

Inclusive Design as the Social Responsibility of Industrial Designers

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Abstract

Human-centred design is a paradigm of industrial design that focuses on producing products that are not only luxurious but also have a good purpose, function well, and provide a satisfying experience for users. Industrial designers possess the skills and knowledge to create such products, but it is unfortunate if these abilities are used in too narrow a field. According to Papanek, industrial designers must prepare themselves to understand social problems. One field that is relevant to industrial designers in terms of social responsibility is related to disabled people. By learning from people with disabilities, designers can understand how a design should be. Standards for design requirement no longer use general standards but use the minimum standards for persons with disabilities. By employing minimum standards, the product usability and environmental accessibility can be used for everyone, and no one is left behind.

This article expands on Victor Papanek's ideas of introducing product design students to an inclusive design paradigm. Students participate in inclusive design and inclusive service-learning classes, where they work on projects aimed at creating educational toys for children by involving children with disabilities, including autism spectrum disorder, cerebral palsy, visual impairment, deafness, slow learning, and mental disabilities. Involving children with disabilities in the design process allows designers to receive valuable feedback on functionality and usability, aiding in the overall improvement of the solutions at once. By embracing an inclusive design approach and involving disabled individuals in the design process, students can develop products which answer the needs of people with disabilities, foster inclusivity and accessibility for more people.

Keywords

Victor Papanek, human-centred design, industrial design, inclusive design, disability

Introduction

Design is a fundamental activity that has accompanied human existence since ancient times. It involves creating products, systems, and communication to solve problems. For example, hunting and hunting tools existed before humans made paintings of their hunting experiences on cave walls. Humans designed scenarios to solve problems and created tools or products to help solve them [1, pp. 3–5]. Therefore, it can be said that all humans are designers, and today, humans live artificially in a human-made world. In addition to design, there is also technology that works to help humans survive. Technology is an instrument that helps humans to realize their

ideas about tools or products [2, pp. 111–112]. Design and technology have transformed nature into culture, and particularly design has become a cultural practice. Design is an everyday activity that creates many alternative solutions to help humans solve problems [3, pp. 17–25].

Design is a problem-solving activity that arises from limitations. Hence, humans have limitations, as does nature, social environments, and even relationships between them. These limitations create gaps or discontinuities that make activities unable to run and operate, and this is where the need for design arises. It generates ideas and formulates scenarios as alternative solutions to address gaps and discontinuities. Design is a meaningful action that fulfils functions and purposes, and it has become a cultural practice that transforms nature into culture. Designers must have street-smart intelligence to fulfil their social and moral responsibilities. The knowledge created by design is more tacit because it always emerges in everyday life [1], [4, pp. 5–10].

This article invites discussion on preparing design students as agents of change. How can design students understand design principles, especially regarding social responsibility and moral judgment that a designer must possess long before starting to design? This issue is closely related to the conference theme that discuss about humanizing agents. As one of the design institutions, the Product Design department of Duta Wacana Christian University designs its curriculum and learning methods with various aspects related to social responsibility and moral judgment. One of them is encouraging students to think inclusively, especially regarding disabilities. Specifically, the product design department provides studio classes and service learning focusing on disability issues. The approach given to students uses the design approach that refers to the thought of Victor Papanek and the Double Diamond from the UK Design Council. This approach was developed to be suitable for the context in Yogyakarta.

Literature Review

The argument that transforms design activity into design education is based on the intrinsic value that makes design a part of everyone's education. One of the unique aspects of design is its synthetic thinking, which is responsible for transforming ill-defined or ill-structured problems into well-structured ones. This stage is crucial so that designers can see problems clearly and create scenarios to solve them. The synthesis process is not linear but constructive and iterative, involving zoom-in and zoom-out processes. Ill-defined or ill-structured problems are problematic situations or conditions because their variables tend to change, and their arguments are conflicting [4]. This situation is often found in inclusive issues that question the standard of normality for the general public. Regarding ill-defined and inclusivity issues, the problem lies in the conflict between essential and existential ways of viewing problems. Humans and their reality are not statues carved by philosopher's or poets' desires, but beings who are free to determine reality.

