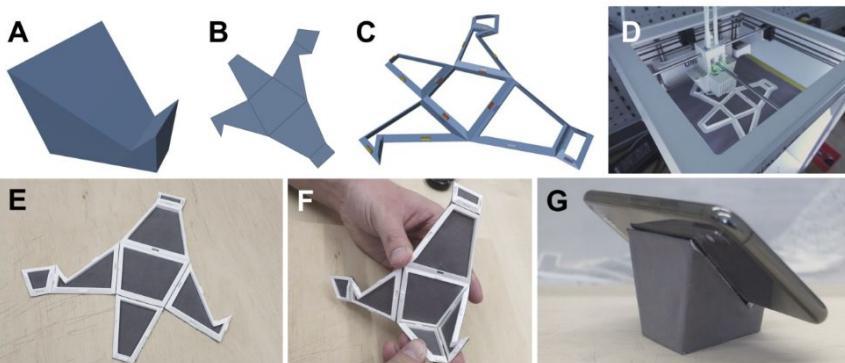
01. Inspiring Interface

The title 'Inspiring Interface' is written in a large, bold, black, cursive-style font. It features several decorative elements: a red oval at the top left, a black circle containing the number '01.' at the top center, and a red oval at the top right. Below the main text, there is a horizontal black line. Various small, stylized icons are scattered around the letters, including yellow diamonds with black outlines, black diamonds with white outlines, and black asterisks.

FabricFaces: COMBINING TEXTILES AND 3D PRINTING FOR MAKER-FRIENDLY FOLDING-BASED ASSEMBLY



FabricFaces is a Blender plugin. It generates foldable 3D-printable frames based on a user-provided 3D model. A user can print these frames on top of a fabric of their choice (or glue them to the fabric after printing). Then, they fold up the frames to get a real-life version of their object. FabricFaces aims to enable non-professional 3D modelers to create finished-looking objects with easily-customizable properties, like grippiness, water-absorption, and colorful patterns. FabricFaces also lets users create objects larger than what 3D printers can normally make: print individual frames, glue them onto fabric, and fold them like normal. Advanced users have access to extra customization options. For example, they can change frame connector types and skip preprocessing face merges. FabricFaces' functionality is limited by the 3D printer's minimal layer height and nozzle size, along with human dexterity. Sometimes preprocessing a model leads to unwanted changes; advanced user settings mitigate this.



Why we were inspired

- FabricFaces was very intentionally designed to be beginner-friendly in multiple ways, but it can also be customized for advanced users. This allows the interface to be used by a wide range of skill levels, which is relevant since we found in our survey that Smith students also have varying levels of comfort with makerspace tools.
- FabricFaces is an example of an interface that integrates with a widely-used tool that already exists (Blender), which lowers the barrier to entry and adoption. Our MakerMate design similarly aims to be integrated into existing platforms.
- After testing the interface with real users, the interface was found to be useful for additional purposes aside from its intended usage.
- In our survey, many Smith students indicated interest in creating with 3D printing and fabrics, so we could see this interface being used in Smith makerspaces such as the DTI.

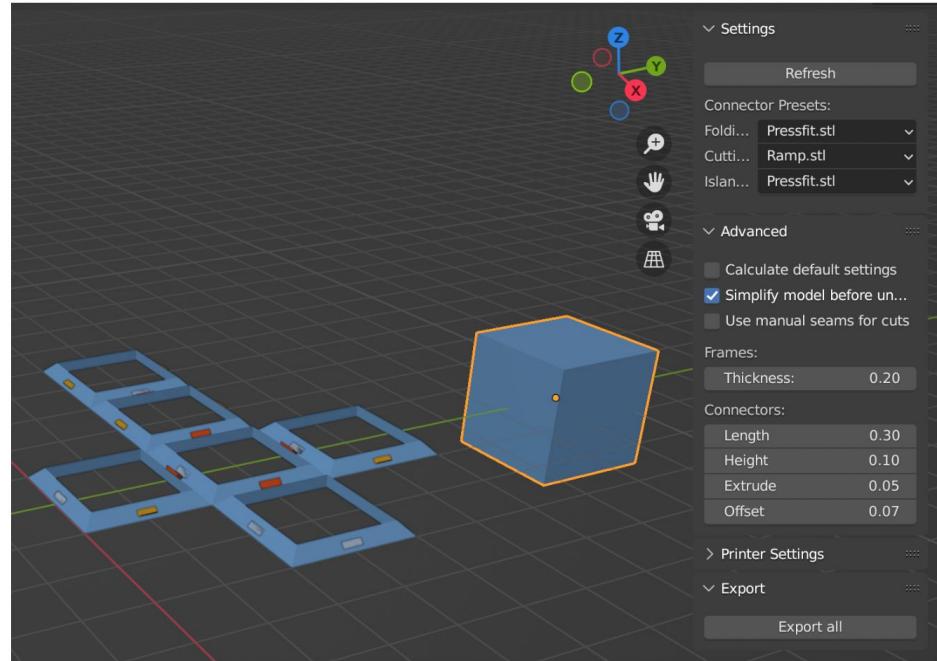


Figure 3: The interface of our plugin in Blender. The automatic process can be tuned manually via the Blender tool shelf on the right.

