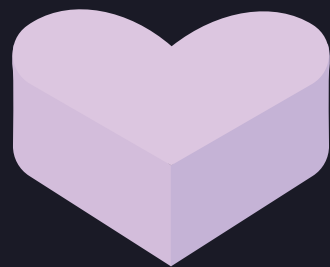




A Mobile Trigger Management System
for Smoking Cessation

Sanika Barawkar
SJSU MDes XD 2026





For everyone who kept showing up for
themselves, even on the hard days.

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THESIS COMMITTEE

Chair

Josh Nelson

Program Coordinator and Faculty, Industrial Design, SJSU.

Josh brings over a decade of experience in industrial and interaction design with a focus on healthcare and patient-centred design.

Advisor

Dana Ragouzeos

Faculty, Industrial Design, SJSU. Dana's expertise in healthcare design and systems thinking was a constant reference point.

Advisor

Carol Southard

RN, MSN Tobacco Treatment Specialist, Swedish Covenant Hospital.

Carol has over thirty years of clinical cessation experience and an American Lung Association certification. She kept this project honest about what actually helps people quit versus what just looks good on a screen.

KEY TERMS

Trigger — A person, place, emotion, or sensory cue that activates a craving. Triggers are not problems to eliminate. They are patterns to understand.

Relapse — A return to smoking after a quit attempt. Reframed throughout this project as a data point rather than a failure. A moment that carries information about what the system still needs to support.

Behaviour Change — The slow, nonlinear process of replacing an ingrained pattern with a new one. It requires awareness, motivated action, environmental support, and repetition, rarely in that order.

Intervention — A designed, in-the-moment action that interrupts the craving-to-smoke loop and offers an alternative path. Interventions in Unlit are brief, evidence-based, and chosen by the user.

Passive Detection — The system's ability to recognise a probable craving moment using physiological signals (HRV, EDA) and contextual data (location, time, ambient sound) without the user actively logging anything.

ABSTRACT

That was the finding that reoriented everything. Going into this thesis, I assumed the central problem in smoking cessation was self-awareness ,that people relapsed because they didn't understand what triggered their cravings. Survey data from 19 respondents proved otherwise. Thirteen had relapsed despite knowing their triggers well. The gap wasn't knowledge. It was the space between knowing and doing, between recognising a craving moment and having something real to hold onto when it arrived. Unlit is a mobile trigger management system designed to close that gap. It helps users log cravings with minimal friction, detects trigger moments through physiological and contextual signals, delivers six evidence-based in-the-moment interventions, and surfaces personalised pattern insights over time.

The system is built on the theoretical frameworks of Charles Duhigg's habit loop, BJ Fogg's Behaviour Model, and Don Norman's principles of emotional design, and grounded throughout by clinical input from tobacco treatment specialists and behaviour change coaches. This book documents two years of design research: a proposal, five iterative inquiry phases, a high-fidelity prototype, system testing, and a physical thesis exhibit that asked visitors to experience the craving loop firsthand. The work spans interaction design, behaviour psychology, physiological sensing, and copywriting, because quitting smoking demands all of that simultaneously.





People know their triggers.
They just don't know what
to do when they hit them.



CALLING INTENTION

I grew up watching my uncle smoke. He'd been smoking since he was seventeen, the way he told it, it started as something social, something that fit the atmosphere of a particular time and place. By the time I was old enough to understand what cigarettes actually were, it had long since stopped being a choice.

What I remember most is not the cigarettes themselves but the cycles. The announcements. The quit dates circled on calendars. The patches on his arm, the gum in his pocket, the apps downloaded and then deleted. The weeks of quiet optimism followed by the weeks of silence that meant it hadn't worked again. I never saw him shame himself out loud, but I saw it in the way he'd change the subject.

I am a multidisciplinary designer, but I am also someone who has spent a long time wondering

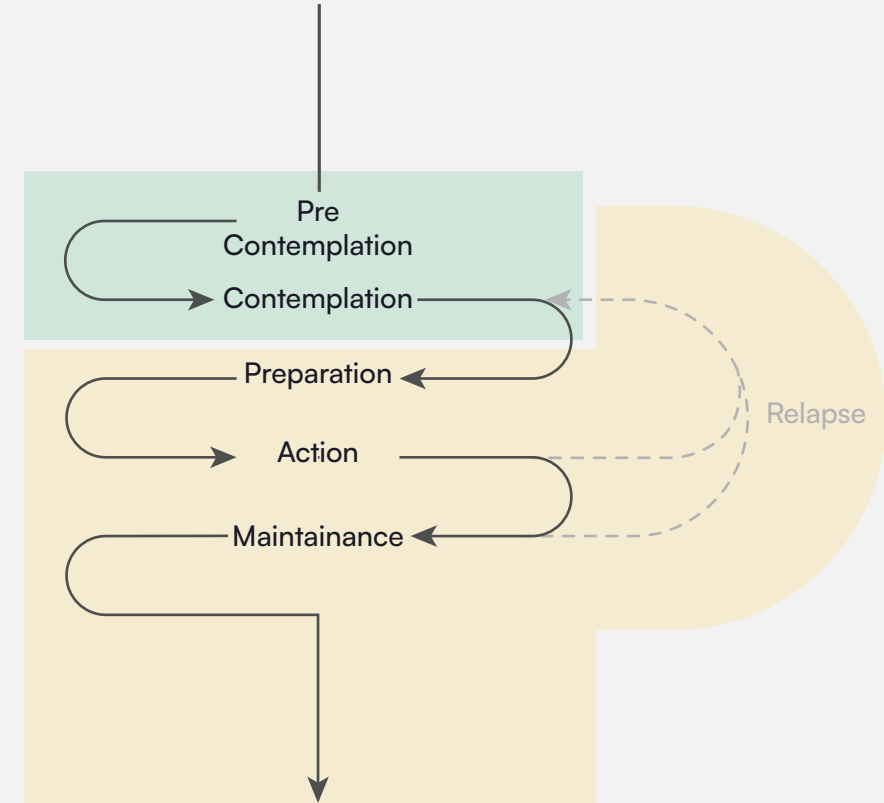
wondering why the tools available to people like my uncle are so poorly matched to what they're actually going through. Cessation apps track days and savings. They send push notifications on a schedule. They measure streaks and celebrate milestones in ways that feel borrowed from productivity software. None of them seem to understand that the hardest moment is not the first day without a cigarette, it is the Tuesday afternoon three weeks in, when the craving arrives and every reason you had feels suddenly very far away.

This project is my attempt to design for that moment. Not the announcement, not the milestone, not the clean thirty-day streak but the moment when the gap between knowing and doing feels widest.

LOCATING THE THESIS RANGE

This project did not begin as Unlit. It began with an assumption that turned out to be wrong. The early hypothesis was that people relapse because they don't recognise their triggers — that the intervention needed was a better tool for trigger identification. Surveys and interviews corrected that quickly. Most people who relapse know exactly what triggers them. The morning coffee. The walk home from work. The drink at a party. The problem is not identification. The problem is the moment itself: the physiological and emotional pull that arrives faster than any rational plan can catch up with. That pivot shaped everything that followed. Rather than designing a tracking tool, the focus became designing for real-time support — a system that could recognise a trigger moment

and respond to it with something useful, in the seconds that matter. The Transtheoretical Model of Change by Prochaska and DiClemente (1983) provided a framework for understanding where the audience sits. The Unlit user has already moved through Precontemplation and Contemplation on their own. They are motivated. They want to quit. The design opportunity lives in the Preparation, Action, and Maintenance stages — with particular attention to relapse, where timely and personalised support can make a meaningful difference. The thesis range narrowed to one problem: how do you design a system that supports people in the moment a craving arrives — not before, not after, but during?



I studied the Transtheoretical Model of Change by Prochaska and DiClemente (1983), and based on my research, my audience has already moved through the Precontemplation and Contemplation stages on their own.

My focus lies in the Preparation, Action, and Maintenance phases — with particular attention to relapse management, where timely and personalized support can make a meaningful difference.

REPOSITORY OF INSIGHT

1.1 THEORETICAL FRAMEWORK

1.2 EXPERT INTERVIEWS

1.3 USER SURVEYS

1.4 COMPARATIVE STUDY



THEORETICAL FRAMEWORKS

Three writers shaped the intellectual foundation of this project before a single screen was designed.

Charles Duhigg — *The Power of Habit* (2012)
Duhigg's habit loop — cue, routine, reward — explains how smoking becomes automatic. The cue triggers the routine (lighting a cigarette) which delivers the reward (stress relief, social connection, nicotine hit). Breaking the loop requires either eliminating the cue (rarely possible) or replacing the routine while preserving the reward. This became the structural logic behind Unlit's intervention design: do not fight the craving, redirect it.

