

PELÜK: Deep-touch-pressure (DTP) Sensory Vest to Reduce Anxiety

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ABSTRAK

Mahasiswa dapat mengalami beragam pengalaman selama proses pembelajaran di kampus, termasuk situasi yang dapat menimbulkan stress. Penelitian ini merangkum penggunaan metode Deep Touch Pressure (DTP) atau tekanan di titik tertentu yang diterapkan pada produk rompi untuk membantu mengurangi kecemasan yang dialami oleh mahasiswa. DTP adalah salah satu metode terapi yang memberikan sensori taktil/sentuhan dan tekanan pada titik tertentu pada tubuh, yang diperoleh melalui media seperti bahan kain berpemberat, untuk memberikan efek pelukan sehingga membantu proses penyembuhan fisik dan emosi yang dialami oleh individu. Perancangan ini menawarkan ide teknologi adaptif – asistif berupa rompi sensori dengan metode DTP untuk memunculkan efek menenangkan. Untuk memenuhi kebutuhan dari mahasiswa yang mengalami gangguan belajar spesifik dan atau mahasiswa yang didiagnosa dengan kebutuhan khusus serta yang mengalami kecemasan dalam situasi tertentu di perkuliahan adalah tujuan utama dilakukannya penelitian ini. Metode pendekatan desain diaplikasikan dalam proses penelitian, dimulai dari observasi kebutuhan, ideasi, proses sketsa alternatif desain, dan ujicoba purwarupa rompi sensori yang melibatkan mahasiswa. Rompi DTP sebagai teknologi adaptif-asistif divalidasi menggunakan metode Visual Analogue Scales yang diisi oleh mahasiswa partisipan. Hasil perancangan ini menjadi solusi untuk membantu menenangkan kecemasan, memberikan stimulasi positif dalam regulasi emosi diri, terutama dalam situasi pembelajaran yang kompetitif. Hasil dari perancangan ini ini juga menjadi media pendukung Unit Layanan Disabilitas Itenas Bandung, yang dapat dimanfaatkan oleh mahasiswa maupun dosen dan civitas akademika yang mengalami gangguan kecemasan.

Kata kunci: rompi deep-touch pressure vest, adaptif, teknologi asistif, rompi sensori, disabilitas

ABSTRACT

In the learning process on campus, students could experience pressure that could cause anxiety if not treated well. This research comprises one potential approach in applying DTP (deep touch pressure) as an adaptive technology vest product to help students through their anxiety. Deep touch pressure (DTP) is a type of tactile sensory input obtained through physical action by using pressure interventions to help students' physical and emotional healing process. Designing a sensory vest

with the deep-touch-pressure method (DTP/weighted vest) aims to provide a calming effect. To solve the needs of the students who experience specific learning difficulties and/or students diagnosed with special needs when they experience anxiety in certain situations on campus is this research's main objective. The design approach method was applied in this research process, starting with observation, interviews, ideation, sketching design alternatives, and prototype testing of sensory vest products involving students. The DTP Vest as an adaptive-assistive technology was validated using the Visual Analogue Scales method completed by student participants. The results of this design provide a solution to help calm anxiety, offering positive stimulation in self-emotional regulation, especially in competitive learning situations. The outcomes of this design also serve as a supporting media for the disability service unit at Itenas Bandung, which can be utilized by students, lecturers, and the academic community experiencing anxiety dysregulations.

Keywords: *deep-touch pressure vest, adaptive, assistive technology, sensory vest, disability*

1. INTRODUCTION

Institutions of higher education that are committed to supporting inclusive education need to provide comprehensive services not only through the design of the curriculum but also in terms of facilities and products that facilitate learning activities. Referring to UNESCO [1], accessibility, building an inclusive curriculum and campus environment, and providing adequate support for smooth learning are the main focuses of this initiative, especially in facilitating students who experience anxiety disorders in learning situations.

