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## EXPLOREX: AN INNOVATIVE OUTDOOR CHAIR FOR ENHANCED COMFORT, SAFETY, AND PORTABILITY

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### ABSTRACT

For someone who love to explore the world with friends, having adventure journey with family and peers, equipped with useful gear will be a great aided tools for users to have some relaxation during camping. An often overlooked or forgotten piece of camping gear is a camp chair. It might not seem as important as a tent, sleeping bag, or sleeping pad, but having a camp chair can add to overall experience of sleeping outdoors. Hence, this project aim to develop a camp chair for outdoor seekers, named 'Explorex'. It is for those who intends to use the gear in multiple occasion related to outdoor activities such as camping, travelling, hiking and relaxing at the beach. It is designed through environmental preservation with nature concept to create nature-based sitting chair. Sustainability considerations were integrated throughout the design process, ensuring that the final product aligns with the United Nations Sustainable Development Goals (SDGs). Specifically, the project addressed SDG 9 (Industry, Innovation and Infrastructure) by promoting innovative yet feasible design solutions, SDG 11 (Sustainable Cities and Communities) by supporting environmentally responsible outdoor practices, and SDG 12 (Responsible Consumption and Production) by emphasising material efficiency, recyclability, and low-impact manufacturing. Explorex is developed through a comprehensive process involving background research, ideation, mock-up creation, and model development. These chairs are designed to be portable, durable, and easy to set up, making them essential for outdoor enthusiasts. They offer comfort and convenience across various settings e.g. for camping, festivals, or beach outings. Often overlooked, camp chairs enhance the outdoor experience by providing reliable seating, and Explorex fully embodies these versatile, user-centered qualities.

**Keywords:** *Camp chair, outdoor enthusiast, camping, adventure, Explorex*

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### PROJECT INTRODUCTION

This project aims to create an outdoor camping chair under the concept of 'Stay Wanderer', designed to seamlessly blend with nature and inspire the user's desire for exploration. The concept encourages users to keep exploring the world and discover its unknown corners by wandering through natural environments. This philosophy is also reflected in the chair's design, which emphasises versatility, allowing users to utilise it in a variety of outdoor settings.

The design draws inspiration from two key themes: vintage and classic, embodying the spirit of early 20th-century adventurers. Named 'Explorex' — a fusion of the words 'explore' and 'revive' — the chair targets those who seek the thrill of discovery while appreciating the timeless charm of vintage aesthetics. Influenced by the colours of nature and historic expeditions, Explorex features rich, warm tones such as rustic red, burnt orange, green, and white. These hues evoke the feel of old-world maps and aged leather, while weathered finishes lend the chair an authentic, antique appearance.

From a practical standpoint, Explorex is designed for convenience and functionality. It folds easily for transport and storage, includes straps for effortless carrying, features a padded headrest for added comfort, and has foldable legs that convert it into a low chair. This low seating position lowers the centre of gravity, enhancing stability even on rough or uneven terrain.

### PROJECT ISSUES

1. Many outdoor chairs sacrifice long-term comfort by prioritising compactness and lightweight features, often lacking essential ergonomic elements such as lumbar support and cushioning. (Fig.1)
2. Many chairs lack stability on uneven terrain, making them unsafe and difficult to use on slippery slopes or rocky ground.
3. Not many chairs are durable enough to withstand harsh outdoor conditions, and they often are not easy to set up or fold for convenient transport and storage. (Fig.2)

Thus, these issues need to be addressed to improve comfort, safety, durability, and usability in outdoor chair designs.



Figure 1: Rocky and uneven landscape

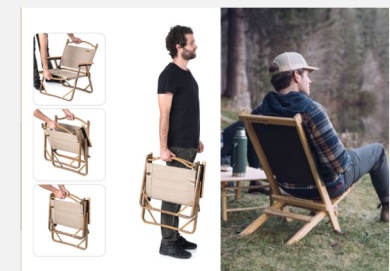


Figure 2: User choice of camp chair for outdoor setting

AIM AND OBJECTIVES

Consequently, this project aims to propose the development of an outdoor camping chair through environmental preservation and nature-based concept with the following objectives:

- 1. Study existing camp chair line-ups to identify design opportunities.
- 2. Analyse user behaviour to inform safety, comfort, and usability features.
- 3. Develop and design a camp chair model that meets identified needs and standards.