Keep the cue,
provide the same reward,
insert a new routine. — Charles Duhigg, *The Power of Habit*

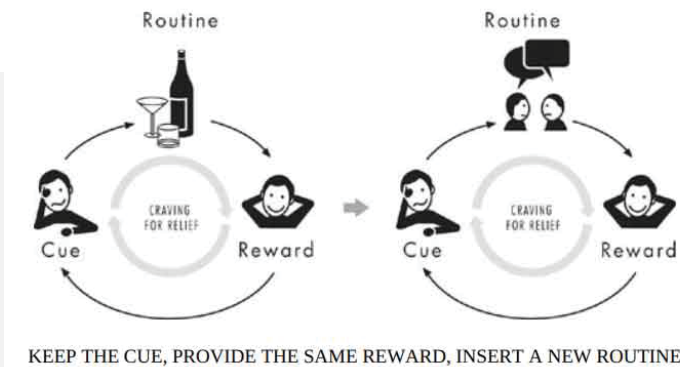
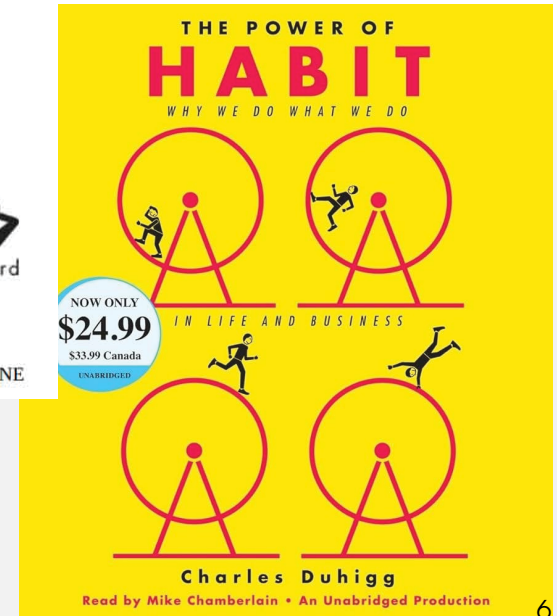


Figure extracted from the book “The power of habit”



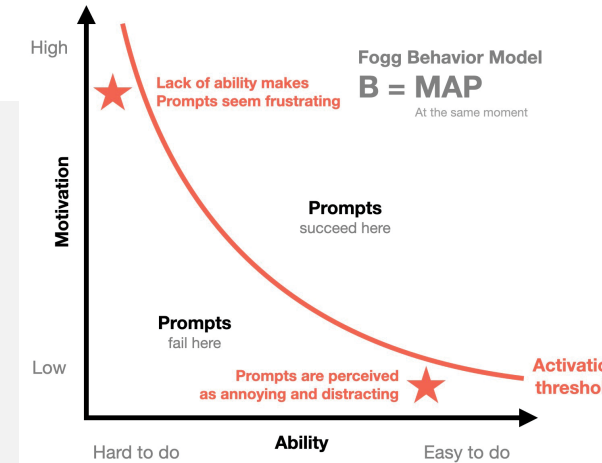
THEORETICAL FRAMEWORKS

Three writers shaped the intellectual foundation of this project before a single screen was designed.

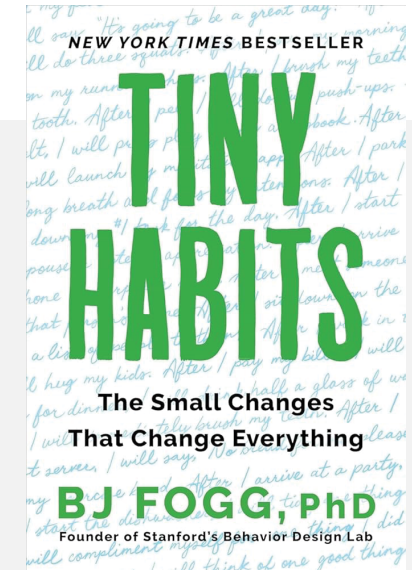
BJ Fogg — Tiny Habits (2019)

Fogg's Behaviour Model (B=MAP: Motivation, Ability, Prompt) frames why well-intentioned quit attempts fail. Motivation alone is insufficient — the user must also have the ability to act and receive a prompt at the right moment. Fogg's insight that emotions create habits, not repetition, directly informed the emotional design of every intervention in Unlit. The system is not trying to build willpower. It is trying to reduce friction and deliver the right prompt at the right moment.

Emotions create habits, not repetition.
If you are designing a new habit, you are really designing for emotions. — BJ Fogg, Tiny Habits



The Fogg Behavior Model



THEORETICAL FRAMEWORKS

Three writers shaped the intellectual foundation of this project before a single screen was designed.

Don Norman — The Design of Everyday Things
Norman's principles of feedback and emotional design set the standard for how Unlit communicates. The system must always acknowledge user action, never leave the user feeling lost, and maintain an emotional register that matches the user's state. In a craving moment, a cold interface is a design failure. Clarity and warmth are not aesthetic choices — they are functional requirements

“A product is only loved and delightful when it is desirable, usable, and compelling.” — Don Norman, *Emotional Design*

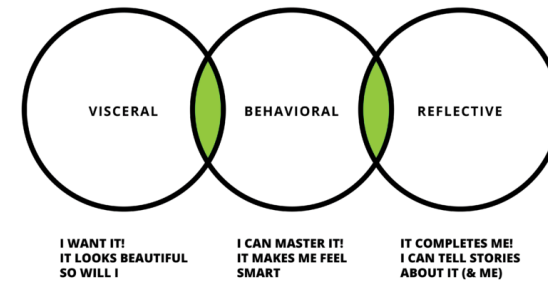
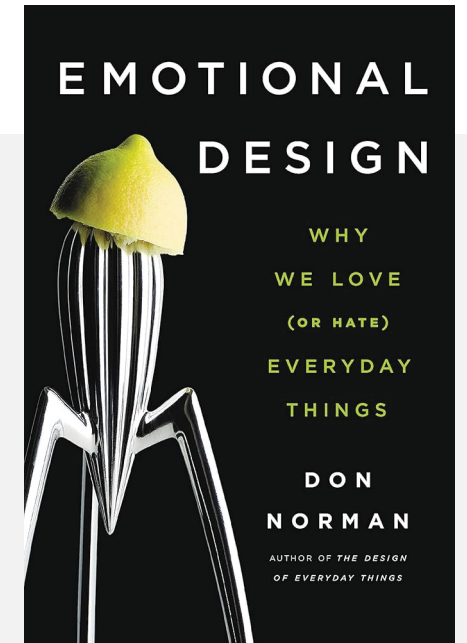


Figure extracted from the book “Emotional Design”



1.2

EXPERT INTERVIEWS

Interviews were conducted with tobacco cessation coaches, clinical specialists, behaviour change practitioners, and product designers working in healthcare. The conversations were not confirmatory — several of them reoriented the project's direction entirely.

On triggers

"Most people know when they smoke — first thing in the morning, with coffee, after meals. They know their triggers. But they still relapse. It's about rewiring the habit, not just naming the trigger."
— Natalie Meneses, Behaviour Change Coach

On motivation

"Waning motivation is a huge barrier to long-term success. People need help to reconnect to their reasons for quitting, again and again. Not once at the start — again and again."
— Kick It California clinician

On coping strategies

"Somebody might smoke when drinking with friends, someone else when stressed at work. The coping plan has to fit real life. Generic doesn't work."
— Carol Southard, Tobacco Cessation Coach

On self-efficacy

"Coaching is not about telling people what to do. It's about empowering them to believe they can achieve their goals. Building self-efficacy over time."
— Natalie Meneses, Behaviour Change Coach

On visible change

"They should be able to point to something and say: I'm better because of this. A measurable perceived benefit — something they can actually feel."
— Nadyne Richmond, Head of Design, RapidAI

On access and barriers

"Barriers depend on the audience. In lower socio-economic groups it might be lack of WiFi. In others it's time, or environment. Solutions must adapt."
— Head of Design and Research, RapidAI

1.3

USER SURVEYS

A survey distributed to individuals currently in recovery or who had previously attempted to quit produced 19 responses. The sample included social smokers, daily smokers, and people who had relapsed multiple times. The findings are presented here as four synthesised insights, not raw numbers — because the patterns in the responses were more instructive than the percentages.

Motivation is personal and identity-deep

People quit for their children, their lungs, their sense of who they want to be. Health consequences — shortness of breath, a surgical recommendation, a morning cough that had gone on too long — were the most common catalysts. Lifestyle conflicts followed closely: a hobby that smoking was getting in the way of, a child who had started asking questions, a partner who deserved better. Surface motivators like cost savings appeared early in the journey but faded. Deep motivators connected to identity and values lasted longer. The design implication: the system needs to surface a user's specific, personal reasons for quitting — not a generic motivation message — and do so repeatedly, not just at onboarding.

Triggers are predictable but feel unmanageable

Routine cues dominated — after meals, morning coffee, the drive home, social drinking. Emotional states compounded them: stress, boredom, anxiety. Thirteen of the eighteen respondents who answered the relapse question had relapsed at least once, despite being aware of their triggers. The gap between knowing and managing is real, consistent, and the central design problem this thesis addresses.

Tangible progress matters more than streaks

Small wins were named more often than milestone achievements. Switching to vaping, saving a week's worth of cigarette money, getting through one hard afternoon without smoking — these felt like progress. Abstract metrics (days smoke-free, percentage reduction) motivated less than visible, felt changes. Breathing easier. Smelling better. Not needing to step outside. The design implication: show change in ways the user can feel, not just count.

No single format works for everyone

Some respondents found Reddit communities essential; others found them overwhelming. Some used apps consistently; others said apps were easy to ignore. Several went through the process almost entirely alone. The design implication: modularity. The system must offer multiple entry points and support styles — quiet background tracking for some, active daily interaction for others.

TRIGGERS

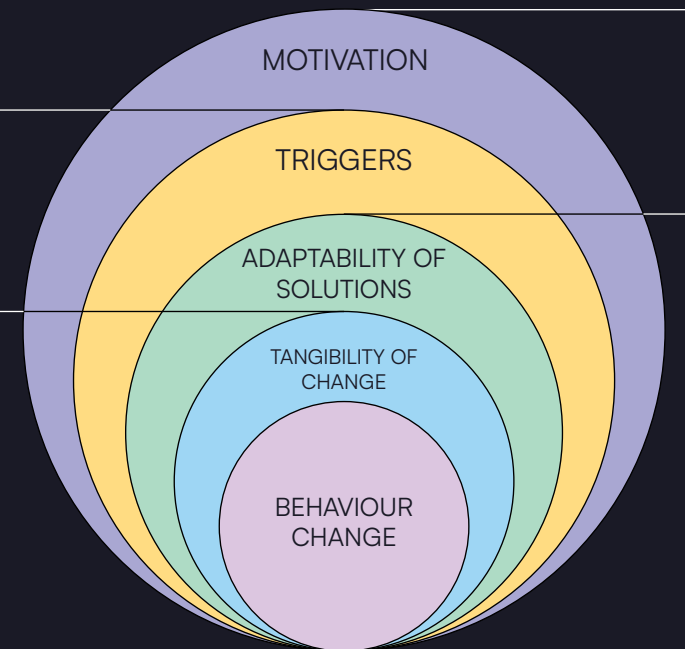
- Routine & Social Cues: Smoking was tied into daily habits and social events. ("After meals, morning coffee", "Social settings")
- Emotional Triggers: Stress, boredom, and anxiety were common challenges. These emotional states make people especially vulnerable to relapse.

