DNB311

ID 7: CAPSTONE

Puteri Nur Dahlia
Binti Samir Muhzzab



RESEARCH REPORT

ACKNOWLEDGEMENTS

Authenticity Statement

I confirm that, to the best of my knowledge, this report represents my own original work and has not been previously submitted for this or any other subject or purpose. I declare that the intellectual content contained within is a result of my own effort, and that any assistance received or sources drawn upon in its preparation have been fully acknowledged.

AI Use Statement

AI tools were used throughout the development of this project to support research and improve the clarity and flow of the writing. Claude AI helped summarise relevant academic sources cited in the Background section, assisted with language translation where needed, and refined sentence structure to strengthen cohesion across the document. Every AI-generated suggestion was critically reviewed before being included: summarised content was checked against the original sources for accuracy, translated or rephrased passages were confirmed to still reflect my intended meaning, and refined sentences were edited to match my own voice and the requirements of this assignment. All final wording and content decisions throughout this document remain my own.

Total Report Word Count: 4003 words (Excluding graphic, tables, figures, references and appendices)

EXECUTIVE SUMMARY

This design research project aimed to address a persistent gap in seating design which is the lack of genuine postural support for people who study or work from their bed or floor in compact living spaces. While this behavior is widespread, most seating hardware still assumes a conventional desk and chair setup, overlooking the specific postural and spatial needs of low-level, floor-based sitting. This study employed a comprehensive approach, drawing on a literature review and product benchmarking alongside primary research, including 60-respondent surveys and interviews with physiotherapists and dorm-room students. Through statistical and thematic analysis, findings revealed that unsupported low-level sitting frequently causes discomfort extending beyond the lower back into the neck and shoulders, with current coping strategies remaining entirely improvised. The research also uncovered a strong preference for compact, foldable design suited to deliberate, short-session use. Collectively, findings point towards an opportunity for a lightweight, non-electronic seating solution combining research-informed lumbar support with an integrated work surface, addressing a gap the current market leaves open.

TABLE OF CONTENTS

00

Acknowledgements 2
Executive Summary 3

01

Part One

1.1 Introduction..... 5
1.2 Project Structure..... 6
1.3 Background..... 7
1.4 Benchmarking..... 8

02

Part Two

2.1 Primary Research 11
2.2 Methodology 11
2.3 Methods - Survey 13
2.4 Methods - Interview 14
2.5 Analysis & Findings of Survey 15
2.6 Analysis & Findings of Interview ... 17

03

Part Three

3.1 Discussion 19
3.2 Design Implications 20
3.3 Conclusion 21

END

References 23

01



PART ONE

1.1 Introduction
1.2 Project Structure
1.3 Background
1.4 Benchmarking

PART ONE

1.1 Introduction

Working and studying from bed or the floor has become an everyday habit for many people, particularly those in compact living situations such as students in shared housing, dorm rooms or small apartments where a dedicated desk set up isn't always available. It's convenient and comfortable in the moment but it comes at a cost as most people fall into cross-legged, slumped or otherwise unsupported postures for extended periods, often while balancing a laptop or notebook on their lap with no seating designed to support them properly in that context.

Existing solutions largely miss this problem. Bed trays and laptops stand, address surface stability, not posture and are typically separate objects that must be positioned and repositioned alongside whatever the user is already sitting on. Standard ergonomic chairs assume a desk and chair setup that doesn't exist in these compact, low-level living situations. The advice most commonly given is to "simply stop working from bed" which ignores why the behaviour persists in the first place as limited space, comfort and convenience aren't going away.

The aim of this design is to **explore how seating design can provide meaningful postural support for low-level sitting with a particular focus on the lumbar spine as the key driver of posture through the rest of the body, alongside an integrated work surface suited to studying or laptop use in this position.** Rather than working against this common behaviour, this design intends to reimagine how to produce a lightweight, non-electronic, portable seating solution suited to compact living environments.



Objectives

1. Investigate the postural and health impacts of prolonged low-level (bed/floor) sitting, particularly on lumbar spine alignment and its direct effect on trunk and neck posture.

2. Identifying gaps in existing seating solutions for people who work or study from bed or the floor in compact living spaces, where current products address surface stability or comfort alone, but not postural support.

3. Investigate the postural and health impacts of prolonged low-level (bed/floor) sitting, particularly on lumbar spine alignment and its direct effect on trunk and neck posture.

4. Identifying gaps in existing seating solutions for people who work or study from bed or the floor in compact living spaces, where current products address surface stability or comfort alone, but not postural support.

PROJECT STRUCTURE

Academic Research

- Reviewing existing literature to define the problem area

Product Benchmarking

- Highlighting gaps within the current market

Primary Research

- A survey alongside four interviews representing both end users and field experts

Analysis & Findings

- Addressing identified gaps by analysing primary data through thematic coding and visual representation

Discussion

- Exploring design implications and key problem areas

Opportunities

- Pinpointing opportunities where design can intervene

1.2 Background

Floor and low-level seating has long been prevalent across many cultures, particularly throughout Asia, where sitting directly on the floor or very low furniture is deeply embedded practice rather than compromise (Min et al., 2024, p. 1). Despite this, ergonomics and posture research has historically focused on Western, chair-based sitting, leaving floor-seated posture comparatively under-examined.

This cultural familiarity increasingly intersects with a separate pressure which is shrinking living space in dense urban environments. In Hong Kong, micro-flats under 40 square metres more than doubled between 2012 and 2016, driven by land scarcity and rising property costs (Wong, 2018, p. 1159). Similar dynamics are emerging globally, with a 2025 study across major U.S. cities finding micro-housing increasingly shaped by remote work, as reduced demand for home offices makes compact, multi-functional living more viable (Wang et al., 2025, p. 1). Students and young occupants are consistently overrepresented among residents of the smallest housing typologies.

HKG

Hong Kong's 7% residential land zoning and 200–300 sq ft nano flats.

Figure 1. Hong Kong Residential Land Statistic

JPN

Tokyo's 1.4 million households under 19.7m², the 75–90% study-in-bed statistic.

Figure 2. Japan Household Statistic

This compression has direct consequences for how people study at home. With little room for a desk setup, students frequently default to their bed or floor, a pattern driven primarily by comfort and convenience (Eman et al., 2026, p. 7411). Where this intersects with existing floor-seating culture, it is further normalised rather than treated as an anomaly.