CITATIONS



- Adrian Wagner, Paul Miles Preuschoff, Philipp Wacker, Simon Voelker, and Jan Borchers. 2023. FabricFaces: Combining Textiles and 3D Printing for Maker-Friendly Folding-Based Assembly. In Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems (CHI EA '23). Association for Computing Machinery, New York, NY, USA, Article 135, 1–7.
<https://doi.org/10.1145/3544549.3585854>

Design Provocations

02.



MAKERS' CHALLENGE



The Makers' Challenge is an event targeted at first years at the beginning of fall semester. It aims to generate student engagement; student-student, student-staff, campus org-campus org collaboration; and campus community.



Makers' Challenge! App or paper



FYS Syllabus
MWF 10:50-12:05
- 20% participation
- 40% papers 1-2
- 40% final paper
Extra credit: extra 5% in any category by completing Makers' Challenge

Explore makerspaces at Smith and earn up to 30 dining dollars. The challenge will guide you through a project you select. Expected time commitment is 4 hours total. Download the app or print the gameboard to get started.

How To

1. Backboard: find somewhere with laser cutter, or a workshop. Be bold and ask for guidance!

2....

Interactive map

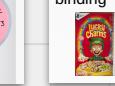
Workshop sign up

Share to get dining dollars!



Makers' Challenge: Clock

Intro to circuits, wood, lasercutter, crafting



Makers' Challenge: Planner

Intro to InDesign, printing, and binding





*PHOTO FROM [HTTPS://WWW.SCIENCE.SMITH.EDU/CDF/](https://www.science.smith.edu/cdf/)

ADVERTISED TO FIRST YEARS HEAVILY VIA SOCIAL MEDIA, POSTERS, AND IN CLASSES AT THE BEGINNING OF FALL SEMESTER. (THOUGH, ANYONE CAN PARTICIPATE.) SOME PROFESSORS INCLUDE IT IN THEIR CURRICULUM, OR OFFER EXTRA CREDIT FOR COMPLETION. A REWARD OF DINING DOLLARS FURTHER INCENTIVIZES PARTICIPATION.

THE CHALLENGE REQUIRES STUDENTS TO USE A VERSION OF THE DTI'S CURRENT MAKERS' MAP—THEY CAN CHOOSE TO USE AN APP VERSION OR A PAPER COPY ON A PAMPHLET. BOTH THE APP AND THE PAMPHLET WILL WALK STUDENTS THROUGH THE PROJECT, PROMPTING THEM TO EXPLORE THE MAP FOR POTENTIAL LOCATIONS AND SIGN UP FOR WORKSHOPS. WHEN THE CHALLENGE ENDS, THE PAMPHLET AND APP REMAIN HELPFUL.

INFORMATIONAL RESOURCES TO USE.

STUDENTS SELECT A PROJECT FROM A SHORT LIST OF OPTIONS. EACH PROJECT CHOICE CAN BE COMPLETED ENTIRELY IN ACCESSIBLE MAKERSPACES, REQUIRES USING AT LEAST THREE MAKERSPACES, AND HAS MANY WAYS STUDENTS CAN CUSTOMIZE AND TAKE OWNERSHIP OF IT. NO PROJECT WILL REQUIRE EVERY MAKERSPACE. BUT, THE STUDENT BODY'S COLLECTIVE NEW KNOWLEDGE WILL CONTINUE SPREADING AFTER THE CHALLENGE.

WE COLLABORATE WITH ALL MAKERSPACES TO GENERATE THOUGHT-OUT AND WELL-SUPPORTED PROJECTS. THOSE RUNNING THE MAKERSPACES CAN BE DIRECTLY INVOLVED IN, AND PROUD OF, THE EVENT THEY ARE HELPING FACILITATE. MAKERSPACES ARE ENCOURAGED TO HOLD RELEVANT WORKSHOPS SO STUDENTS ARE LESS INTIMIDATED EXPLORING THE SPACE, CAN MAKE FRIENDS WHILE WORKING ON THEIR PROJECT, AND MEET THE PEOPLE WHO RUN THE SPACES. EXTRA FUNDING IS OFFERED TO SPACES THAT DO THIS.

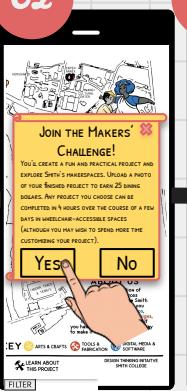
APP (STORYBOARD)

01



MADELEINE, A NEW SMITHIE, SEES AN AD FOR THE MAKERS' CHALLENGE. SHE'S INTRIGUED. SHE DOWNLOADS THE APP.

