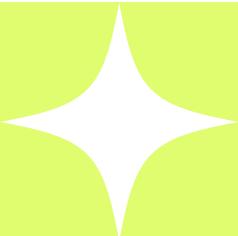




# The Sound of Smart Things

DCM180 2024-2025

Jiaqin Liu	Bar
Melody Syu	Beer Tap
Hauyu Liu	Coffee Machine
Yanny Wong	Cups
Kaixuan Chen	Pillows
Yu Tan	Sofa
Demi Sparidans	Pin Board
Jochem Verstegen	Shop
Pin-Yuan Wang	Trash Can



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# Introduction



This report explores the role of sound design in shaping the interactions of everyday objects within Lucid bar. This project follows an object-centered approach and explores how sound enhances the function and character of objects. It aims to create a smarter and more interactive environment.

The study focuses on nine objects commonly found in Lucid Bar, including beer taps, a coffee machine, a snack and drink shop, cups, a sofa, pillows, a trash can, and a pinboard. By analyzing how these objects interact with people and each other, the project envisions a scenario in which sound design fosters dynamic and engaging interactions.

Through observation, role-playing, relationship mapping, and prototyping, the team explored how sound could define the behavior and communication patterns of these objects. In the final design video, we set a playful "last-night party," demonstrating how sound can bring objects to life—giving them personalities, emotions, and a sense of agency. The report details this process and highlights the potential of sound design in creating smarter, more responsive environments.

[Video Link](#)

# Methodology

The team visited Lucid at the beginning of the project. This visit gave an overview of the Lucid environment, and as a result, provided a list of objects available to get smarter with sound design. Each member of the group independently selected their interested object and shared their choices with other members to inform an unintended context with the participation of nine different objects. The resulting context consisted of the bar, beer taps, the coffee machine, the snack and drink shop, cups, the sofa, pillows, the trash can, and the pinboard. In later phases, the team explored how these objects could be implemented with sound design and contribute to a smarter future scenario.

Team members conducted individual ethnographic observations of their chosen objects by visiting Lucid Bar at different hours for one week. In this way, objects were studied for what their personality and technology responsibilities were for the Lucid, the object family, and human actors. The observation was eventually presented in object-centered diaries. These diaries were used as the ethnography of selected objects and implied how objects would feel about their roles, functions, and interactions with other actors in Lucid. The team then came together to share and discuss their observations, collaborating to find out how these various objects might interact within the future smart system.

Before diving into creating sounds, the team first figured out the object mapping and defined the scenarios. The mapping was aimed to help team members have a clear view of potential relationships between objects and other objects and interactions between objects with human actors. With this analysis, objects were given deeper thoughts into their potential capabilities and awareness when they were made smart. Based on this object mapping and feedback session, the team started to create a comprehensive blueprint documenting each object's sound interaction rationales, which demonstrated “How does the object perceive and react?” and “How does the object interact with other objects?”.

Then, the team developed the design scenario around a playful “last-night party” to connect all objects, portraying events from evening activities to the following morning, where all the objects, still in a hangover state, are awakened by the coffee machine to start a new day. Based on the scenario

script, each member designed the sound for their individual objects and related context. The sound design personified objects with personality and emotions through variations in tone and pitch. The video was edited using Adobe Premiere to create a coherent story, focussing on interactive behaviors by adding the designed sound effects to their respective context or interaction.

# Observations

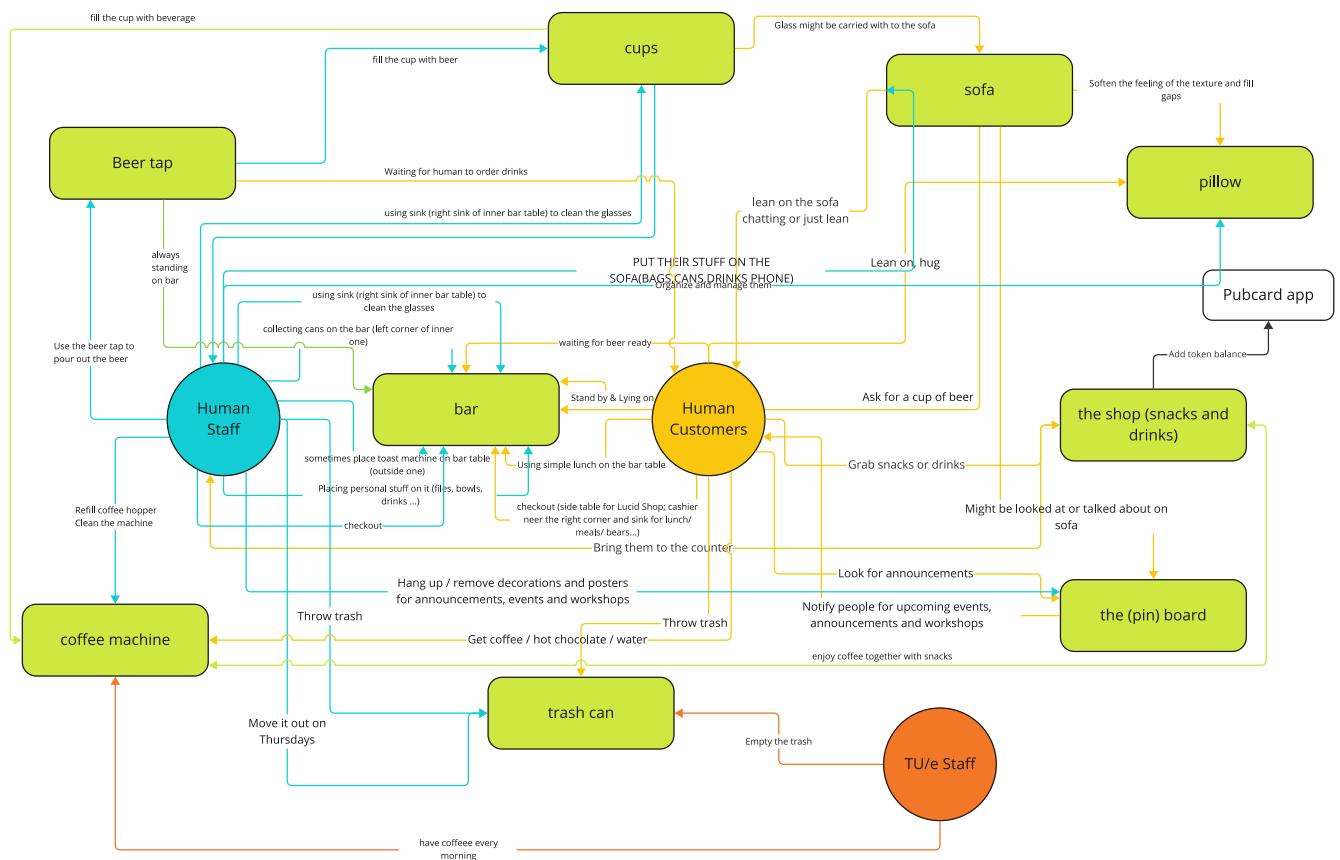
Before the Christmas break, a visit was made to Lucid Bar to explore all the objects available with the potential to be smart. Each team member then selected an object of interest and observed it independently during available time. The object-centered ethnographies were completed by sitting at Lucid Bar, gathering detailed information from the bartenders, and observing the selected objects and their interactions with people and other objects. This object-centered process provided valuable insights into the role of these objects in the bar environment and contributed to a better understanding of their potential as "smart" objects.

