

# Project 4

**Student:** Daniela Gallegos Dupuis

**Course:** AE 311 Design Thinking

**Institution:** University Name

**Date:** August 16, 2025

---

## Project 4



*A Multipurpose Portable Privacy Panel*

## Research & Development

Public spaces can be overwhelming for many people due to a combination of anxiety, sensory overload, and hygiene concerns. Academic research consistently shows that noise, visual distraction, and perceived social surveillance reduce focus, especially for students and neurodivergent individuals. Post-pandemic, hygiene fears remain high, with public transport and shared seating seen as contamination risks. These barriers limit participation, mobility, and productivity.

For neurodivergent users (autism, ADHD, dyslexia), environments often feel “too loud, too bright, too close.” Field studies confirm that shielding visual and auditory input improves concentration and comfort. In public learning spaces like libraries, noise is one of the top barriers to study satisfaction. Hygiene research shows persistent bacterial loads on shared surfaces, with elevated risk perception shaping behaviour especially among people with OCD or germ-avoidance traits.

The problem: Students and commuters need a lightweight, portable, adjustable privacy tool that reduces sensory input, creates a controllable hygiene boundary, and adapts to multiple public scenarios.

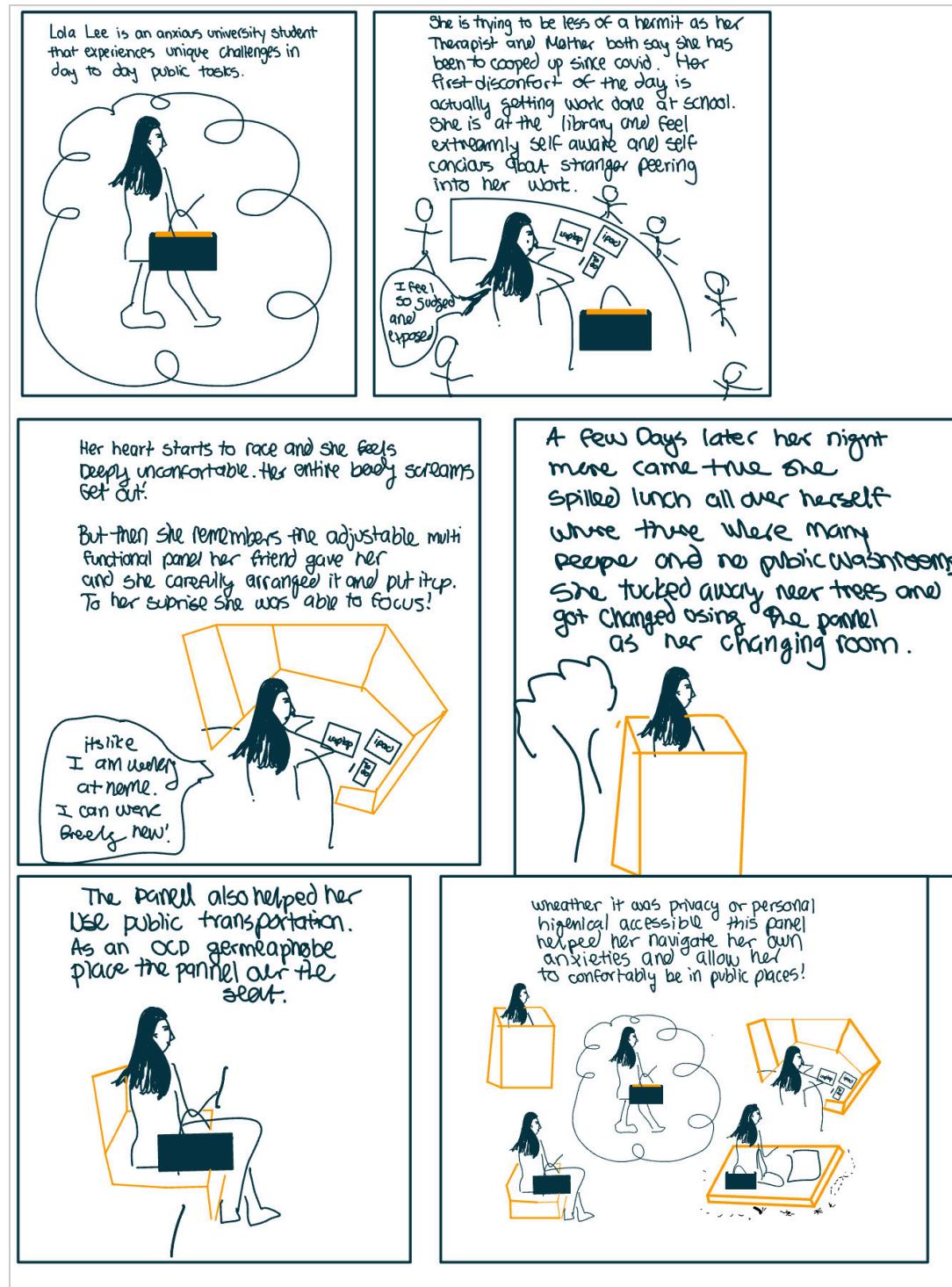
## Target Audience

The Study Shell serves a diverse range of users who require enhanced privacy and sensory control in public environments. Primary users include students seeking low-distraction environments in libraries, cafés, and lecture halls where concentration is essential for academic success. Neurodivergent individuals represent another key demographic, particularly those who benefit from tunable sensory input and reduced social exposure to manage overstimulation and anxiety. Additionally, the design addresses the needs of germ-averse or contamination-conscious individuals who require a hygienic barrier in shared spaces. The solution also serves anyone requiring temporary privacy in public settings, whether changing after a spill, expressing milk, or managing personal medical needs, providing dignified access to essential activities in otherwise exposed environments.

## Research Methodology

My research began with an evaluation of existing solutions, including laptop privacy screens, which offer limited visual shielding but no protection against social exposure or hygiene concerns; noise-cancelling headphones, which address auditory distraction but leave visual and hygiene needs unmet; public changing pods, which provide privacy but are bulky and non-portable; and foldable desks, which, while functional, are too large and heavy for personal carry. This comparative analysis revealed a clear gap: no single product currently offers a lightweight, fold-flat, multi-purpose design that can be easily adjusted for both desk and standing configurations. To inform my design direction, I reviewed literature on acoustic privacy and sound masking (Bergefurt et al., 2024; Lee et al., 2024), sensory accessibility for autistic adults (MacLennan et al., 2023; Poulsen et al., 2025), hygiene in public transport (Smelíková et al., 2025; UK Department for Transport, 2024), and post-pandemic contamination fears (Audet et al., 2023; Chau et al., 2024).

## Empathetic Understanding



Lola Lee Storyboard

This project grew from imagining the day-to-day life of a student like Lola Lee (see storyboard). Lola experiences anxiety in public spaces, struggles to concentrate under visual and auditory distraction, and feels unsafe touching public surfaces. She sometimes avoids studying outside her home entirely, limiting her academic participation and social engagement. By designing from Lola's perspective, the goal was to create a safe, portable "bubble" that could be deployed anywhere, quickly.