RESEARCH METHODS

The study employed a multi-stage approach to inform the development of the Explorex chair. First, a literature review was conducted to examine existing camping chair designs, ergonomic principles, and sustainability guidelines. This was followed by a market analysis to identify current trends, product strengths, and gaps within the camping chair segment. In parallel, observational studies were carried out to understand user behaviour, comfort preferences, and typical usage patterns in outdoor settings. Insights from these stages guided the design development, where ideation sketches and mock-up prototypes were created, tested, and refined to enhance usability, portability, and ergonomic comfort.

LITERATURE REVIEW

CAMP CHAIR DESIGN AND MARKET TRENDS

The outdoor gear market has seen continuous growth, with increased consumer demand for products that are lightweight, foldable, and durable (Outdoor Industry Report, 2021). Many current designs incorporate aluminum or carbon-fibre frames with weather-resistant fabrics, aiming for minimal weight and maximum portability (Brown, 2019). Ergonomic considerations such as lumbar support, seat height, and backrest angles have also become essential in enhancing prolonged sitting comfort in outdoor settings (Chen & Wu, 2022).




USER INTERACTION AND BEHAVIOR

Studies show that outdoor product usability is deeply influenced by the context of use, such as terrain type, weather, portability needs, and assembly time (Nguyen & Hassan, 2021). Users prefer designs that are intuitive, easy to carry, and adaptable to multiple settings like beaches, campsites, or festival grounds. Moreover, emotional attachment to gear that evokes a connection with nature or minimalist living is becoming a trend among younger outdoor enthusiasts (Kaur, 2020).




NATURE-INSPIRED AND BIOPHILIC DESIGN APPROACHES

Nature-based design—commonly referred to as biophilic design—emphasises aesthetics and functions that connect users with the natural world (Kellert, 2016). In the context of furniture, such elements can include organic shapes, earth-toned colours, and the use of natural or sustainable materials. Integrating such principles into the camp chair’s form can elevate the user’s sensory and psychological experience during outdoor activities (Tan & Ramli, 2018).

MECHANISM

Product	Name	Measurement	Material	Feature	Type
	Strongback low gravity chair	<ul style="list-style-type: none"><li>• 20"(Seat W) x 23.5"(D) x 24"(H)</li><li>• 136kg (weight cap)</li></ul>	<ul style="list-style-type: none"><li>• Heavy-duty polyester 600D tear and wear-resistant fabric</li><li>• Black powder-coated durable steel frame</li></ul>	<ul style="list-style-type: none"><li>• Installed beverage holder</li><li>• Upgrade cup holder straps and pocket</li><li>• Lumbar padding to align spine position</li><li>• Designed to reduce back pain</li><li>• Backpack – dual shoulder straps</li></ul>	<ul style="list-style-type: none"><li>• Low chair</li><li>• camping, travel, picnics and beach trips</li></ul>
	Big Agnes Big Six Armchair	<ul style="list-style-type: none"><li>• 40 x 24 x 26 in- Size</li><li>• 136kg (weight cap)</li><li>• 2.6 kg (item)</li></ul>	<ul style="list-style-type: none"><li>• Polyester</li></ul>	<ul style="list-style-type: none"><li>• backpacking Armchair with two built in cup holders</li><li>• Extra height and width for ultimate comfort</li><li>• Light weight and compact size</li></ul>	<ul style="list-style-type: none"><li>• Classic camp chair</li><li>• Perfect for camping , picnics, and outdoor events.</li></ul>
	Nemo stargaze auto reclining chair	<ul style="list-style-type: none"><li>• 136kg (weight cap)</li><li>• 100cm(H) x 98 cm w x 64 cm D</li><li>• 67 cm (H) x 17 cm (w) –Backpack</li></ul>	<ul style="list-style-type: none"><li>• Oxford cloth &amp; aluminum bracket</li></ul>	<ul style="list-style-type: none"><li>• Adjustable headrest</li><li>• Low leg (low center of gravity for stability)</li><li>• Mesh cup holder (no-spill cupholder)</li><li>• Reclining system (rocking mechanism)</li><li>• Sized stash pocket for phone or book</li><li>• Backpack -1 shoulder straps and snag straps</li></ul>	<ul style="list-style-type: none"><li>• Suspended chair</li><li>• Camping, Backpacker</li></ul>