## Division of Lucid Bar objects

Jiaqin	Bar	Appendix A.1
Melody	Beer Tap	Appendix A.2
Haoyu	Coffee Machine	Appendix A.3
Yanny	Cups	Appendix A.4
Kaixuan	Pillows	Appendix A.5
Yu	Sofa	Appendix A.6
Demi	(Pin) Board	Appendix A.7
Jochem	Shop (Snacks and drinks)	Appendix A.8
Pin-yuan	Trash Can	Appendix A.9

# Scenario

Given the diversity of the objects, the interactions and relationships among them are quite complex, we discussed the relationships and interactions after the observation through the mapping (Figure 1). It highlights the interactions between objects and human customers, between objects and human staff, and their object-centred behaviours.



**Figure 1. Group objects mapping**

During the script setup stage, a first-person perspective was decided to be used to convey the whole story with higher emotional depth. Rather than choosing the bartender's perspective, the customer's perspective was believed to resonate more with the audience. Based on object-centred ethnography conducted with individuals, more-than-human methodology was integrated to enhance the sound design in this scenario. Additionally, specific scenes, filming techniques, and editing requirements were also taken into consideration during this stage.

However, implementing this approach came with several challenges, particularly when trying to integrate all the objects into one cohesive scene. For instance, the scene of ordering tap beer and canned beer was considered one of the biggest features of our script. However, the tap beer was available only after 16:30, while the shop closed before that. The similar issue also happened to the coffee machine, which was barely used during the party hours. Therefore, a set of unique scenarios, including the party night and peaceful morning, were decided to be used for a better demonstration of the distinct characteristics of each object.

Typically, the morning scenario should come first, but after reflection and experimentation, the team decided to reverse the order. This arrangement effectively enhances the story's cohesiveness by creating a dramatic contrast between the two, thereby emphasizing the transition from night to morning. Starting with the chaotic night creates a strong contrast, which highlights the shift from a lively and excited night to a peaceful and calm morning. Additionally, moving from the release and exhilaration of the night to the reflection and organization of the day deepens the emotional impact, while this non-linear arrangement adds intrigue, which is expected to engage the audience. Meanwhile, several repetitive scenes with blur, vignette, and shaking effects are incorporated to illustrate the customer's fragmented memory due to intoxication, enhancing the narrative and the continuity of the party and drinking scenes. Detailed descriptions of both scenarios and the script setup (Figure 2) are shown below.



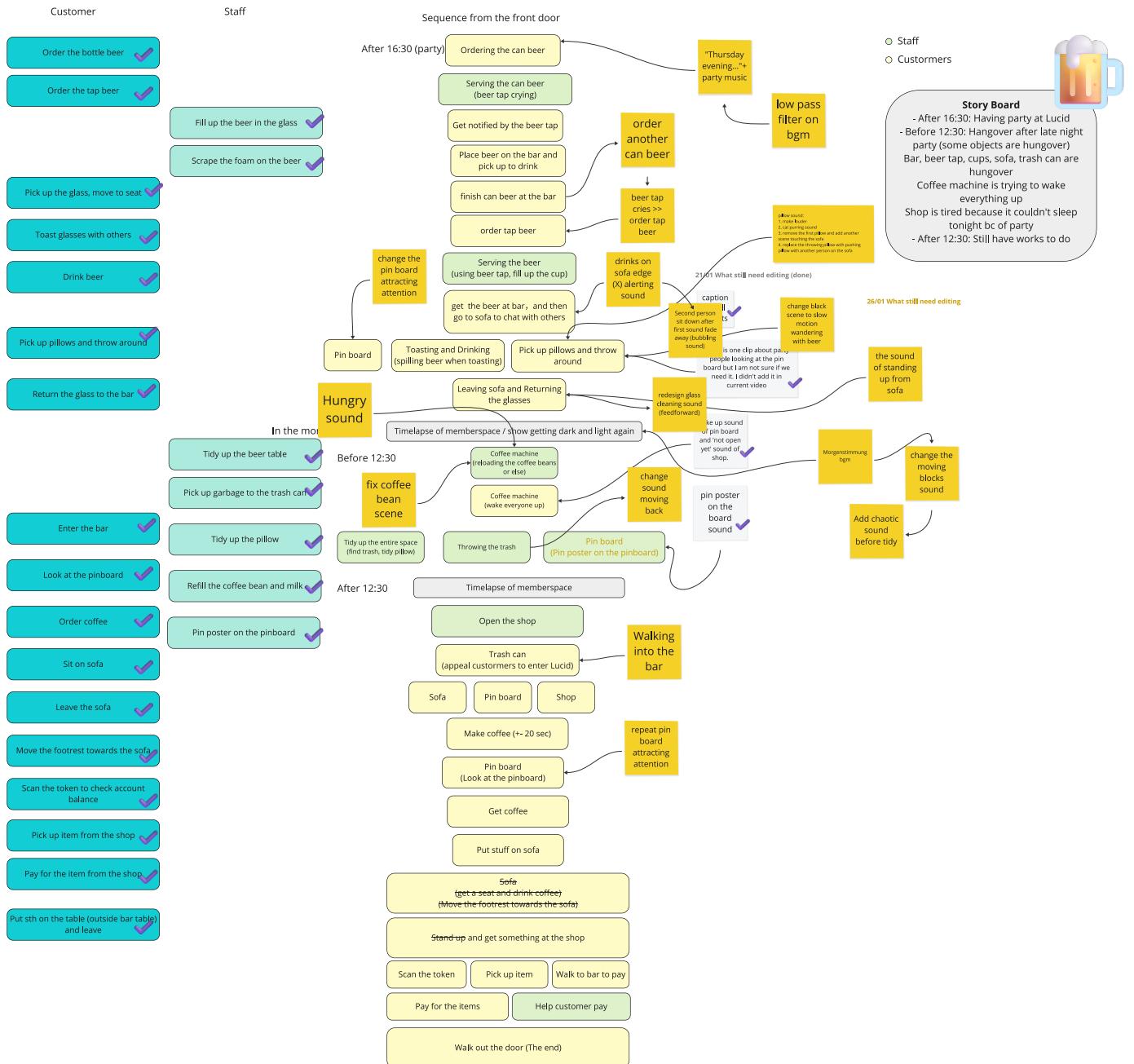
### **Night Scenario**

This scenario describes a unique yet lively party environment around Lucid Bar. Glasses clink in joyful toasts, footsteps blend with soft conversations, and the sofa corner creaks faintly as customers relax, contributing to the vibrant atmosphere.