## Ideation Process

Initial concepts explored four main directions: a portable desk shell with a three-panel folding structure for visual privacy; a convertible changing room with extendable panels for standing privacy; an integrated hygiene layer with wipeable, patterned surfaces and cable pass-through slots; and a multipurpose configuration that could serve as a laptop stand, stool, tray, or car trunk cover. A storyboard titled “Lola Lee’s Day” illustrated real-world triggers such as study anxiety, spills, and public transport discomfort, showing how one device could address multiple needs.

Prototyping began with a bare cardboard model to test folding and hinge placement, leading to feedback on reinforcing the desk surface and improving handle comfort. The second prototype added laminated, wipeable surfaces, carry handles, and adjustable straps, with testing in real seating conditions. The final prototype featured laminated zigzag panels, a fold-flat binder closure with ergonomic handle, a hinged desk with triangular braces, and quick-deploy straps configurable as a stool, privacy nook, or changing pod.



*In-depth research analysis and strategic planning documentation*



*In-depth research analysis and strategic planning documentation*

Peer feedback confirmed the appeal of the multifunctional design and led to key refinements: triangular gussets for stability, higher handle placement for better

weight balance, and a 5 cm increase in panel height for improved visual shielding in public spaces.

## Final Work



*Final project deliverable showcasing the complete design solution*

### Artistic Statement: Study Shell

The Study Shell addresses a persistent challenge in public environments: spaces that are too loud, too bright, too close, and often unhygienic. Students, commuters, and neurodivergent individuals experience reduced focus, heightened anxiety, and ongoing hygiene concerns, conditions intensified in the post-pandemic era. This

project responds by combining two urgent needs: sensory regulation and hygienic boundaries in a single portable, adaptable solution.

**Empathetic Approach:** Design began with the perspective of "Lola Lee," a composite user navigating noisy libraries, sudden clothing changes after spills, and crowded transit. Storyboarding her experiences identified key intervention points where control, privacy, and personal space could improve comfort, concentration, and agency.

**Research Foundation:** Existing solutions such as laptop privacy screens, noise-cancelling headphones, public changing pods, and foldable desks addressed parts of the problem but none offered a lightweight, multipurpose, adjustable format suitable for both seated and standing use. Literature review included acoustic privacy and sound masking, sensory accessibility for autistic adults, hygiene in public transport, and post-pandemic contamination psychology. These findings shaped the Study Shell's three design pillars: sensory buffering, hygienic interface, and portable adaptability.

**Range of Ideas Generated:** Early concepts explored a three-panel desk shell for seated privacy, a convertible standing privacy nook with extendable panels, wipeable laminated surfaces with cable pass-throughs for hygiene and organization, and multipurpose configurations enabling the product to serve as a laptop stand, stool, tray, or car trunk cover. This breadth ensured versatility and adaptability for varied user scenarios.

