

***Creating Awareness About Planetary Wellness Using Projection Mapping Through  
“NOKTAH”***

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The Barcelona Conference on Arts, Media & Culture 2024  
Official Conference Proceedings

**Abstract**

Projection mapping transforms physical objects into immersive art displays. *Noktah*, a research-creation project, combines art, filmmaking, and upcycling to explore the connection between artistic expression and sustainability. By using video projections, audiences experience visual narratives that showcase the beauty of the natural world, address contemporary challenges, and explore the relationship between humanity and the planet, in line with the United Nations' Sustainable Development Goals (SDGs). Through projection mapping and micro short films, this project encourages reflection on planetary health. Each micro short film is paired with an SDG such as poverty, climate action, biodiversity conservation, responsible consumption, and health to raise awareness, provoke discourse, and inspire action. Interdisciplinary collaboration forms the theoretical framework of *Noktah*, bringing together artists, designers, and environmental experts to craft impactful works. Idea generation methodologies and prototyping processes are guided by the ethos of sustainability, focusing on upcycled physical artworks and digital storytelling. This approach integrates ecological awareness into the project's artistic narratives and material choices. This paper discusses the research-creation process behind *Noktah*, emphasizing how interdisciplinary collaboration informs its development. It also highlights the role of sustainability in the creation of projection mapping films and upcycled artworks. The study explores how *Noktah* can bridge the gap between art and advocacy, engaging audiences in pressing environmental issues while fostering a collective commitment to sustainable practices and harmonious coexistence.

Keywords: United Nations Sustainable Development Goals (UN SDGs), Projection Mapping, Upcycling, Installation Art, Filmmaking, Research-Creation

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## Introduction

Across cultures worldwide, the full stop is a punctuation mark used to signify the end of a sentence or indicate the end of a thought or idea. In the Malay language, the full stop is known as *noktah*. The function of the *noktah*, like its usage in English, Mandarin, Japanese or various other languages of the world, similarly marks the end of a thought or sentence. In 2024, *Noktah* was selected as the title for a projection mapping project held in conjunction with the Sunway University Planetary Health Summit 2024. In line with the Summit's aim of connecting global communities to seek solutions faced by humanity and the planet, a team of researchers/artists understood how a notch could become a focal point that connects ideas instead of signifying the end. *Noktah*, as a single dot, rather than signifying an end, when repeated thrice, forms an ellipsis—a symbol of growth, continuity, and the forward march towards a sustainable future. This led to the creation of *Noktah*, which serves as the focal point for a transformative group exhibition that delves into the critical theme of planetary health.

Through research-creation, each researcher/artist in *Noktah* correlates their short film and projection mapping with a United Nations Sustainable Development Goal (SDG). Upcycled items were used to create a display surface for short film projection to create a form of 3D projection that transforms digital films into real-life art exhibits to harness the transformative power of art to raise awareness, provoke meaningful discourse, and inspire collective action. This intentional pairing of filmmaking, art, and upcycled items transforms the exhibition into a thought-provoking exploration of artistic expression, global sustainability, and planetary health.

Guided by the SDG goals, *Noktah* portrays the complex relationships between humanity and the planet to harness the transformative power of art to raise awareness, provoke meaningful discourse, and inspire collective action. Audiences will experience dynamic visual narratives showcasing the natural world's beauty and addressing its challenges. This experience is aimed to inspire reflection, dialogue, and a collective commitment to positive change by merging art and sustainability.

Ultimately, *Noktah* strives to bridge the gap between art and advocacy, foster a deeper understanding of the interconnectedness between artistic expression and pursue a healthier, more sustainable world for all. This paper first discusses the research-creation process behind the project's inception, the creation of the short films and projection mapping. Second, this paper outlines how *Noktah* aimed to create a sense of planetary awareness by intentionally pairing art, filmmaking and upcycled products to create a thought-provoking exploration of artistic expression and global sustainability.

## Projection Mapping

Developed in the 1990s, projection mapping is defined as a simple hybrid of cinema, animation, and scenography (Schmitt et al., 2020). It is a form of mapping tantamount to spatial augmented reality, short film mapping and spatial correspondence. It is a technique to project digital content onto surfaces, often irregularly shaped objects or architectural structures. It transforms into a dynamic short film display that creates an immersive visual experience. This method is frequently used at concerts, fashion shows, music festivals, and performing arts events to create a physical illusion of images by combining audiovisual elements (Ekim, 2011). Such shows are performed live and prerecorded, and technology is

used as a tool to compose and edit programs to create motion graphics and images. It also presents readymade images to audiences by beaming short films using a projector onto three-dimensional objects.

