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Industrial Materials to Support Kinetic Sculpture as Interior Elements

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Abstract

Art plays a vital role in human life, not only as a source of beauty but also as a form of profound expression. Sculpture creates three-dimensional objects from various materials such as wood, stone, and metal. The aim is to discuss the process of designing kinetic sculptures from car engine waste, as well as assembly and splicing techniques using welding and screws. Optimizing function and aesthetics can contribute to environmental sustainability using industrial waste materials. This research is expected to guide the design of three-dimensional sculpture art in the context of industry and education to contribute to contemporary art's development.

Keywords: Industrial materials; kinetic sculpture; interior elements; fine art

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1.0 Introduction

Designing kinetic sculptures using waste material is a part of enhancing environmental sustainability, and discussing techniques and material waste is supposed to guide artists to be aware of sustainability. Art is needed in life. It provides the value of beauty that attracts the attention and feelings of everyone who sees it. Art is all kinds of beauty created by humans. It is a product of beauty, a human effort to make beautiful things that can bring pleasure. Sculpture art is an essential development of art history and artifacts. Zhou and Lian (2020) said that sculpture has historically been a decorative object in a garden. Sculpture art is inextricably linked with architecture, gardens, religion, cemeteries, folk art, etc.

Art originated from human expression (artist) and was aimed at bringing enjoyment. A work of art is created from the artist's hand due to self-expression. Eco-materials or environmentally friendly materials can be renewed and recycled, requiring little energy (Hartini et al., 2020). One type of artwork that is three-dimensional is sculpture art. As part of fine art, the sculpture is an artistic and aesthetic statement through a three-dimensional form. This sculpture uses various media, including wood, stone, and metal. The three-dimensional works discussed in this article are multiple forms of metal sculptures produced from former industrial machines, namely car

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engines. The engine of this car is assembled into a kinetic sculpture and developed by combining it with interior elements in the form of furniture.

Technology and industry are developing quite rapidly in this era. One of the technology and industry is the automotive industry. Throughout 2019 alone, the production of four-wheeled motor vehicles reached 1.28 million, and two-wheeled vehicles reached 7.29 million units. These motorized vehicles appear with models or types that continue to evolve so that new types or models will always appear. The emergence of production with new types or models makes old types or models of vehicles begin to be abandoned. Sometimes, even when damaged, it is no longer repaired but used as a scraping item. Maintaining an old vehicle is usually more expensive than buying a new one because spare parts that have yet to start to be produced trigger the high cost of maintaining old vehicles. The work design uses car engine materials that are no longer used or have become waste as the primary material, which will be a unique form of combining technology and art. Car engines are converted into interior elements in shape or function as motor drive engines. The combination of waste industrial machinery, sculpture, and interior art will give rise to a new work of art that is not only a display but can function as furniture that can build an atmosphere of enthusiasm for work. Sculptures with car engine materials can add a reference for creative thinking in the atmosphere of the space. According to Jung & Lee (2019), The 3D sculpture education model of automotive design proposed in this study is expected to be applied and added to automobile 3D sculpture education for classes in various fields.

The mechanical functions of the car are still used. This is because it is considered that car engines have a certain uniqueness that they want to bring out in interior elements. These machines are mechanically functioned using custom-designed aids and modified existing mechanics. Mechanical movements are made using electrical power converted into motion through a dynamo or electric motor. The dynamo was the first electric generator capable of delivering power for industry, and it is still the most critical generator in use in the 21st century. Dynamos use the principle of electromagnetism to convert mechanical rotation into alternating current electricity. This electric dynamo will later be used to drive the car engine's gears to create a motion display on the three-dimensional statue.

The Whitney Museum of American Art, New York, owns one of the most significant motorized works by the renowned American artist Alexander Calder, titled Half-Circle, Quarter-Circle, and Sphere. Created in 1932 and acquired by Whitney in 1969, this seminar work was featured in an iconic exhibition held in 2017 entitled Calder: Hypermobility. (Pozzi et al., 2020). Creation of kinetic works using various engineering equipment. While the work's mechanism retained its creator's ingenious engineering solutions, the motor, urethane belts, plug, and electrical wires were neither original nor authentic to the period. (Huang et al., 2009). Knowledge of the types of industrial materials is fundamental in producing this three-dimensional work because not all industrial materials can be formed into kinetic sculptures with the theme of industrial space. The materials that are prepared must pay attention to comfort and safety for the user the need to implement the priority requirements of different level users to the spatial planning structure of the stop complex, such as transparency, control, protection, safety, accessibility, information, rational use of space, comfort, and services; (Gnatiuk & Novik, 2018)The wrong selection of industrial materials will damage the shape of the kinetic sculpture, turning it into a sculpture without a concept. Industrial machines usually have simple mechanical systems and high technology. Industrial materials that can be used in this three-dimensional work are machines with mechanical systems such as gears and motors. In addition, machine waste that can be used is metal-based because metal can be welded or firmly in couplers.