However, prolonged low-level sitting carries a measurable cost. Watanabe et al. (2010) found trunk muscle co-contraction helps maintain spinal curvature during cross-legged sitting, suggesting the body compensates for the absence of support through active muscular effort. This is challenged by Min et al. (2024, pp. 3–4), who found this compensation comes at a cost as maintaining a lordotic lower back during floor sitting still produced measurable balance loss, muscle fatigue, and discomfort over longer sessions. This positions the lumbar spine as the critical point of failure in unsupported low-level sitting.

Literature on lumbar support design also reveals disagreement. Harrison et al. (1998) found people vary widely in preferred lumbar support height and depth, arguing a single fixed-height support cannot suit everyone. A more recent study instead lets the pelvis rotate forward through a flexible seat pan, improving hip and lumbar angles by up to 15.3° compared to a fixed seat (Park et al., 2025, p. 1). A third perspective comes from Kuster et al. (2020), who found a dynamic chair encouraging active movement produced a distinct pattern of lumbar muscle engagement, suggesting even well-fitted static support may protect the spine less than one that keeps muscles actively working. Collectively, these studies suggest genuine lumbar support may need dynamic, movement-responsive engagement rather than a single fixed shape, a possibility the current market has yet to explore.

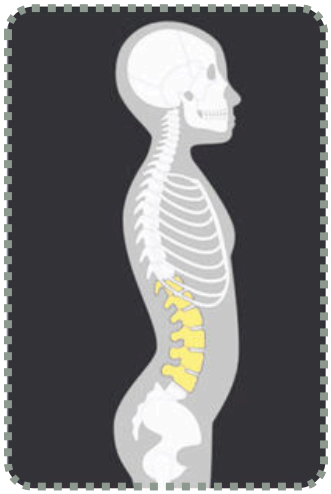


Figure 3.Human spine with lordosis lower back

1.3 Benchmarking

The quality of a new design is best understood in relation to what already exists in the market. Benchmarking involves evaluating a product against other successful products within the same market, pinpointing where it falls short and applying those insights to drive improvements in performance and competitive standing (Erlhoff & Marshall, 2007, p. 44). Given the range of products available, this section narrows its focus to two distinct categories which is low-level seating (Table 1) and chairs with integrated table (Table 2), evaluated separately since they represent different segments of the current market. The following benchmarking outlines both the methodology and findings used to evaluate 11 across these two categories, scored against five shared criteria: lumbar support, adjustability, portability and price.

	Product	Lumbar Support	Adjustability	Portability	Price	Overall
	VEVOR Asjustable Floor Chair	2	5	4	5	16
	Giantex Floor Chair	2	5	3	5	14
	Muji Floor Chair	2	5	4	4	14
	Ungloo Meditation Box Chair	4	1	5	2	12
	Acipenser Swivel Chair	2	2	4	3	11
	Tatamiza	5	1	1	1	8

Table 1. Benchmarked floor-seating products scored against 4 criteria (Refer to Appendix for a full analysis and benchmarking criteria information)

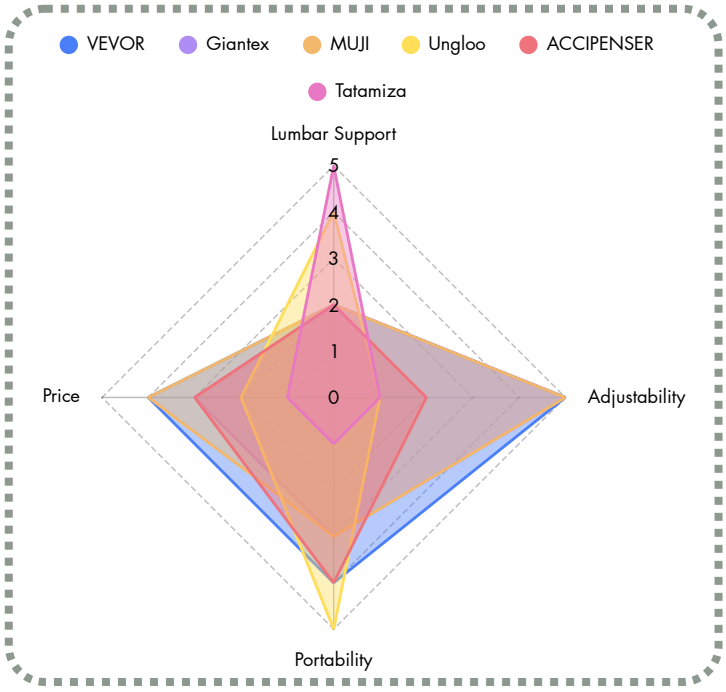


Figure 4. Radar graph of benchmarking table 1.

Table 1 compares six products against the criteria most relevant to this project. VEVOR (16/20) scored highest overall, excelling in adjustability and price as an affordable, high-adjustable folding chair, closely followed by Giantex and Muji (17/20), both similarly strong on adjustability but limited by unsubstantiated lumbar support. Ungloo (12/20) stood out for portability, fully collapsing for storage but its fixed meditation posture limits adjustability. ACIPENSER (11/20) offered portability but has a low profile across all other criteria. Tatamiza scored lowest overall (8/20) despite being the only product with genuinely research-informed lumbar support, since it sacrifices adjustability, portability and affordability to achieve it.

This trade-off is clearly visualisd in the radar graph (Figure 4), where Tatamiza's shape stretches furthest on lumbar support but collapses inward on every other axis, in direct contract to VEVOR's more balanced, evenly-spread scale.