SHAPE AND SIZE

Product	Name	Measurement	Material	Feature
	XGEAR Leisure Folding Camping Chair (Asteri)	<ul style="list-style-type: none"><li>• 56cm(D) x 59cm(W) x 106cm(H) (Size)</li><li>• 6.08 Kg (item)</li><li>• 136 Kg (weight cap)</li></ul>	<ul style="list-style-type: none"><li>• Alloy steel (frame)</li><li>• 600D Oxford fabric (cushion)</li></ul>	<ul style="list-style-type: none"><li>• Padded hard armrest and headrest.</li><li>• adjustable lumbar cushion – find comfortable position, adjust body position and waist comfort</li><li>• high back provide better support and comfort</li><li>• Portable carry bag</li><li>• Cupholder on armrest</li></ul>
	OZTENT MAWSON CHAIR BLACK & GREEN	<ul style="list-style-type: none"><li>• 150 kg (load cap.)</li><li>• 53 x 66 x 90cm</li></ul>	<ul style="list-style-type: none"><li>• 600D Polyester</li></ul>	<ul style="list-style-type: none"><li>• solid collapsible table</li><li>• portable cooler holding up to 16 cans</li><li>• Adjustable lumbar support system and ample padding</li><li>• Tough adjustable table with cup holder</li></ul>
	DUNE 4WD NOMAD II DELUXE XL CHAIR BLACK & GREY	<ul style="list-style-type: none"><li>• 120 kg (load cap.)</li><li>• 56 x 46 x 48/109 cm</li></ul>	<ul style="list-style-type: none"><li>• Material: 600D PVC &amp; Neoprene</li><li>• Frame: Powder Coated Steel</li><li>• Carry Bag: 600D PVC</li></ul>	<ul style="list-style-type: none"><li>• Cup &amp; wine glass holder, built into the armrest</li><li>• Fully padded seat and back</li><li>• 8 position reclining function</li><li>• Square frame for excellent stability</li><li>• Fold away side table and cooler included</li></ul>

STYLE AND INSPIRATION




Product	Name	Measurement	Material	Feature
	The Spanish chair	<ul style="list-style-type: none"><li>• Height: 67 cm</li><li>• Width : 82.5 cm</li><li>• Depth: 60cm</li><li>• Seat height :33cm</li><li>• Weight10.7kg</li></ul>	<ul style="list-style-type: none"><li>• Lounge chair of solid wood and saddle leather</li><li>• seat and back made in vegetable tanned saddle leather with metal buckles.</li></ul>	<ul style="list-style-type: none"><li>• Solid oak or walnut</li><li>• Highest calibre saddle leather creates a strong presence in a chair that will only become more beautiful with age.</li><li>• Designer : Borge Mogensen</li><li>• Design Year : 1958</li></ul>
	Danish Mid Century Folding Deck Chair	<ul style="list-style-type: none"><li>• 28.75"W x 21"D x 30.5"H</li><li>• Seat height :17.0 in</li></ul>	<ul style="list-style-type: none"><li>• Teak</li><li>• Colour : Black</li><li>• Item type : Vintage, antique</li></ul>	<ul style="list-style-type: none"><li>• Style : Danish modern</li><li>• Designer : Hans Wegner</li><li>• Period :1950s</li><li>• Have cupholder on both armrest</li><li>• foldable</li></ul>
	Roorkee Campaign chair	<ul style="list-style-type: none"><li>• Height: 33-35 inches (83-89cm)</li><li>• Width: 22-24 inches (56-61 cm)</li><li>• Depth ( 22-24 inches ( 56-61cm)</li><li>• Seat height: 16-18 inches (41-46 cm) from the ground</li></ul>	<ul style="list-style-type: none"><li>• Leather (3.5-4.0mm) double butt belt leather</li><li>• Color – black, brown, tan cognac</li><li>• Copper rivets</li></ul>	<ul style="list-style-type: none"><li>• Designer (Christopher Schwarz)</li><li>• Lightweight and ease of assembly</li><li>• Portability : can be foldable</li><li>• Simple construction : wooden as frame and canvas or leather as seat and backrest</li><li>• Timeless Design : The chair’s classic utilitarian design used as inspiration for modern furniture</li></ul>

Figure 3: Line-up study

LINE UP STUDY

Figure 3 reviews current camping chairs, highlighting features like cup holders, storage pockets, and lumbar support. Foldable and stable designs are common, with an ideal size of 35" H, 20" W, 22" D. These insights shape the Explorex chair—ergonomic, eco-friendly, and inspired by nature and minimalist outdoor style—designed for comfort and convenience on the go.