### **Morning Scenario**

This scenario describes the workday morning after yesterday's energetic party. Awakened by the coffee machine, the day begins with the trash can's plea for attention. The shop is also alive with excitement, ready and eager to get started with the day, while the staff start to tidy up the hungover objects. Invited by the trash can, the customers start their daytime exploration in Lucid Bar.



**Figure 2. Detailed Script Setup**

# Designing the sound

## Bar

The bar is proud of its centerpiece, the C-position of Lucid Bar, and is humorous and warm-hearted. It will alert customers forgetting personal belongings, desires to stay organized and really hates trash or items be left on it.

Additionally, it always enjoys party time with customers and other objects. During the sound design, the beating sound was initially recorded by hitting the table with porcelain cups on it, and further adjustments such as different pitches, volumes and speed were done by Adobe Audition, Max and Audacity.

Rule	Object behaviour	Output sound	
Help prevent customers from forgetting personal belongings	Monitors and alerts when items might be left behind	Initial low-pitched alert bass-like beatings ; if no response, increases in both pitch and volume progressively until noticed	
Maintain cleanliness and order of its surface	Shows dissatisfaction and calls trash can and staff for assistance	Urgent, stern drum-like beats that increase in rhythm and tempo until the situation is addressed, but will maintain in a relatively low volume so that can be noticed by bartenders without disturbing customers	
Create atmosphere in harmony with beer taps	Synchronizes with beer taps' emotional states during service	A general cheerful and crisp beat which gradually rises pitches and speed at lower volume, complementing the taps' sounds while letting them remain the focus	

Rule	Object behaviour	Output sound	
Ensure efficient customer checkout process	Monitors waiting times and alerts staff when needed	Lower pitches during waiting, transitioning to louder sounds when focusing on bar service, aligned with shop's signals	
Enhance Lucid Bar's atmosphere during events	Transforms into an energetic DJ host	Playful, rhythmic sounds with slight pitch variations to match the celebratory mood. The overall pitch will gradually rise by one octave by the second half of the party, where subtle, random detuning and off-key notes will be introduced, reflecting a lively, slightly drunk atmosphere.	
Ensure the cups are clean after washing	Monitors whether cups are clean and alerts staff if the cleaning isn't finished	The crisp, delicate sound mimics ice cubes clinking and water droplets hitting marble, indicates the interaction with water during washing. The gradually rising pitch represents the process filling up, acting as an auditory "progress bar" for completion	

## Beer Tap

The beer tap's personality can be considered to jealousy, when customers opt for canned beer, the tap responds with gradually low, slow, and melancholic tones to express disappointment and loneliness. However, if someone orders tap beer, the taps convey their excitement by increasing pitch and tempo, reflecting their joy and eagerness.

The sound design for the beer tap has involved different interactions with glass (such as tapping, rubbing, and clinking) to create a library of expressive sounds. Lower tones were used to convey sadness and jealousy, while higher tones reflected excitement and anticipation. Tempo changes were employed to indicate the contrast between the tap's feelings of being neglected and their moments of joy when serving tap beer to customers. Finally, the gradual increases can be used to alert bartenders when the taps are being ignored.

Rule	Object behaviour	Output sound	
Yearn for customers' attention and selection	Shows emotional responses to customers' beverage choices - becoming dejected when canned beer is chosen, or excited when tap beer is selected	Either low-pitched, slow glass tones that become more melancholic when overlooked, or increasing pitch and tempo of glass sounds creating a joyful melody when chosen	
Guide proper beer pouring process	Assists bartenders with volume monitoring while expressing satisfaction	Progressive glass tones that indicate fill level and timing, changing in character to show contentment	
Maintain presence in bar environment	Interacts with surrounding glasses and bar elements to show readiness	Subtle glass-like sounds indicating presence and eagerness to serve	

## Coffee Machine

The coffee machine takes the role of a barista and the morning wakeup clock of the Lucid Bar. It shows hunger when running out of coffee beans, and cheerful and energetic character when refilled. It also takes pride in waking other objects and welcoming visitors.

The sound design primarily revolves from water-based sounds, indicating how water serves as the machine's lifeblood. From single drops to bubbling streams, different water states were recorded and synthesized to create a vocabulary of expressions. Pitch variations were used to convey emotional states - decreasing pitch for hunger, sparkling effects for satisfaction after refilling, and varied water drop sound for different drink selections. These sounds were edited to get a balance between functional feedback and character expression, creating the identity that blends the coffee machine's practical role with its personality.

Rule	Object behaviour	Output sound	
Manage daily startup and ingredient status	Expresses hunger when low on ingredients, satisfaction when filled, and fullness when ready	Hungry sound (high to low pitch), chewing/swallowing sounds during filling, satisfaction sound (low to high pitch)	
Act as the morning awakener for the bar	Takes responsibility to wake other objects once it's ready	Combined bubble popping and magical shining sounds (like a fairy godmother's wand) to create a refreshing morning atmosphere	
Guide drink preparation process	Acknowledges cup placement, confirms selection, shows preparation progress	Single drop sound for cup detection and selection, bubbling water sounds during preparation, bubble burst sound at completion	

## Cups

As a primary interactive object during the bar party, the beer glass engages intensively with both other objects and humans. So it is characterized as outgoing, party-loving, and eager for customers to drink from it. During the interactive period, the beer glass interacts with two human roles, bartenders and customers, and almost all other objects in the bar.

The beer glass is made of rigid glass physically, so the sound design primarily revolves around different tonalities of glass collisions. The fragile and resonant qualities of glass sounds effectively mirror the emotions of the taps, so the glass sounds are chosen to represent the taps' sensitivity. Besides, the volume of the beer needs to be noticed from the start till the end, requiring the bartender's full attention. It is expected that the beer taps can develop a character that engages with customers and bartender on a deeper, more immersive level.

Rule	Object behaviour	Output sound	
Welcome beer pouring process	Interacts enthusiastically with beer tap during filling	Crisp, solid collision sounds instead of typical liquid pouring sounds, emphasizing glass texture	
Communicate with fellow glasses	Exchanges greetings with other glasses during service	Looping pattern of prolonged and continuous glass collision sounds	
Respond to customer handling	Shows excitement and anticipation when held	Rhythmic sounds mimicking fingers tapping on glass surface	
Participate in toasting moments	Creates special celebratory interactions during group toasts	Distinct glass collision sounds, different from regular greeting sounds, reflecting the social context	
Signal end of service cycle	Expresses farewell when empty and ready for cleaning	Specific sound of wine glass striking faucet, suggesting completion	

## Pillows

The pillows in Lucid Bar are like a playful family of kittens who, while not involved in drinking activities, play an essential supporting role throughout space. Like curious cats, they move and shift positions, appearing unexpectedly but always welcomingly. During the day they assist with seating comfort, but by morning cleanup time, they become sleepy cats, tired from a night of supporting bar guests, purring, snoring, and meowing as staff restore them to their proper places.

