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Exploring Somaesthetic Design and Phenomenology in Understanding Paraplegic Mobility

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Abstract

This study explores how somaesthetic design and phenomenological approaches can offer insights into the mobility experiences of individuals with paraplegia. By examining how design, technology, and symbols intersect with the challenges faced by paraplegic individuals, the study presents an alternative perspective on disability that emphasizes user experience, independence, and freedom of mobility. The paper discusses the role of design in shaping assistive devices and considers the implications for user-centered design practices. While the scope is primarily focused on the experiences of paraplegic individuals, the insights offered may inform broader design practices for enhancing mobility and accessibility.

Keywords Somaesthetic design; Phenomenology; Paraplegics; User experience; Assistive technology.

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Introduction

“What about sense-perception? But certainly, this does not take place without a body, and I have seemed to perceive very many things when asleep that I later realized I had not perceived. What about thinking? Here I do something: it is thought; this alone cannot be stripped from me. I exist, this is certain. But for how long? Certainly, as long as I am thinking, for perhaps if I were to cease from all thinking it might also come to pass that I might immediately cease altogether to exist. I am now admitting nothing except what is necessarily true: I am therefore, speaking precisely, only a thinking thing, that is, a mind, or a soul, or an intellect, or a reason – words the meaning of which was previously unknown to me. I am therefore a true thing, and one that truly exist; but what kind of thing? I have said it already: one that thinks.”

(Descartes, 2009, pp.19–20)

“... I have body, which is very closely conjoined to me, yet because, on the one hand, I have a clear and distinct idea of myself, and so far as I am a thinking and not an extended thing, and, on the other, a distinct idea of the body, in so far as it only an extended and not thinking thing, it is certain that I am really distinct from my body, and can exist without it.”

(Descartes, 2009, pp.55)

Descartes posited that the mind and the body are two distinct entities that interact with each other but are fundamentally different in substantial ways. He believes that the body is like an extension of the mind, and the mind exists independently from the body. The mind, in Descartes's view, is an immaterial substance that is capable of thought, doubt, and consciousness. Meanwhile, the body is a material substance that is capable of performing various functions, such as movement and sensation. Descartes' thought provides an 'analytical consciousness' that factual (facts) are the result of the mind, while what happens to the body is actual (act). The term factual refers to the concept of facts in the form of evidential information about an event or reality; meanwhile, actual (act) refers to the reality of events or occurrences (Williams, 1959). The mind was tending as an instrument for translating information obtained by the body's senses. The situation that Descartes thought about and happened to himself is assumed its also happen to ordinary people; what Descartes thought about is also known as a mind-body problem (Pfeifer & Bongard, 2018, pp. 5–7). The problem is, what if it was used to look at people with disabilities, particularly paraplegia, who have paralysis because of

injury of the spinal cord? Does the mind and body concept of Descartes also occur to people with paraplegia?

Paraplegic and The Body

Now, first of all, I observe here that there is a great difference between the mind and the body, in this respect, that the body of its nature is endlessly divisible, but the mind completely indivisible: for certainly, when I consider the mind, or myself in so far as I am purely a thinking thing, I can distinguish no parts in myself but understand myself to be a thing that is entirely one and complete. And although the whole mind appears to be united with the whole body, if the foot is cut off, or the arm, or any other part of the body, I know [cognosco] that nothing is therefore subtracted from the mind. Nor can the faculties of willing, perceiving by the senses, understanding, and so forth be said to be parts of the mind, since it is one and the same mind that wills, that senses, and that understands. On the other hand, however, no bodily or extended thing can be thought by me that I cannot mentally divide into parts, without any difficulty; and I therefore understand it is divisible. This point alone would suffice to show me that the mind is altogether distinct from the body if I did not yet sufficiently know [scirem] this for other reasons.