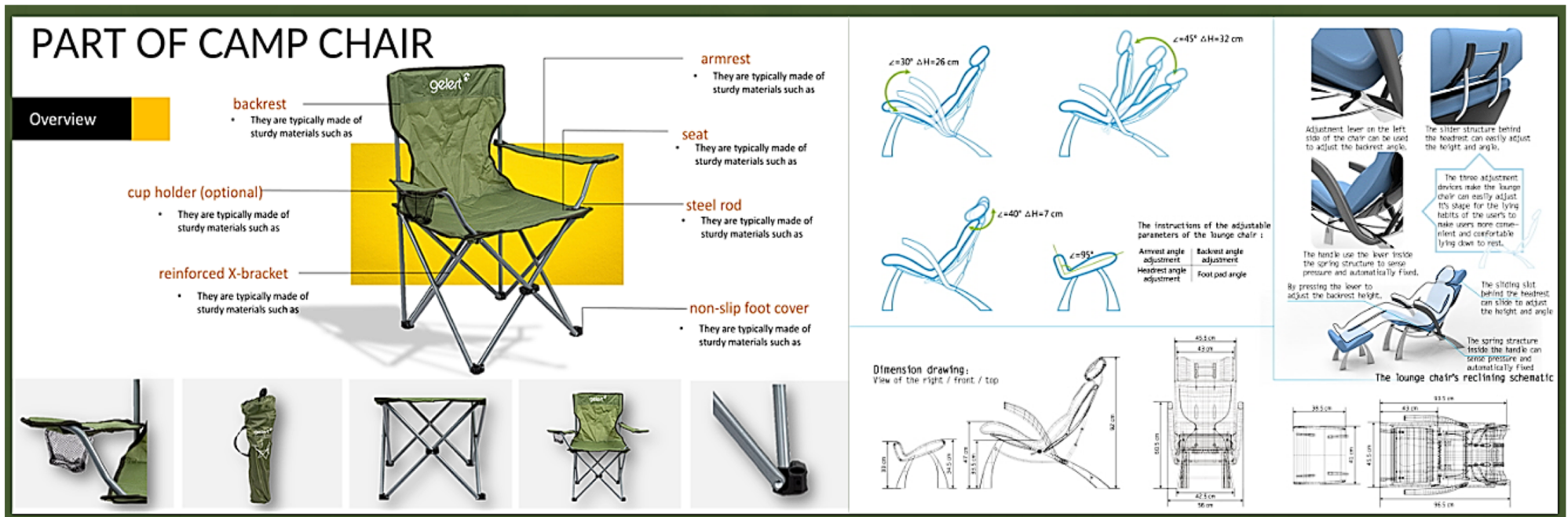


Figure 4 Study for Part of Camp Chair for Ergonomic Study

For optimal comfort and safety, the camping chair design must incorporate essential ergonomic elements. Features such as armrests and a cup holder enhance usability and convenience during extended outdoor use. The Explorex chair addresses key user needs through ergonomic posture support, ensuring back and lumbar comfort with flexible canvas that adapts to the body. Its low centre of gravity and stable leg design enhance balance on uneven terrain. Lightweight and foldable, Explorex is easy to carry and store, making it an ideal companion for any outdoor adventure. The chair must also adhere to standard ergonomic dimensions to ensure proper posture and support:

- Seat height from ground: 15–18 inches (38–46 cm)
- Seat width: 18–24 inches (46–61 cm)
- Seat depth (front to back): 16–20 inches (41–51 cm)
- Backrest height (from seat to top): 18–24 inches (46–61 cm)
- Overall chair height (ground to top of backrest): 30–40 inches (76–102 cm)

In addition, the chair should be able to support a standard weight capacity of 250–300 pounds (113–136 kg) to accommodate a wide range of users safely. (Refer to Figure 4 )