Insight: Triggers are predictable but frequent. Solutions must go beyond tracking—they must offer real-time, adaptive interventions (like guided breathing, support check-ins, or emotional checklists).

TANGIBILITY OF CHANGE

- Small wins matter: People cited vaping, saving money, and "one day at a time" as helpful. Tangibility wasn't high-tech—it was emotional, visible, or financial.
- Desire for better feedback loops: Some relapsed due to a lack of felt progress. ("Cravings that never went away", "Just sucked it up daily")

Insight: Users need to feel progress. Celebrating even a smoke-free day, showing savings, or visualizing lung health can make change real. Logging alone is



MOTIVATION

- Health and Performance: "Needing surgery to improve quality of life", "Shortness of breath"
- Lifestyle and Identity Conflicts: Respondents mentioned hobbies (singing, sport) and parenting as motivators ("Having a kid", "My hobbies")
- Disgust and Self-Perception: "It stinks", "Coughing gross stuff"

Insight: Motivation is deeply personal and tied to identity, health, and values—not just addiction. Solutions should reflect back a person's why consistently.

ADAPTABILITY OF SOLUTIONS

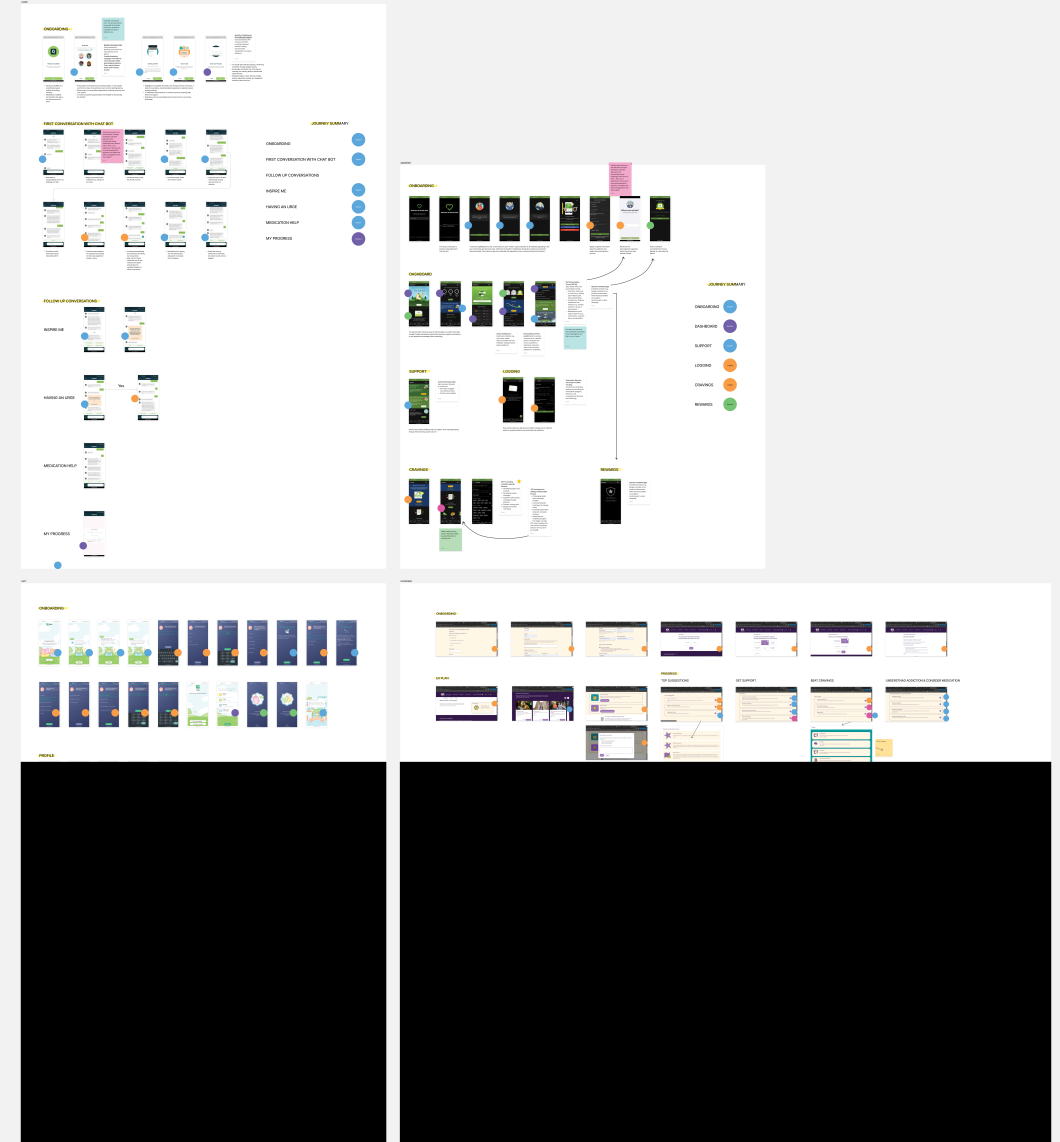
- Digital tools received mixed reactions:
- Some found apps or Reddit useful for community, but others ignored or didn't use digital tools at all. ("Easy to ignore", "Not productive", "Did not use")
- Social support was inconsistent: A few relied on partners, but many went solo or avoided support entirely.

Insight: One-size-fits-all doesn't work. Some want peer support, others prefer private, self-paced tools. Design should offer modular support options—quiet encouragement for some, active interaction for others.

1.4

COMPARATIVE STUDY

A comparative study of four widely-used digital cessation tools — Smokefree, QuitBot, Kwit, and the EX Program — examined how each handled motivation, trigger support, adaptability, and tangible feedback. The goal was not to criticise these products but to understand the landscape well enough to design something different.



1.4

COMPARATIVE STUDY

Smokefree visualises physical health recovery milestones with impressive clarity — within hours of quitting, the app shows what is already improving in the body. QuitBot offers a chatbot-based response to cravings: conversational, low-barrier, available at any hour. Kwit uses gamified streaks, badges, and an avatar that grows healthier over time. The EX Program centres community — peer forums, shared stories, and structured support plans.

Each tool does something well. None of them can do what matters most: recognise that a craving is happening right now and respond to it in real time. Every tool in the comparison is reactive at best — it logs what already happened or delivers support on a fixed schedule. None of them learn. None of them notice. None of them arrive uninvited at the right moment with the right kind of help.

That is the gap. Not a missing feature — a missing orientation. The existing tools are designed to be used. Unlit is designed to be useful when it is hardest to use anything at all.

Design Focus	What Works	What Doesn't	Design Opportunities
Motivation	Visual rewards, goal setting	Motivation fades without renewal	Add emotional check-ins and re-surfacing “why” moments
Triggers	Craving logs, chatbot coping tools	No trigger anticipation or pattern learning	Predict and preempt triggers with proactive nudges
Adaptability	Multiple quit paths, pace flexibility	Interfaces aren't responsive to emotional state	Personalize interface and tone to mood and relapse risk
Tangible Change	Progress stats, savings, health graphs	Logging lacks feedback; rewards feel generic	Reflect back change through stories, milestones, emotions

