Overcoming plastic waste problem in Indonesia: Case study in the art history class

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Abstract. Nowadays, more than ever, plastic waste becomes a major problem for almost every nation in the world, including Indonesia. Creative solutions are needed to be the answer to overcome this urgent issue. Although there have been many attempts to create better waste management, these ongoing efforts are still far from the expectation. Therefore, every sector needs to collaborate to be part of the solution, including the education sector. The young generation is fertile ground for the birth of innovative ways to reduce plastic waste. This research aims to show that everything, even things as old as historical artifacts, can be a source of inspiration to overcome the plastic waste problem in Indonesia. However, an appropriate skill set is needed to extract this local content and make it suitable for the current digital society. This qualitative research is conducted through a case study using lateral thinking mode to prove that all things can be the source of inspiration to generate ideas. We can conclude that ideas can come from anywhere in the form of anything. Even though historical artifacts come from a long time ago, and even some have been around for hundreds of years, they possess unique local ingenious capacities.

Keywords: waste management, plastic waste, lateral thinking

1. Introduction
When we heard the word "Bali," the thing that comes to our mind is the beautiful island of paradise with sandy beaches, colorful seashells, and glittering sunset. However, in reality, most beaches in Bali are filled with piles of plastics and trashes. It is not just Bali, but the whole Indonesian archipelago faces the same problem. In the South Sulawesi port of Paotere, micro-plastic particles are identified inside their fisheries. These particles are harmful to the human body, and they are found in salt intended for people's consumption [1]. A study in 2015 indicated that Indonesia was placed second amongst the list of countries contributing to plastic waste in the sea. Based on the World Bank's Indonesia Marine Debris Hotspots Rapid Assessment, one-fifth of all plastic pollutants in Indonesia are predicted to end in rivers and oceans [2]. At this rate, it is predicted that by 2050, oceans will be home to plastic more than fish (by weight) [3].

Plastic is not a substance that can be easily degraded. It needs hundreds of years, which means the number of plastic waste piles way more quickly than the amount of time they require to perish. From these facts, it is plain to see that plastic waste has caused a severe biospheric problem in Indonesia.
Therefore, some critical countermeasures need to be urgently done. In this smart society era, the young generation is expected to generate creative ideas to solve problems in daily life relentlessly. Campuses may be the ideal place to look for idea and innovation for overcoming the plastic waste problem.

2. Research methodology
This qualitative research using a case study method consists of data collection from journals and articles. It examines a case study in a class project titled “Design Creation: Re-imagine the Works of Art” undertaken by the first-year student in the Eastern Art Review, which is an art history module at the Visual Communication Design Class in Bina Nusantara University, Jakarta. As future designers, these students are expected to contribute to the nation’s creative industry – an industry that swiflts alongside technological advancement, and potentially become the next innovator to overcome the waste problem.

This article will discuss the nature of plastic waste as the core of Indonesia’s waste problem. It will continue by showing some programs that have been conducted to manage public’s waste in Indonesia so far. As an effort to contribute to this problem, students taking the modules are given a task to create solutions in the waste management sector. This research will start to discuss our case study by showing the thinking process of the students. To conduct this project, the students are taught to use the mode of thinking from Edward de Bono, called lateral thinking. Using this method, we will see the process of idea extracting from two seemingly unrelated topics, which are plastic waste and historical artifacts. Lastly, it will conclude that in this age of disruption, by applying a suitable approach, everything can be a source of ideas that are relevant to today’s technological advancement, including things as ancient as historical artifacts.

3. Plastic: Then and now
Since the late nineteenth century, the modern mass consumption of plastic as we understand today has commenced. Around the 1870s, celluloid and successor surrogates have been inducted to drop the production budgets of precious resources and desirable commodities, such as ivory scrimshaw and various timbers [4]. The use of plastic is quickly spread all over the world, including Indonesia. Today in Indonesia, plastics are regularly used practically in everything, namely shopping bags, bottled water, coffee cups, straws, food packaging, and others. Most of this plastic packaging is single-use only, which means the intrinsic and economic values of the material are lost once it is thrown away. From 175,000 tons of waste that Indonesian disposes daily of, approximately 24,500 tons are made from plastics. Regrettably, more than 80% of Indonesia’s waste is unsorted. Hence, it is challenging to recycle them [2].

3.1. Increasing trend of plastic ban
The trend of plastic banning is happening worldwide. Starting with the rules to charge the use of the plastic bag in supermarkets, this move has been applied since 2015 in the UK and has allegedly reduced 86% of the plastic bag use in supermarkets in the country [5]. From Asia, the Chinese central government declares a ban on imports of 24 classifications of waste, including plastics [6]. This move surprises the international audiences since countries that formerly export their plastic waste to China can no longer enjoy the convenience. If they cannot find alternative disposal, they have to reduce their number of plastic wastes. The Indonesia government recently has also launched a ban on single-use plastic bags. This policy raises Indonesian plastic manufacturers’ complaints, who are anxious because the ban will put a hindrance on the plastics industry [7]. In 2018, the Balinese Governor pronounced a ban on plastic bags, plastic straws, and polystyrene.