Based on observations from online videos, outdoor chair users prioritise comfort, especially during long periods of sitting. Ergonomic support and relaxed seating positions are highly valued. Portability is another key factor—users prefer lightweight chairs that are easy to carry and transport, often with features like shoulder straps or compact folding designs. Quick setup is essential, with a clear preference for chairs that require minimal effort to assemble and disassemble, ideally without the need for tools. Durability is also critical, as the chairs must withstand outdoor elements such as sun, rain, and dirt, along with rough handling. Foldable designs are especially favoured for their convenience in storage and space-saving during travel. (Figure 5)

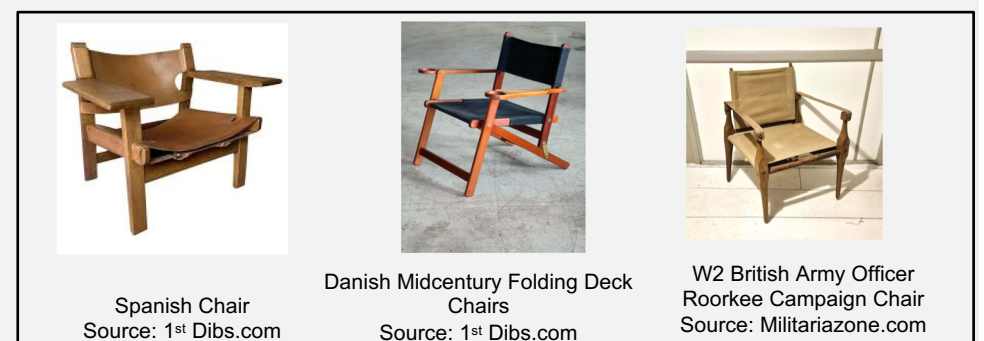


Figure 6 Design Inspiration

The W2 Roorkee Campaign Chair, Spanish Chair, and Danish Midcentury Folding Deck Chairs inspire the Explorex chair through their blend of form, function, and heritage. The Roorkee chair offers portability and minimalist construction ideal for outdoor use. The Spanish Chair contributes robust materials and wide armrests for comfort and utility. Danish folding chairs add lightness, clean lines, and efficient storage. Together, these elements shape a design that is **versatile, practical, and timeless**, suited for modern explorers. (Fig.6)