	Product	Lumbar Support	Adjustability	Portability	Price	Overall
	Oztent Gecko Chair with Side Table	2	5	4	2	13
	Enea Tray Chair	2	5	3	2	12
	Measured Anyhow Lounge Chair with Table	2	5	3	1	11
	COZONI Jasper Training Chair	4	1	5	2	12
	Zoom Tablet Folding Chair	2	2	4	3	11

Table 2. Benchmarked floor-seating products scored against 4 criteria (Refer to Appendix for a full analysis and benchmarking criteria information)

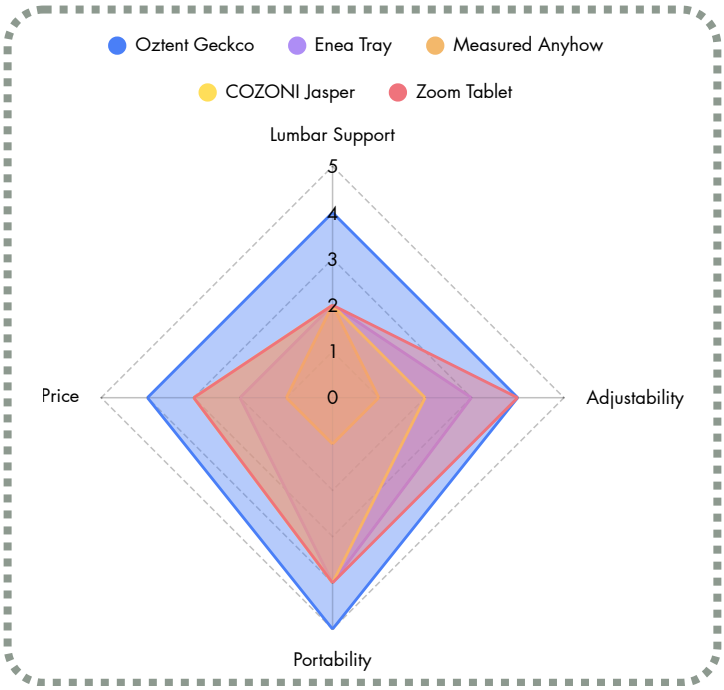


Figure 5. Radar graph of benchmarking table 2.

Table 2 examined five chairs with an attached table and notably, Oztent Gecko scored highest (13/20) due to its strong portability and adjustable table. This proves that this combination of features is achievable in principle. The remaining four products offered functional tables but only generic, non-lumbar-specified back support with the Measured Anyhow chair scoring lowest overall (11/20) due to its fixed, non-portable premium design-object positioning.

Reviewing both tables together reveals a consistent compounding gap. First genuine lumbar support, strong adjustability and portability rarely coexist within a single product.

This benchmarking reveals a critical finding as none of the low-level seating products offers an integrated table, while everyday product that does offer an attached table is designed for standard chair height. This confirms that chair-and-table integration is a well established idea in standard seating, yet remains unexplored for low-level seating use.

Market Summary

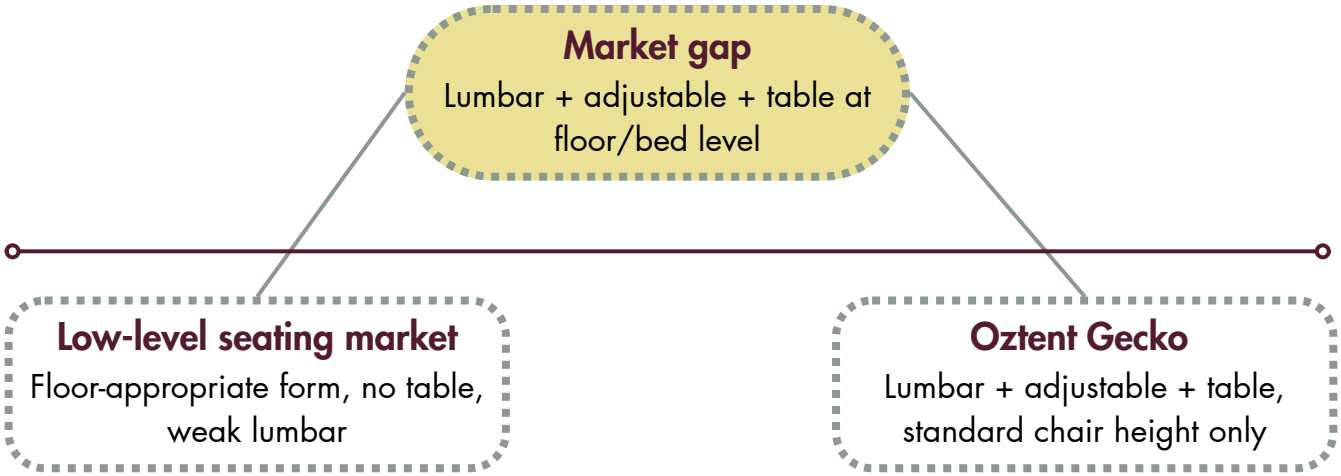


Figure 6. Market Gap Graph

Figure 6 highlights a clear opportunity as none of the existing products combines research-informed lumbar support, real adjustability and integrated work surface and floor/bed low-level seating applicability in a single, affordable and portable design. Existing solutions solve individual pieces of this problem well. For example, Oztent Gecko demonstrates that lumbar engineering and portability can coexist, while the low-level seating market shows that floor appropriate form factors are achievable but none of the products benchmarked brings these elements together for the specific context of prolonged, bed or floor based study in compact student living spaces. This gap directly supports and justifies the direction developed in this project by designing a lightweight, non-electronic seating solution that united postural support and a dedicated work surface at floor or bed level seating, addressing a gap the current market leaves entirely open.

02



PART TWO

1.1 Primary Research Overview
1.2 Methodology
1.3 Methods - Surveys
1.4 Methods - Interviews
1.5 Analysis & Findings - Surveys
1.6 Analysis & Findings - Interviews

PART TWO

2.1 Primary Reserach

Design decisions grounded in existing literature alone risk missing how problems are actually experienced by real people in their own environments. Primary research addresses this by generating original insights directly from the people a design is intended for, surfacing habits and workarounds that secondary sources often won't be able to capture in enough detail (George, 2023). For this project, that means going beyond the posture and ergonomics literature reviewed in the Background section to understand, directly from current bed-and-floor based sitters and how the problem shows up in everyday practices.

