

E-BOOK OF EXTENDED ABSTRACT

THE 14TH INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2025



14TH **INDES** 2025

ENVIRONMENTAL • SOCIAL • GOVERNANCE



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COMFORT BUDDY

Suziyanty Matori¹, Siti Rasidah Md. Sakip^{2,5*}, Azizah Md. Ajis³
& Mohamed Nizam Abd. Aziz⁴

^{1,2,3,4} Department of Built Environment & Technology,
Faculty of Built Environment, Universiti Teknologi MARA, 32610 Perak Branch, Perak, Malaysia
⁵Green Safe Cities (GreSafe) Research Group,
Department of Built Environment Studies and Technology,
Faculty of Built Environment, Universiti Teknologi MARA, 32610,
Perak Branch, Perak, Malaysia

2024659906@student.uitm.edu.my¹, sitir704@uitm.edu.my^{2,5*},
azizah850@uitm.edu.my³, moham575@uitm.edu.my⁴

ABSTRACT

Children with Autism Spectrum Disorder (ASD) is a neurodevelopment condition characterized challenges in communication, behavior, and social functioning. Children with ASD may be considered as having disability depending on the severity of their tactile defensiveness. They often experience sensory challenges that make conventional furnishings like pillows, blankets, and sleeping mats uncomfortable. Tactile defensiveness and sensitivity to certain textures can disrupt rest, focus, and emotional well-being. Parents, caregivers, and educators also struggle to find products that are both effective and adaptable across various settings like home, school, therapy, and travel. COMFORT BUDDY addresses this need with a unique 4-in-1 sensory-friendly design that transforms into a pillow, sensory blanket, sleeping mat, and portable bag. Additional accessories, such as a sensory plush toy and a safety harness, offer added support for parents managing children with ASD. Designed with a child-centered approach, COMFORT BUDDY features customizable tactile surfaces, optional weight inserts for calming deep-pressure input, and eco-friendly, sustainable materials. This all-in-one solution offers the flexibility and portability lacking in many traditional sensory products, which are often bulky, single-purpose, or hard to transport. COMFORT BUDDY blends emotional comfort with practical design, making it ideal for therapy sessions, classroom use, travel, or home relaxation. Unlike typical sensory tools, it enhances sensory regulation while simplifying routines for families and professionals. By integrating therapeutic function, environmental consciousness, and user convenience COMFORT BUDDY empowers children with ASD to feel secure and engaged in multiple environments. It supports their independence and emotional stability while providing caregivers with a reliable, multifunctional solution. This product exemplifies how thoughtful innovation can transform therapeutic furnishings into accessible, everyday tools that enrich the lives of children with sensory processing needs.

Keyword: Sensory friendly, soft furnishing, tactile defensiveness, ASD children, psychological comfort

1. INTRODUCTION

Autism Spectrum Disorder (ASD) is a disorder of neural development characterized by impaired social interaction, verbal and non-verbal communication and restricted and repetitive behavior (Hodge et al., 2020). The number of diagnoses for ASD in Malaysia has risen steadily over the past decade, according to Department of Social Welfare data until July 2024. The latest information states that a total of 52,839 children are autistic (NASOM, 2024). Numerous children diagnosed with ASD often have noticeable sensory problems, which may be unsettling. It is well recognized that human senses include vision, auditory perception, tactile sensation (pressure and texture), olfaction, gustation, vestibular movement, and proprioception (Park et al., 2020). Sensory processing is the neurological mechanism whereby the brain struggles to assimilate and react to sensory stimuli (Alsaedi et al., 2024;

Henshall, 2008 & Phillips et al., 2011). Henshall asserted that the sensory systems function as a pathway via which the brain acquires information. Consequently, the brain must derive meaning from this information to devise and implement a response. A malfunction in this system within a person might result in either hypersensitivity or hyposensitivity.

As explained by Zahra et al. (2018), fabric properties include texture, weight, breathability, and hyperallergenic properties. The connection between tactile defensiveness and fabric textures is particularly significant, as certain fabrics can trigger negative reactions (Clapperton, 2019). For example, rough or scratchy fabrics, like wool or some synthetic materials, can cause discomfort, while soft and smooth fabrics, such as cotton or silk, may be more tolerable or even soothing (Temel et al., 2022; Fangmeng et al., 2024). Consequently, rough textures can irritate sensitive individuals, while fabrics that feel cool or warm, clingy, or heavy may either provide comfort or discomfort depending on the person. Understanding these factors helps in selecting appropriate clothing and materials for those with tactile sensitivities, improving their comfort and overall well-being (Temel, 2022; Fangmeng et al., 2024 & Mehta et al., 2024).

Kyriacou et al. (2021) stated, fabrics with smooth textures, such as soft cotton or silk, may provide a calming sensory experience, reduce anxiety and promote relaxation. On the other hand, rough or itchy textures may cause discomfort, leading to sensory overload, agitation, or difficulty sleeping. According to Autismresponseteam.com (2024), Gee et al. (2021) and Tozzi (2020), the physical impact of these fabric textures can also affect the child's ability to settle down or stay asleep, which is crucial for their overall health and daily functioning. Moreover, psychologically, the right fabric textures in bedding, pillows, or curtains can contribute to a sense of security and comfort, helping children with ASD feel safe in their personal space. As stated by Delsoin et al. (2021), sensory elements are included in the microsystem category of the 'home environment', encompassing both human and nonhuman elements that influence the functioning of autistic people. A soothing and sensory-friendly environment can support better emotional regulation, reduce stress, and improve sleep quality, which are essential for the mental well-being of children with ASD (Tozzi, 2020 & Ford, 2019).