Figure 5 User Behaviour Study



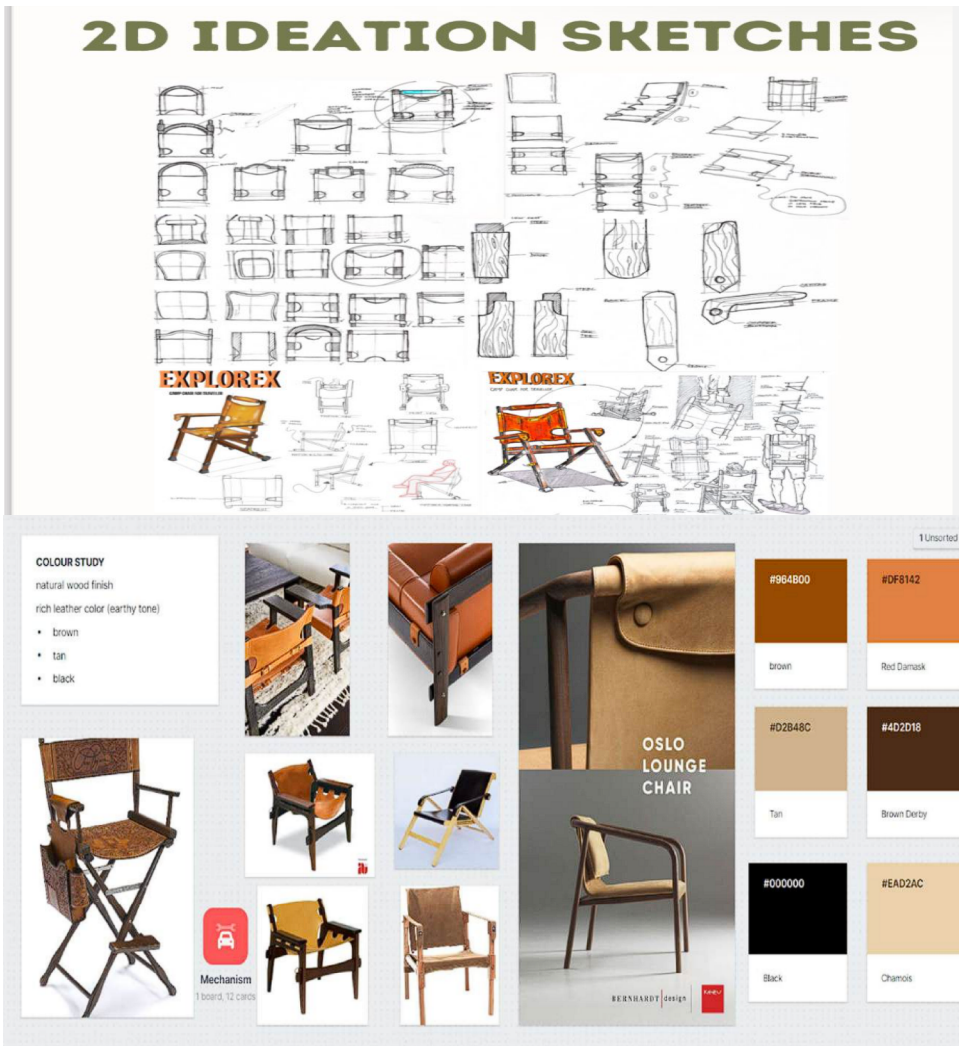


Figure 7: Ideation Sketches

The inspiration for this project draws heavily from the era of 19<sup>th</sup> and early 20<sup>th</sup>-century exploration, when travel gear was built for durability, adaptability, and timeless style. Historical expedition furniture—such as the Roorkee Chair used by British officers—inspired the structural simplicity and portability. These campaign-style pieces were designed for easy setup, transport, and resilience in rugged terrain, aligning with modern needs for compact and durable outdoor furniture.

Additionally, the aesthetic direction influenced by the warm, weathered tones of antique maps, leather satchels, and natural landscapes—seen in the choice of rustic red, burnt orange, forest green, and off-white. These colours evoke nostalgia and a deep connection to nature. From the Spanish Chair, the project borrows the idea of broad leather elements that age beautifully over time, while the Danish folding chairs inspire clean lines and efficient folding mechanisms for compactness and modern appeal. The sketches reflect a synthesis of these references—covering not just form and structure, but also folding techniques, ergonomic features, and material exploration. Altogether, these inspirations shape a chair designed not just for sitting, but for storytelling—a piece that encourages users to wander, rest, and continue their journey (Figure 6).