The design of a Sensory Vest to reduce anxiety among students is very specific yet inclusive, making it usable by all students, as well as lecturers and educators. The goal of this innovation is to provide assistive technology in the form of a sensory vest to help facilitate students in the process of self-regulation when experiencing anxiety disorders. The sensory vest has been used as a behavioral therapy medium for Children with Special Needs to provide a calming effect through light pressure. The design of the sensory vest at Itenas is conducted to support the implementation of an inclusive curriculum by the Disability Services Unit, serving as an assistive technology that can be utilized by students and even lecturers in need. The expected benefit of this assistive technology innovation is to open educators' minds to the understanding that the anxiety disorders experienced by students should not be taken lightly and must be addressed in ways that can be implemented by the Disability Services Unit, through the assistive product in the form of a sensory vest.

This research offers opportunities for innovative supportive products for students who experience anxiety disorders or sensory-related needs. This is based on the requirements of typical students who face specific learning difficulties as well as students diagnosed with special needs when they experience anxiety in certain situations during lectures. The aim of this innovation is to help facilitate students in the process of self-regulation when experiencing anxiety during learning, thereby enhancing the overall quality of their learning experience. A design approach methodology is applied in this research process, starting with observations, interviews, ideation, alternative design production, and prototype testing of the sensory vest product involving students from the Product Design Study Program at ITENAS. It is hoped that the results of this research can assist students and lecturers who need assistive products related to self-regulation when experiencing anxiety during the learning process.

Dalam kotak header pada halaman gasal ini tulislah judul makalah

The following are data obtained from initial screening via Google Forms for students in Product Design, Interior Design, and Visual Communication Design in 2024.

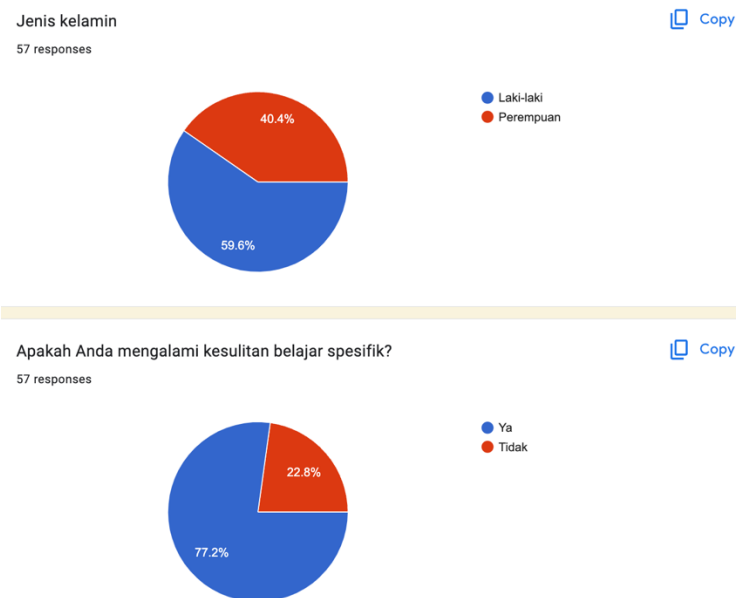


Figure 1. Early students respondents (total 57) from the Faculty of Architecture and Design