SYNTHESIS & FRAMEWORKS

2.1 DESIGN FRAMEWORKS

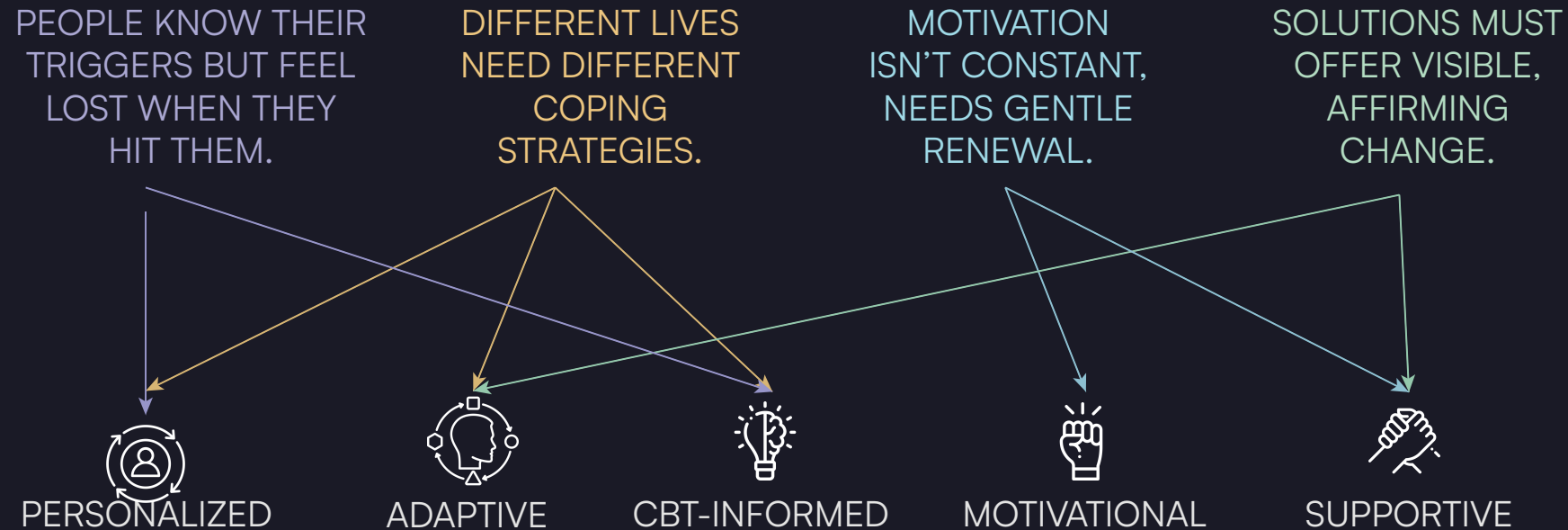
2.2 USER JOURNEY DEVELOPMENT



2.1

DESIGN FRAMEWORKS

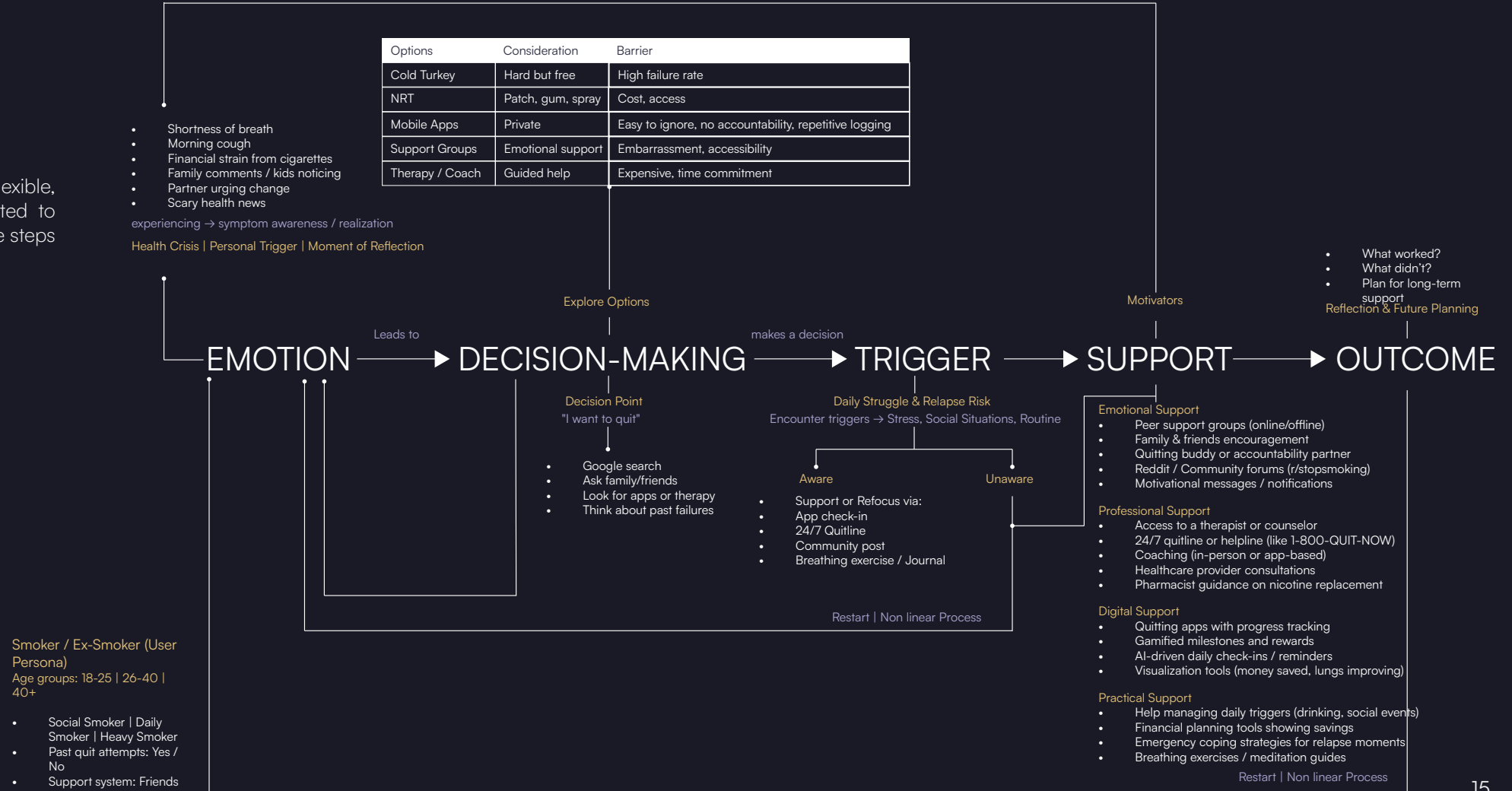
Every insight from Phase 1 pointed toward the same set of requirements. These are not features — they are commitments. Every design decision in Phase 3 and beyond was tested against them.



2.2

USER JOURNEY DEVELOPMENT

Instead of one fixed quitting journey, I must created a flexible, responsive experience that helps users stay connected to their values, feel understood, and find small, achievable steps wherever they are, however they feel..



2.2

USER JOURNEY DEVELOPMENT

Rather than designing for a single, idealised quit path, Unlit supports four distinct user journeys that reflect how quitting actually happens — not how we wish it would.

Learning Phase Journey

Log Trigger → Pick Emotion → Pick Location → Use Intervention → Log Use → View Milestone → Check Analytics → Add Motivator. The first two weeks. The system observes and learns. The user starts to build a picture of their own patterns. Everything is low-stakes and exploratory.

Adaptive Phase Journey

Trigger Detected → Notification → Quick Action → Intervention → Log Use → Auto-Log → View Insight → Continue Journey. The system begins to act on what it has learned. Notifications are contextual. Interventions are suggested, not assigned. The relationship between user and system starts to feel like genuine support.

Maintenance Phase Journey

Open App → Review Progress → Check Health → Motivation Card → Light Intervention → Earn Badge → Close App. The craving intensity has lowered. The focus shifts from surviving moments to sustaining progress. The system becomes lighter and more celebratory.

Relapse Journey

Log Slip → Gentle Message → Pick Intervention → Review Motivator → Reset Goal → Continue Journey. The most important journey to design for. A relapse handled badly — with shame, with a streak counter reset to zero, with silence — can end a quit attempt permanently. Unlit treats a slip as one data point in a long process, not an ending.

HOW THE BACKEND WORKS

How Unlit collects, processes, and learns from your data.

Baseline Data

INPUT LAYER

HRV and EDA are physiological markers of stress arousal — they shift before you consciously feel a craving. Continuous biometric capture via wearable device establishes personal physiological baseline for deviation tracking.

Data Fusion

PROCESSING LAYER

Based on Ecological Momentary Assessment — a research method for capturing behaviour in real time, in context. Every craving you log is cross-referenced with what your body was signalling at that exact moment.

Predictive Modelling

INTELLIGENCE LAYER

LSTM (Long Short-Term Memory) neural networks are designed for sequential, time-dependent data — exactly how cravings work. The system identifies the specific combination of physiology, location, emotion, and time that predicts a high-risk moment for you — then flags it before the craving peaks.

HOW THE EXPERIENCE FEELS

How that data translates into a real journey for the person trying to quit.

The Mountains

PHASE 1

ACTIVE LOGGING

You're at the base, looking up. Every craving feels steep. You start logging, you're paying attention for the first time. The mountain doesn't shrink. But you start to see the path.

User-reported inputs at craving onset. The system is cross-referencing logged inputs with biometric data to surface pattern correlations invisible to the user.



The Forest

PHASE 2

PASSIVE SUPPORT

You're moving through it now. Triggers come from directions you didn't expect, a meeting, a commute, a quiet moment alone. But Unlit starts flagging the moments before you feel them. Interventions arrive. You keep going.

The system has enough data to predict. It cross-references your physiology with your patterns and delivers contextually matched interventions in real time.



The Campsite

PHASE 3

MASTERY

You made it through. You know the Tuesday 3pm meeting. You know the car park. You know stress looks like a heart rate spike twelve minutes before you even reach for the habit. The campsite isn't the end. It's the first place you can rest and see how far you've come.

The user's response to the habit loop has been fundamentally modified. Trigger unawareness, the primary driver of relapse — has been replaced by pattern literacy built from their own data.



PROTOTYPING & TESTING

- 3.1 LOGGING
- 3.2 SYSTEM
- 3.3 INTERVENTIONS
- 3.4 QUESTIONS



3.1

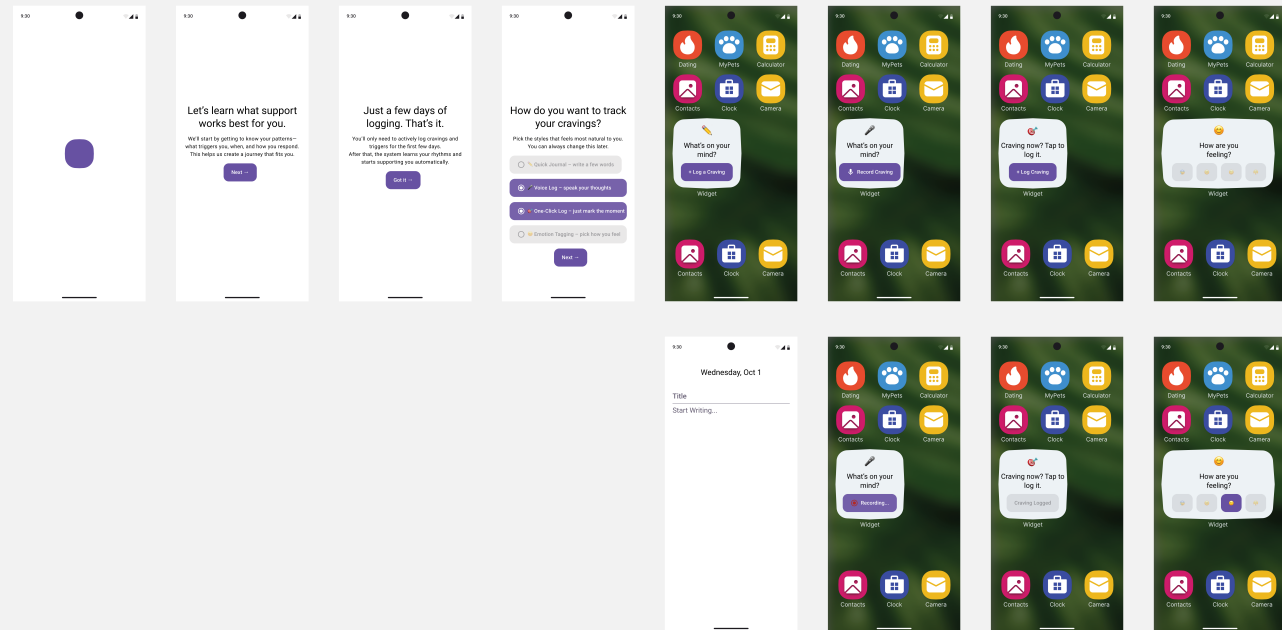
LOGGING

The question

What makes logging feel effortless and personal? How do people reflect when a craving is actually happening?