As a note, the understanding of "normal" standards and the term "common people" is still under debate. Normal standards and the term "common people" use an essentialist understanding that does not see that humans have different choices and actions related to the reality they face. Humans grow from childhood to old age (i.e., generative and degenerative processes) which is far from the essential normal and general understanding, as well as disabilities that are innate or caused by illness or accidents. This essentialist thinking then derives into the ableism perspective in society, and culture has a strong contribution to ableism [5]. Unfortunately, design education as one of the pillars of humanity also tends to run ableism through the achievement of competency

standards. For example, ableism in design education is the assumption that people with colour blindness cannot learn design because the attractive appearance is partly determined by colour. It can be imagined that people who have desire to learn design must be extinguished because of unwanted conditions, even something that they cannot change. Competence in design education sees humans as beautiful statues that express the perfection of the past. It is to be ashamed and contradictive when the design is always walking and watching the past, not the future.

Ableism and achieving competency standards have a close cultural relationship and have been strongly criticized by Marx through commodity fetishism. He emphasised that human assumptions about perfection and satisfaction greatly influence the condition called quality. Achieving quality requires that the work carried out by humans be in a perfect phase and requires support from all the complexities of bodily work and cognitive work. At this point, productivity becomes a form of ableism that makes bodily work and cognitive work the perfection of human work in producing something of quality. Worse still, the assumption of quality goods then becomes an assumption of social benchmarks in society, such as trends, style, and fashion [6, pp. 163–177]. People with disabilities are considered not to be included in the productive criteria because they cannot have perfect bodily work and/or cognitive work to produce quality goods. Furthermore, in principle, culture also ignores the condition of disability and considers it as a condition that should not exist [5].

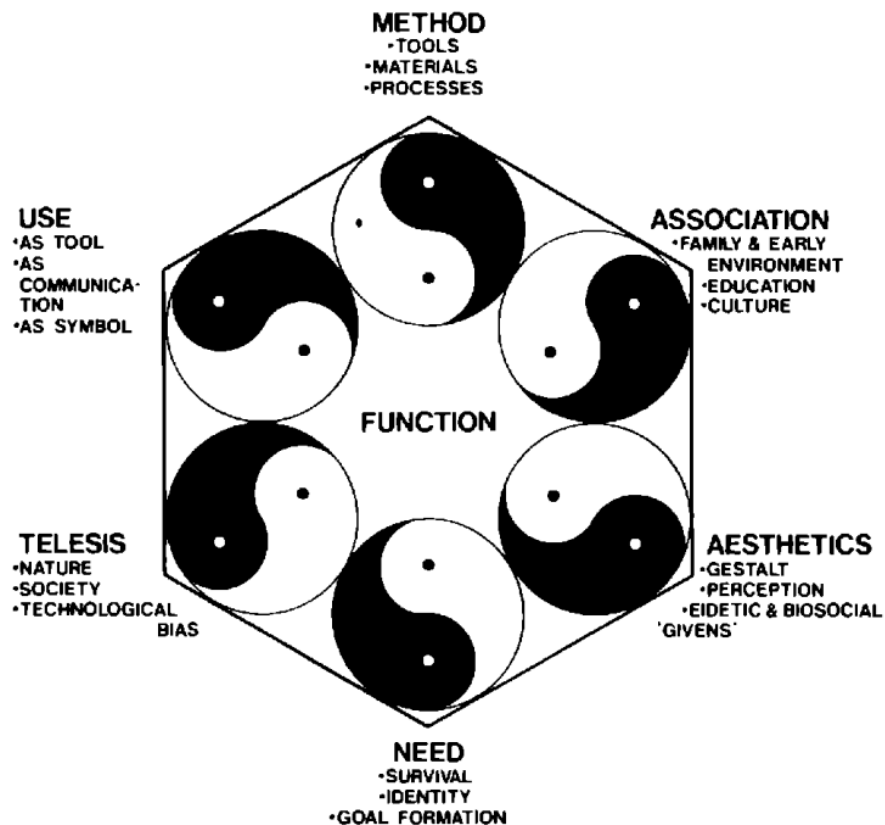
Design and designers become one of the main contributors to the occurrence of ableism in the creation of trends and products that are strongly linked to ableism in the production aspect. This condition reached its peak when Pevsner tried to think about the rapidly advancing technological trajectory and formed new ideas about manufacturing, production, and consumption. On the other hand, there was a decline after World War II, and social problems regarding human capacity that was replaced by machineability. Pevsner realized that the ideas of the times had changed, the industrial community had to be formed, and manufacturing technology still had to have an impact on society. Designs must be able to be mass-produced, and products must be significant in people's daily lives. Pevsner then performed a lot of curatorial and design processes for everyday products that were typically modern material expos, simple and minimalist shapes that could be done by machine for mass production, fulfilling the value of use and function for daily life [7]–[13]. Design becomes very meaningful and encourages the formation of a consumer society that is closely tied to design. The modern movement gave birth to one of the juggernauts that is becoming increasingly unstoppable (i.e. consumers will need more accessories, fuel, maintenance when they already bought their car to fit the society's expectations)