In composing industrial materials, one must pay attention to the mechanical components displayed and driven simply by electrical or manual power sources in a new form. Industrial materials with simple mechanics can be displayed as the central part of the sculpture's shape. Simple assembly and splicing in composing industrial materials must pay attention to the mechanical components displayed and driven simply with electrical or manual power sources in a new form. The technique that can be used to form this three-dimensional work is simple assembly and splicing, not damaging the industrial material's original shape.

Simple splicing techniques that can be used are welding and screws. Welding is a metal joining technique that involves melting part of the parent metal and filler metal with or without pressure and with or without additional metal and producing a joint. Welding is a metal joining technique that involves melting part of the parent metal and filler metal with or without pressure and with or without adding metal and producing a joint. According to the definition of DIN (Deutch Industrie Normen), welding is a metallurgical bond on an alloy metal joint that is carried out in a molten or molten state.

A bolt or screw is a rod or tube with a helical groove on its surface. Its primary use is as a fastener to hold two objects together and as a simple plane to convert torque into linear force. Bolts can also be defined as inclined planes that wrap around a rod. Most bolts are tightened by turning them clockwise, called the right thread. In three-dimensional art, screws or bolts are commonly used to connect one part of the sculpture to another. Thus, in the creation of this work, the researcher uses screws to unite the parts of the machine until it becomes the desired shape.

2.0 Literature Review

Beyond aesthetic or communicative functions, art serves as a tool to provoke new perspectives on exploration and introspection, both on an individual and societal scale. Art is a work that is meant to stimulate emotions, both through perception and understanding (Hays et al., 2020). End-of-life vehicles (ELVs) are a problem that cannot be solved through simple disposal, as they are considered hazardous with the potential to pollute the environment and as a spatial problem that generates about 5% of waste industries worldwide. Now, more than ever, in contemporary industries, an essential prerequisite for developing an efficient ELV recycling model as a reverse supply chain must align with environmental requirements and long-term sustainability goals. (Petronijević et al., 2020) This triggers artists to create vehicles that are no longer used in three-dimensional works. Some existing works of art are the trigger for several individuals and artists who ultimately create materials to be turned into art items. The uniqueness of this shape attracted several people to make it work.

Not only are artists interested in processing car engines into works, but automotive lovers are also interested in making this part of the car into an object or work. They work just as a hobby or take advantage of used car parts that are said to be thrown away. The works these automotive lovers produce are usually objects that can function, such as tables, lamps, etc. The resulting shape is also simple: just an engine block or a part of the car on which glass is given to function as a table. In addition to tables, some turn engines, such as pistons, into clocks. This work is elementary and only attaches the clock to the engine part, such as the piston. Another form that is often produced is the yaou lamp. The engine or car part is combined and given a lampshade to form a work as a sleeping lamp.

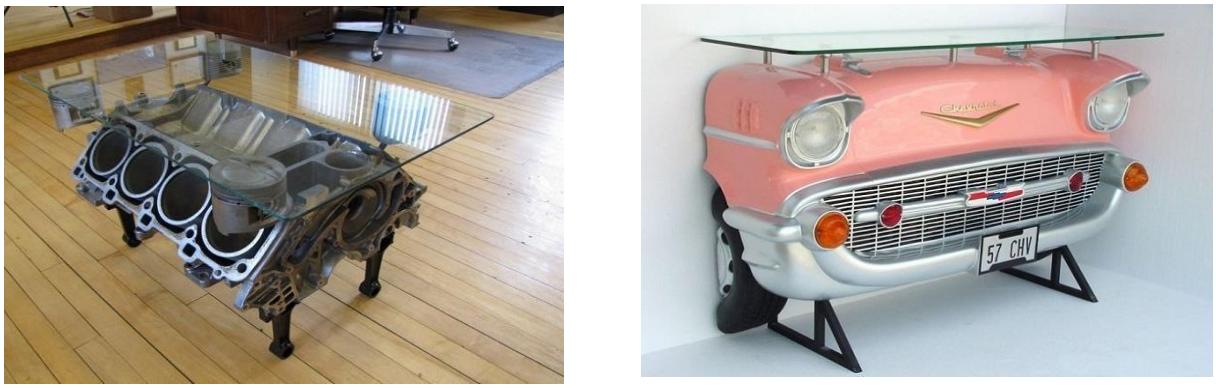


Fig. 1: The image of the Table from automotive machine
(Source: https://berita.99.co/kreasi-barang-bekas-mobil/, 2024)