(Descartes, 2009, pp. 60–61)

Several people (male and female) with paraplegia are in wheelchairs that I met primarily because of accidents, both at work and in road traffic. They have spinal cord injuries that cause them to lose motor and/or sensory function in the thoracic, lumbar, or sacral (sacrum) (Bromley, 2006, pp. 1–11). This situation caused people with paraplegia to have paralysis, have no feeling in their lower body feel, and lose a part of self-body balancing. In one situation, I was asked by one of the participants (she), who has paraplegia, to sit in a wheelchair and pick up items that had fallen below. I quickly tilted my body and immediately reached out my hand to grab the fallen item. My balance does not have problems because I can still support my body weight and body momentum of my lower body, such as the waist, thighs, legs, and soles. However, neither happened with the participant. She had to adjust her position with difficulty first because she could not feel their lower body, and her balance to resist forces. Her capability to support their body weight was disturbed. Consequently, She used her left hand (non-dominant hand) to hold firmly onto the wheelchair's armrest as an anchor to keep her balance, and she tilt the body forward diagonally with an effort, while her right hand (dominant hand) stretched out to grab the fallen item. This condition occurred because of the loss

body balance situation due to not being able to feel the lower body, including the centered body mass, which is around the sacrum area (Hamilton et al., 2012, pp. 360–390).

This somatic movement was experienced by all participants. As described above, the paraplegic participants experienced trial and error in retrieving the fallen items on the floor. The movement tried to bring the body to a limit point with the risk of failure or success, ignoring the potential hazard. The mind determines the starting point of the hand, grasping the wheelchair armrest, and the final destination, which is to retrieve fallen items below. Furthermore, the rest of the body will determine the position and how to move; bodily experience will be arranged by its body self. The muscles, bones, self-body balancing, and base of support will continue to support somatic movement and body deportment. The condition was like learning while doing, and the *rationale* comes at the same time the body does some movement (Schon, 1983, pp. 54–59). That figuration explains the correlation between bodily experience and the thinking process, which comes from the interaction between the physical processes of the body and what we might call information processing. (Polanyi, 1962, pp. 57–59) (Pfeifer & Bongard, 2018, pp. 18–22).

At this point, Descartes' thoughts regarding mind and body problems are questionable. Other situations occur simultaneously in the mind and body, working in sync, processual, and not processing based on a hierarchy. The system of information processing of the mind and body works organically as if there are no boundaries between body organs. The separation of mind and body occurs when an activity begins and ends, but when all activities take place, the mind and body are like organic entities that move esoterically. In my opinion, the event of mind and body information processual is one of the basic processes of human evolution, how homo sapiens experienced the evolution of their cognition and physical body. Thus, the big question arises: Could humans evolve without tools and products? How do tools and products insert themselves between the work of the mind and body? Could the paraplegic participant retrieve the fallen items below properly from a wheelchair without an armrest?

The Twins: Design and Technology

Design activities and technological trajectories exist together with man learning to know their world, moreover when man had to face and survive from the environment around them. Design and technology start to work together when man thinks about function, form, and goal to attain. Man tries to reconcile the interface of two different systems, for example, the human body and the environment, the body temperature and the environment temperature, which initiates blankets, jackets, air conditioners, or heaters. Design and technology build the artificial world to attain the goal. The design

ought to find the problem and arrange the scenario to find the solution, while technology ought to materialize the scenario to be things (i.e., products, systems, or services) that help man to survive and know the world (Michalos & Simon, 1970, pp. 111–138) (Ihde, 1979, pp. 3–11).