2.2 Methodology

When a research is conducted methodology guides how a project investigates its problem by identifying the reason behind why particular research approaches are chosen rather than the specific tools used to carry them out. Establishing a clear methodology ensures the research collected is appropriate to the problem being studied and produces findings that genuinely support the design decisions that follow. Central to this is the principle of triangulation (Figure 6), a technique used in mixed-methods research to increase the validity and

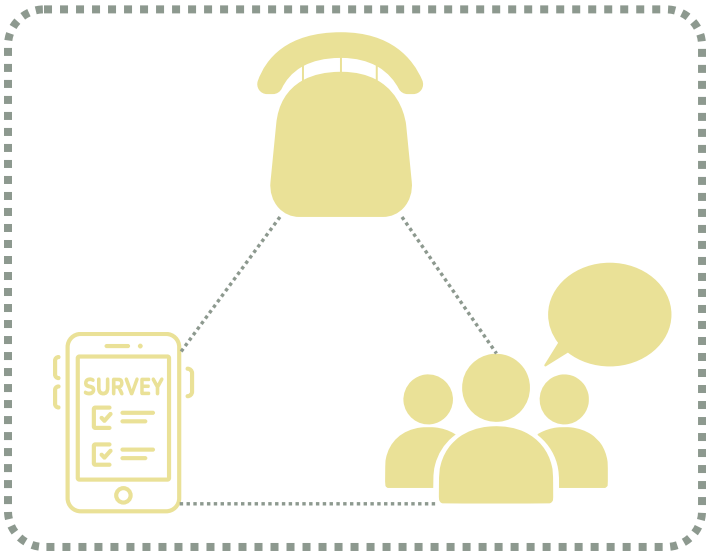


Figure 7.. Triangulation method used in mixed-methods research

reliability of findings by combining multiple data sources or methods (Turner et al., 2017, p. 1). Rather than relying solely on a single method, triangulation allows broad behavioural patterns to be cross-checked against individual lived experience, strengthening confidence that a finding reflects a genuine, widespread issue rather than an isolated result (Moon, 2019).

This design project adopts a mixed-methods approach, combining quantitative and qualitative research to develop a thorough understanding (Mertens, 2023, p. 11) of low-level (bed/floor) sitting behaviour and its associated postural and functional challenges. A survey was used to establish behavioural patterns at scale, while semi-structured interviews provided depth, capturing individual reasoning, lived experience and pain points that quantitative data alone could not surface. Where findings from both methods point to the same conclusions. For example, if survey respondents consistently report lower back discomfort and interview participants independently describe the same issue in their own words, hence this convergence increases confidence in the finding validity.

Research Design

Survey

- Survey designed on Google Forms, with participants confidentiality maintained throughout
- Shared via social media (Instagram and Whatsapp), and student groups to reach the target demographic

Interview

- A semi-structure question guide was prepared in advance to balance consistency with flexibility
- Four participants were recruited, representing both end users and subject-matter expertise
- Sessions were carried out over video or audio call and recorded for accuracy
- Transcripts were produced from each recording to support analysis

Data Analysis

- Quantitative and qualitative findings were examined separately, then brought together to identify overlapping patterns
- Statistical analysis was used to interpret survey response
- Thematic coding was applied to interview and open-ended data to surface reaccuring patterns and meaning

2.3 Methods Survey Design

A survey is a research tool used to gather standardized responses from a sample of participants, allowing behaviours, opinions or experiences to be measured and compared across a larger group than interviewers alone could reach (Ponto, 2015, p. 3). By reaching more respondents, surveys make it possible to identify how widespread a behaviour or issue is, rather than relying on a small number of individual accounts.

Whether people respond honestly often depends on how relevant they find the topic to their own life. This is known as leverage-saliency theory that holds participation increases when a respondent recognises a clear, personal connection to the subject matter (Groves et al., 2000, p. 306). This principle guided the survey's construction as the early questions immediately establish whether the respondent actually studies or works from bed or floor, filtering in only those with direct relevance and the wording throughout avoids clinical or overly formal phrasing in favor of languages closer to how people naturally describe their own habits. Acting on that relevance also meant the survey couldn't rely simply on binary responses.

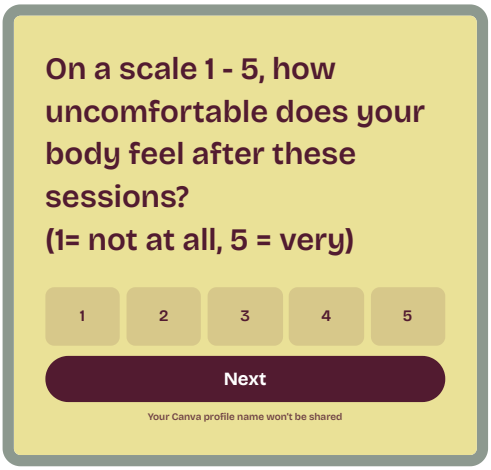


Figure 8. Example of likert scale survey question

It used a mix of multiple choice and Likert-scale items (Figure 8), paired with optional short-answer questions reflecting the broader idea that effective survey designs (Mette Lise & Jones, 2019, p. 25) draws on both quantifiable measurements and space for individual nuance. These closed formats were designed to produce standardised, directly comparable data across respondents, making it possible to calculate clear percentage breakdowns and identify patterns across the sample as a whole which open-ended responses alone cannot easily support (Zamokuhle Mbandlwa & Wellington Zondi, 2026, p. 2).

Alongside this, one open-ended question ("Why do you choose to study/work from bed or the floor rather than a desk?") was included to capture qualitative insight into personal reasoning and motivation, allowing respondents to express context-specific factors that a closed-question format might otherwise miss or oversimplify. This combination produced data that could be compared consistently across respondents, while still leaving room to capture some individual reasoning ahead of the deeper exploration planned through the interviews.

While the survey provided useful behavioural data, several limitations affect how far these findings can be generalised. Recruitment through social media networks and universities skewed the sample toward younger, digitally engaged participants, while voluntary participation may have overstated the issue's severity through self-selection bias. The sample also remains too small to claim statistical representativeness, and relies on participants' own perception rather than observed posture or behaviour. Finally , while the survey reveals clear patterns, it cannot fully explain the reasoning behind them. Hence, this gap will be addressed through the interview session.

2.4 Methods Interview Design



Figure 9. Interviewees

A semi structured interview is a qualitative data collection method that uses a set of prepared questions as a guide, while allowing flexibility to probe, follow up, or explore unexpected points a participant raises, by combining the consistency of structured approach with the depth of open conversation (Kallio et al., 2016, p. 2955). Rigorous development of the interview guide itself matters, since a well structured guide directly improves the trustworthiness and depth of the resulting data (Kallio et al., 2016, p. 2956).