The sound design makes the pillows feel like friendly cats by recording people breathing both softly and loudly, then changing these sounds in Audacity to sound like cat purrs, making the pillows sound cozy and happy. For morning clean-up time, deep, heavy breathing sounds were recorded to create sleepy cat snores when staff moves the pillows around. When people move the pillows, they hear gentle cat-like sounds - simple recordings were changed in Audacity to make high sounds for picking up pillows and low sounds for putting them down. These sounds help make the pillows seem friendly and alive, like sleepy cats that make noise when moved or touched.

Rule	Object behaviour	Output sound	
Respond to human petting and patting	Reacts to different intensities of touch like a sleeping cat	Cat-like breathing sounds - soft purrs for gentle touches, deeper breaths for firmer pats	
Express tiredness during morning cleanup	Shows exhaustion from night activities when staff begins morning tidying	Sleepy, heavy cat-like snoring sounds, suggesting post-party fatigue and desire to keep resting	
React to being moved by staff	Communicates different states when grabbed versus when released	Higher-pitched meow when picked up, satisfied lower-pitched meow when set down	

## Sofa

The sofa is frequently used from the customer perspective, both during the day and at night. However, from the object's perspective, its interactions are limited. It cannot move freely and appears passive. Therefore, the sofa's sound effects are combined an object-centred approach with the user's perspective to guide the sound design.

The sofa consists of two parts: the sofa itself and the footrest, and the sound effects for each part differ slightly. The Foley technique is primarily used to enhance the sofa's presence in the scene. The sound was then mixed with sounds from other objects to create a more harmonious effect. The sound recording focuses on materials like sponge and foam board, and be recreated by rotating, squeezing, rubbing, and striking these sources. The collected sounds were edited using Audacity, and then applied various effects based on the scene's needs, such as reverse playback, wah-wah effects, echo, and sound stitching.

Rule	Object behaviour	Output sound	
Protect itself from potential hazards while welcoming safe items	Distinguishes between safe items (blankets, clothes) and risky ones (drinks, snacks), showing anxiety about potential stains	When the glass is placed on the couch, there are two sounds add up to make this effect. The base sound, derived from bubbles like the couch, is slowed and lowered in pitch, with increasing repetition speed. A higher-pitched version is added after a few seconds. The second layer is a warning tone when dangerous items are placed on it, inspired by ripples in a peaceful lake, created from the echo of water sounds with added reverb and a repeat effect. Both pitches were recorded separately, merged in Audacity, and enhanced with an echo effect.	
Express post-party recovery state	Shows hangover symptoms the morning after parties, moving sluggishly and seeking cleanup	Like human snoring, lighter versions of usual sounds; descending volume (high to low) calling trash can for help	

Rule	Object behaviour	Output sound	
Respond to gentle petting interactions	Expresses pleasure when users stroke its surface	"Wah-wah" processed squeezed foam sounds, creating an excited, electric-like sensation effect	
Create comfortable atmosphere for seated users	Shows satisfaction when providing comfort, expresses disappointment when users leave	Processed Sea foam sounds with echo effects while occupied; reversed version of same sound when abandoned	
Maintain connection with footstools	Expresses distress when footstools are moved too far away. It will protest when user kick it by feet.	Uncomfortable rising friction sounds (low to high) from foam boards when footstools are displaced, indicating separation anxiety. But when user move it with hands then it won't against it.	

## (Pin) Board

The pin board sits at the edge of the room above the sofa. It wants others to notice and look at it, especially at the posters it is displaying. It wants to inform visitors about fun activities that are planned by showing them off. Its personality is a bit vain because of this. But ultimately, its main goal is to foster connections between others.

The sounds used were recorded on a phone with the pinboard just outside of the lucid bar. This pinboard was chosen instead of the actual pinboard above the sofa, because it has a quieter surrounding. The sound was created using a push pin and pinning it through a poster to the corkboard so that the sound design comes from the actual sounds that are made by the object itself. This sound was then edited through Mixpad to clean up and change the pitch. These were then put together to form a little melody in the same program.

Rule	Object behaviour	Output sound	
Staff puts up poster	Notify others that a new poster has been added	Sound when each pin gets added. Little happy melody when poster has been fully put up	
Someone looks at the pin board	Happy that they have been acknowledged	Happy sounds to respond to the attention	

## Shop (Snacks and Drinks)

The shop speaks its own unique language through the gentle crackling of its packages. Just as each shop has its own personality, this one chose the sound of rustling snacks as its voice, a sound born from the familiar comfort of opening treats. During open hours, the shop contentedly murmurs to itself, its products creating a soft chorus of plastic whispers. It becomes especially happy when visitors approach, expressing its excitement through more lively crackles. The shop forms special bonds with its items too. When one gets chosen, the others settle into a quieter rustle, patiently waiting for their turn to bring joy to someone.

Since the shop can be considered a collection of multiple items, most of which have plastic packaging, the sounds designed for the shop are based on recordings of crackling plastic. A sound edited in Max was recorded in multiple cases, and that recording was further sampled to make more adjustments. Other effects, such as reverb, were added using Audacity.

Rule	Object behaviour	Output sound	
Show presence during open hours through ambient sound	Items create a welcoming atmosphere by making gentle sounds	Continuous soft crackling at various pitches, randomly timed to create living presence	
Detect when customers approach the shop area	Items show increased excitement at potential selection	Crackling sounds intensify, become more frequent, and increase in volume	
Track when items are selected from shelves/fridge	Chosen item celebrates while others show mild disappointment	Slight decrease in overall crackling intensity, frequency, and volume	

Rule	Object behaviour	Output sound	
Guide payment process to bar area	Shop communicates with bar to facilitate payment	Short drum-like fill sound, which bar echoes with its own sounds	
Process payment with token scanning	Shop acknowledges balance decrease	Plastic-like sound decreasing in pitch to indicate balance reduction	

## Trash Can

The trash can features the ability to identify the material of the trash and encourage users to sort it correctly. When a user holds trash near the bin, it makes a sound that is based on the material of the trash. It is an upbeat rhythm with a rising melody, serving as a prompt to “feed” the trash can. Once the user feeds the trash into the appropriate category, the bin plays a feedback sound of the material dropping on metal, serving as its way of expressing gratitude.

The trash can is made of metal and accommodates a variety of materials, such as metal, plastic, and cardboard. The sound design is therefore based on the recording of these materials colliding with metal. Due to its heavy body, the way it moves seems to be slow and clumsy, paired with clunky noise.