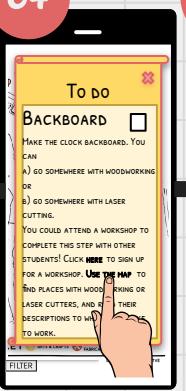
02



03



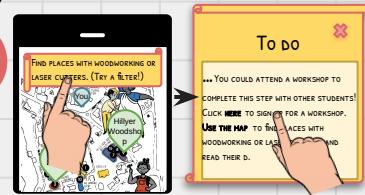
04



05



06

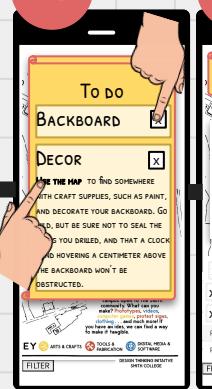


MADELEINE SEES THAT HILLYER WOODSHOP IS NEAR HER HOUSE. SHE'S NERVOUS AND DOESN'T WANT TO JUST SHOW UP, SO SHE LOOKS FOR A WORKSHOP THERE. THE APP LINKS TO FAMILIAR SOFTWARE TO SCHEDULE. SHE PICKS A SLOT FOR THE NEXT DAY.

07

At the workshop, Madeleine is in a 10-student group. They're shown how to cut a rectangular or circular clock backboard. Madeleine chooses a square backboard, and picks the dimensions. She exchanges phone numbers with a student, Ana. At the end, group leaders discuss the woodshop open hours and types of projects it supports.

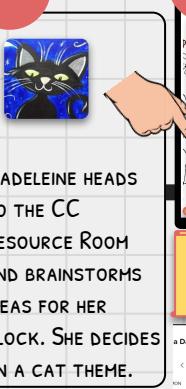
08



09

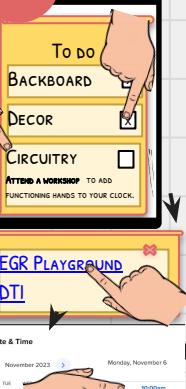


10



MADELEINE HEADS TO THE CC RESOURCE ROOM AND BRAINSTORMS IDEAS FOR HER CLOCK. SHE DECIDES ON A CAT THEME.

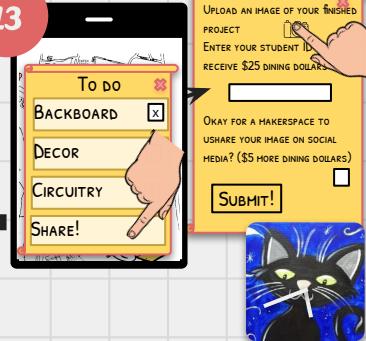
11



12

AT THE EGR PLAYGROUND WORKSHOP, MADELEINE LEARNS HOW CIRCUITS WORK AND HOW TO SOLDER. SHE'S EXCITED WHEN SHE POPS A BATTERY INTO THE HOLDER AND HER CLOCK HANDS MOVE. AT THE END OF THE WORKSHOP, SHE'S TOLD HOW TO ACCESS OTHER SPACES WITH SIMILAR TOOLS AND SUPPLIES (SINCE THE PLAYGROUND IS ONLY FOR EGR STUDENTS), AND REMINDED THAT SHE CAN GET \$25 DINING DOLLARS BY UPLOADING PICTURES OF HER PROJECT.

13



MADELEINE FEELS ACCOMPLISHED, LOVES HER CLOCK AND IS CONFIDENT EXPLORING NEW SPACES. SHE IMMEDIATELY THINKS TO USE THE APP'S MAP LATER WHEN DESIGNING A POSTER FOR A CLUB, AND DISCOVERS THE DIGITAL MEDIA HUB.



PAMPHLET LAYOUT (DOUBLE SIDED PAPER)

- * Students have the option to use a paper pamphlet instead of the app. Links are provided so students can access workshops and other up-to-date online information. Students are prompted to interact with the pamphlet by checking off what they've completed and making notes (eg, "CDF Workshop Wed 9/28 2pm")

Different pamphlets for each project option

MAKERS' CHALLENGE: CLOCK



- Build a clock to hang in your dorm room!
- Learn about circuits, wood, lasercutting, and crafting
- Earn up to \$30 dining dollars
- Time: ~4 hours

MAKERSPACE INFO

[very quick summary of all of the makerspaces, whether they're accessible, applicable websites, and contact information]

01

04

STEPS — NOTES

Backboard

- Find somewhere with lasercutters or woodworking.
- Ask for help at that location, or attend a workshop:
[<link/QR>](#)

Decorate

- Find somewhere with craft supplies like paint.
- Make the theme of your dreams!