So does the relationship people with paraplegia have with wheelchairs and all the accessories of wheelchairs. They need wheelchair instead of their legs to stand and walk. Of course, they cannot stand like ordinary people, so they sit in the wheelchair. The paraplegic situation is a big different compared to people with a leg prosthesis who can stand and walk. Most people with paraplegia have severed motor nerves, and they can move their legs. Meanwhile, most people with prostheses still have good motor nerves but they do not have body organs completely to stand or walk. This situation makes people with paraplegia very dependent on a wheelchair to have good mobility. People with paraplegia will use wheelchairs all day long, and that will have consequences on the design of the wheelchair. All features on a wheelchair must be able to accommodate the minimum needs of a wheelchair user to be able to move and be active, for example, freely to reach, and freely transfer from the wheelchair to the bed. One of the features of the wheelchair is the armrest, the dimensions and form of the armrest help to freely move or transfer and reach things. The problem is how to determine the fit for the purpose and appropriate armrest for wheelchair users with paraplegia. What is the relationship between design and the body, as well as its features and habits or behaviour?

Designing with The Body

Bodily experiences are based on somatic processes and then continue to become extra-somatic. Somatic and extra-somatic processes always run in everyday life, most like the process of adaptation and interaction between functions and organ systems of the body, as well as the interaction between our body and the environment, products, or anything outside our body. In the somatic process, there is no division between mind and body, as Descartes imagined. For example, in the jumping activity, the body, through the feet, will first feel the surface of the foot in contact with the earth's ground. All muscles will then measure and react to the need for jump height and measure muscle strength to fight gravity. Apart from that, the hands, feet, and head will also be in certain positions to make jumping achieve the body gives information to the mind about the body's capabilities, and then the mind will estimate (measure) jumping probability, and so on until the body does the jumping. Bodily experience has elements such as behaviour and habits. Behaviour has emotional characteristics that arise as a reaction to feelings. Every thought that is closely related to feelings will affect changes in the muscles, for example, anger will make the muscles tense. Meanwhile, habits are very biological, racial, and individual. Apart from the fact that genetically each race is unique, ecological and social elements also contribute (Todd, 1937, pp. 1–5) (Nelson, 2002, pp. 103–139).

In cases of paraplegia, this also occurs with the habits and behaviour of using a wheelchair related to transfer activities. The people with paraplegia I met admitted that they rarely made transfers other than to go to the toilet or bed. I divide them into two categories of reasons why they rarely make transfers: body problems and cultural problems. Body issues refer to the readiness of all active bodies to be able to support each activity. For example, strength and flexibility of the upper body, such as the back, shoulders, arms, and hands. Transfer activities require arms and hands to support body weight when moving. They have to move using their upper body because their lower body, such as their legs and waist, is paralyzed. Most of the paraplegics I meet have not trained their muscles to gain strength and flexibility, especially women with paraplegia. However, this situation also occurs in elderly paraplegics; they have decreased muscle capacity, so they also have difficulty transferring. On the other hand, cultural issues also influence transfer activities. Some male paraplegics often wear sarongs, while female paraplegia wear long dresses. The use of this type of fashion refers to a particular religious way of dressing that has become a daily habit. The long and wide shape of sarongs or long dresses often causes difficulties when moving the legs, such as the cloth getting tucked into the wheelchair and difficulty holding the thighs when moving the legs.

There was an interesting problem-solving with body and culture issues, their transfer behaviour was modified, not by lifting the body but by doing "*ngesot*" or sliding, it was like drifting on a car. They move the buttocks and waist first by sliding, then hold the thighs and move the legs in the final stage. These habits and behaviours require modifications to the wheelchair design, especially the armrest. Through sliding behaviour, the armrest on the wheelchair must be able to be swung sideways or backward. The armrest, which functions as an armrest and railing, must then be moved to facilitate transfer by sliding. The design must be able to provide support for the body's needs because the context is not exercised but comfort and safety. Designing with the body is one solution in the context of user experience.