Fig. 2: The image of the Table lamp (left) and Table watch (right) from the automotive machine.
(Source: https://id.pinterest.com/pin/706431891525097999/; https://www.pinterest.co.uk/pin/663436588835365341/, 2024)

Fig. 3: The image of the Billiard from the automotive machine.
(Source: https://www.viva.co.id/foto/510218-kala-mobil-mobil-sangar-disulap-jadi-meja-billiard, 2024)

In addition to works produced by automotive lovers, some artists are interested in using engines or car parts to make three-dimensional works. Artists who use car waste include James Corbett and Rudolph de Harak. They assemble car engines into three-dimensional works that have a high selling value. The works produced are of high aesthetic value but cannot be used in the household. The work is only made to be displayed and enjoyed for its beauty. One of James Corbett's works is The Green Kawasaki Grasshopper,

displayed at Sydney's new Oran Park library. This work is in the form of a giant locust pasted on the wall to give the impression of life. The engines of cars and motorcycles are assembled in such a way that they form grasshoppers. In addition to The Green Kawasaki Grasshopper, James Corbett also produced several unique works made of car engines. His works are always in realist form or resemble living objects such as humans or other stars.

Fig. 4: The image of The Green Kawasaki Grasshopper, new Oran Park Sydney (left) and Paddy's Tractor, Sydney (right) by James Corbett *(Source: https://jamescorbettart.com/2018/10/october-2018/, 2024)*

Rudolph de Harak is an artist from California. Almost all of his work is installation work using machines. One of his works is Exploded Engine, which is an installation work. Rudolph used several car engines as objects or materials for his work. According to his created concept, these machines were arranged and hung from the ceiling.

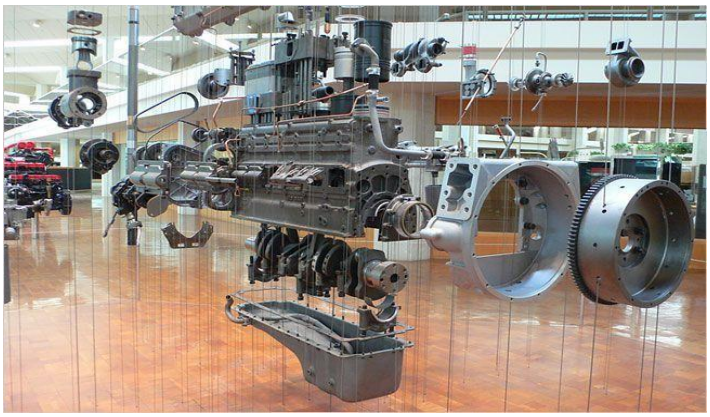


Fig. 5: The image of The Exploded Engine, museum of Cummins by Rudolph de Harak *(Source: https://www.pinterest.co.uk/pin/25684660349816802/, 2024)*

Of all the works that have existed or have been created, there are no kinetic works made from car engines combined with interiors. Based on reviewing these previous works, the researcher will make a work different from the previous ones. The three-dimensional artwork made by the viewer is a work of art that combines sculpture art with the interior, namely the table. The work presented is not only a display to enjoy its beauty but also has a function. In addition, the three-dimensional work produced is also kinetic. The dynamo engine will be used to drive the engine or motor of the car.

3.0 Methodology

This study's methodology refers to the Design Action and Practice Research Model (Swann, C., 2002). This methodology creates kinetic sculptures that incorporate used industrial materials as sculptures in interior elements. This research provides insight into designing and utilizing industrial materials in kinetic sculpture art and offers practical guidance for their application in interior design.