What was built

Four input methods were designed and prototyped: a journaling widget where users write a short reflection, a voice note widget, a one-click log that requires only a tap, and an emotiontagging widget with preset icons. All four were built as functional Figma prototypes and tested in scenario-based walkthroughs with three users, each of whom was presented with a craving scenario and asked to log using all four methods.



3.1

LOGGING

What was found

The preference hierarchy was unambiguous. One-click logging won. Not because it was the most informative — it is deliberately minimal — but because it was the only method that did not feel like work in a moment of stress. Voice logging was immediately disqualified for public use. Journaling was described as something users might do after a craving had passed, not during one. Emotion tagging occupied a productive middle ground — quick, expressive, and emotionally honest — but needed an open-ended escape valve for emotions that did not fit the preset options.

What changed

The active logging flow was redesigned around a single principle: collect the maximum amount of contextual data with the minimum amount of visible effort. The resulting flow — Trigger → Log Craving or Use → User-System Diary — captures situation, emotion, location, and people through a sequence of one-tap inputs that the user can complete in under fifteen seconds.

"Just one tap to say I had a craving. I'd actually use this every day."

— User 3, One-Click Log scenario

"I wouldn't use this at work. What if someone saw me talking to my phone about needing a cigarette?"

— User 2, Voice Log scenario

"I can use the emotions — but what if I'm feeling something that's not on the list?"

— User 1, Emotion Tagging scenario

3.2

SYSTEM

The question
Which signals are most reliable in recognising a trigger moment? How should the system respond once it detects one?

What was built
A passive detection framework was designed using secondary research on physiological markers. Normal EDA ranges from 1 to 20 microsiemens — above 20μS indicates heightened arousal consistent with a craving. HRV deviation of ±15% from a user's personal baseline signals physiological stress. These internal signals were paired with contextual signals: repeated presence in a past trigger location, a consistent time-of-day pattern, and ambient audio cues. A detection rule matrix defined how the system should respond depending on how many signals were active simultaneously. A Python simulation in Google Colab tested the logic against synthetic craving scenarios using a Decision Tree Classifier.

CATEGORY	SIGNAL	WHAT TO LOOK FOR	INTERPRETATION
INTERNAL (PHYSIOLOGICAL)	HRV (Heart Rate Variability)	±15% deviation from user's baseline	Physiological stress or craving response
	SC (Skin Conductance)	>20 μS	Heightened arousal or craving intensity
EXTERNAL (CONTEXTUAL)	Location	Repeated in past trigger zones	Environmental or social cue
	Time	Consistent pattern (e.g., post-meal, breaks)	Routine or ritual trigger
	Ambient Sound	Contextual audio patterns (e.g., chatter, traffic, lighter flick)	Environmental, social, or emotional cue

Trigger Prediction Tree

gini = 0.0
samples = 5
value = 1.0

Decision Tree.ipynb

File Edit View Insert Runtime Tools Help

Commands + Code + Text Run all

```
[ ] import pandas as pd
from sklearn.preprocessing import LabelEncoder
from sklearn.tree import DecisionTreeClassifier, plot_tree
import matplotlib.pyplot as plt

[ ] data = {
    'time_of_day': ['morning', 'afternoon', 'evening', 'morning', 'evening'],
    'location': ['home', 'work', 'outside', 'work', 'home'],
    'emotion': ['happy', 'bored', 'calm', 'anxious', 'happy'],
    'heart_rate': [95, 88, 72, 102, 76], # bpm
    'skin_conductance': [10, 11, 12, 10, 11], # μS
    'triggered': [1, 1, 1, 1, 1] # 1 = craving logged
}

df = pd.DataFrame(data)

[ ] label_encoders = {}
for column in ['time_of_day', 'location', 'emotion']:
    le = LabelEncoder()
    df[column] = le.fit_transform(df[column])
    label_encoders[column] = le

# Features & target
X = df[['time_of_day', 'location', 'emotion', 'heart_rate', 'skin_conductance']]
y = df['triggered']

model = DecisionTreeClassifier()
model.fit(X, y)
```

DecisionTreeClassifier ⓘ ?

DecisionTreeClassifier()

Variables Terminal

20

3.2

SYSTEM

The tiered response system
Fewer than two signals detected: the system stays idle. Two signals (at least one physiological): the system gathers additional context before acting. Three or more signals (at least one physiological and one contextual): a gentle intervention is suggested. Four or more signals aligned: proactive support is offered immediately. The logic was designed to err strongly toward inaction — a false positive in a non-craving moment is more damaging to trust than a missed detection.

CONDITION	SYSTEM ACTION
Fewer than 2 signals detected	Do nothing — system remains idle.
2 signals detected (at least one physiological)	System will try to gather additional context, such as ambient sound, to confirm the state before suggesting any intervention.
3 or more signals detected (at least 1 physiological + 1 contextual)	System has moderate to high confidence — suggests a gentle, in-the-moment intervention.
4 or more signals aligned	High certainty — proactive support is offered immediately.

3.3

INTERVENTIONS

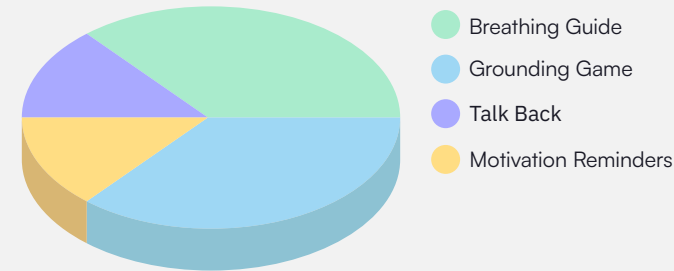
What was built

Five interventions were designed, each rooted in a specific clinical or psychological framework: a Grounding Game based on the 5-4-3-2-1 mindfulness technique, a Talk Back mini-game adapted from CBT thought reframing, Motivation Reminder Cards drawing from motivational interviewing, a Breathing Guide based on physiological calming techniques, a Reach Out feature grounded in social support research, and a Future Self visualisation based on motivational therapy. All six were prototyped and distributed for remote testing via the SJSU Sammy App, Reddit quit communities, and the SJSU Department mailing list. Respondents rated each intervention across five dimensions: ease of understanding, calming effect, format effectiveness, accessibility, and engagement.

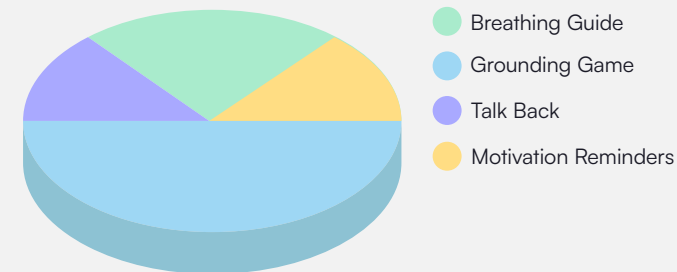
What the data showed

Breathing Guide and Grounding Game ranked highest across all five dimensions. Both share a key property: they require no personal disclosure, no typing, and no cognitive effort beyond following a simple prompt. Talk Back scored highest on engagement — the gamified framing resonated — but lowest on immediate calming effect, making it better suited to medium-intensity craving moments than acute ones. Future Self was described as meaningful but too cognitively demanding to work during a craving. Reach Out performed strongly for users with active support networks and poorly for those without one.

Which intervention felt most helpful during a craving?



Which intervention would you most likely use regularly?



Responses
https://docs.google.com/spreadsheets/d/1qoMjOldC9U-6McqSpZIBJ2xMxX5zqhb1_k8Eew81uHA/edit?gid=1027640262#gid=1027640262

3.3

INTERVENTIONS

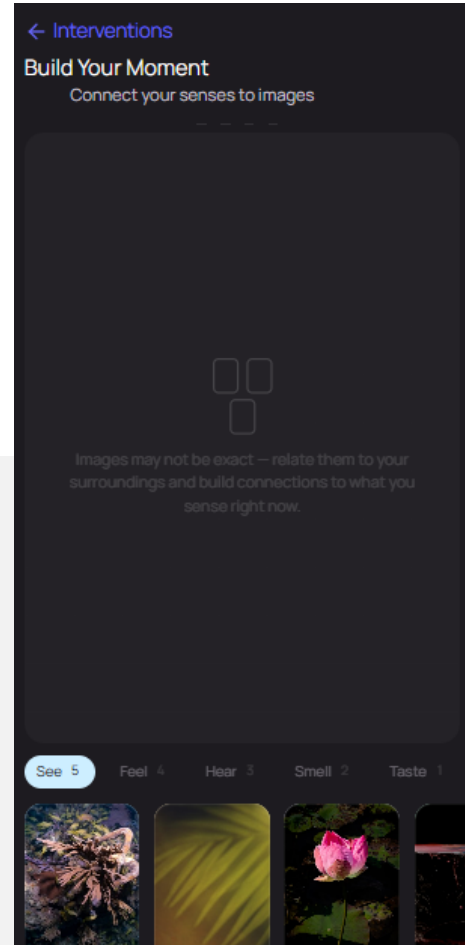
GROUNDING GAME

Where it comes from

The 5-4-3-2-1 Grounding Technique is one of the most widely used tools in Cognitive Behavioural Therapy for interrupting anxiety and urge cycles. It works by redirecting the brain's attention from the abstract (I want a cigarette) to the immediately sensory (what can I see right now), making the craving feel smaller by comparison. It requires no props, no privacy, and no prior experience.