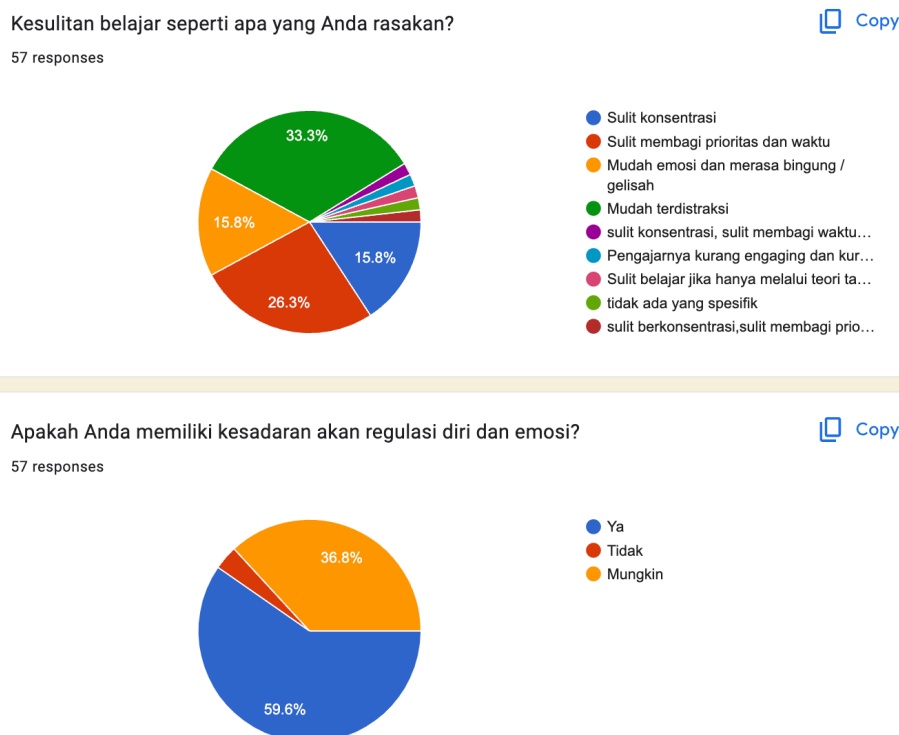


Figure 2. Charts of students with specific learning difficulties

From Figure 2, it can be seen that the specific learning difficulties experienced by the majority of respondents include being easily distracted, followed by difficulty in prioritizing and managing time. Additionally, being easily emotional and feeling confused/anxious holds the same value as having difficulty concentrating. While the majority of students are aware of specific learning difficulties, they

also recognize the importance of self-regulation and emotional awareness, although some still have uncertainties about it.

Apakah Anda pernah menggunakan atau mendengar tentang rompi sensorik sebelumnya?
57 responses

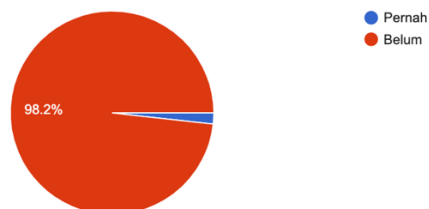


Figure 3. Charts of sensory vest acknowledgment

From Figure 3, almost all respondents have never heard of or are aware of sensory vests or weighted/pressure vests as one of the therapeutic tools that provide calming effects, especially for individuals diagnosed with autism. From Figure 4 below, 64.9% of respondents expressed a desire to try out the sensory vest prototype to help reduce anxiety during the learning process, and most are willing to share their experiences after using the sensory therapy vest.

Apakah Anda percaya bahwa penggunaan rompi sensorik dapat membantu dalam mengatasi kesulitan belajar dan mengatur emosi?
57 responses

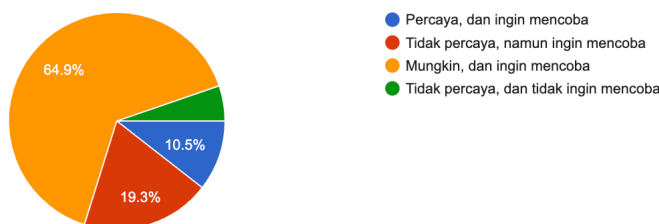


Figure 4. Charts of students' interest in sensory vest

This initial data indicates that the majority of students experience anxiety during their lectures, particularly in performance-demanding situations like presentations, seminars, or final defences. Students often require time to calm down to effectively regulate their emotions. The results of this initial survey assist in validating the design criteria for the innovative Sensory Vest as assistive technology.