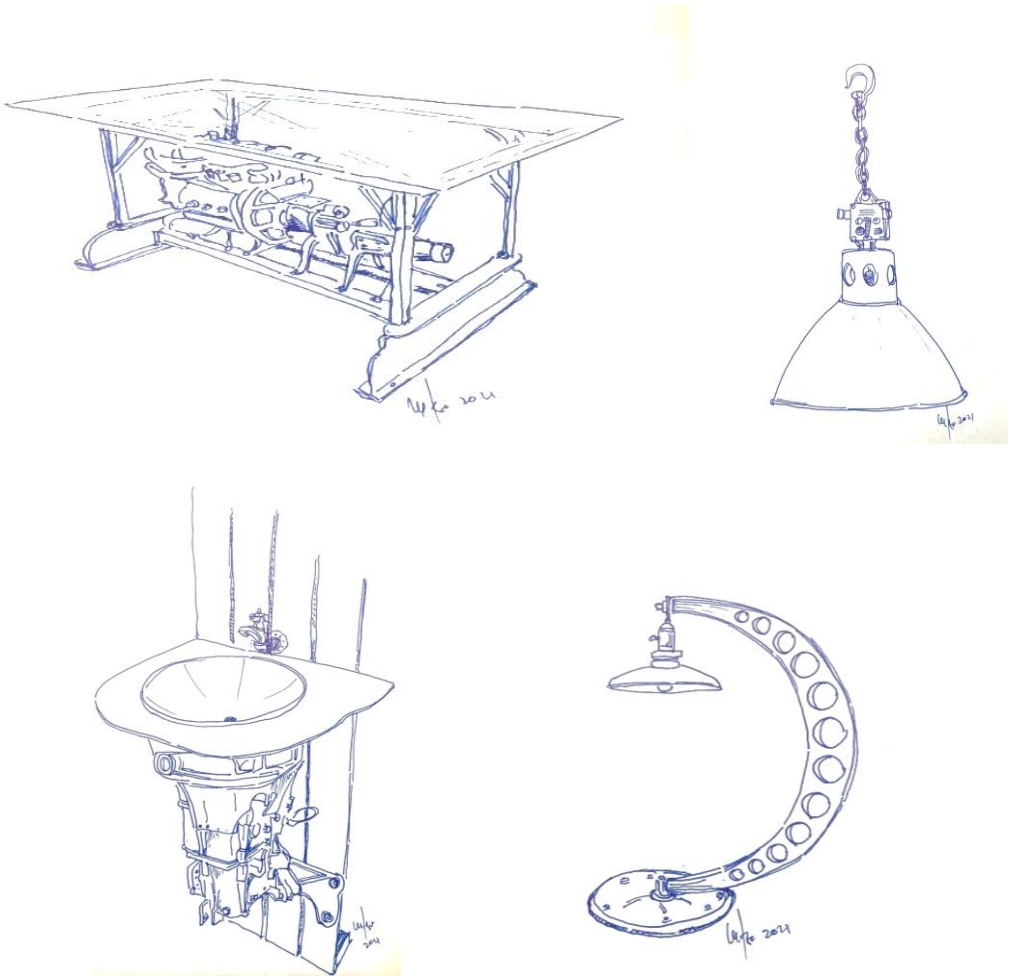
In realizing the research objectives explained in the background, Practice-led Research (PLR) applied research on kinetic sculptures that function as interior elements with car engine waste materials using the Design thinking: Art Exploration method. In the exploration stage, the researcher determines the theme of the creation idea to obtain a form that can adjust the space and compose between the sculpture and conventional interior elements, the process of thinking, imagination, taste, responsibility object, and interpreting the object from the found object and its assembly technique that does not eliminate the original form—the process of building the concept of creation or creating art. As a result of the concept of creation, the process of material exploration with experiments with new forms and

work techniques is focused on the aesthetic work of the function of the artwork in the interior space. The stage of forming a work of art is creating a new form by combining elements of found objects produced from various explorations or experiments. The technical formation of work requires the ability to determine unity and other parameters (Hendriyana, 2018), as well as following the guiding principles and rules in the concept of environment-based artworks (Thornes et al., 2008); art exists in the development of human beings' civilization as an essential part of human life. Colorful kinds of art can reflect human emotion, bringing them aesthetic pleasure and creating a variety of enlightenments for human beings. (Wang, X., 2016). This research is applied to three-dimensional art production (Ethical and Aesthetic Interaction in Environmental Art). There are three claims: (1) the proper ethical criticism of environmental art requires a production-oriented approach—an approach that appraises the ethical merits or flaws of the work in terms of how the artwork is created as well as the consequences of its creation; (2) that, depending on contextual factors, ethical flaws in environmental artworks may, but do not necessarily, constitute aesthetic flaws in those works; (3) that because environmental artworks appropriate part of the environment as an aspect of their identity, an aesthetic flaw in an environmental artwork necessarily also creates aesthetic disvalue in the environment—disvalue that exists in virtue of the creation of the artwork (Nannicelli, T., 2018). The goal is to produce environmentally reused-based sculpture artworks from the results of industrial processes, which are then created into new forms and presented in interior elements.