This method was chosen specifically to complement the survey. Where the survey captured how common and severe posture discomfort was across a broader sample, interviews were used to understand the reasoning, habits and context behind those numbers that closed-ended questions cannot surface. Participants were selected using purposive sampling, a method used to identify "information-rich cases" who can provide insight directly relevant to the phenomenon being studied, rather than a random or representative sample (Palinkas et al., 2015, p. 533). This approach is appropriate when participants must possess specific qualities or experience relevant to the research question(Etikan et al., 2016). On this basis, four semi-structured interviews were conducted (Figure 9), two physiotherapist selected for their clinical expertise in lumbar spine mechanics and effective postural support, and two with students living in dorm rooms, selected for their direct lived experience studying or working from bed or the floor within a compact living space.

Two separate interview guides were developed to reflect these distinct participant groups. The physiotherapist guide progressed from general questions on lumbar spine mechanics under prolonged, unsupported low-level sitting, towards more specific questions on what genuine lumbar support requires and how it should be prioritised in a seating design. The dorm-student guide progressed from establishing their room layout seating design. The dorm-student guide progressed from establishing their room layout and space constraints, into their reaction to the concept of dedicated seating and work-surface solution. This structure allowed each interview to build naturally from context toward more specific, design relevant insight, while leaving room to follow up on anything unexpected a participant raised.

2.5 Analysis & Findings of Survey

Quantitative data collected from 60 survey responses was analysed statistically to identify percentage-based patterns in behaviour, posture and discomfort, while the single open-ended question was analysed thematically to understand the reasoning behind these patterns.

Statistical Analysis

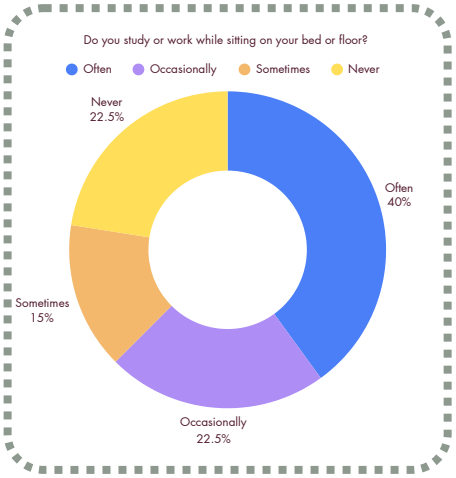


Figure 10. Q3 survey data represented in a pie chart

The survey confirmed that studying or working from bed/floor is a widespread behavior (Figure 10) as 40% respondents reported doing it “Often”, a further 22.5% "Occasionally", and 15% “Sometimes”, meaning the large majority engage in this behaviour to some degree. Session duration (Figure 11) skewed towards shorter sittings, with 35% spending under 30 minutes and 305 spending 30-60 minutes, though a notable 22.5% reported sessions of 2 or more hours. Cross legged (Figure 12) sitting was the most common position (52.5%), followed closely by legs extended (50%) and lying down (45%), with many respondents selecting more than one position per session.

A critical finding is the prevalence of self-rated discomfort, with an average rating of 3.5/5 across the sample (Figure 13). Discomfort (Figure 14) was reported almost equally in the lower back and neck (35% each), suggesting that while lumbar strain is the primary concern, postural issues extend beyond the lower back alone. Current coping strategies were almost entirely improvised as 75% of respondents used pillows (Figure 15) for support, while only 10% used any form of dedicated bed tray or laptop stand, with 42.5% instead balancing their laptop directly on their lap (Figure 16). Interest in the proposed concept was strong with 72.5% responding “Yes” and further 22.5% answered “Maybe” (Figure 17).

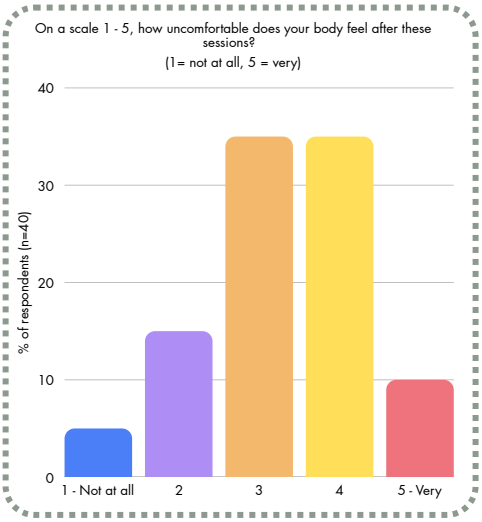


Figure 13. Q5 Likert-scale data represented in a bar chart

Thematic Analysis

Thematic analysis was conducted by grouping responses and identifying underlying patterns within them, in order to determine the most prevalent themes across participant answers.

Responses to the open-ended question (“Why do you choose to study/work from the bed or floor rather than a desk?”) were grouped into themes to understand respondents’ underlying motivations.