Theoretical Foundation

According to the research results by Edelson et al. [2], the use of weighted vests and pressure vests aims to provide proprioceptive input that can have a calming effect on the central nervous system. Deep touch pressure (DTP) is a type of tactile sensory input obtained through physical actions such as squeezing, hugging, stroking, pressing, and wrapping, and therapists use this pressure intervention to assist in the process of physical and emotional healing [3]. Meanwhile, Grandin [4] explains that Deep touch pressure (DTP) is the type of surface pressure that is exerted in most types of firm touching, holding, stroking, petting or animals, or swaddling, in contrast of light touch pressure (LTP) that she explains as a more superficial stimulation of the skin, such as tickling, very light touch, or moving hairs on the skin. Occupational therapists who work with children diagnosed with autism often use DTP because it is believed to be more effective in reducing symptoms of anxiety, panic attacks, and

stress. Additionally, it can help children develop better behavioral regulation skills, improve focus in daily activities, and enhance academic performance. The DTP method also has no negative impacts, is easy to apply, brings many benefits, and leads to significant changes, making it increasingly utilized in occupational therapy practice [5]. Research in this area indicates that DTP therapy interventions can improve the quality of life and personal satisfaction for individuals experiencing high levels of stress, anxiety, and difficulty relaxing. DTP research also shows success in assisting individuals diagnosed with Autism Spectrum Disorder (ASD), individuals with Attention Deficit Hyperactivity Disorder (ADHD), developmental disabilities, and other special needs [6]. Several products have been developed based on DTP therapy, with most being ready-to-wear fashion items including weighted vests and blankets, sensory vests, and garments featuring compression, such as the products developed by Temple Grandin—a researcher and educator diagnosed with autism [4]. Vests that provide a hugging sensation offer comfort through the warmth memory of brain neurons (shape memory alloy/SMA) that transmits calming instructions from the nervous system to the body to soothe anxious children, thus enhancing their concentration and adaptability [7]. The deep pressure method has varying effects on the majority of individuals with autism, with most reporting an improved quality of life related to sensory acceptance processes. Previous studies evaluate the effectiveness of DTP therapy as a treatment with wearable and non-wearable products applying DTP, with various results from positive when using DTP as an intervention, while others found non-significant results. Some limitations of these studies and use of weighted vests as an intervention include inconsistent treatment procedures [8] [9]. The findings from the study conducted by [10] suggest that DTP should be designed in such a way that it becomes assistive products tailored to the needs of individuals experiencing specific anxiety disorders. Individuals can also develop anxiety when stimuli are not associated with a specific object, but a place or event such as exam or presentation in university. The design of a wearable sensory vests as assistive media for students and lecturers experiencing anxiety or specific learning disorders in academic processes becomes crucial, especially in Indonesia, where research on this topic is still very limited. The design development of assistive technology will result in a sensory vest as part of the services provided by the Disability Services Unit to support the outcomes-based education (OBE) curriculum currently implemented at Itenas.

2. METHODS

This design research begins with the establishment of the design, followed by prototyping, and then testing aimed at evaluating students' reactions before and after using the Deep Touch Pressure (DTP) sensory vest. The design thinking method is applied as below stages:



Figure 5. The Design Thinking Methods in establishing the vest design prototype

Later on, the testing method is utilized using the Visual Analogue Scales (VAS) to measure the activity and mood of the respondents before and after using the DTP sensory vest for 5 minutes (using a pre-test and post-test approach). The VAS method is one of the measurement techniques in design research that employs a 10 cm line with indicators of “not at all” and “very much” that is selected by students in pre-test and post-test, using a smiley graphic as seen Figure 6 below.