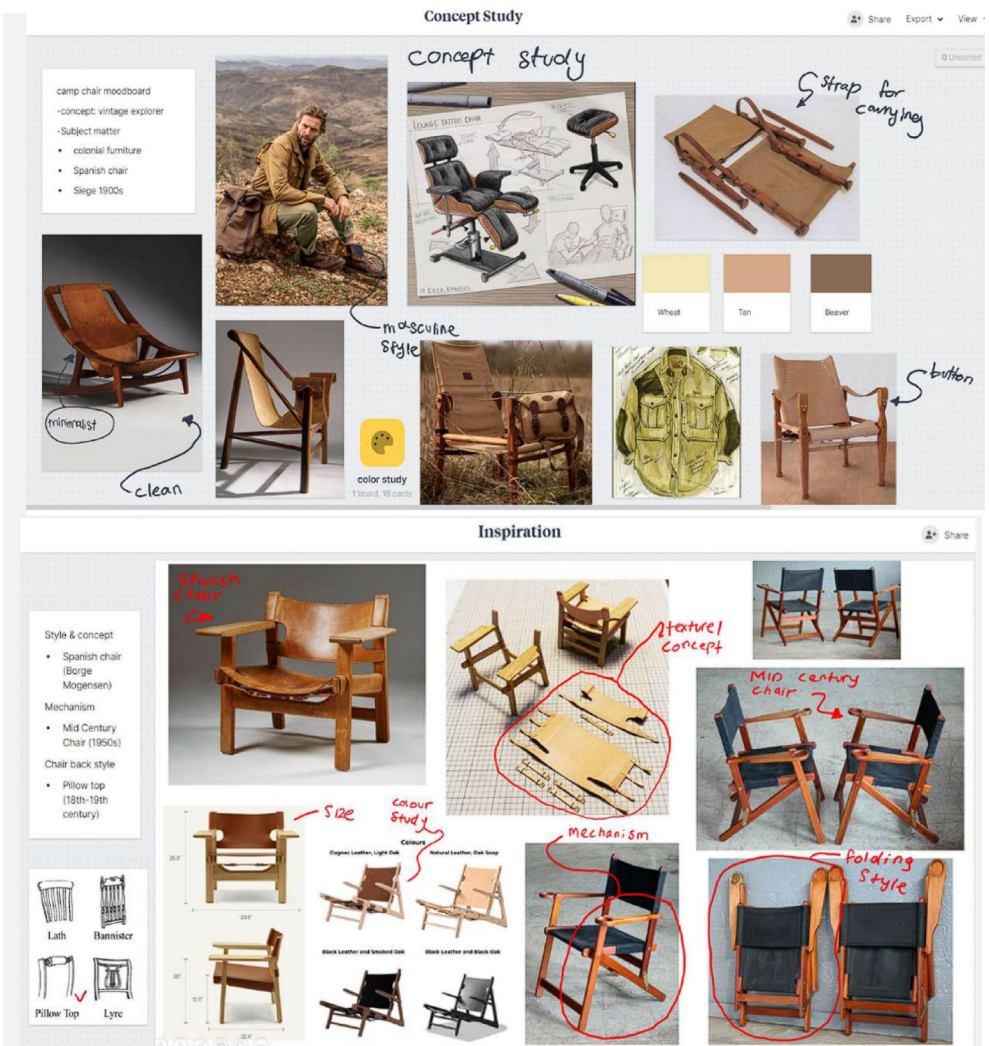


Figure 8: Ideation Sketches

### Sustainability Considerations in Design.

Sustainability was integrated throughout the design process to ensure that the camping chair supports both environmental responsibility and ethical manufacturing practices. This approach aligns with several United Nations Sustainable Development Goals (SDGs):

**SDG 9 (Industry, Innovation and Infrastructure)** was addressed by developing a chair that uses efficient folding mechanisms, allowing for easy production, repair, and replacement.

**SDG 11 (Sustainable Cities and Communities)** was considered is addressed by designing an outdoor-friendly chair with minimal environmental impact, using non-slip, low-pressure feet to prevent soil erosion and non-toxic, weather-resistant finishes to reduce contamination.

**SDG 12 (Responsible Consumption and Production)** is reflected through the use of recyclable and reusable materials such as mesh and canvas. Mesh offers breathability and comfort, especially when made from recycled or bio-based synthetics, while canvas—traditionally cotton or linen—is durable, biodegradable, and reduces waste through long-term use.

From an Islamic perspective, sustainability is guided by *khilāfah* (stewardship), *wasatiyyah* (moderation), and *mīzān* (balance). The camping chair reflects these values by minimising waste, using durable materials, and promoting long-term usability, aligning both with global sustainability goals and ethical responsibilities.





Figure 7: Proposed colour design

### INNOVATIVE DESIGN ELEMENT



Figure 9: Innovative design element

### DESIGN STATEMENT

The Explorex chair is created to solve common problems found in outdoor seating such as lack of comfort, poor stability, and limited durability. It addresses long-term comfort by using an ergonomic design with canvas cut-outs that flex and support the user's posture, helping reduce strain during extended use. The chair is designed with a low-ground adjustable leg system for better balance on uneven or rocky surfaces, making it safer for outdoor environments. Made from strong yet lightweight materials, Explorex is built to withstand tough outdoor conditions while remaining easy to fold and carry. Additional features like a Velcro-attached cooler bag and compact folding frame make it both functional and convenient for transport. With colour options like beige, red, olive green, and yellow-orange paired with a sleek black frame, Explorex offers comfort, safety, durability, and style such as meeting the real needs of outdoor users.

### CONCLUSION

The Explorex chair presents a well-rounded design solution that elevates outdoor experiences by emphasising comfort, ergonomic support, and portability. Tailored for travelers, campers, and outdoor enthusiasts, it addresses key practical needs such as posture support, stability on uneven terrain, and convenient transport. Innovative features—including a foldable frame, flexible canvas cut-outs, and modular accessories—enhance usability across diverse environments.

Rooted in sustainability, the design aligns with Sustainable Development Goals (SDGs) 9, 11, and 12 by promoting responsible material selection, efficient production, and environmentally conscious design. By combining functionality with aesthetic value, Explorex not only fills critical gaps in current outdoor chair offerings but also redefines what it means to sit comfortably and responsibly in nature.

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