In the end, Papanek gave a sharp critique of the modern movement design thinking which focuses on consumerism in his book entitled "Design for The Real World". Papanek's thoughts as an architect and industrial designer about complexity are inseparable from what Nikolaus Pevsner did through the modern movement. Papanek and Pevsner's thoughts have similarities in thinking about complexity, namely the contribution of design in viewing phenomena and problems that shape reality. Understanding complexity is not only about the interconnection between elements but involves systems that form phenomena, the number of elements that interact, and how they are connected [14]–[18].

"I must agree that the designer bears a responsibility for the way the products he designs are received at the marketplace. But this view is still too narrow and parochial. The designer's responsibility must go far beyond these considerations. His social and moral judgment must be brought into play long before he begins to design, since he has to make a judgment, an a priori judgment at that, as to whether the products he is asked to design, or redesign merit his attention at all. In other words, will his design be on the side of the social good or not".

Source: [1]

The complexity thought by Papanek resulted in new basic principles of thinking for industrial designers, namely regarding function involving method, association, aesthetics, needs, Telesis, and use. At least through the functional aspects formulated by Papanek, design students understand that design complexity is not only measured by appearance and makes the product a commodity. There are other aspects related to displaying a meaningful design reality.



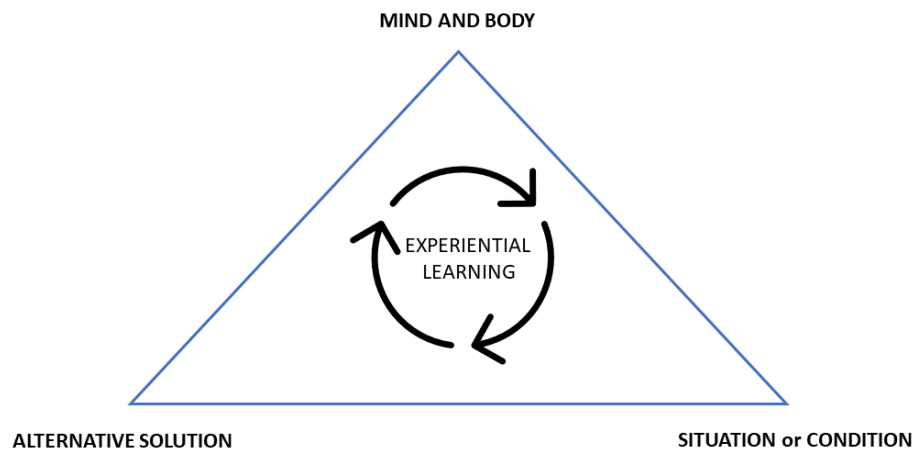
Picture 1. Function complex diagram from Victor Papanek

Source: [1]

Through the novelty offered, Papanek then refers to the things that must be done by designers to fulfil the meaning of design apart from ecology, namely design for children, the elderly, disabilities, and medical rehabilitation. Through Papanek's formulation, many inclusive design topics have emerged that discuss and design inclusive products with extreme users such as children, women, the elderly, and people with disabilities.