All these trends of plastic banning are supposedly objectively contemplated. However, despite their many flaws, plastic with its unbeaten character is the powerhouse material of the modern economy. Martin R. Stuchtey from the McKinsey Center for Business and Environment stated that with circular economy philosophy, an after-use plastic could be revolved into valuable substance, which would eventually benefit the whole supply chain [3]. In a voice with it, plastic manufacturers are adamant that the answer to plastic problem is on its waste management in addition to lessening
usage. Furthermore, the Indonesian Olefin, Aromatics, and Plastic Industry Association (INAPLAS) believes the ban will only obstruct the efforts to find creative solutions for plastic waste management [7].

3.2. Innovation in battling the plastic problem

For such public matters with a multitude of interests, it brings disparate people together, not just environmental organizations and conservationists, but politicians, engineers, entrepreneurs, journalists, Non-Governmental Organizations (NGOs), and others [8]. Several Indonesian individuals and companies have made some commendable attempts to tackle this environmental problem by offering their services. Balinese people, whose economy depends a lot on tourism, are fast to take action. In 2006, when most garbage collectors transferred household waste straight to the landfill, EcoBali was established to perform a trash separation with their sorting and material recovery facility. EcoBali provides a two-bin system to their subscribers: green bin for the paper; and the red bin for plastic, metal, glass, and other non-organic waste. Their service includes a routine garbage collection, transferring them to their facilities, starting to do the separation process to specific categories, and recovering from recycling plastics, metals, paper, glass, Tetra Pak cartons, and even specific Styrofoam. They also give waste management training for their business clients’ staff, such as restaurants, villas, and schools. The company conforms with the existing national legislation on waste management under the Ministry of Environment and guarantees that 100% of remaining residues are disposed of only in authorized facilities [9].

Another solution came from Avani Eco with their biodegradable and compostable bag, food packaging, straw, cutleries, and even poncho made from cassava. Founded in 2014 by Kevin Kumala, the company encourages the term ‘Responsible’ as a value of the previous three basic aspects: reduce, reuse, and recycle [10].

In the same year, a social enterprise venture, Waste4Change, was established with the insight from Indonesia’s Statistic Agency, which stated that currently, only 9% of the garbage in Indonesia was separated and reused. The biggest portion, 81% of it was unsorted. Meanwhile, 10% was separated but ended up being remixed. Waste4Change targeted that 10% of people who had already attempted to sort their plastics. The company had it collected and sorted, so it did not get mixed again like the existing system [2]. More prominently, teen sisters, Melati and Isabel Wijsen, initiated the founding of Bye Bye Plastic Bag in 2015. This venture started from a humble online petition when they were 12 and 10 years old. It has become one of the largest eco-friendly NGOs in Bali and has appealed international masses with representatives in 25 locations around the globe [7, 11, 12]. Of course, there are many other environmental enterprises in Indonesia, but we can see the similarity from those mentioned. They are all driven by the youth. Shaping young minds with ecological consciousness is vital for the continuity of a sustainable environment. Therefore, it is important to provide young people with some skill set to empower them in generating creative solutions for environmental problems.

4. Design creation: Re-imagine the works of art project

Educational theorists mostly agree that pupils study best when combining academic theories and classroom knowledge into practice. In environmental education, participatory and service-oriented learning is especially crucial [13]. In the class project, the students are expected to generate as many ideas as possible before choosing one that is considered the most potential as an innovation to help with the plastic problem. However, innovation does not suddenly appear out of thin air. It needs some effort, time, and process to produce one. Innovation is generally used to indicate revolution, especially in the technology field. It becomes substantial when good ideas are assembled and integrated into significant industrial structures that influence reforming the existing conditions and constructing new ones [14]. Inspiration to create an innovation can come from almost anything, both purportedly south and accidental occurrence. Even historical artifacts that come from hundreds of years ago can be a good source of inspiration. That being said, creativity is needed to link the gap between the so-called “old”
materials with the new audiences, in contemporary settings, who live in a technology-equipped world. To bridge the difference, we will use the concept of lateral thinking to seek new ideas.