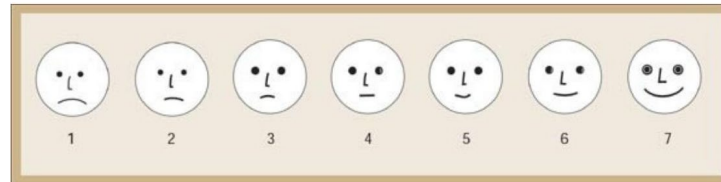


Figure 6. Visual Analogue Scales Methods to score the respondents' feelings

The categories of behavior and mood measured in the VAS method include: level of calmness/peace; response to commands or stimuli; level of comfort; and communication response. The VAS measurement is conducted before and after participants wear the DTP sensory vest. The short-term success indicators (output indicators) of the assistive product design program for the DTP sensory vest are the number of students who show an improvement in VAS measurement results. In the long term (outcome indicators), success is marked by increased engagement and responses from students in the academic process overall as a result of this assistive technology innovation's implementation. Additionally, it is expected that this assistive product will benefit not only the students but also the teaching staff, while attracting new student applicants and exchange students who experience the benefits of this assistive technology product in addressing the specific learning difficulties faced by students.

Preliminary Design

This research begins with the development of an initial design idea where the vest design is determined as a lightweight, dynamic solution for applying Deep Touch Pressure (DTP) that is easy for users to wear. In addition to the DTP vest, there are other options such as pneumatic garments [11] arm splints [12], and stretch garments with negative ease [13], each yielding varied results. The choice of vest products not only makes it easy for students to wear but also serves as a campus identity through the selection of garment colors. The preliminary designs are seen as in Figure 7 below:

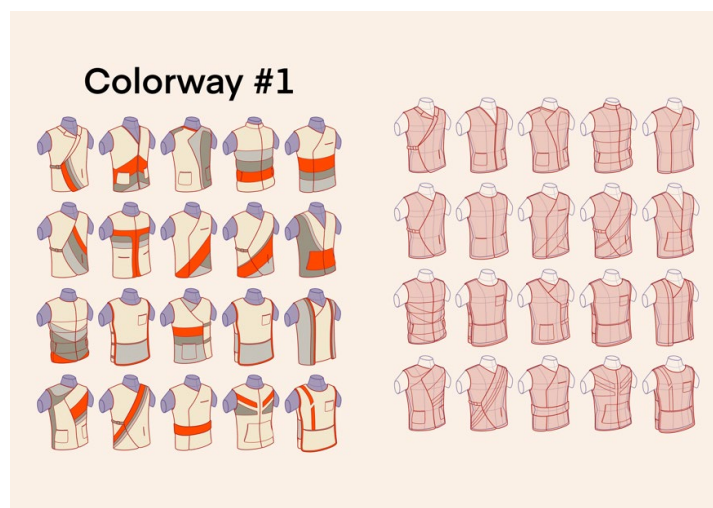


Figure 7. Preliminary designs alternatives

The vest design process begins with the initial idea development stage, ideation, and discussions related to a simple adaptive technology system that can apply pressure to specific points on the body. Interviews with occupational therapists are conducted to finalize the ideation process. The selection of fabric is also carried out to determine comfortable materials for the DTP vest. Subsequently, the prototype development process is conducted to proceed to the testing phase with student respondents. The design of the DTP vest uses 100-gram latex distributed across 7 points on the vest, and the vest is worn for 5 minutes to assess mood changes before and after wearing the DTP vest. The final design of the DTP vest as we named it “Peluk” is seen as in Figure 8 and 9 below:



Figure 8. Final design of “Peluk” DTP Vest

3. RESULTS AND DISCUSSION

Positive results were found for most of the participants. Weight was placed in the DTP vest approximately equivalent to 5% of the wearer’s body weight. Vests were worn for 5-10 minutes during the testing, and behaviors were rated 5 minutes into wearing the vest. All participants had an increasing better mood when wearing the vest. Below is the responses from the student participants before and after wearing the DTP vest:

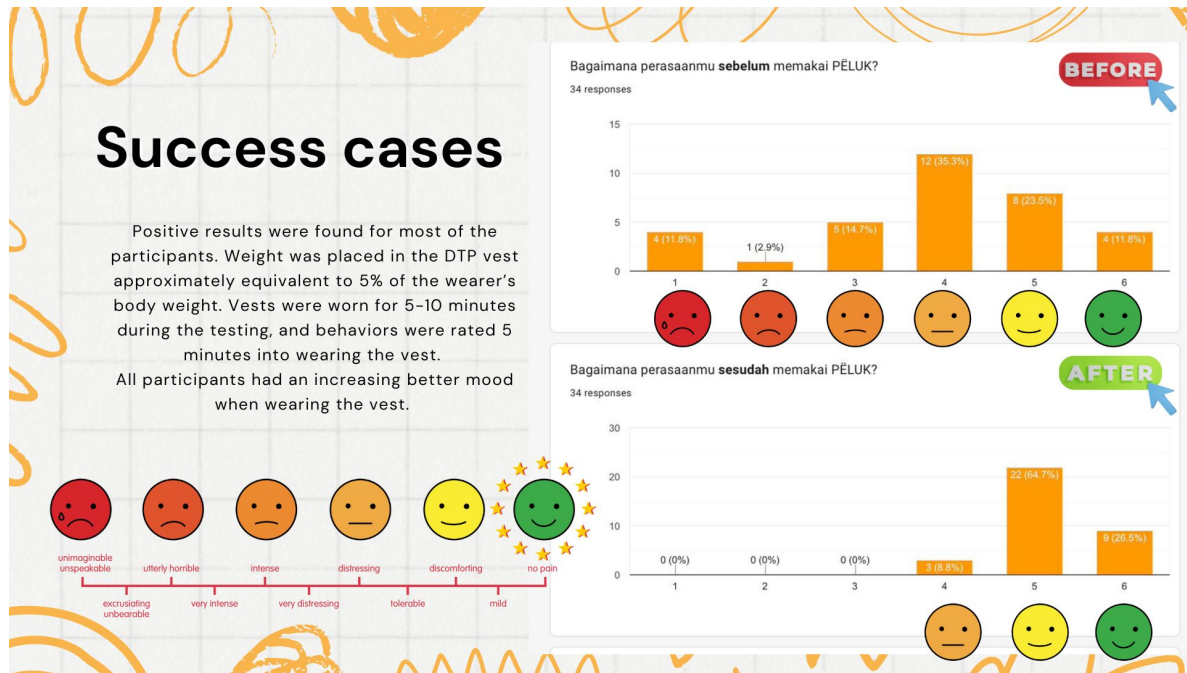


Figure 10. Student participants responses with “Peluk” DTP Vest

Further analysis about the DTP vest is explained by the SWOT in Figure 11 below:



Figure 11. SWOT Analysis of “Peluk” DTP Vest

This research develops a prototype that enables rigorous and qualitative studies to better determine optimum DTP vest design to reduce anxiety for students in higher education. The sustainability plan as a long-term goal is to equip the Itenas Disability Services Unit with DTP sensory vests as one of the assistive technology products that are beneficial for students and the academic community. This research offers an idea for supportive assistive technology for the College Disability Services Unit. The innovative idea of a sensory vest that can provide a calming effect for those experiencing anxiety disorders can offer positive stimulation in self-emotional regulation, particularly in competitive learning situations. However, the limitations of this study include that the long-term effects of the DTP vest were not observed, so it is needed for future research to examine weighted DTP vest usage and to establish recommended practices for the weight, duration of using the vest, and the garments choice. Furthermore, this research is conducted with a spirit to inspire the development of inclusive universal design.

4. CONCLUSION

Positive responses to the DTP vest included calming and increasing a better mood. However, further research is needed to come up with a standardized protocol and clear objectives to use as a guideline for determining weight, duration of wear, and also the garment choosing for the vest. It would be best if there is a future therapy garment capable of alleviating pressure without using/requiring weights/doffing.

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