How it works in the app

The user is guided through five steps: name five things you can see, four you can touch, three you can hear, two you can smell, one you can taste. Each step is a single prompt with a simple text or photo input. The full activity takes under ninety seconds. The visual design during the activity shifts to soft green tones with slower animation speeds — a deliberate physiological cue for calm. Completion is acknowledged with a quiet affirmation, not a score.



What users said

"This was actually calming. I didn't expect it to work — I thought it would feel forced. But naming things around me pulled me out of the spiral."
— Test participant, Grounding Game

The Grounding Game ranked highest overall and was the most consistently recommended intervention across all user types. The key design finding: the prompts must be genuinely open — asking for what the user can see right now, not what they expect to see. The specificity forces real attention. Iteration also added a silent mode for public use, where tapping replaces naming aloud.

Design decisions

The activity must complete in under two minutes with no required typing. Prompts must be phrased in the present tense. The visual shift to green during the exercise must be deliberate and consistent — it becomes a conditioned signal for calm over time. Never end with a streak update. End with a breath.

3.3

INTERVENTIONS

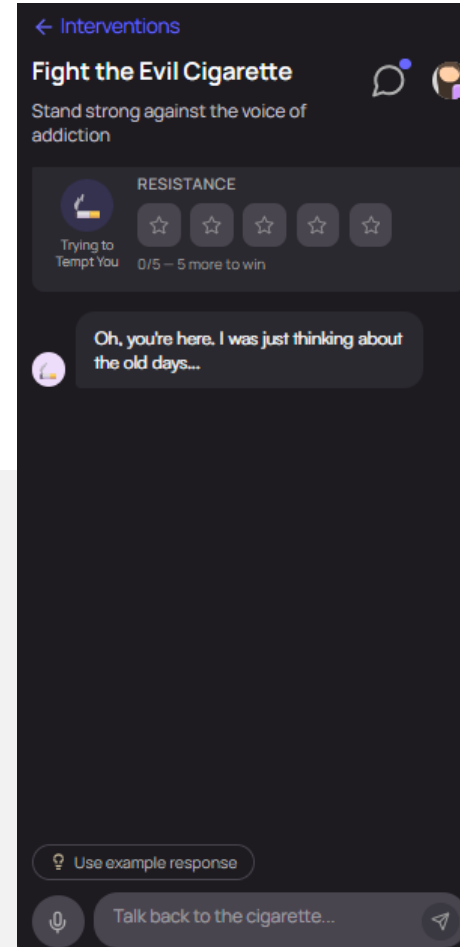
TALK BACK

Where it comes from

CBT's thought reframing and urge surfing techniques both operate on the same principle: the craving is not a fact, it is a thought — and thoughts can be challenged. Urge surfing asks users to observe a craving without acting on it, watching it rise and fall. Talk Back makes that abstract practice concrete by externalising the craving as a character: the Evil Cigarette, who says the things the user's own craving voice says.

How it works in the app

The Evil Cigarette character repeats the user's own logged craving thoughts back at them — phrases pulled directly from their diary entries, made into dialogue. The user responds, either by typing or speaking. Each response earns resistance points, which accumulate visibly during the session. The interaction is designed to feel like a winnable argument, not a test of willpower.



What users said

"I actually laughed at the cigarette character. That helped more than I thought

it would. Making it absurd made it feel manageable."

— Test participant, Talk Back

Talk Back ranked highest on engagement and was described as uniquely motivating,

particularly among younger users who responded well to the gamified format. It was consistently less effective during acute high-stress craving moments, where cognitive load made active participation difficult. The primary design recommendation: position Talk Back as a medium intensity intervention surfaced during moderate cravings, not as a first-response tool.

Design decisions

The character's dialogue must be drawn from the user's own logged language — generic craving lines feel hollow. The resistance points must accumulate quickly; users should feel momentum within the first thirty seconds. The tone of the character must be absurd rather than threatening. The user must always feel like they are winning.

3.3

INTERVENTIONS

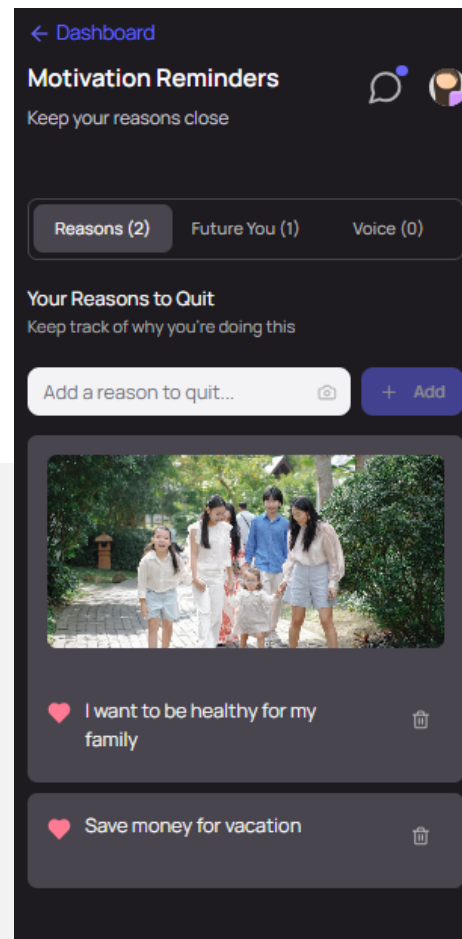
MOTIVATION REMINDERS

Where it comes from

Motivational interviewing operates on the principle that the motivation to change already exists within the person — the practitioner's role is to surface it, not supply it. The same logic applies here. Motivation Reminders are not the app telling the user why to quit. They are the user's own words, their own voice, their own future — returned to them in the moments when those things feel furthest away.

How it works in the app

Users create three types of cards: Reason Cards (why they are quitting, specific and personal), Future You Notes (a message written to themselves from a moment of strength, to be read in a moment of weakness), and Voice Notes (a short audio recording of their own voice). During a craving, the system surfaces the most contextually relevant card based on time, location, and emotional state. A card written after a particularly hard craving survived is more likely to appear the next time that same craving pattern is detected.



What users said

"Reading what I'd written to myself when I was feeling strong — I hadn't expected it to still sound true. It did."

— Test participant, Motivation Reminders

Motivation Reminders ranked highly on calm effect and personal relevance. The key finding was a strong dependency on onboarding quality: users who created detailed, specific cards during setup found the intervention significantly more powerful than those who had written generic oneliners. This pointed to a design challenge — the intervention's value is built before the intervention is ever used. Onboarding must be designed to encourage rich, personal, specific content.

Design decisions

Cards must appear full-screen with a slow fade transition. Future You Notes should be framed as arriving from the user's own future self — the phrasing matters. The voice note option must be visually prominent; audio carries emotional weight that text cannot replicate. Never show all cards at once. Surface one. Make it count.

3.3

INTERVENTIONS

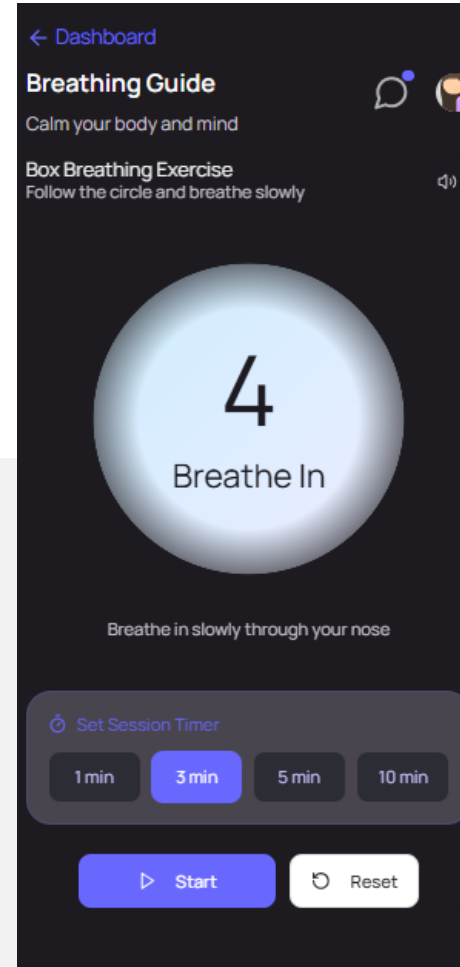
BREATHING GUIDE

Where it comes from

Controlled breathing is one of the most physiologically grounded interventions available and one of the few that directly affects the nervous system without requiring any cognitive work. Diaphragmatic breathing activates the parasympathetic nervous system, lowering heart rate and cortisol levels within minutes — measurably reducing the physical intensity of a craving. It requires no equipment, no privacy, and no explanation.

How it works in the app

A soft, expanding and contracting shape guides the user through a 4-4-6 breathing cycle: inhale for four counts, hold for four, exhale for six. The extended exhale is clinically significant — it is the exhale that activates the vagal response that slows the heart rate. The session runs for sixty seconds by default. No text appears during the exercise. No decisions are required. The visual and audio design shifts the entire interface into a calmer register for the duration.