Rule	Object behaviour	Output sound	
Detect and greet approaching visitors	Sways side to side in a welcoming gesture	Rapid, crisp, and cheerful metallic sounds that increase in enthusiasm as visitors approach	
Respond to staff's signal when trash needs to be transferred	Moves forward to receive trash, then retreats when full	Initial rhythmic crashing sounds simulating rolling objects, then shifts to a deeper, more resonant tone after collecting trash, indicating its growing fullness	
Identify material type when trash is held nearby	Analyzes and recognizes different materials	Upbeat rhythm with rising melody specific to each material type	
Confirm proper waste sorting	Accepts correctly sorted materials	Distinctive feedback sound of specific material dropping on metal, expressing gratitude	

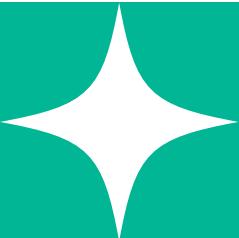
# Conclusion

This project explored how sound design can give everyday objects unique personalities and enhance their interactions within a shared space. By focusing on an object-centred approach, we examined how sound could improve both functionality and engagement, creating a smarter and more interactive environment in Lucid Bar.

Through detailed observations, role-playing exercises, and relationship mapping, we analysed how these objects interact with people and with each other. The project developed a structured scenario that connects a lively "last-night party" with a quiet morning, using sound to highlight the contrast between the two. Each object was given a distinct voice and personality, making interactions more expressive and intuitive.

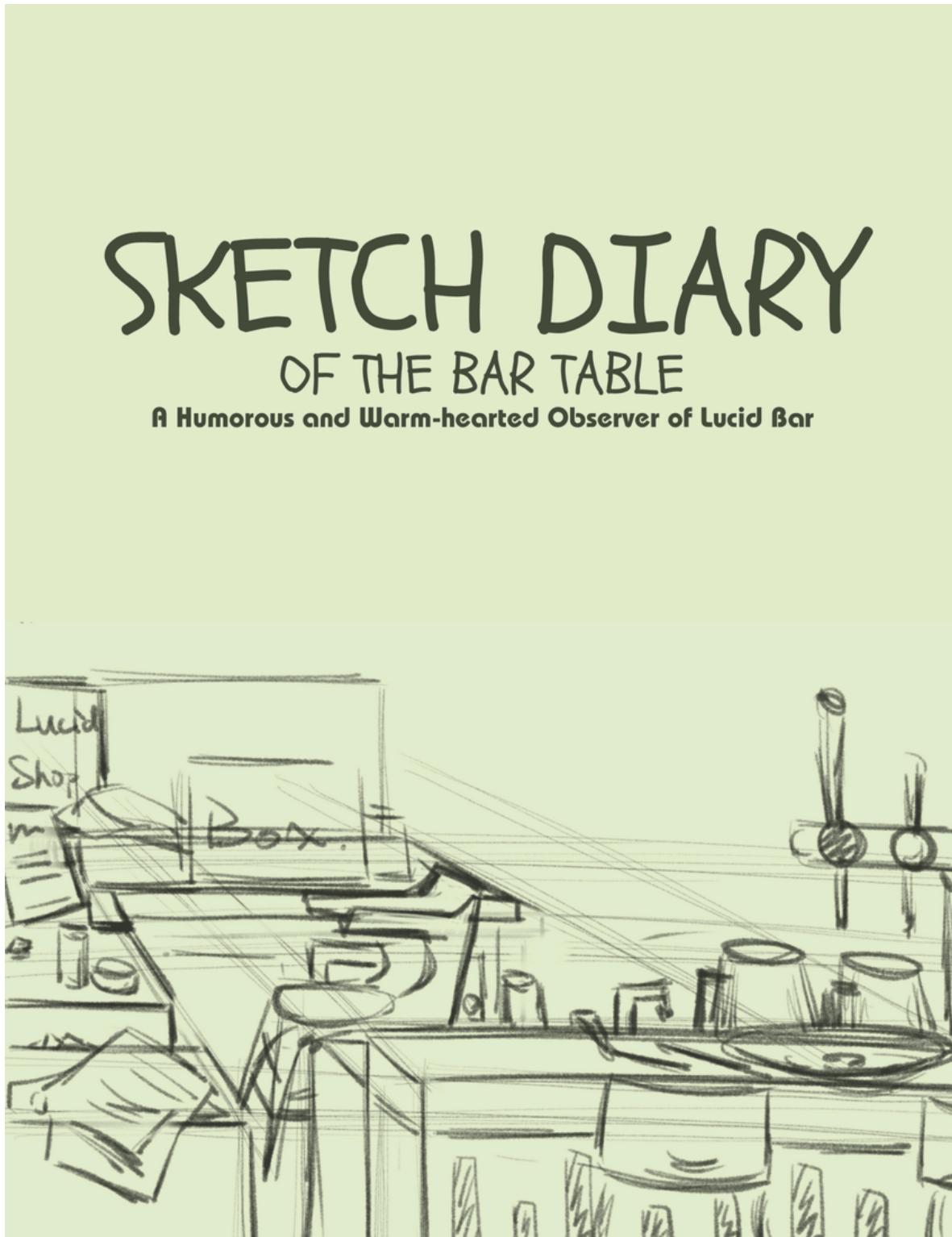
The final video prototype demonstrated how sound can turn ordinary objects into engaging participants in a social space. This approach has the potential for broader applications, not only in entertainment but also in smart environments where objects respond intelligently to human behaviours. Future work could explore real-time adaptive sound interactions, further enhancing the role of sound in everyday spaces.

# Appendix



## A. Ethnographies

### A.1 Bar



Hi there! This is the bar!

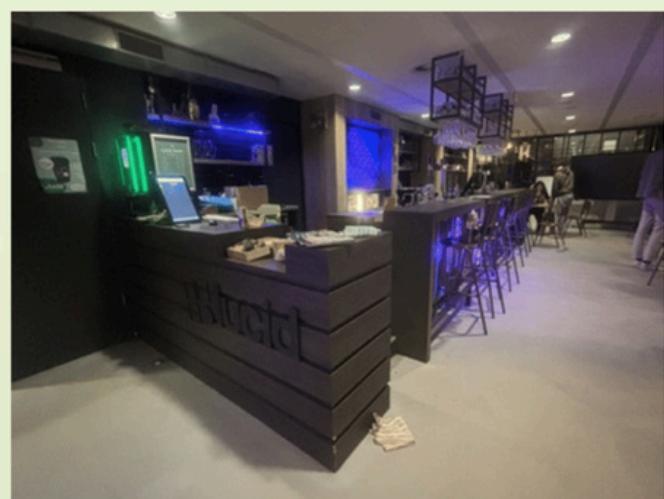
Being the CORE of Lucid Bar (of course! I'm the BAR!) is not an easy job. But it's easy for me, since I'm so functional and supportive of everything!

Every day there are so many things happening around me, I feel so glad that I can observe different people and their emotions. Although I have a quite heavy body, I like observing different body languages, facial expressions and emotions! I'm absolutely the OBSERVER of the whole bar (and occupying the best position for observation)!

You want to hear more about my story? Then just turn to the next page! I'm quite proud of my sketches, that's why I made this sketchbook for you to read! After all, the pictures are the better evidence and have stronger power in storytelling, aren't they?