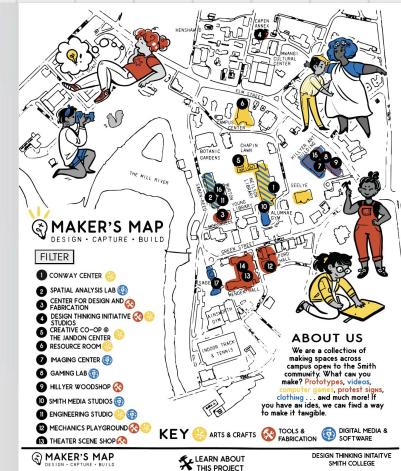
Circuitry

- Attend a workshop to add moving hands to your clock
[<link/QR>](#)

Share

- Upload a picture of your project and your student id number to earn dining dollars!
[<link/QR>](#)

02



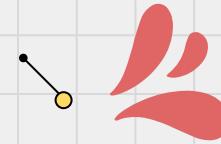
Interactive map: The Makers' Map website has information about hours, contacts, and notes on the spaces.
[<link/QR code>](#)

03





CONCEPT JUSTIFICATION



The Makers' Challenge addresses the following gaps that our research revealed:

PROBLEM

"If there's a page that consolidates all the makerspaces, that page needs to be accessible because I don't know it exists." —non-SDP student

"I kinda wish that more students knew about all of the makerspaces" —SDP

"Pretty much every space...is like, oh you knew how to do this, here's how to improve. They have one workshop at the beginning of the year." —non-SDP student

It's hard to use the DTI social media as a gallery space, since students don't share their projects. —paraphrased quote from Emily from the DTI

HOW THE MAKERS' CHALLENGE ADDRESSES IT

The Makers' Map consolidates information, but students need to know it exists. The Challenge addresses this by:

- introducing students to two versions of the Makers' Map
- triangulating advertising, ensuring students know about the challenge and, by extension, the Map
- providing a memorable experience focused on the Map, so students remember it as a tool

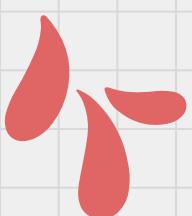
Most likely, students return to spaces they know about and are comfortable in. So, the Makers' Challenge aims to increase base knowledge and familiarity with makerspaces by

- Pushing students to explore at least three makerspaces
- Increasing familiarity and skill level with the Makers' Map, to learn about spaces in the future
- Increasing collective campus makerspace knowledge, so even if a student hasn't visited somewhere, they are more likely to hear about it from a friend.

This challenge will drastically increase the number of introductory workshops offered by providing

- extra funding for spaces that hold relevant workshops (unsure how to do this, but this assignment says we can have "radical ideas")
- demand for specific workshop types, so it's worth the time for those running them

The Challenge prompts students to upload photos of their final work, and offers five additional dining dollars if they allow the photos to be shared on social media.



INDIVIDUAL DESIGN CHOICES JUSTIFICATION



CHOICE

REASONING



Why modify the existing Makers' Map, instead of making something new?

- We want to build on the work of the students who made the map, not override it
- The DTI is likely still able to edit/update the map themselves instead of going through other organizations at Smith, and we want to let the makerspaces retain control of their image

Why do both an app and paper, and not another format?

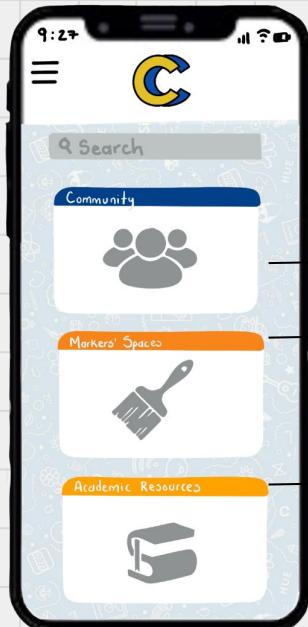
- Both of these options are highly portable, which is helpful because the challenge requires moving around campus. Students won't need to haul around laptops.
- Different people find it annoying to download new apps, don't have space to download new apps, prefer paper, live their entire lives on their phones, or dislike wasting paper. We want to cater to all of these people, so we'll have two options for challenge completion.
- We are not building a new type of portable electronic, because we think students are more likely to engage with (and remember to carry) devices/objects they are used to carrying, and mobile phones/paper is a viable medium.

Why advertise to first years at the beginning of fall semester, instead of year round, or at another time?

- While the challenge could be completed year-round, and by anyone, we want to capture the limited-time event excitement
- Constraining the timeline makes it easier to gather large enough crowds to justify workshops
- We want to capitalize on the window at the beginning of the year where first years are still excited and exploring, and not overwhelmed by schoolwork nor orientation.