What users said

"My whole body was tense. I was sceptical. But two minutes later I felt it — something actually shifted."

— Test participant, Breathing Guide

Breathing Guide ranked highest of all six interventions across ease, calm effect, and likelihood of regular use. Users valued its complete lack of cognitive demand and the fact that it could be used in any public or private setting without drawing attention. The primary feedback from testing: some users wanted a thirty-second express version for very acute moments, and several asked to remove the visible timer, which created its own low-level pressure. Both changes were implemented.

Design decisions

No text during the session. No timer visible by default. The 4-4-6 rhythm must feel natural, not rushed — test the pacing carefully before finalising. The colour palette shifts toward soft blue-green for the duration, conditioning a physiological association with calm over repeated use. The session can be extended indefinitely by the user. Make it easy to stay

3.3

INTERVENTIONS

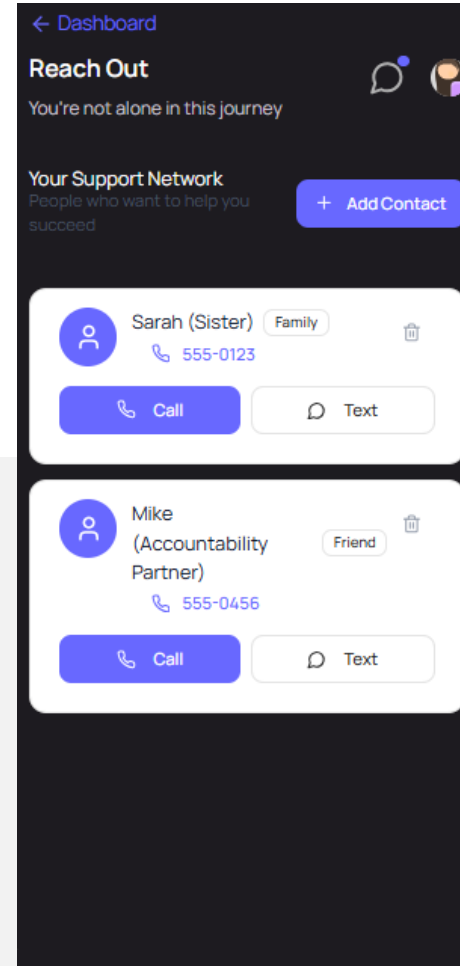
REACHING OUT

Where it comes from

Social support is among the most consistently effective factors in long-term smoking cessation. The research is clear: isolation amplifies cravings; connection — even brief, even tangential — interrupts the craving cycle by activating social and emotional pathways that compete directly with the urge to smoke. Reaching out does not require disclosing a craving. It requires only a voice, a message, the presence of another person.

How it works in the app

During a craving, the user is shown their pre-selected support contacts — people they have named during onboarding as trusted members of their network. The app facilitates a call, text, or voice message directly from the interface. A suggested conversation opener is provided for users who are not ready to disclose: a version of just wanted to hear your voice. The act of reaching out, not the conversation that follows, is the intervention.



What users said

"I called my sister even though she didn't know what was happening. Just hearing her voice helped. A lot."
— Test participant, Reach Out

Reach Out performed strongly among users with active personal support networks. For users who listed no close contacts or who preferred private self-directed tools, it was among the least used interventions. This confirmed the modular design principle: Reach Out must be visibly available without being prominently featured by default. Users without a personal network should be routed to the app's community features or the 1-800-QUIT-NOW quitline as an alternative.

Design decisions

Contact setup must happen during onboarding — not during a craving. The craving-moment interface must be a single action. No decision-making. The suggested opener should be ready to copy; the user should not have to compose anything. Transparency about how Reach Out data is handled is non-negotiable. The session can be extended indefinitely by the user. Make it easy to stay

3.4

QUESTIONS

When does the system knowing too much become a problem?

The question

How do users respond to insights about their own behaviour patterns? When does pattern recognition feel like support — and when does it feel like surveillance?

What was built

Mock pattern summaries were designed at three specificity levels — low, medium, high — and three tone variations — factual, gentle, playful — across five message types: craving detected, early warning, relapse support, reinforcement, and daily motivation. The same insight was expressed at every level: 'Your cravings frequently occur around 4 p.m.' Factual. 'Afternoons seem a little tougher for you. Want support during that time?' Gentle. 'Uh-oh — 4 p.m. again, your sneaky craving hour!' Playful.

Seven things learned

1. Specificity increases trust, but only when the system explains how it knows what it knows. High specificity without transparency felt like surveillance. 2. The gentle tone was almost always the right default. Playful worked only in low-stakes moments. Factual felt informative but emotionally cold. 3. A notification is only effective if its timing matches the user's actual context — irrelevant timing destroys trust faster than any wrong word. 4. Messages that imply failure trigger shame and avoidance. Supportive framing increases willingness to act. 5. Naming the user or referencing a specific time window made users feel understood; referencing exact location or physiological data without context felt invasive. 6. Notifications that ended with a simple, optional action were acted on more than passive observations. 7. Users need to understand the system's logic. Transparency is not a feature — it is the foundation of the entire trust relationship.

Does the whole thing hold together?

The question

Does the complete system feel coherent, supportive, and usable across different emotional states and journey phases? Are users comfortable moving between prompts and features?

What was built

A full information architecture was built spanning every section of the app: Onboarding, Home Journey, Triggers, Interventions, Analytics, Settings, Profile, and Chats. Four complete user journeys were mapped and then prototyped in wireframes — Learning Phase, Adaptive Phase, Maintenance Phase, and Relapse Journey — and tested through scenario-based walkthroughs before moving to high-fidelity design.

What iteration produced

Four significant changes came out of full-journey testing. Data transparency flows were added throughout the onboarding and settings sections after users raised consistent concerns about what data the system was collecting and why. Navigation was restructured to reduce the number of decisions required in a craving moment — the original design asked users to choose between too many paths at the exact moment cognitive resources were most depleted. Alternative logging was added to the home screen as a persistent widget, available without opening the app. Confirmation messages were introduced after every action — not congratulatory, not performative, simply present. Acknowledgement costs nothing and means more than almost any other design decision in this system.

SYSTEM DESIGN

4.1 VISUAL DESIGN
4.2 KEY SCREENS
4.3 TESTING AND ITERATION



4.1

VISUAL DESIGN

The visual system for Unlit was built against a single constraint: nothing in this interface should make a craving moment harder. Not the colour palette. Not the typography. Not the speed of the animations. Not the words.

Dark mode is the primary experience — most craving moments happen in low light, and a bright white screen is a small but genuine assault on the senses in an already activated state. The colour language follows the three journey phases: soft greens for the Learning Phase, where the user is observing and adjusting; cool blues for the Adaptive Phase, where the system is beginning to act; warm golds for the Maintenance Phase, where the work is sustaining what has been built. Each colour shift is a spatial cue — the user knows where they are without needing to read anything.

The home screen journey borrows from game design: a vertical path of milestone coins the user progresses along as their quit journey continues. It is deliberately non-punitive — landing on a craving moment does not reset progress. It adds a data point. The path continues regardless. Microcopy was written against one rule: never sound like a product. Every message in the app is written as if from a person who has been through something hard and knows it. Not a healthcare professional. Not a wellness app. Someone who has been in the room.



4.2

KEY SCREENS

The following screens represent the core moments of the Unlit experience. Each was designed to handle a specific emotional state — not a use case, an emotional state. Onboarding: curious and slightly guarded. Home journey: motivated and checking in. Trigger logging: stressed and time-poor. Intervention hub: in need right now. Analytics: reflective and wanting to understand. Voice companion: isolated and looking for presence.

<https://www.figma.com/make/d41NZvf4yIPy4imKiMy5zC/Interventions?t=k8PzNVS09DSXa9QR-1>



4.3

TESTING AND ITERATION

System testing was conducted through scenario-based walkthroughs with users navigating the complete prototype across a simulated craving moment — from detection through intervention to evening reflection. Feedback was collected through direct observation, qualitative notes, and Likert ratings across five dimensions: system coherence, tone accuracy, navigation legibility, emotional safety, and data transparency.

The principle that emerged most clearly from every testing session: friction in a craving moment is not a usability problem. It is a clinical problem. Every additional tap, every decision, every unclear label is a moment the user may close the app and light a cigarette instead. Friction reduction is the intervention.

Four changes made

Transparency screens were added throughout onboarding and settings explaining exactly what data the system uses and why.

Navigation was simplified from a five-tab bar to four, with the most critical actions — logging and interventions — accessible from the home screen without navigating anywhere.

The Quick Log widget was made available on the phone's home screen as well as inside the app.

Confirmation messages were added after every action: short, warm, and non-conditional on performance.