Methods

The inclusion and service-learning studio classes offered to students are project-based with an experiential learning approach. The aim of the method approach offered is that students as prospective designers understand the basic design principles of tacit dimensions. The empathy process is not separate from the process of understanding and searching for ideas. Through involvement, students and participants actively seek solutions to problems together.



Picture 2. Diagram of experiential learning on design
Source: Guspara, 2023

The complexity that Papanek offers in the design process can be more closely and easily understood through the formation of experience. It is not about learning “by” doing but learning “while” doing, not just learning from experience, but shaping experience. The learning process applied combines the perspectives of Dewey and Schon. Dewey's concept of pragmatism emphasizes truth through function and usefulness in facing reality. Dewey's concept of pragmatism also underlies design thinking and processes that are oriented towards real action to solve problems. Thus, Dewey's perspective on education is a process and socialization. Education becomes a model of community life, so the process of education must be very close to reality [19, pp. 17–23]. Meanwhile, Schon's concept is to transform knowing into knowledge through reflection, where experience becomes knowledge through the reflection process [20, pp. 21–65]. The process of change lies in the “by” formulated by Dewey, which becomes “while” formulated by Schon through intuition, which is then continued into quality standards and work processes. The pragmatist perspective can be of value in design thinking, as it offers well-developed and coherent articulations of concerns that are central to design thinking. The uniqueness of the Dewey and Schon concept mixture is demonstrated through the following steps:

1. Students seek knowledge through activities done together with participants, such as cooking fried rice or cleaning the garden.
2. Through specific activities done together, students will see specific problems that arise.
3. Students, together with participants, try to solve the problems they face.
4. Students formulate scenarios.
5. Students create tools or products to run the scenarios.

On the other hand, the combination of Dewey and Schon's concepts forms tacit personal knowledge. "We know more than we tell," as expressed by Polanyi in the context of tacit knowledge [21]. This type of knowledge is generated from sensory experiences that are embodied, such as learning to swim, ride a bike, or even forge iron and weld metal. In people with visual impairments, the tapping of a directional cane on objects around them gives meaning through visual logic. The empirical process occurs in sensory instruments that are then coordinated by the entire body and mind. There are almost no explicit words that can provide a clear explanation of what is happening, except for figurative and metaphorical language. The visual logic formed by people with visual impairments can also differ between those who are born with visual impairments and those who have visual impairments by disease or accident. There is no standard process in general, but rather a personal standardization process so that they can adapt to daily life.

Results and Discussion

The implementation of inclusive studio classes and service-learning programs is carried out in collaboration with several Special Schools in the Yogyakarta Special Region. There are two outputs of the program, (1) advocacy through social media and (2) the creation of tools or products to support the designed scenarios. Students form groups of 4-5 people and can participate in one of the participant categories. The categories of students with disabilities range from elementary to senior high school with different disability categories, such as visual impairments, hearing impairments, autism, paraplegia, cerebral palsy, and intellectual disabilities.

A. Upgrading qualitative sensing

The important activity that students must do is to update themselves as qualitative researchers through an activity called "If I Were to Become" (Pic. 3). This activity adapts the role-play model by involving daily activities that are carried out over several days, such as routines at home, going to campus, and shopping at a mini store. There are activity options in role-play that can be randomly selected to do: (1) playing the role of a visually impaired person or visual impairment, (2) playing the role of a disabled person using a wheelchair, (3) playing the role of a disabled person with amputations or deformities. The "If I Were to Become" activity is chosen to increase students' sense of spatial aspects, sensitivity to the physical environment, sensitivity, and memory as the main instrument of cognitive activity. Through the activities carried out, students' tacit knowledge is updated so that it can help in the process of inclusive design.



Picture 3. Role play activity "if I were".
Source: Inclusive Service Learning, 2023

The development of tacit knowledge in design thinking speaks of sensibility and logic that develop posteriori. Sensory experience will strongly encourage the "posteriori" model of empirical thinking. The series of information received by the body's senses can provide patterns or path that are closely related to daily reality. Tacit knowledge can provide a design dimension that refers to the real world.