THE CAMPUS CONNECT APP

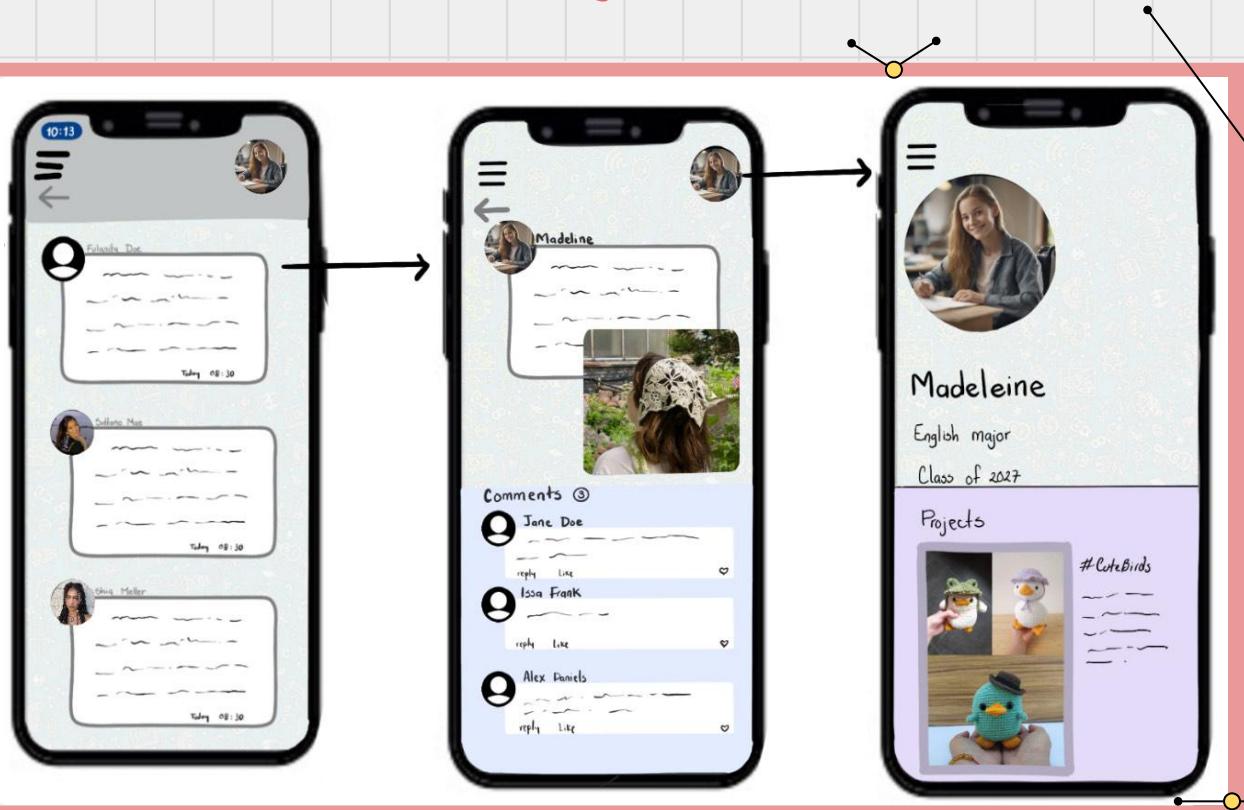


The Campus Connect App streamlines access to campus resources, with a focus on makerspaces. It facilitates easy navigation for students seeking these facilities. The app encompasses two primary components:

- **Community Hub:** Fosters student interaction, enabling project sharing and mutual assistance.
- **Makerspace Directory:** Offers comprehensive information on campus maker spaces and available resources.
- **Potential Expansion:** There's potential for future inclusion of additional college resources, such as academic support services.

THE CC APP : COMMUNITY HUB

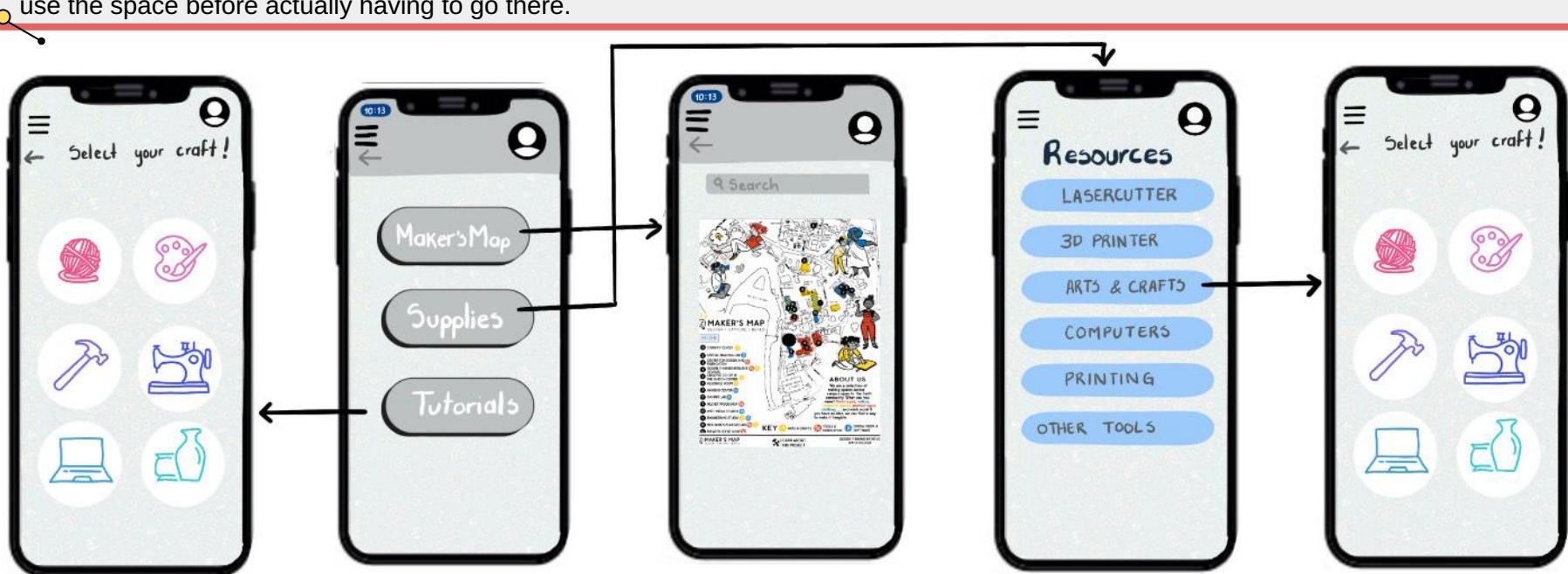
Madeleine, one of our personas, has been crocheting in her spare time at the DTI. She wants to share with other students her projects, so she uploads the photos in her CC profile where other Smithies can check out her work. Thanks to this feature, other smithies who are interested in that craft contact Madeline about suggestions on patterns and materials. Madeline is thrilled about meeting more students who share her passion for crocheting, and continues to share her projects on the app.