4.1. Lateral thinking as the key to creativity
Lateral thinking is closely related to creativity. However, creativity is often only a description of a result. Lateral thinking is the description of a process [15]. Following De Bono’s model, in this mode of thinking, we are pushed to generate various ideas as many as possible without judging whether those ideas are on the right track or not. Every idea is welcomed. Lateral thinking does not follow any solitary track. Instead, it goes to a diverse ideation trajectory. We are not expected to think methodically, but we can do a random jump from one point to another, and later on, fill the gap inadvertently created during the process. Lateral thinking methods are very suitable for Visual Communication Design students since they will work in the creative industry once they graduate from the university. Working in the creative industry means that they will be placed in a situation which they need to generate various ideas within a limited time.

4.2. Historical artifacts as the source of inspiration
The National Museum of Indonesia (MNI) in Central Jakarta is one of the proper sites for students to interact with historical artifacts. Most students get their share experience of visiting museum when they are young, mainly from school trips, which are common for elementary and secondary school. However, more recently, reality is changing. Slowly but steady, more and more museums started to improve themselves both major and minor. These improvements enhance their potential to become places to absorb some information, not only just for students but also for the public of all ages. As one of the oldest museums in Asia, the collection of MNI comprises a significant time, from the stone-age collections dated back million years ago, to the everyday ethnographic instruments that are still in use in our daily life. Geographically, the museum’s collections encompass an expansive area from the Pacific to the Hindi Ocean. These diversities are materialized as a form of freedom for the students to choose their artifacts of choice to be their source of inspiration.

In the class project, each first-year student is given a set of tasks, starting with choosing their favorite object in the museum. Figure 1 shows an example of the historical artifacts selected by the student: the statue of Ganesha. After that, they need to do some research on the object of their choice. The elephant-headed Ganesha is one of the most beloved Hindu Gods. The statue in figure 1 is a copy of a similar statue in Leiden, the Netherlands. Here we notice that even though in the current time Indonesia is a nation with the biggest Muslim population in the world, there is a notion that this statue has no longer serve its original function as ritual paraphernalia.

![Figure 1. The Statue of Ganesha from Candi Singasari, Malang, East Java. (Source: Suhardjono, 2018)](image-url)
After finishing their research, the students start to make a visual audit by breaking down the elements of the statues, visually and content-wise, based on their previous study. Based on Ganesha's visual appearance and the chronicle, the students break down the statue into ten elements: elephant, house guard, vehicle, intelligence, axe, blessings, lotus, food, house ornament, and Hindu religion. We can see in Figure 2 that the student writes her breakdown accompanied by a few visuals.

![Figure 2. Visual Audit of the Ganesha Statue.](Source: Esteria, 2018)

After concluding the visual audit phase, the student uses lateral thinking by brainstorming many ideas as possible. Out of numerous generated ideas, they are expected to choose twenty best ideas (Figure 3). Again, we can see the different outputs from the first and second students – one is a written-based idea, and the other is a visual-based idea. Both outputs are allowed since the emphasis in this lateral thinking project is the idea itself.

![Figure 3. Twenty Creation Design Ideas from the Ganesha Statue.](Source: Esteria, 2018)

In the final stage, the student is expected to make a personal assessment on which design ideas are the most suitable for the current society’s condition. This society is accustomed to technology and
modern entertainment. Here the student chooses the concept of Ganesha rubbish bank (Figure 4). Ganesha rubbish bank is a vending machine that does not sell any product. It buys any rubbish that can be recycled. Every time people sell their rubbish into the machine, they can get a credit stored in Ganesha-card. The credit in this card can be used to buy stuff in real life. This device promotes the habit of recycling our rubbish.

![Ganesha Rubbish Bank](Figure 4. Final Design: Ganesha Rubbish Bank. (Source: Esteria, 2018))

We can see in the chosen ideas that the original content of the artifact has been altered to make it suitable for the contemporary context. Even the trace of Hinduism is no longer apparent. For this project, as the brief is about idea-generating, the product stays as “ideas” without a physical manufacturing stage. However, the new ideas show that these historical artifacts can be adapted as a source of inspiration in creating new products.

5. Conclusion
From the research, we understand that the plastic waste problem is a real danger for our ecosystem’s sustainability. There have been some commendable efforts to curb the problem, but we still need to do more. Young generations are our best stake to be the voice of solutions. From the sample of the class project discussed, we can understand that collaboration from the education sector can be used to generate innovations to solve the environmental problem and show our efforts to live in harmony with the earth. We can conclude that ideas can come from anywhere in the form of anything. Even though historical artifacts come from a long time ago, and even some have been around for hundreds of years, they possess unique local ingenious capacities. It can be a perfect source for getting inspiration. Hence, as a place that can be freely accessed by the public, museum as the home of many artifacts is an ideal instrument for lifelong learning. Besides utilizing historical artifacts as the source of inspiration, the young generation of Indonesian designers can grow the sense to love the nation’s heritage even more.

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