Hope you like it! Enjoy!

P.S. This is a selfie of me!  
Do you also like it?



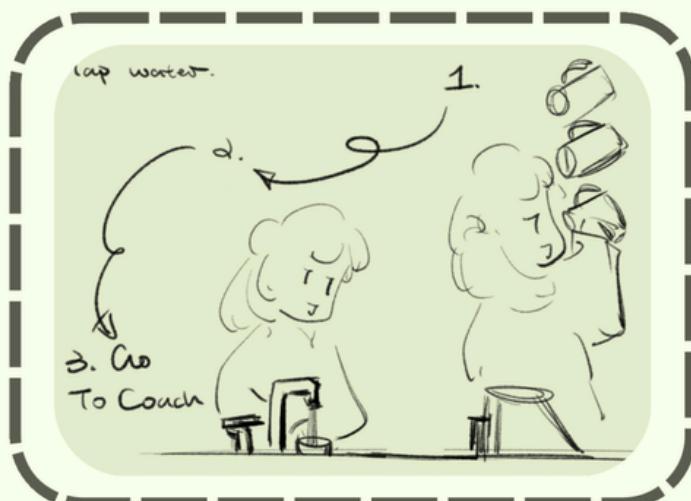


Ohhhhh! The Cups!

I like the cups. They are so beautiful, their sounds are also graceful. And... they are so vulnerable. But with me, they will never break easily!

I collect all the cans in my right corner, and all the glasses in the left corner.

I also have sinks for pure water! If you are thirsty, tell the bartender to let you try this freeeesh water!



Hum? Something for suggestions? Hummmmm...

Ah! Don't make mistakes! It's MY right and left corner! Just to remind you, otherwise the trash can will be soooo angry....

Time for beer!!!

What's your aim for the bar? Of course! The beer!

The tap beer is available from 16:30 every day, so enjoy!

Taking Out Glasses



Cleaning  
Glasses.



I know, I know! It's annoying that you need to wait until then for the tap beer, but the delicious fresh beer is always worth waiting for!

Don't want to wait? Then maybe try the canned beer...

BUT! NEVER, I say NEVER, order the canned beer in front of the beer taps! They are so proud of their fresh beer, ordering can beer just makes them so saaaaad... They will really cry on that!!!

Fill in Beer





I also like talking with customers! (Although they cannot really hear me...)

Observing human beings is also interesting, just imagine HOW you might interact with me!

Hey! See? The perfect height!  
Everyone leans on me automatically like this! I bet this is the best height and best design ever!

But don't FORGET your items! That's not a good thing...



Ordering, purchasing, having conversations, and even toasting!

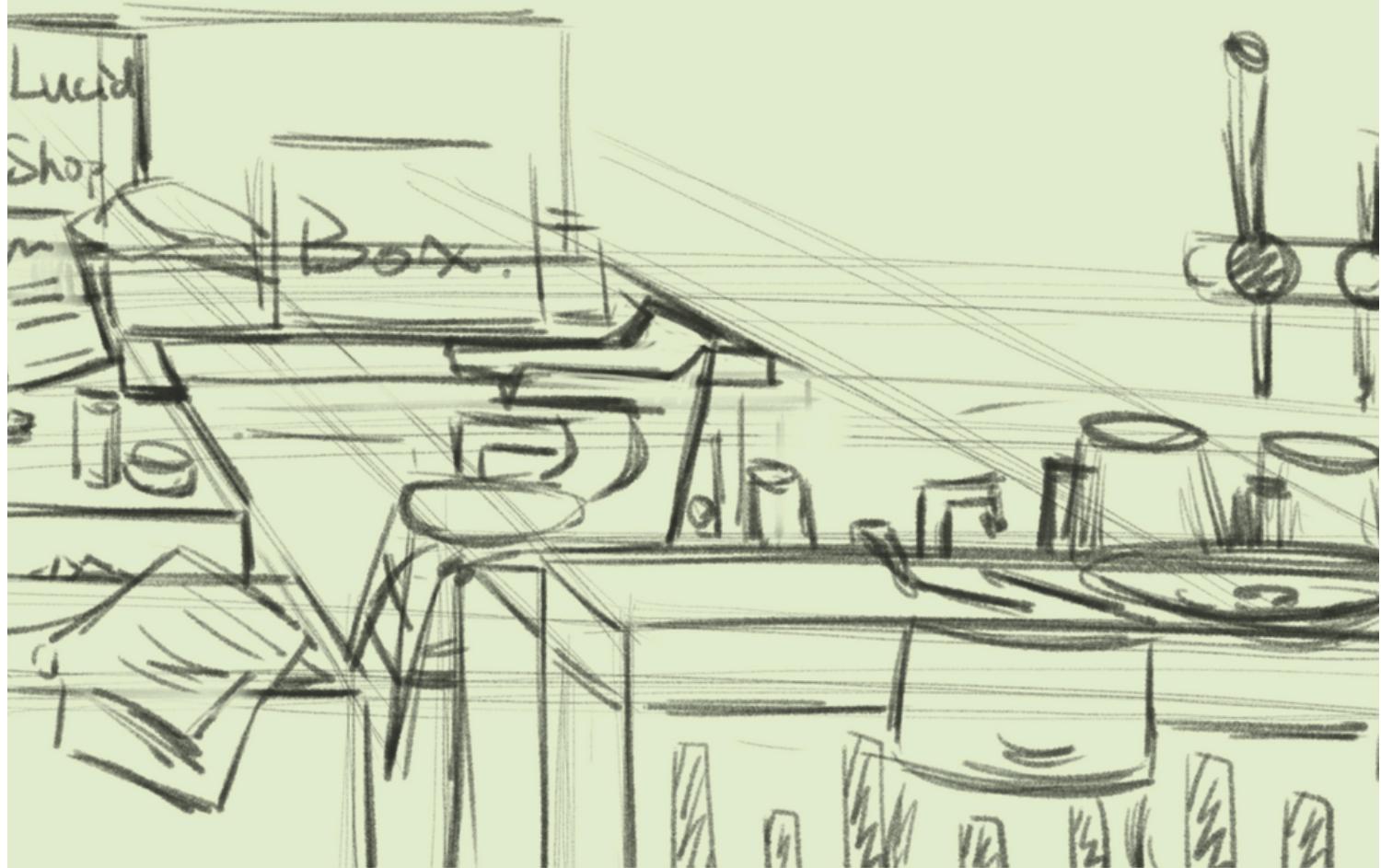
So many things happen around me every day! I guess I will never get bored about this!!!

This is already the end! Thank you for watching my sketch diary completely! Sharing all this stuff with you reminds me of my busy but enjoyable days, do you also enjoy that?

You want to see more?

Then come to the Lucid Bar! You will definitely like it!

And... observing all the activities that happened there with me! I will always welcome more people to observe with me! But be careful, I will always be the BEST OBSERVER!!!