4.0 Findings

This research shows that industrial waste materials that concentrate, especially car engines, can be transformed into kinetic sculptures that function as fine art and functional interior elements. The material transforms into a new shape that maintains aesthetic and functional value. Between aesthetics and function, kinetic sculpture and interior elements are combined to create an aesthetic and inspiring space. Kinetic sculptures designed with scrap materials show how art can combine function and beauty in an interior context.

This research contributes to the understanding of environmental art by recycling industrial materials into artworks with an aesthetic and environmental impact. This is in line with the principles of ethical and sustainable art production. Looking from the perspective of interior design, it offers a practical guide to using kinetic sculptures as interior elements, integrating art and design to create a more inspiring environment, and evoking a sense of memory in the process of newness of the form of found objects that were once nostalgic according to their original function.



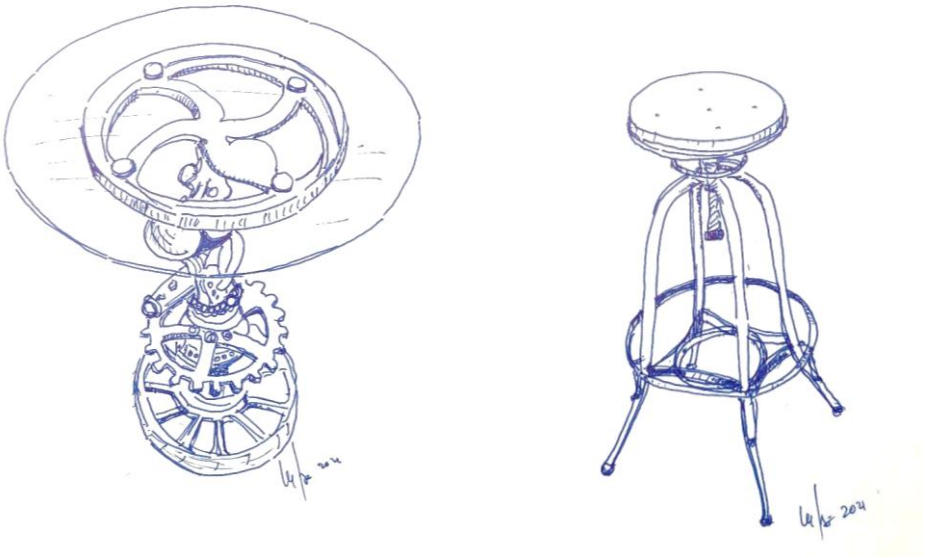


Fig. 6: The Creating Concept of Kinetic Sculptures as Interior Elements
(Source: The authors)

5.0 Discussion

Using used car engine materials to design functional sculptures shows how art and design can complement each other. The resulting kinetic sculptures enrich the visual experience and provide practical benefits in interior spaces. This shows great potential for innovation in the use of waste materials. Upcycling can combine various elements in one solid object, creating a unique and memorable design. This process protects the sentimental value of existing items and transforms them into new forms. Thus, upcycling gives interior spaces an elegant and aesthetic touch, while recycling increases the value of authentic items. (Ali, Nawwar Shukriah, et al, 2013)

6.0 Conclusion and Recommendations

The main challenges in the project included assembling complex scrap materials and ensuring the safety and stability of the functional sculptures. The solutions implemented include careful assembly techniques and special tools to ensure the sculptures function properly and safely. In modern society, we cannot avoid the influence of global popular culture, which has led us to excessive consumption patterns. With the rise of advertising and promotion, commodities are now judged based on their usefulness and the meaning and symbols they contain. As Jean Baudrillard notes in his work, the nature of our consumption often goes beyond basic needs and becomes a form of persistent dissatisfaction. (Waring J, Bishop S., 2015, p: xxiii) In a consumer society, the object of consumption is often defined by its relationship to a system of social signs and values rather than its actual function. Excessive consumption leaves a significant environmental impact, including the accumulation of waste that threatens the quality of human life. Waste, although often considered an enemy of the environment, can also have value if appropriately managed. In this context, art can influence our perspective on waste and provide creative solutions. Art can be a vehicle to explore and change people's views on waste. Sugiharto argued that art follows trends or media and adapts to evolving social and cultural contexts. In a society faced with the problem of waste, art can be present as a productive and creative form, transforming waste into aesthetic and functional works. (Sugiharto, 2013) Creating art with recycled materials, such as waste-based paints, adds a new aesthetic dimension. This aesthetic is rooted in the honesty of materials and the principles of popular culture that often emphasize surface values and pleasure. Art provides space for creativity and inspiration, serving as an oasis amidst the burdens of everyday life. Artworks that use waste as a material can symbolize innovation and environmental awareness. Recycled art expands aesthetic possibilities and serves as a medium of reflection and a solution to environmental problems. Artwork made from waste materials can show that art is not separate from environmental issues but can contribute to awareness and solutions to these problems.