Design, Technology and Symbols

Human beings are the only primates that could create a culture. This ability may have originated from three initial factors: design, technology, and symbols. The design provides humans with a scenario for how they live, technology enables them to materialize this scenario, and symbols give meaning to the experiences of the scenario they arrange. These perspectives can be applied to the study of the disability of paraplegia, for example. People with paraplegia have been suffering injuries in the spinal cord and have had to use wheelchairs for mobility. The design arranges how the survivor of people with paraplegia has their own mobility; the technology gives them mobility assistive devices and their freedom of mobility symbolizes how wheelchair users can shape their world. They can quickly meet

friends, colleagues, and family and interact well. Design, technology, and symbols have a precise contribution to humanity.

Small movements from one place to another become a big dream for people with paraplegia, for example, moving from a bed to toilet. Moving independently becomes freedom from paralysis, and they really need mobility aids such as wheelchairs. Design and technology can help with the independence and freedom that people with paraplegia need. The design of assistive mobility devices provides support for people with paraplegia to be able to enjoy the atmosphere outside the home, meet friends and colleagues, pray at the mosque, teach Al-Quran at the mosque, shop at the traditional store, and even take their children to school. Of course, expanding mobility will increase the meaning of freedom for people with paraplegia. Freedom of mobility gives new meaning and symbols to the lives of people with paraplegia; they take part in shaping the world. Assistive mobility devices exist as a symbol of freedom which, together with other symbols of freedom in the world shapes a new culture (White, 1949, pp. 22–39).

Answering the question of whether design can be an alternative in understanding disability, then through the case of people with paraplegia, I answered 'YES'. Design can be a way of understanding how disability is not a separate culture. People with disabilities are not aliens who have a different culture from the culture of ordinary people. Accessibility is a bridge to unite cultures that are considered different. Accessibility must be equipped with assistive devices to remove obstacles. Design as usual then works to prepare scenarios (i.e., products, systems, and services) for what accessibility will look like. Then, technology will support turning the design into a tool that people with disabilities can use. Design views disability more neutrally without any stigma, what is seen as what is needed (i.e., design requirements) by humans regardless of whether they are disabled or not. The design sees the ultimate of humans as existing is to live together in unity.

Discussion

The design has problems faced in paraplegic and wheelchair cases, which addressed user experience. The design sees the capability of paraplegic survivors to face the environment around them as the design requirement that has to be solved. Particularly in paraplegic issues and mobility assistive device cases, user experience is determined by somatic movement and body department. Several questions arise in these circumstances. How do we know about the phenomenon of the somatic process and bodily experiences of paraplegic survivors? How can the somatic process affect the design of mobility assistive devices? That can use a somaesthetic design and Husserl's phenomenology. Somaesthetic design focuses on body department and somatic movement, while phenomenology focuses on the investigation process. The output of this approach is (1) a design

perspective on disability, and (2) a framework to investigate user experience accurately from the body's needs. This situation ultimately refers to the aspect of design: user experience and how it transforms into independence and freedom of mobility.

Conclusion

In conclusion, this study primarily offers an exploratory perspective on the intersection of design and paraplegic experiences as somatic movement and body deportment. By highlighting the lived experiences of paraplegic individuals, such as the challenges faced when attempting to retrieve items from the floor or the necessity of adjusting body movements to maintain balance, this study emphasizes the importance of designing assistive devices that respond to real-world needs. For instance, participants repeatedly mentioned how the lack of tactile feedback from their lower bodies affected their sense of stability, demonstrating the intricate relationship between design and bodily awareness. This understanding delivers insights for other researchers or designers to understand how design can enhance user experience and mobility. These first-hand accounts underscore the need for design solutions that prioritize user adaptability and comfort, offering crucial insights into how assistive technology can evolve beyond mere functionality to support an enhanced sense of independence and self-awareness.

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Author's Bio

Winta Adhita Guspara was born in Yogyakarta on May 24, 1974. He began his academic background in Mechanical Engineering, then Art Studies (Product Design) focusing on creativity and tacit knowledge as his Master's, and He has been interested in micromobility for people with disability since his Doctoral study (ongoing). As a lecturer in product design and industrial design, he also promotes disaster preparedness to deliver inclusive product innovations.