B. Learning while doing

During this stage, students engage in activities with participants. There are two learning activities that students carry out, namely participant learning and special activity performance (Pic. 4). As facilitators, students can gain a detailed, deeper understanding of the situation, conditions, and dynamics of the participants. Through their role as facilitators, students can understand that reality, which seems the same, has different roots and processes. Understanding reality is very important for students because it provides a background for synthesis thinking and a persona dimension in the design process.



Picture 4. A student participatory
Source: Inclusive Service Learning, 2023

The personal knowledge constructed by students becomes an important element in the design process, especially in the synthesis process. In the current process, students were invited to see problems with various backgrounds and then try to find out the relationship between the elements. Unconsciously, students have not only constructed "know-how" but also "know-what". There is a process of abstraction of empirical experience through reflection and contemplation at each stage. The complexity of knowledge, both tacit and explicit, helps students to see real problems more comprehensively. Not only that, the construction of tacit and explicit knowledge also provides a more coherent and comprehensive understanding. This ability is needed in making design decisions that will be implemented for a more equal and better world for everyone.

C. Advocacy: visual out loud by social media

Advocacy through social media is carried out in conjunction with participatory activities. Advocacy through social media has become a popular tool for expressing ideas without strict sentence structure. The advocacy content created by students is through a memo and field notes obtained while they construct "know-how" and "know-what". Advocacy through social media is chosen based on the tendency of digital society's behaviour and preferences. The effectiveness of entering and sharing private spaces becomes easier through social media. Perhaps the content created by students is quite general, but it is possible that many people are still unaware because the culture we live in still does not have enough concern for people with disabilities. Our culture and traditions tend to hide and consider disabilities as a burden that is troublesome and unproductive.



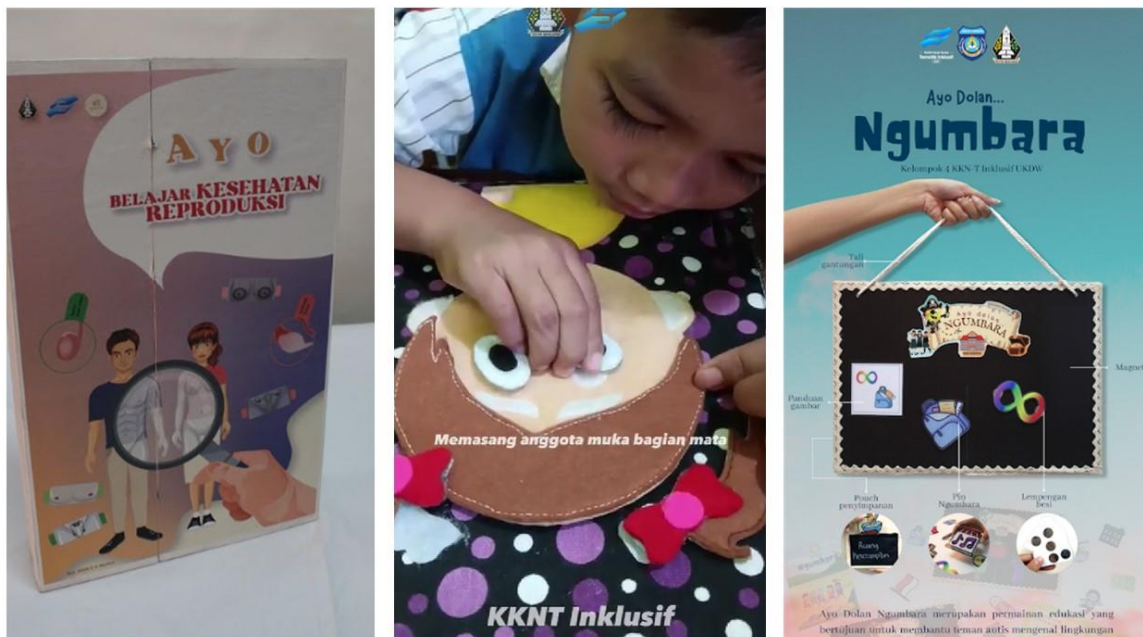
Picture 5. Advocacy about disability on social media by students
Source: Inclusive Service Learning, 2023 [22]