Paper Contribution to Related Field of Study

This research is expected to guide the design of three-dimensional sculpture art in the context of industry and education to contribute to contemporary art's development and the artisan.

References

Ali, Nawwar Shukriah, Nuur Farhana Khairuddin, Shahriman Zainal Abidin, (2013). Upcycling:Re-Use And Recreate Functional Interior Space Using Waste Material. International Conference On Engineering And Product Design Education, pp. 798-803. Dublin: Dublin Institute Of Technology, Dublin, Ireland.

Gnatiuk, L., & Novik, H. (2018). Metal in the design of public transport stops. MATEC Web of Conferences, 170, 1–8. https://doi.org/10.1051/matecconf/201817003008

Hartini, L., Wibawa, B., Situmorang, R., & Raissa, F. (2020). Interior design of national library with environmentally sustainability materials. IOP Conference Series: Materials Science and Engineering, 1007(1). https://doi.org/10.1088/1757-899X/1007/1/012004

Hays, K., Kubli, C., & Malina, R. (2020). Creativity and Cognition in Extreme Environments: The Space Arts as a Case Study. Frontiers in Psychology, 11(September), 1–10. https://doi.org/10.3389/fpsyg.2020.575291

Hendriyana, H. (2018). Metodologi Penelitian Penciptaan Karya. Bandung: Penerbit Sunan Ambu Press. ISBN, 978-979

Huang, Z., Conway, P. P., & Qin, R. (2009). Modeling of interfacial intermetallic compounds in the application of very fine lead-free solder interconnections. Microsystem Technologies, 15(1 SPEC. ISS.), 101–107. https://doi.org/10.1007/s00542-008-0629-9

Jung, A., & Lee, K. (2019). Communication-oriented automobile design by a three dimensional sculpture educational model: Narrowing the gap between company work and education system. Archives of Design Research, 32(2), 71–88. https://doi.org/10.15187/adr.2019.05.32.2.71

Nannicelli, T. (2018). The interaction of ethics and aesthetics in environmental art. The Journal of Aesthetics and Art Criticism, 76(4), 497-506. https://doi.org/10.1111/jaac.12601

Petronijević, V., Đorđdević, A., Stefanović, M., Arsovski, S., Krivokapić, Z., & Mišić, M. (2020). Energy recovery through end-of-life vehicles recycling in developing countries. Sustainability (Switzerland), 12(21), 1–26. https://doi.org/10.3390/su12218764

Pozzi, F., Arslanoglu, J., & Nagy, E. (2020). Alexander Calder's Half-Circle, Quarter-Circle, and Sphere (1932): a complex history of repainting unraveled. Heritage Science, 8(1), 1–14. https://doi.org/10.1186/s40494-020-00419-7

Sugiharto, Bambang (ed.). (2013). Humanisme dan Humaniora, p. 28-29. Bandung: Pustaka Matahari.

Swann, C. (2002). Action Research And The Practice Of Design. Design Issues, 18(1), 49-61

Thornes, J. E. (2008). A rough guide to environmental art. Annual Review of Environment and Resources, 33, 391-411. Doi: 10.1146/annurev.environ.31.042605.134920.

Wang, X. (2016). Ecological art education. The Anthropologist, 25(1-2), 109- 116. https://doi.org/10.1080/09720073.2016.11892095

Zhou, X., & Lian, X. (2020). Discussion on Development Trend of Landscape Sculpture Based on Big Data Analysis Method. Journal of Physics: Conference Series, 1550(3), 032035. https://doi.org/10.1088/1742-6596/1550/3/032035

Waring J, Bishop S. George Ritzer. (2015). Rationalization, Consumerism and the McDonaldization of Surgery. In: Collyer F (editor). The Palgrave Handbook of Social Theory in Health, Illness and Medicine, pp 488-503. New York: Palgrave Macmillan. doi: 10.1057/9781137355621_31