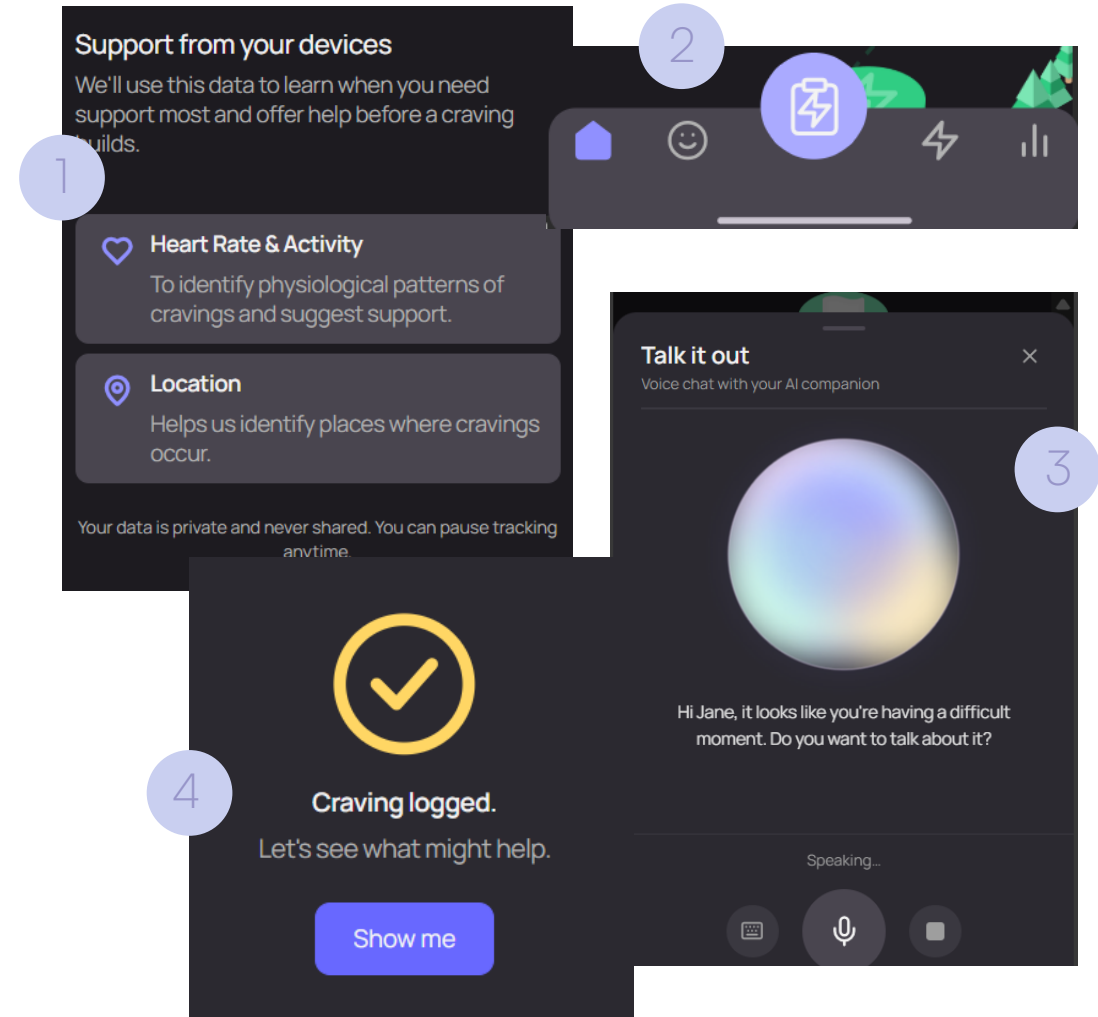


EXHIBIT DESIGN AND BUILD

5.1 CONCEPT
5.2 COMPONENTS



5.1

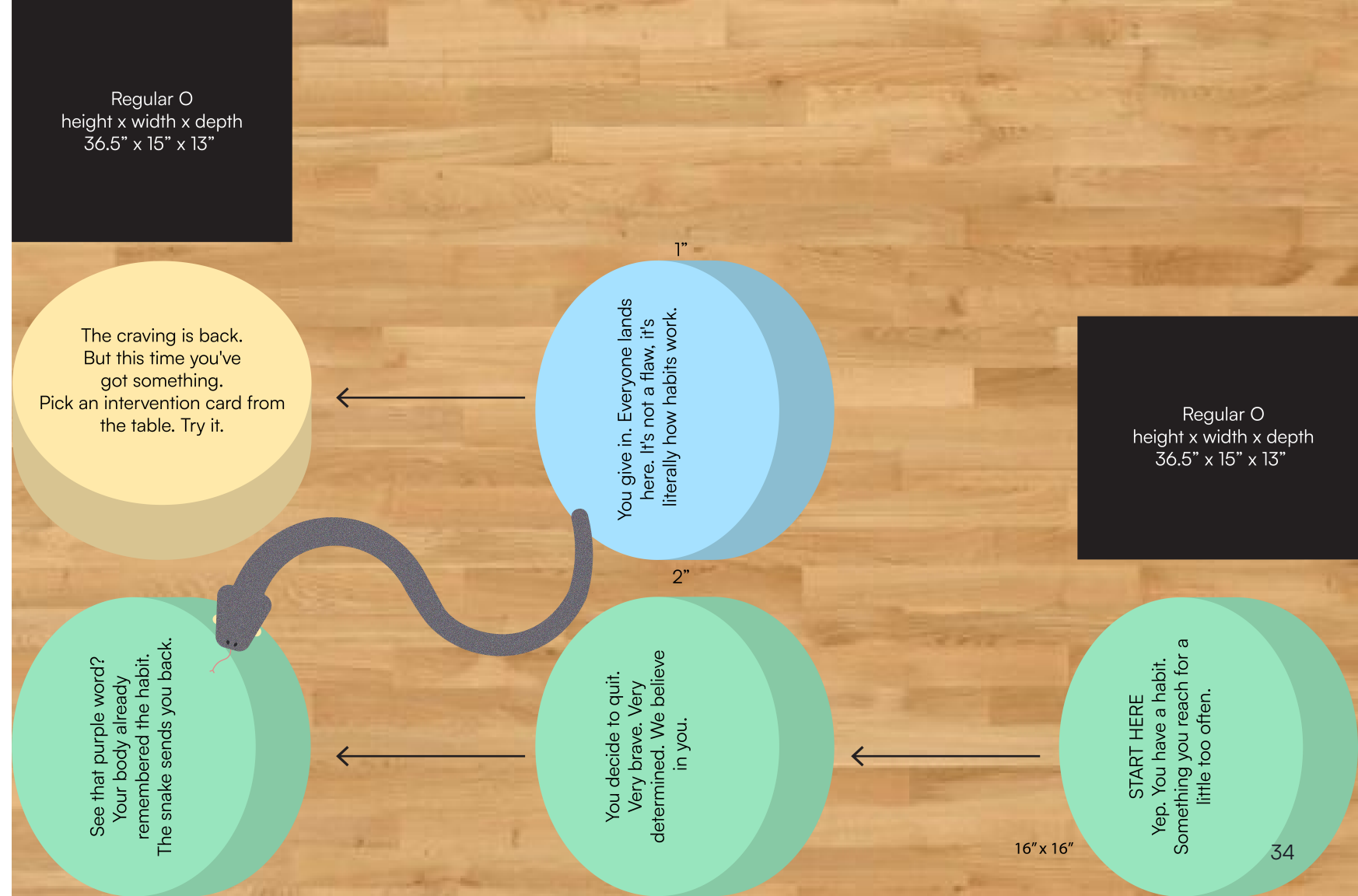
EXHIBIT CONCEPT

How do you make someone who has never felt a craving feel a craving?

The central challenge of the thesis exhibit was this: most visitors would not have experienced a nicotine craving. The research, the design decisions, the interventions — all of it was built for a feeling most visitors had never had. How do you build empathy for something that specific, that physical, that fast?

The answer was play. A snakes-and-ladders-style board game printed at floor scale, where the squares are trigger moments and the snakes are relapses and the ladders are interventions that actually worked. Players roll dice, move through scenarios, and encounter the non-linearity of a quit attempt through their own body — through the frustration of going backwards, the small relief of an intervention card, the realisation that there is no straight path from start to finish.

Play makes the abstract concrete. It also makes it social. People played the game in pairs, in groups — they argued about which intervention to use, they groaned when someone landed on a relapse square. The exhibit created conversation about something people almost never talk about in public.



5.2

EXHIBIT COMPONENTS

Floor game

A floor-scale snakes-and-ladders board adapting the classic mechanic to simulate the craving loop. Bubble-shaped spaces contain trigger scenarios, positive milestones, and relapse moments. Snakes represent setbacks; a corresponding space sends the player to pick up an intervention card instead of sliding down. The game was playtested for pace and emotional register before printing.

Wall panels

Two large-format printed panels at 27.93 by 19.97 inches. The left panel presents the Unlit system: how it works, what it detects, the four phases of the quit journey. The right panel presents the research voices: key quotes from experts and users that grounded every designdecision.

Intervention card deck

Physical versions of all six in-app interventions, printed as cards. Each card carries the intervention name, a one-sentence grounding in its clinical source, and step-by-step instructions usable without the app. Cards were available for visitors to take. Many did.

Logo and identity

The Unlit wordmark — developed across multiple iterations — uses a rounded letter-form that reads simultaneously as a word and a visual reference to a cigarette that was never lit. The brand purple runs through everything: the wall panels, the card deck, the board, the app. The identity system is designed to be recognisable at every scale, from a phone screen to a floor.



CONCLUSION

The most important thing this project taught me about design is also the most uncomfortable: the moments that demand the most from a system are the moments when the user has the least to give. Craving moments are not inconveniences to design around. They are the entire problem. Every decision — about friction, about tone, about timing, about what the screen looks like at 2am — is a decision made on behalf of someone at their lowest. I started this thesis with a hypothesis that turned out to be wrong. People know their triggers. What they do not have is something to hold onto when the trigger arrives. That correction made the project harder and more honest. It meant designing for a moment I could describe but not fully know — and finding rigour in that uncertainty rather than papering over it.

The five inquiry phases taught me that research and design are not sequential. Every test changed something. Every user quote reoriented a decision. The system that exists at the end of this book is not the system I proposed in May 2025. It is more specific, more sceptical of itself, more careful about what it promises. I think that is what two years of iteration is supposed to produce.

I also learned something about the exhibit as a form. Putting the research on the floor — making it something people walked through, played with, stood on — produced conversations I could not have generated any other way. People who had never smoked asked questions about what withdrawal feels like. People who had quit ten years ago stopped in front of the relapse square and went quiet. The work landed differently in space than on a screen.

Unlit is not finished. No intervention system for something as complex as addiction ever is. But it has a direction, and it has principles, and it has the specific, careful attention of two years of asking: what does someone actually need in the moment it is hardest to need anything?

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