In an Inclusive design project, an extreme user would be chosen as a persona (a certain category of potential user sample). Extreme user is a category in the smallest percentage (i.e. 5th percentile) in a population bell distribution chart [23]-[24]. In this project, users with minimum capabilities were chosen. As part of mainstream users with full capabilities, the biggest challenge was students needed to learn the world outside of their everyday life, for instance: life without vision, utilizing only one hand, with weakened muscles and damaged nerves, with hearing impairment, with autism, with intellectual disabilities. It was a problem in society which failed to understand people with disabilities when there is not any adequate information or role models. The worst practice is the separation between the life of people with disabilities and mainstream people which commonly occurred intentionally due to the lack of knowledge and interactions. Therefore, the popular advocacy on social media included sharing their interactions and how they can learn from children with disabilities. By using this exposure, students could get feedback from viewers and be contacted by related organisations.

D. Product: one of elements that build a scenario

In the understanding of the user-centred design approach, the term of 'scenario' has been commonly used. Jonas (2001) introduced a scenario as a technical framework to guide a designer in understanding of the design: "A scenario is a design in itself" [25, p1] It is an experimental set for design and planning practice. He redefined the characteristics of design as anticipative, generative, use-oriented, illustrative, integrative, and context-sensitive. It has been acknowledged that design is a complex constructed interaction of sub-events and many elements which should be seen holistically.

The interaction of each element (i.e. human, environment, product, task) will construct the whole experience in a certain context. For instance, the features of the product built by designers are dependent on human factors (i.e. cognitive, sensory input, motor capabilities, values and emotion), environment (e.g. indoor vs outdoor, texture, light intensity), and the task (e.g. detail level of the sub-task, flow, cues, leisure vs emergency). The term of 'use-oriented' is perceived as a dynamic interaction. It is the opposite of how the 'object-oriented' can be perceived as a static sequence or without any interaction to other elements. In this inclusive design project, the initial assumptions built by the students based on the textbook tended to be demolished. Picture 6 shows how the educational product about the reproductive organs for teenagers with hearing impairments should involve words that have direct association with the visuals and challenge to encourage social interactions with peers or guardians (left); the educational book for children with intellectual disabilities needs to carefully use a certain thickness of material and mechanism in accommodating less fine motor skills (middle); and the spatial cognitive need of children with autism should be assisted by a very simple visual and mechanism which consisted of a specific icon of the landmark in their real-world to develop confidence.



Picture 6. Product as a part of an interactive system
Source: Inclusive Service Learning, 2023

Conclusion

This paper aims to expand on Victor Papanek's ideas of introducing product design students to an inclusive design paradigm by introducing a holistic experience to them. Papanek's principle could also lead to a complete understanding that the function aspect ('use-oriented') is constructed by method, association, aesthetics, need, Telesis and use itself. The exposure to each of the principle elements let the design student identify the gap of knowledge and practice objectively and deliver sustainable solutions which possibly exist against initial assumptions. Moreover, the positive impact experienced by users, both users with disabilities and non-disabled, could lead to inclusive movement and culture in society. In this project we learned about the

interaction process in understanding, identifying, ideation and the prototyping phase should educate all parties which includes the designers, potential primary users (users with disabilities) and people without disabilities. Therefore, an industrial designer can be the agent of change against the capitalism movement and seek for the core of needs.

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Biographies



Winta Adhitha Guspara was born in Yogyakarta at 1974, 24 May. He began his academic background in Mechanical Engineering, and Art Studies (Product Design) as his Master. His interest is growing in inclusive product design since his master study. As a lecturer in product design and industrial designer, he also promotes Micromobility and Disaster Preparedness to deliver inclusive product innovations.



Winta Tridhatu Satwikasanti was born in Yogyakarta at 1983, October 12. She began her academic background in Product Design, and Ergonomics (Human Factors) as her Master. She completed her PhD from Loughborough University. Her interest is growing in inclusive product design since her doctoral study. As a lecturer in product design and industrial designer, she also promotes Inclusive Service Learning to deliver inclusive product innovations.