This aligns with prior findings that autistic individuals derive pleasure from feeling textures that are soft and smooth (Cascio et al., 2008). Significantly, the participants exhibited sensory-soothing behaviors towards their preferred materials and expressed fascination when they discovered new soft fabrics that they found agreeable. Prior research has also discovered indications of individuals with autism consistently engaging in the behavior of sitting and grasping soft fabrics and textures (Ashburner et al., 2013; Dunn, 2007; Lane et al., 2010). Bedding selection is crucial for autistic children with tactile sensitivities to ensure better sleep quality (Ford, 2019). Rough textures like wool should be avoided; instead, fabrics like cotton, flannel, or sateen are recommended. Firm, even mattresses are preferred, as they reduce noise and discomfort. Weighted blankets and body pillows can offer comfort and stability, especially for older children (Gysel et al., 2007; Gringras et al., 2014; Gee et al., 2016). According to Kyriacou et al. (2021), understanding tactile defensiveness helps promote autism-friendly practices through proper fabric choices. Sleep also supports sensory processing and emotional regulation, areas often challenging for children with autism (Gee et al., 2016). Lack of sleep can worsen irritability, sensory sensitivity, and focus, leading to more behavioural issues. Sleep is a key factor in quality of life and is linked to both cognitive and behavioural development (Papadopoulos, 2021)

3. METHODOLOGY

This study uses two key theories: Kolcaba’s Comfort Theory and the Duplex Theory of Tactile Texture. Kolcaba’s theory (1994) describes comfort as meeting needs in four areas—physical, psychological, social, and environmental. The environmental aspect is relevant here, as fabric choice can affect the comfort of autistic children. The Duplex Theory explains how we feel textures through touch. Rough textures are sensed through spatial patterns, while fine textures are felt through vibrations. This helps explain how the brain understands different fabric textures. In addition, based on previous studies such as Gysel et al. (2007), Gehring et al. (2014), Gringras et al. (2014), Gee et al. (2021; 2016), Baric et al. (2021), Kyriacou et al. (2021) and Temel (2022), it is difficult to find research that combines fabric texture and soft furnishing components to meet the needs of children with ASD as shown in Figure 1.0. Therefore, the researcher has taken the initiative to create a new design that integrates four functions into one mobile design.

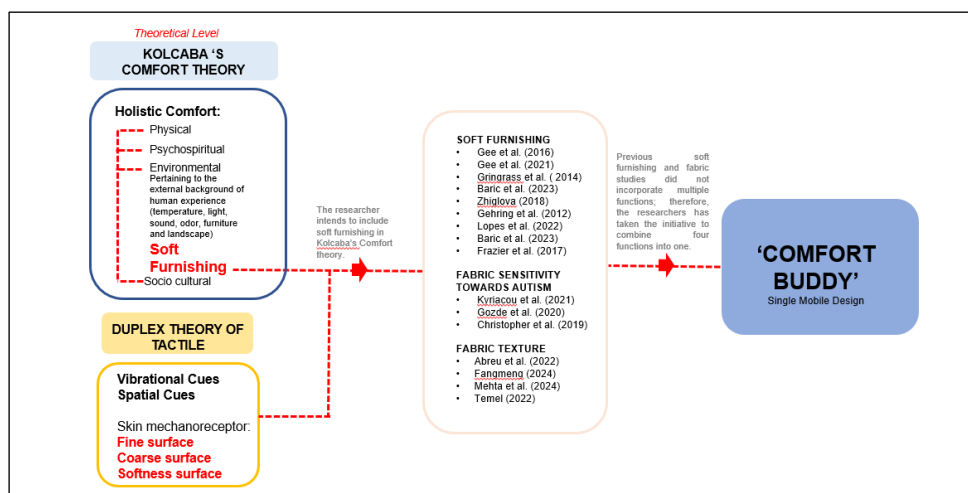


Figure 1.0 Framework of the research

4. FINDINGS

The researcher has taken the initiative to support those involved with children with ASD by combining their needs into one mobile design. Parents need to understand their child's sensory sensitivities and choose suitable fabric textures—such as soft, smooth, or coarse—to support emotional stability. Various fabrics like linen, cotton, bamboo, and flannel, along with textures like embroidery, corduroy, and etc. are available. Parents should identify their child’s specific needs before selecting fabrics for the COMFORT BUDDY. The COMFORT BUDDY is a mobile design that combines a bag, sleeping mat, pillow, and blanket using mix-and-match fabrics tailored to each child. While weighted blankets are known to improve sleep by providing a hugging sensation, room temperature must be considered, as heat can cause discomfort. The included sleeping mat offers an alternative for cooler comfort.

A plush toy is also part of the COMFORT BUDDY, with customizable textures like beads or stitching to suit sensory preferences. Its washable design and simple folding technique allow multiple functions, helping children manage their needs independently. Since play is essential in childhood, the plush toy adds comfort and familiarity. For safety during travel, a safety chain helps parents keep children close and secure. The COMFORT BUDDY is a portable, multifunctional product designed to support children with ASD by combining a sleeping mat, pillow, blanket, bag, and plush toy in one design. It uses calming textures to help regulate emotions, reduce anxiety, and improve sleep.

It also promotes independence and gives children a sense of security during daily routines. For parents, it offers a washable, durable, and customizable solution, with safety features like a travel chain to support routines and ease caregiving. Teachers can use it to help students stay calm, focused, and included in class. Overall, it provides comfort and sensory support across home, school, and travel settings.

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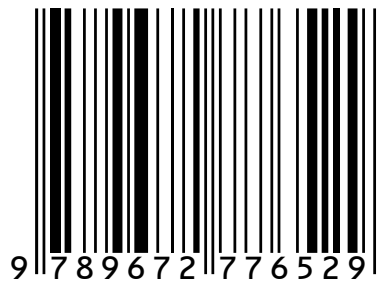
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