## A.2 Beer Tap

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### Beer Tap Diary

#### Day 1

A lot of customers ordered for canned beer over tap beer consistently. The beer tap stood idle and unused for much of the evening. The taps' usage was limited compared to canned beer orders.

#### Day 2

Finally someone ordered tap beer! It was noticed that interactions between the bartender and the beer tap. When the bartender used the tap, it served its purpose briefly during beer pouring, while the bartender needs to keep staring at the beer tap to know the condition of the glass being filled. As a result, it was observed that the connection between the tap, the bartender, and the glass.

#### Day 3

Again, I observed more canned beer orders than tap beer. The beer tap was used occasionally but still received far less interaction compared to its canned counterparts.

#### Day 4

I watched the bartender manage several tasks while using the taps intermittently and also again, I noticed the need for bartenders to monitor the beer volume closely while filling glasses, ensuring they could multitask effectively.

## A.3 Coffee Machine

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### coffee machine diary

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#### Friday 13/Dec/2024 “Cleaning day”

Finally Friday! Finally the time for a short break for weekends! But sadly I had to work a bit longer than usual since it's the demo day for ID students! While it's also the busiest and happiest time of the semester! There were so many students coming in and out Lucid.Bar, and so many stories being shared. But as the happy time passed, I know what's coming. I saw the staff rolled up her sleeves coming for a deep clean of me. It's usually the hardest time of a week, while I understand the necessity. It all started with my drip tray, pulling it out and scrubbing away the week's accumulated spills. My spout was dismantled for descaling, a soothing and slightly ticklish process. Guess it might be how massage would feel like. The chocolate dispenser was next. Every nook was brushed carefully and no residue was ensured to remain. Then the grinder was vacuumed, clearing away stubborn remains of beans. Finally, descaling liquid ran though my pipes. To be honest, I was kinda enjoying this process especially after a whole week's working. I think I was fully refreshed and am ready for a quiet rest during weekends.

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#### Monday 16/Dec/2024 “Fresh start”

Waking up to the familiar sound of the staff opening the bar, I was ready for a fresh start of a brand new week. Another thing that fully aroused me is the pleasant smell of fresh beans. I really enjoy the feeling when the barista refilled my hopper with a fresh bag of coffee beans and the hot chocolate dispenser with chocolate powder. As usual, the barista cleaned bay drip tray and wiped my glossy exterior before turning me on. Really like the shinning moment to start my work!

The students arrived in waves. Espresso is always the most popular. “Cappuccino, start” It's been a long time since I last saw Steven show up in the bar. Cappuccino is always his first choice. “Hi, how was your demo day going, steven?” Another similar voice from Isabel. Guess she would like a hot chocolate as usual since I also saw the biscuits she bought from the snack shop.

Although it might not be enjoyable to work, those moments of connection happened around me always would make me feel meaningful and a sense of accomplishment. With the fragrance of coffee, I have witnessed conversations about assignments, parties, and dreams. As it got dark and the lights dimmed, I stood silently by the door, awaiting tomorrow.

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### My technology actor

- **Offer beverage:** the basic role to offer coffee, hot chocolate, and water.
- **Foster social interactions:** A silent witness to countless conversations. There might be stories, emotions, and worries.
- **Work with cups and snacks:** Cups to put coffee in. Snack to drink coffee with.

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### Smart opportunities

**Social agent:** For the student customers, I could act as a friend to perceive their emotions, hear their stories, or creating the atmosphere for conversations between friends. This could happen when I am preparing coffee. I could also collaborate with cups and snacks. For example, different cup colors indicate different emotion. Also based on that give suggestions for beverages. As for snacks, suggest the perfect type matching different beverages.

## A.4 Cups

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### Beer Glass

#### Thursday

Today is the liveliest day at Lucid Bar. Customers keep coming in, and I am handed to a young lady who carefully holds me while chatting with her friends. Her fingers gently tap on my surface, producing a crisp sound that seems to echo the background music of the bar. I collide with the bar counter, tables, and other beer glasses, each sound feels like part of a silent conversation. I can feel the liquid swaying inside me, and when the beer is finally finished, the bartender swiftly takes me away, cleans me, and places me back, ready for the next interaction. However, when I am being washed, I feel like I have lost my purpose, leaving me empty and sad.

#### Friday

I am first grasped by the bartender, then lifted along with many of my friends, making me afraid that I might fall to the ground. Soon, I am tightly gripped by a young boy who keeps clinking me against other glasses. The intense collisions make me tremble, producing crisp and powerful ringing sounds. They laugh and cheer, and each clink feels like a victorious bell ringing. Meanwhile, the bartender moves faster and more precisely. Whenever I am placed back on the counter, he quickly refills me with new life which is the new beer.

#### Monday

Today, Lucid Bar isn't very crowded, and I am only used three times. I spend a long time sitting quietly on the side, so much so that there is no need for a beer scraper to remove the foam. With fewer people, there are no toasts, and customers drink slowly. They carry me to the sofa, sipping the beer inside me at a leisurely pace. Eventually, I am taken back by the bartender, cleaned, and placed back on the bar counter, waiting for the next Thursday

## A.5 Pillow

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About me:

I'm a cozy pillow that comes in two shapes - square and rectangular. I'm covered in soft fabric and filled with comfy stuffing, making me a bit bigger than A4 paper. You can find me and my pillow friends scattered around Lucid Bar's sofas, cubes, and window seats. We work together with the furniture to make everyone comfortable, whether it's preventing sliding or creating snug spots to sit.

Dear Diary,

The staff just cleaned up the bar this morning. They put me and the other pillows back nicely on the sofas and by the windows. We look nice and fluffy, ready to help make people comfy today!

A busy day at Lucid Bar! Someone studying put me behind their back while using their laptop by the window. Later, another person used me under their legs while relaxing on the sofa. I like how I can help people sit better in different ways - my soft fabric feels warm and cozy against the leather sofa.

Something funny happened tonight! Two friends started playing and hitting each other softly with us pillows, laughing a lot. A staff member kindly asked them to be careful with us - after all, we're here to help people sit comfortably!

The best part was when a group of friends sat together on the big sofa. They put us everywhere - behind their backs and next to the sofa arms. Some of us were stacked together near the window to fill the gaps better. We helped make a nice, comfy spot for them to talk and drink coffee.

By closing time, we pillows were all over the place - I somehow ended up near the wooden cubes! But that's fine because tomorrow morning, the staff will come early to put us back where we belong and clean us up.

I wish I could:

I wish I could make gentle sounds to help guide people to sit more comfortably, or give friendly reminders when they've been sitting still for too long. Wouldn't it be amazing if I could change how loud I am based on what's happening in the bar - quieter during peaceful study times and livelier during fun gatherings? Maybe one day I could even work with the other pillows to create perfect spots for everyone, letting them know through soft sounds when they've found just the right position.