**Prototyping Journey:** Development progressed from a basic cardboard model to a laminated, wipeable version with ergonomic handles, and finally to a full-scale prototype with zigzag-patterned panels, a fold-flat binder closure, triangular braces for stability, and quick-deploy straps for secure deployment in multiple configurations.

**Peer Feedback & Refinement:** Feedback validated the multifunctional appeal and highlighted areas for enhancement. Recommendations led to stronger desk bracing via triangular gussets, repositioned handle placement for improved balance, and a 5

cm panel height increase for greater visual shielding. These refinements improved stability, ergonomics, and user comfort.

**What I Learned:** This process reinforced that successful design is an iterative balance of empathy, research, and adaptability. Engaging deeply with user perspectives sharpened my understanding of real-world constraints, while broad research grounded decisions in evidence. Iterative prototyping taught me the value of low-cost, rapid testing to validate form and function before final execution. Peer feedback demonstrated how collaborative critique can reveal overlooked issues and elevate a design's usability and appeal. Ultimately, I learned that the most effective solutions emerge from combining human-centered insights with disciplined, evidence-based design practice.

**Outcome:** The Study Shell is a portable architecture for privacy, hygiene, and focus: functional, aesthetically refined, and deeply user-centered, embodying a process that moves fluidly from problem identification to research, ideation, testing, refinement, and final execution.

## References

The following academic sources and research studies informed the theoretical framework, design methodology, and evidence-based decision making throughout the Study Shell project development. These interdisciplinary references span acoustic privacy, sensory accessibility, hygiene research, and post-pandemic behavioral psychology.

- Aguzie, I. O., et al. (2024). Hand contamination and hand hygiene knowledge. *Infectious Disease Reports*, 16(2). [View Article](#) (<https://PMC11142581>)
- Audet, J.-S., et al. (2023). COVID-19 related stress and fears of contamination: A commentary. *Journal of Obsessive-Compulsive and Related Disorders*, 38, 10091346. [Read Full Text](#) (<https://PMC10091346>)
- Bergefurt, L., et al. (2024). Level-adaptive sound masking in the open-plan office. *Applied Acoustics*, 219, 109352. [Access Article](#) (<https://www.sciencedirect.com/science/article/pii/S0003682X23006436>)
- Bossaller, J., et al. (2020). A happy ambience: Incorporating ba and flow in library spaces. *Library & Information Science Research*, 42(3), 101019. [View Abstract](#) (<https://www.sciencedirect.com/science/article/abs/pii/S0099133320301191>)
- Center for the Built Environment (CBE). (n.d.). Speech privacy in office environments. University of California, Berkeley. [Research Overview](#) (<https://cbe.berkeley.edu/research/speech-privacy-office-environments>)
- Chau, H. W., et al. (2024). The impacts of perceived safety and service quality on perceived accessibility in public transport. *Land*, 13(11), 1928. [Open Access](#) (<https://www.mdpi.com/2073-445X/13/11/1928>)
- Finnigan, K. A. (2024). Sensory responsive environments and sensory sensitivities. *Land*, 13(5), 636. [Read Article](#) (<https://www.mdpi.com/2073-445X/13/5/636>)
- Jafari, M. J., et al. (2019). The effect of noise exposure on cognitive performance and brain activity. *Safety and Health at Work*, 10(4), 393–399. [Full Text Available](#) (<https://PMC6901841>)
- Jaydarifard, S., et al. (2024). Mitigating airborne infection risks in public transportation: A review. *Transport Policy*, 151, 122–132. [View Research](#) (<https://www.sciencedirect.com/science/article/pii/S0967070X24002051>)
- Lee, S. M., et al. (2024). Influence of partition layouts on speech privacy in open-plan offices. *Heliyon*, 10(12), e24130733. [Access Paper](#) (<https://www.sciencedirect.com/science/article/pii/S2405844024130733>)

- MacLennan, K., et al. (2023). Sensory experiences of autistic adults in public spaces. *PLOS ONE*, 18(11), e0293058. [Open Access Article](#) (<https://PMC10726197>)
- Poulsen, R., et al. (2025). Auditory environments influence the link between autistic traits and quality of life. *Scientific Reports*, 15, 12345. [Nature Publication](#) (<https://www.nature.com/articles/s41598-025-94585-y>)
- Rachman, Z., et al. (2024). Exploring soundscape assessment methods in office environments: A systematic review. *Buildings*, 14(11), 3408. [MDPI Access](#) (<https://www.mdpi.com/2075-5309/14/11/3408>)
- Smelíková, E., et al. (2025). Bacterial contamination in public transport during COVID-19. *Journal of Transport & Health*, 39, 1017007. [ScienceDirect](#) (<https://www.sciencedirect.com/science/article/pii/S0147651324017007>)
- UK Department for Transport. (2024). Infection concern on public transport. [Government Report PDF](#) (<https://assets.publishing.service.gov.uk/media/66d96b632bc43c72b08264ac/infection-concern-on-public-transport.pdf>)