THE CC APP : MAKERSPACES DIRECTORY

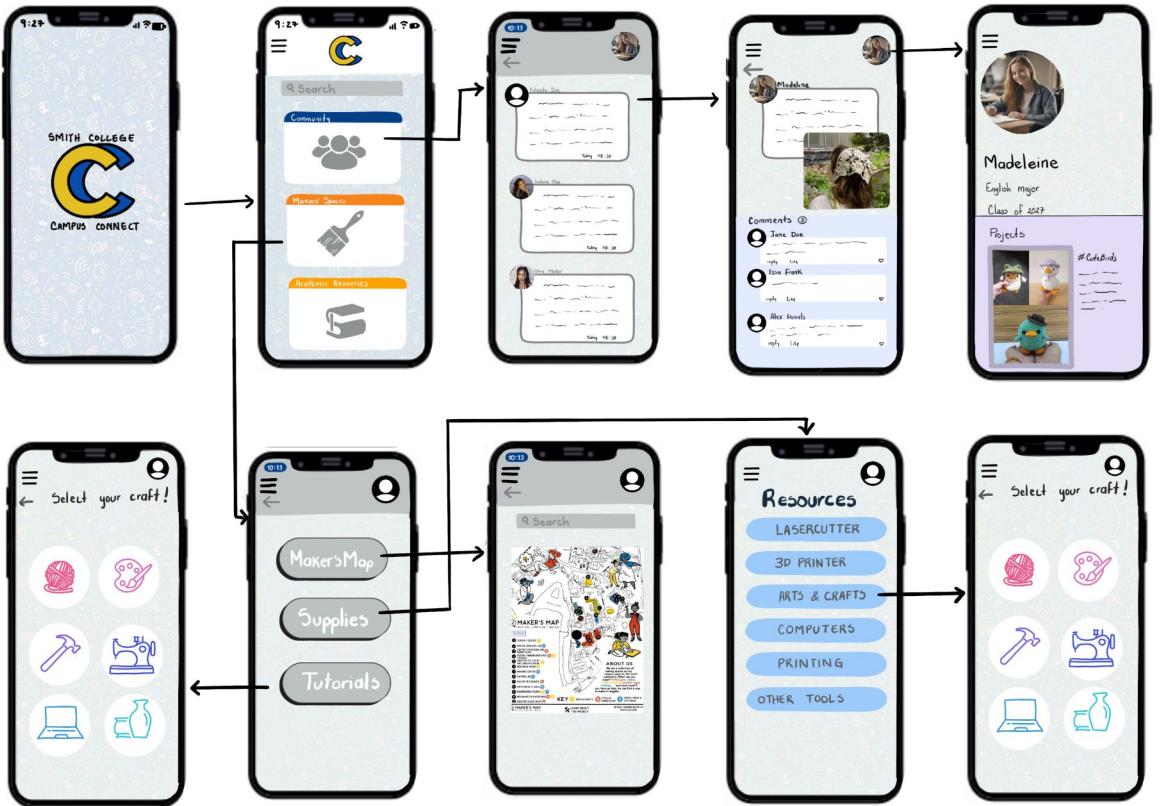


After her successful endeavor with crochet, Madeleine is ready to venture into new art mediums. She wants to start painting, but she can't do that in her dorm. She then uses the CC app to access the makers map. She finds out that there are art studios in Hillyer and they are wheelchair accessible. Unfortunately, she learns that the space is for students who are taking art classes only. Since she's very interested in the subject she decides on taking an art class next semester. However, it was good to find out whether she was allowed to use the space before actually having to go there.



JUSTIFICATION

"If there's a page that consolidates all the makerspaces, that page needs to be accessible because I don't know it exists."
—non-SDP student



We propose an option that once downloaded, will be easily accessible and has all the information in one place.

I feel like the DTI is so popular because it's the only makerspace people know about.
—non-SDP student

By making the information about all the makerspaces available we aim to increase the amount of students who know about other makerspaces, their location and how to make the best use of them.