## A.6 Sofa

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### Diary (from 18-12)

At around 8 p.m., a group of students came into the bar and sat on the sofa. There were four footstools, and they moved them around. Two people shared one footstool, pushing each other for space before both placed their feet on it and laughed.

One student lay on the sofa with their legs on the armrest, looking at their phone. They put a bag of snacks and a glass of beer on the other armrest.

Another sat cross-legged, holding a snack bag on their lap and looking at the drinks on the table.

Some students put their feet on the footstools, swinging them a little, while others leaned on the armrest and almost slid off the sofa. The sofa cushions were pressed down, and the footstools were left in random spots. Of course, there are still some cans, and their own stuff put on the footstools.

After about an hour, they left, before they left, they swapped snack crumbs. The sofa still showed a little bit of a faint trace of where they had been sitting. The sofa and footstools were messy, showing how much fun, they had.

## A.7 (Pin) Board

**Pin Board**

Hey there, I'm Pin Board. I "hang" above the sofa in our lovey Lucid Bar!

**My Job:**

I keep people in the loop! From events, activities, and workshops, I'm the one-stop spot for all fun announcements for lucid members. My mother and father also work at the same bar!

**What I Love:**

- Fresh Posters: Nothing makes me happier than a well-designed poster. (Bonus points if it's colorful).
- Hearing the buzz of students chatting, laughing, and making plans around me.
- Playing a part in connecting people through new events, workshops, and parties!

**Dear Dairy**

It's a quiet morning at the lucid bar. Observing everything, like I always love to do, I see the barman checking Coffee Machine and asking them why he is not working. The usual. A few people are quietly working behind their laptops. One of them is sitting directly below me on Sofa. With Santa Slinger and Christmas Sock accompanying me throughout my day, I'm fully decorated and ready for the Christmas holidays. I am even working with Christmas Drink Poster to notify the lucid members of the upcoming event! A friend of the guy below me joins on Sofa, they are talking about their upcoming holiday plans! I hope they are going to join me on the Christmas drink that we're promoting.

Another person walks into the bar, she looks at Volleyball Poster who is connected to me through Push Pin. Volleyball reminds her that the volleyball tournament is tonight! She asks the person on Sofa if he is also joining her at that event. He doesn't know for sure yet but he thinks he will. I hope he does! Volleyball has been very excited about it and I know that the event planners have put effort into it. Just look how clean and professional Volleyball is designed!

I'm quite bare at the moment. Only five posters hang on me, even though I have space for eight! :( I do appreciate Push Pins and Thumb Tacks still hanging out with me when they don't need to. But I feel useless when I'm not at full capacity. But not to fret dear dairy. This will change soon. I heard talks about a new event, namely a shark tank. I wonder what Poster will look like when he joins me to promote it. I'm feeling divided since the holidays are approaching. Although some fun events will be held at the bar, the holiday weeks are boring for me. No one to observe, to overhear chatting, laughing, and talking about their plans. So I need to savor the moments and events happening before them. I hope for many new plans, events and announcements in January!

## A.8 Shop

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Start: 12:50 (18-12)

People sitting on the couch in front of it

Hard to reach the store

2 girls got pringles and vitamin water, did not have enough money on the account (few cents too little) so needed to top it up first

Someone got a Haribo candy roll

The computer next to coffee machine isn't working, it opens Outlook every time a token is scanned. Instead they use the computer on the bar

I just got a can of Fernandes cherry, first time for me. The lights in the fridge turned on when I opened the door. Before buying, I checked my token balance first because I had no idea how much I had on it.

Fridge lights playing some animations while closed

Someone looking at store but not buying anything

The snacks shop and fridge exist next to each other but feel separated. The fridge is more forward than the shelves, making the shelves less visible. The moving and changing lights inside the fridge also draw attention towards the fridge.

There's nothing indicating that it's a shop, this requires knowledge by members/users. The only place "lucid shop" is mentioned is on the side of the coffee machine, where you pay for items. This shows the opening hours, but the coffee machine is not actually part of the shop (you buy a yearly subscription once in the shop but can't buy a single coffee)

The fridge sometimes makes a humming sound, but otherwise there's no sound from the shop

Someone buying a drink, paying by bankcard instead of token. Someone else buying Haribo roll using token, has 43 cents balance left.

The shop doesn't show any prices.

Someone bought Schweppes with token, same guy bought 2 things before

The shelves (with the games) across the space from the store shelves also offer some shop products on top. It does look separated from the shop however.

One day later at 12:25:

The store was being opened. The fridge and snack shelves were locked.

Opportunities to make smart:

First, it can be made smart by showing what is all part of the shop and equally drawing attention to each part. Or, it can detect what the user wants, and draw attention to the part where that item is sold.

Further, the user can scan their token to see what products they can afford. Students are always poor after all.

Personality:

I'm a shop, but I'm a little chaotic. I offer products students enjoy for a nice price, but don't actually show the price. I have a lot of products, but some are sold out. I fully rely on trust for people not to take something without paying, but I am locked shut outside of opening hours. I am looking at the games shelf, but there's also some instant noodle on there that I could keep as well.

Customers pay for my stuff at the bar, but I don't offer any products at the bar. I want people to buy stuff from me and am very visible because of the lights inside the fridge, but I am hard to reach because the couch is in the way.

## A.9 Trash Can

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### TRASH CAN

#### About me:

Hi, I am the trash can in Lucid bar. You might think I look just like other trash cans in TU/e, but you are wrong! I am unique because Lucid gave me these wheels. They wanted to give me the autonomy to move around. Though the project is postponed now, I am looking forward to the day they complete it.

#### Interactions I usually have with others:

Time	Most of the time	Thursday 17:00-19:00	Mon.-Fri. 8:00 a.m.
<b>Interact with...</b>	People in the Lucid bar	Lucid bar staff	Cleaning staff
<b>Interaction</b>	They try to separate their trash into different categories of materials and throw them into my mouth.	There are usually events on Thursday evenings. They will move me out to the hallway for more people to fit in the space and in case drunk people bump into me.	She comes to visit me every morning to empty the trash in me. Sometimes she also sits on the sofa to get some rest.
<b>My emotion</b>	I am <b>happy</b> to see people making efforts to sort the trash correctly. However, I am <b>upset</b> when people do not pay attention and throw trash into the wrong mouth.	I feel a bit <b>lonely</b> when I am not welcome at parties. I can only return when the events end, and they need me to clean up all the mess.	I am always <b>happy and grateful</b> to see her every morning.



*Stools:* Hey... This garbage should belong to you.



*Trash can:* Well... I wish I could come and collect it.

### I wish I could...

- When the tables make signals of having trash on them, I could make a sound to remind humans to throw the trash.
- When humans come to throw trash, I could make sounds to guide them with sorting the trash correctly.
- When the staff moves me out of the bar before the parties on Thursdays, I could play some party music for myself to enjoy the vibe outside. Maybe I could attract my friends.
- When the cleaner empties the trash in my stomach in the morning and is enjoying the coffee on the sofa, I could play radio for them.