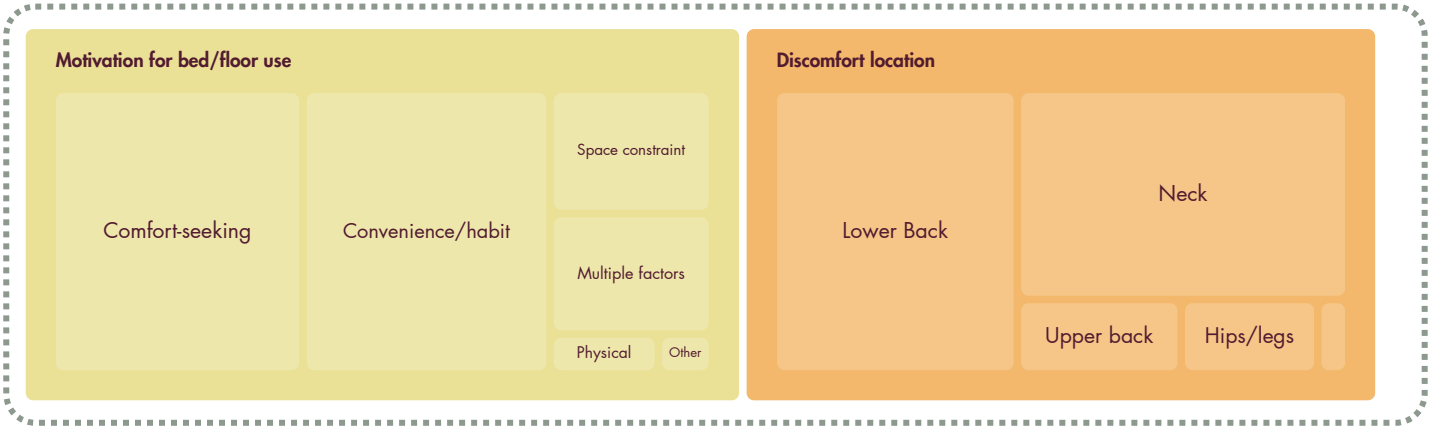


Figure 18. Treemap of survey data in a thematic analysis

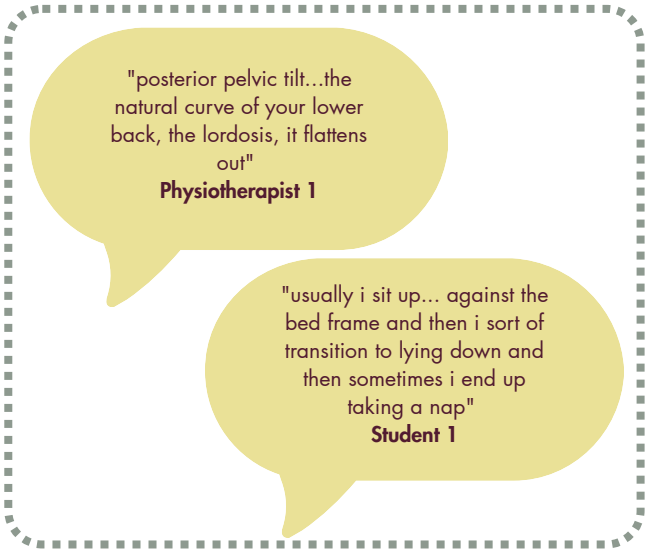
Two themes (Figure 18) dominated equally which are, comfort-seeking (35%), captured in responses (Figure 17) such as “more comfortable” and “lazy to get up” and convenience/habit (35%), reflected in the frequently repeated single-word responses "convenience" and “habit”. A smaller but notable theme was space constraints, with (10%) of respondents directly citing “no desk space available” which is a direct evidence connecting this behavior to compact-living context central to this project. A further 10% cited multiple combined factors (“all the above”), suggesting that for some respondents, no single reason fully explains the behavior. A small number of respondents noted needing to lie down specifically “because of back pain”, directly reinforcing the postural strain identified in the statistical finding.

2.6 Analysis & Findings of Interview

Interview data was similarly analysed using thematic coding, allowing patterns of meaning to be identified across multiple participants while preserving the depth and nuance of individual responses (Ayre & McCaffery, 2022, p. 3). Rather than treating each interview in isolation, quotes from both participant groups (physiotherapist and dorm-room students) were grouped where they spoke to the same underlying concern, allowing points of alignment and divergence between physiotherapist expertise and student lived experience to be identified directly.

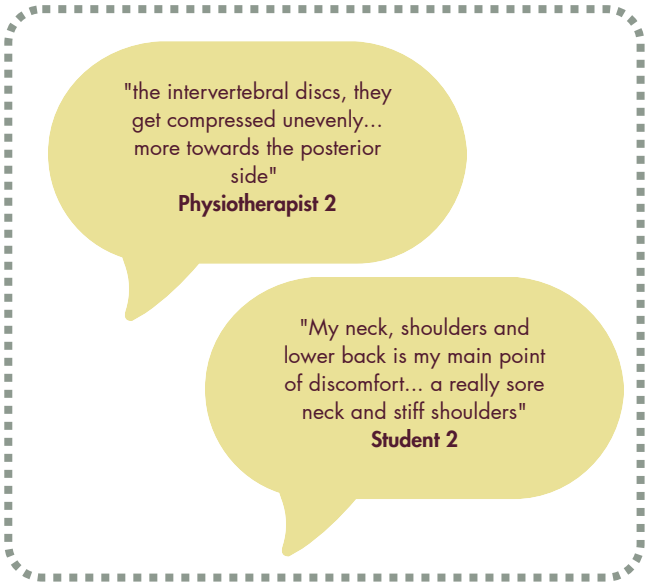
Theme 1: Postural compensation mechanism

The physiotherapist explained that unsupported low-level sitting causes posterior pelvic tilt and loss of the lumbar curve, shifting load onto muscles under sustained, static loading, progressing from fatigue to structural strain with repeated exposure. Both students independently described this compensation as a lived experience, reporting a drift from an upright position into increasingly unsupported postures as sessions extended beyond an hour or more. Together, these accounts connect the clinical mechanism to its real, observable behavioural pattern.



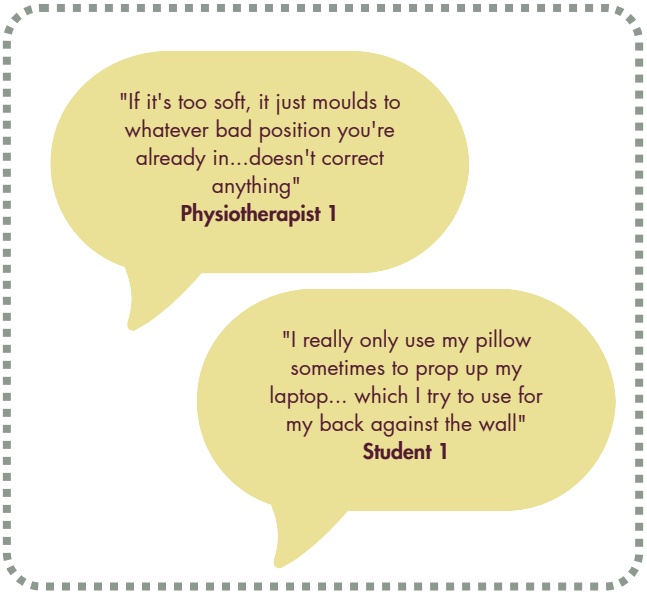
Theme 2: Comfort does not mean genuine support

The physiotherapist's explanation focused on lumbar and disc mechanics as the primary driver of discomfort during unsupported sitting. However, both students reported discomfort extending well beyond the lower back, independently citing neck and shoulder strain from looking down at a screen for extended periods. This divergence suggests cervical posture may warrant equal design consideration alongside lumbar support, and is a specific gap worth probing directly in further physiotherapist consultation.