It's hard to use the DTI social media as a gallery space, since students don't share their projects. —This quote is a paraphrase of Emily Norton, Director of the DTI.

The community hub in the CC app offers students the option to share their artwork with other members of the college, which can foster collaboration and serves as an incentive to use the app for community building.

Hi I'm MakerMate!
Have a project or craft idea you want to bring to life? Let me help you figure out where to start!

I want to make a children's book filled with colorful hand-painted pictures for my Education class. I may even add pompons, fabric, and yarn to add texture!

That's an awesome idea! There are multiple places on campus to help:

- Digital Media Hub (Neilson) or Knowledge Lab (Alumnae Gym):** To type and format your book digitally, you can use Adobe InDesign on the computers in Neilson's Digital Media Hub or Alumnae Gym's Knowledge Lab! If you need help, you can meet with the Digital Media Mentors during their [drop-in hours](#).
- Imaging Center (Hillyer Hall):** To print your book, you can use the printers in Hillyer's Imaging Center! If you need help, you can meet with the Imaging Center staff during [these hours](#).
- Design Thinking Initiative (Capen Annex) or Resource Room (Campus Center):** To access painting and craft supplies, you can pick up materials from the DTI or the CC Resource Room! If you need help, you can [book an appointment](#) with the DTI staff, or meet with the DTI Studio Design Partners during their [Open Hours](#).

Let me know if you'd like more information about these spaces!

Message...

Design
03

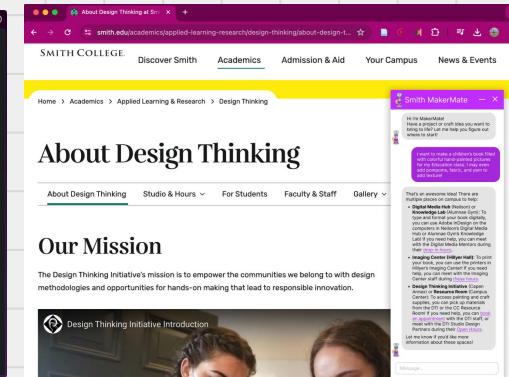
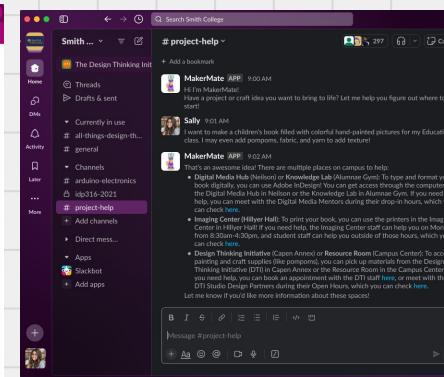
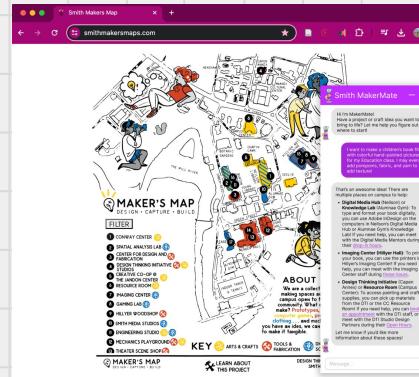


MAKERMATE AI CHATBOT



The MakerMate chatbot is a **GPT-4 powered** interactive tool that takes a project idea and **suggests appropriate Smith makerspaces and resources** to make the project.

It can be accessed **on a variety of existing platforms**, including the Maker's Map, Moodle, Slack, Discord, and the official websites of each Smith makerspace.



It is worth noting that we are **NOT trying to replace staff or human help**, such as the DTI SDPs, since we are not providing detailed instructions on how to create a project. The goal here is to simply **connect students with the most relevant people and places** (that they may not have known existed).

MAKERMATE CHATBOT: SALLY'S STORY



THE PREMISE:

This is **Sally** from our Distilled Fact Scenario. She's a **junior** double majoring in **English** and **Education**. She has the idea of **creating a children's book** for her Education class, but doesn't know how to make it.

THE NARRATIVE:

- While talking to a friend about her project idea, Sally's friend tells her about the **Design Thinking Initiative (DTI)**.
- Sally expresses **concern that she is not allowed to use the DTI** as a non-art student, so her friend suggests that she join the DTI Slack to ask for more information.
- Sally decides to **join the Slack**. After joining, Sally browses through the channels and **finds the #project-help channel**.

STORY



THE NARRATIVE (CONTINUED):

- When Sally opens the #project-help channel, the **MakerMate Slack bot greets her** with an opening message to introduce its functionality.
- Sally **types up a brief description of her project idea** and sends it to MakerMate.
- MakerMate **suggests 3 relevant makerspaces** on campus, as well as who and when to ask for help.
- Sally follows MakerMate's suggestions by...
 - going to the **Digital Media Mentors' drop-in hours** to learn **Adobe InDesign** to format her children's book,
 - going to the **Imaging Center** to print out the book,
 - making an appointment with **Kathy from the DTI** to generate ideas for illustrating and decorating the book,
 - spending the next few weeks at the **DTI during the SDPs' Open Hours** to finish things up.