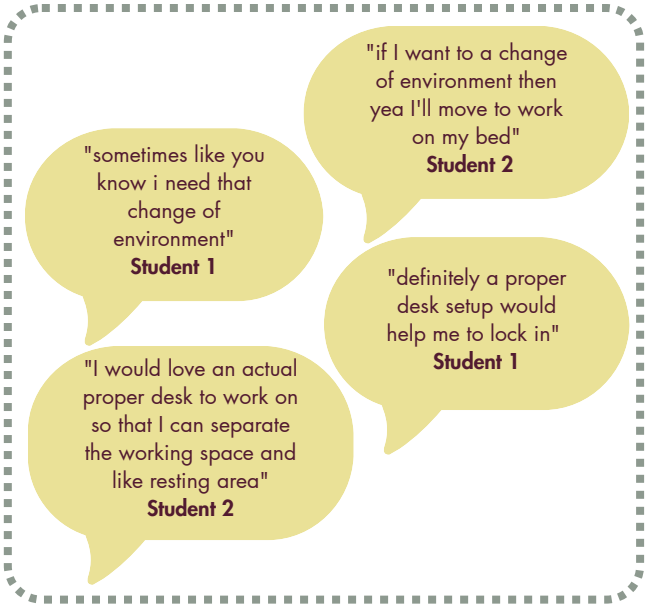
Theme 3: Stability and cushioning trade-offs

The physiotherapist identified a counter-intuitive finding as excessive soft padding reduces proprioceptive feedback and destabilises rather than supports, requiring more muscular correction rather than less. Neither student raised this point independently, which is unsurprising given cushioning mechanics require specialised knowledge to articulate rather than being something felt and named directly. This theme illustrates precisely why expert consultation is necessary alongside end-user interviews, since some design-relevant insights are not accessible through lived experience.



Theme 4: Motivation for bed/floor use as deliberate choice

Both students independently said "change of environment" to describe moving to their bed or floor, suggesting this is a genuine, recurring motivation rather than coincidence. Both also expressed a preference for a proper desk as their primary "lock in" space, with bed/floor use functioning as an intentional, occasional break rather than a full replacement. This has a direct design implication as the product should support short, deliberate sessions of low-level seating, not be built only full-time, all-day use.



Research Summary

Overall, the findings show that prolonged, unsupported bed- or floor-based sitting is common, driven mainly by comfort, convenience, and limited space, and genuinely uncomfortable for most who do it. Physiotherapists indicated loss of lumbar curve as the underlying cause of fatigue and strain, while students' data confirms this discomfort extends beyond the lower back to the neck and shoulders. Current coping is entirely improvised, with no product addressing support or workspace integration, and both students described bed/floor use as a deliberate, short-term "change of environment" rather than a full desk replacement. These findings validate the problem and directly shape the design priorities that follow.

03



PART THREE

3.1 Discussion
3.2 Design Implications
3.3 Conclusion

PART THREE

3.1 Discussion

The overall research analysis and findings revealed a consistent and compounding gap as there is no existing product that combines evidence-based lumbar support, adjustability and integrated work surface for floor/bed level use despite this being a widespread, well-evidenced behaviour. Both the literature review and benchmarking findings converge on this same conclusion , while primary research confirms it is not merely a market oversight, but genuine, felt problem for the target user group.

1 Floor-level posture remains a research and design blind spot.

Overall, the findings show that prolonged, unsupported bed- or floor-based sitting is common, driven mainly by comfort, convenience, and limited space, and genuinely uncomfortable for most who do it. Physiotherapists indicated loss of lumbar curve as the underlying cause of fatigue and strain, while students' data confirms this discomfort extends beyond the lower back to the neck and shoulders. Current coping is entirely improvised, with no product addressing support or workspace integration, and both students described bed/floor use as a deliberate, short-term "change of environment" rather than a full desk replacement. These findings validate the problem and directly shape the design priorities that follow.

2 Discomfort extends beyond the lumbar spine, adding new nuance to the identified gap.

While this project's design focus centred on lumbar support, both survey and interview findings revealed discomfort split almost equally between the lower back and neck (35% each, mentioned in section 2.5), with both interviewed students independently citing neck and shoulder strain. This aligns with, and extends Nilmart et al. (2026, p. 2) RULA-based finding that floor sitting produces cervical as well as trunk misalignment. Where the literature primarily frames lumbar strain as the central concern, this project's primary research suggest cervical posture deserves comparable design attention. A detail that existing literature and benchmarked products largely overlook.

3 Bed/floor use is a deliberate, recurring behaviour, not a problem to be corrected.

Existing guidance (Carter, as cited in Caldwell, 2018) treats bed-based study primarily as a sleep-hygiene issue to be discouraged. However, both interviewed students independently described switching to their bed or floor as deliberate "change of environment", while still preferring a desk as their primary base. This reframes the design problem, rather than replacing desk use the product must support short, intentional sessions within a compact, foldable form. A distinction this project's primary research brings to light, one that the existing literature overlooks by focusing solely on discouraging the behaviour altogether.

3.2 Design Implications

Following the analysis of this project's findings, several direct implications emerge for the design of a posture-supportive, low-level seating solution for bed/floor use in compact living spaces. This section identifies opportunities that move away from generic "comfort" furniture toward a design genuinely grounded in postural evidence, functional need and the practical realities of a small, shared living environment.

Research-Informed Lumbar Geometry

A central opportunity lies in designing lumbar support based on actual spinal mechanics, rather than the vague marketing language seen throughout the benchmarked market. Findings from both the literature and physiotherapist consultation point to a specific requirement which is support positioned at the natural lumbar curve, firm enough to resist deformation under sustained load, rather than soft padding that merely cushions poor posture without correcting it.