CONCLUSION:

By using the MakerMate chatbot, Sally was **introduced to new places** on campus that she had **previously not heard of**, and now **knows who to ask for help**. With everyone's support, Sally was successfully able to bring her project idea to life.

The screenshot shows a Slack interface. On the left, there's a sidebar with navigation links: Home, DMs, Activity, Later, and More. Under 'More', the '# project-help' channel is selected, highlighted with a purple background. The main area shows a conversation in the '# project-help' channel. The first message is from 'MakerMate APP' at 9:00 AM, saying 'Hi I'm MakerMate! Have a project or craft idea you want to bring to life? Let me help you figure out where to start!'. The second message is from 'Sally' at 9:01 AM, saying 'I want to make a children's book filled with colorful hand-painted pictures for my Education class. I may even add pompons, fabric, and yarn to add texture!'. The third message is from 'MakerMate APP' at 9:02 AM, saying 'That's an awesome idea! There are multiple places on campus to help:'. It then lists three options: 'Digital Media Hub (Neilson) or Knowledge Lab (Alumnae Gym): To type and format your book digitally, you can use Adobe InDesign! You can get access through the computers in the Digital Media Hub in Neilson or the Knowledge Lab in Alumnae Gym. If you need help, you can meet with the Digital Media Mentors during their drop-in hours, which you can check [here](#).', 'Imaging Center (Hillyer Hall): To print your book, you can use the printers in the Imaging Center in Hillyer Hall! If you need help, the Imaging Center staff can help you on Mon-Fri from 8:30am-4:30pm, and student staff can help you outside of those hours, which you can check [here](#).', and 'Design Thinking Initiative (Capen Annex) or Resource Room (Campus Center): To access painting and craft supplies (like pompons), you can pick up materials from the Design Thinking Initiative (DTI) in Capen Annex or the Resource Room in the Campus Center! If you need help, you can book an appointment with the DTI staff [here](#), or meet with the DTI Studio Design Partners during their Open Hours, which you can check [here](#).'. At the bottom, there's a message input field with placeholder text 'Message #project-help' and a toolbar with various icons for text styling and attachments.

MAKERMATE CHATBOT: JUSTIFICATION

“I kinda wish that more students knew about all of the makerspaces... I feel like I’ve

learned about a lot of the spaces on campus, but they’re hard to utilize.” **-SDP**



“I wish there was more room for onboarding people who are newer in the other makerspaces. It would do a lot for inclusion on campus to make these specific types of spaces more inclusive.” **-non-SDP**



“I feel like the DTI is so popular because it’s the only makerspace people know about.” **-non-SDP**



“I didn’t know most of these places existed. **The DTI was the only space at orientation.** If the CDF had been open we would’ve used it, but it wasn’t.” **-non-SDP**



“**A lot of the spaces are underutilized. Especially the technology-based spaces,** the Imaging Center, the Spatial Analysis Lab, the UX lab—didn’t know about that until very recently. These spaces are super underutilized. **The DTI becomes a general space for people,** and we can’t help people with what they’re looking for. **We have to point people in a different direction.**” **-SDP**

MAKERMATE CHATBOT: JUSTIFICATION

CHATGPT

A screenshot of a CHATGPT interface. On the left, a sidebar shows user history: "What is dark matter?", "Dark matter astrophysics", and "I want to make a children's book filled with color hand-painted pictures for my Education class. I may even add pompons, fabric, and yarn to add texture! How do I make this book using resources on Smith College's campus?". The main chat area shows a message from "CLAUDE AI": "Creating a Hand-Painted Children's Book at Smith". A large curved arrow points from the text in Claude's message to the "MAKERMATE!" section of the slide.

A screenshot of the "Smith MakerMate" chatbot interface. The header says "Smith MakerMate" with a close button. The bot's message: "Hi I'm MakerMate! Have a project or craft idea you want to bring to life? Let me help you figure out where to start!". A user message: "I want to make a children's book filled with colorful hand-painted pictures for my Education class. I may even add pompons, fabric, and yarn to add texture!". The bot's response: "That's an awesome idea! There are multiple places on campus to help:

- Digital Media Hub (Neilson) or Knowledge Lab (Alumnae Gym): To type and format your book digitally, you can use Adobe InDesign on the computers in Neilson's Digital Media Hub or Alumnae Gym's Knowledge Lab! If you need help, you can meet with the Digital Media Mentors during their drop-in hours.
- Imaging Center (Hillver Hall): To print

".

Our user research found that students **generally aren't aware of all the resources available** on campus for making their projects.

If anything, students tend to **flock to the DTI** because it is the **only makerspace that they know of**.

The MakerMate chatbot aims to **fill this gap in knowledge**.

- It provides suggestions that are **personalized** to each student's situation so that students get the specific information they need.
- It is **widely available on any platform** that students may check for information so that it can be **easily discovered**, even unintentionally.
- It has a **familiar interface**, since most students have likely used an AI chatbot at least once by now.



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