Firmness Over Excess Cushioning

Closely related, this project;s research surfaces a counter-intuitive but well-evidenced opportunity such as firmness should be prioritised over thickness. Both literature and expert consultation indicated that excessive soft padding reduces stability and increase muscular correction rather than reducing it, suggesting the design should favour structured, supportive materials over plush comfort as the primary comfort strategy.

Genuinely Integrated Work Surface

Benchmarking revealed that no existing low-level seating product offers an integrated table, while products that do combine seating and a work surface are built for standard chair height. This presents a clear opportunity to design a table as a core structural element of the seating itself, rather than a separate or clip-on accessory, directly addressing the improvised lap-based laptop use reported by the majority of survey respondents.

Compact, Genuinely Portable Form

Interview and survey data consistently linked purchasing hesitation to storage concern in small, shared lived spaces. This presents an opportunity for a design that folds flat or compactly, prioritising a low stored footprint over structural permanence, so the product does not become clutter in an already space-constrained room.

Support for Deliberate, Short-Session Use

Rather than positioning the product as a full desk replacement, interview findings suggest it should support short, intentional sessions, since participants describe switching to bed or floor seating as a deliberate change of environment rather than a permanent habit. This reframes the design brief towards flexible, easy-to-use furniture suited to occasional rather than continuous use.

3.3 Conclusion

The gaps surfaced throughout this research highlight clear opportunities for design innovation in floor and bed base seating for compact living spaces. Findings from the survey, interviews and benchmarking demonstrate that while affordable, adjustable products exist and premium-lumbar engineered solutions also exist, non-combined genuine postural support, adjustability and an integrated work surface within a single accessible product. This research does more than confirm the problem is widespread and genuinely felt. It also uncovers specific, actionable opportunities such as cervical posture and deliberate short-session use, that a literature-only approach would have missed. For this project, the research process shows why design decisions need to be grounded in both lived experience and clinical understanding, not assumption to genuinely serve users. With this foundation in place, the project can move into design development with a clear, evidence-based direction.

References

Ayre, J., & McCaffery, K. J. (2022). Research note: Thematic analysis in qualitative research. Journal of Physiotherapy, 68(1), 76–79. https://doi.org/10.1016/j.jphys.2021.11.002

Caldwell, E. (2018, November 13). Sleep in bed, don't study in it. The Daily Texan. https://thedailytexan.com/2018/11/13/sleep-in-bed-dont-study-in-it/

Eman, L., Mustafa, M., & Anjum, O. (2026). Prevalence of habitual studying in bed and its association with perceived musculoskeletal discomfort among university students: A cross-sectional study. The Critical Review of Social Sciences Studies, 4(1), 7411–7420. https://doi.org/10.59075/2hq8km97

Erlhoff, M., & Marshall, T. (2007). Design dictionary. Walter de Gruyter.
Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4. https://doi.org/10.3898/17586431681885524 8

George, T. (2023). Primary research | definition, types, & examples. In Scribbr. https://www.scribbr.com/methodology/primary-research/

Groves, R. M., Singer, E., & Corning, A. (2000). Leverage-saliency theory of survey participation. Public Opinion Quarterly, 64(3), 299–308. https://doi.org/10.1086/317990

Kallio, H., Pietilä, A.-M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. Journal of Advanced Nursing, 72(12), 2954–2965. https://doi.org/https://doi.org/10.1111/jan.13031

Mertens, D. M. (2023). Mixed methods research. Bloomsbury Publishing.
Mette Lise, B., & Jones, J. E. (2019). Applied Social Science approaches to mixed methods research. IGI Global.

Min, S. N., Subramaniyam, M., Parnianpour, M., & Kim, D. J. (2024). Postural and spinal stability analysis for different floor sitting styles. Heliyon, 10(17), e37379. https://doi.org/10.1016/j.heliyon.2024.e37379

Moon, M. D. (2019). Triangulation: A method to increase validity, reliability, and legitimation in clinical research. Journal of Emergency Nursing, 45(1), 103–105. https://doi.org/10.1016/j.jen.2018.11.004

References

Nilmart, P., Yodchaisarn, W., Vajidee, N., Tansakul, N., Sramongkhol, W., & Leangsakul, S. (2026). Immediate effects of sitting position on cervical and trunk posture, perceived discomfort, and RULA-based ergonomic risk during smartphone gaming: A randomized within-subject study. PLOS One, 21(7), e0354360. https://doi.org/10.1371/journal.pone.0354360

Palinkas, L., Horwitz, S., Green, C., Wisdom, J., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. Administration and Policy in Mental Health and Mental Health Services Research, 42(5), 533–544. https://doi.org/10.1007/s10488-013-0528-y

Park, S., Rho, J., Tak, Y., Lee, W., & Park, C. (2025). An ergonomic design and evaluation of a chair with a flexible seat pan for the maintenance of correct sitting posture. Applied Sciences, 15(23), 16. https://doi.org/10.3390/app152312714

Ponto, J. (2015). Understanding and evaluating survey research. Journal of the Advanced Practitioner in Oncology, 6(2), 168. https://pmc.ncbi.nlm.nih.gov/articles/PMC4601897/#A3
Tim Wong, L. (2018). Tiny affordable housing in Hong Kong. Indoor and Built Environment, 27(9), 1159–1161. https://doi.org/10.1177/1420326x18792159

Turner, S. F., Cardinal, L. B., & Burton, R. M. (2017). Research design for mixed methods: A triangulation-based framework and roadmap. Organizational Research Methods, 20(2), 243–267. https://doi.org/10.1177/1094428115610808

Wang, B., Seiler, M. J., Liu, K., & Du, J. (2025). Locational and spatial development patterns in U.S. urban micro housing. The Journal of Real Estate Finance and Economics, 1(3). https://doi.org/10.1007/s11146-025-10033-8

Watanabe, S., Kobara, K., Yoshimura, Y., Osaka, H., & Ishida, H. (2014). Influence of trunk muscle co-contraction on spinal curvature during sitting. Journal of Back and Musculoskeletal Rehabilitation, 27(1), 55–61. https://doi.org/10.3233/bmr-130419

Zamokuhle Mbandlwa, & Wellington Zondi, B. (2026). Innovative approaches to Social Research Challenges (pp. 1–16). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3373-6410-0.ch001