The projection is effectively mapped according to the target object's shape instead of spilling onto walls. It becomes eye-catching as the short film is no longer a flat square on the wall but becomes an object in space resembling an animated sculpture. When overlaying computer-generated images onto a material surface using a projector, projection mapping forms an augmented reality (AR) backdrop where the virtual and real worlds blend seamlessly (Iwai, 2024). As such, 2d graphics become 3d when the image interacts with the projected surface as the surface provides messages through audiovisual elements (Ekim, 2011). Because image technologies influence how we represent ourselves, projection mapping offers a unique experience of amazement and wonder and does not always require any equipment on board the spectators (Schmitt et al., 2020). As such, projection mapping through electronic, technological, and digital art is increasingly significant at institutions and gallery events.

Although projection mapping has become standard, its place in research within the humanities and social sciences fields remains wanting. For *Noktah*, projection mapping enhanced audiences' visual impact and immersive experience. Projection mapping can transform static artworks into dynamic installations by projecting dynamic visuals onto physical surfaces. As shown in the cultural preservation and awareness exhibitions, these installations encourage audience engagement and call to action (Nikolakopoulou et al., 2022). *Noktah* also represents the link between human existence and the planet's health, as it involves projecting light and images onto a surface constructed from waste materials, as seen in Figure 1. As the visuals created by the six artists differ in the form and colour of projections, projection mapping allows for a multi-dimensional representation of the artwork, creating a rich and diverse visual experience. These attributes enhance the static canvas, allowing audiences to engage more in the visuals and embrace each artist's work's narrative.



Figure 1: Calibrating Projection Mapping Onto an Uneven Surface

## Upcycling in Malaysia

Upcycling is an effort to minimise waste and promote sustainability by finding new uses for items that would otherwise end up in landfills. In 2002, William McDonough and Michael Braugart defined the term upcycling, and it differs from recycling, which requires a copious amount of energy and resources to collect, sort and process unwanted items and waste. Often referred to as 'cradle-to-cradle', upcycling attempts to disrupt the environmentally unsustainable production cycle of 'cradle-to-grave'; sustainability issues include environmental and social matters (Wegener, 2016).

Rather than adopt the cradle-to-grave model—where items are eventually disposed of in a landfill or incinerator, upcycling adopts the cradle-to-cradle model, where resources are extracted and shaped into products that are ultimately resold. As a greener way of recycling, upcycling finds new purposes for items. Rather than throwing them away, the cradle-to-cradle model discourages the downcycling of low-end products. This model, however, favours upcycling as it repurposes products that offer improvements that allow for disposable items and create new value for these items. Examples of upcycling include turning old clothes into quilts or rugs, using empty glass jars as candle holders, or repurposing wooden pallets into furniture. Upcycling is also a fun and creative way to breathe new life into old items and reduce your environmental and social impact.

In valuing the new, the word upcycling is a sustainable alternative to throwing items away and is created by mixing “upgrading” or adding value with “recycling” or reusing (Wegener, 2016). In short, upcycling means reassessing and transforming waste or trash into something valuable. This process is essential because the challenges brought upon by socioeconomic inequalities, climate change, and ecosystem damage in Malaysia require changes in the behaviour of companies, governments, communities, and individuals. Aside from the environmental impacts, upcycling can drive social change by promoting sustainability, creating job opportunities, encouraging creativity and innovation, supporting marginalised communities, and raising awareness about waste and its impact on the environment and society. Besides promoting sustainable practices by reducing the amount of waste going into landfills, conserving natural resources, and reducing carbon footprint and need for new resources, upcycling also creates job opportunities and supports marginalised communities by providing them with a source of income and a way to use their skills and resources. Upcycling can be a powerful tool for social change, as it can promote sustainable practices, reduce waste, and support local communities.

Upcycling is gaining popularity in Malaysia for addressing waste management challenges and promoting sustainable development. According to the Solid Waste Management and Public Cleansing Corporation (SWCorp), Malaysians throw away about 39,078 tonnes of solid waste daily, equivalent to about 1.17kg per person (Zainal, 2024). The amount of waste generated is expected to increase with the country's growing population and economy. Upcycling can help address this challenge by reducing waste sent to landfills and promoting the efficient use of resources.

Malaysia's upcycling industry currently faces several challenges that limit its potential impact on sustainable development. One of the main challenges is a need for more awareness and understanding of upcycling. Many individuals and businesses in Malaysia need to become more familiar with upcycling, limiting its potential to reduce waste and promote resource efficiency. Currently, no specific policies or regulations support upcycling practices in Malaysia. Government support is needed to limit the growth and impact of the upcycling industry in the country.

Furthermore, the lack of a supportive regulatory environment can make it difficult for upcycling businesses to access funding and resources. In addition to these challenges, the upcycling industry in Malaysia is fragmented and lacks coordination and collaboration. The lack of collaboration and coordination can limit the potential of upcycling to promote sustainable development by limiting innovation and creativity in the production of upcycled products.

Despite these challenges, the upcycling industry in Malaysia has significant opportunities to promote sustainable development. Upcycling can create employment opportunities, promote economic development, and contribute to environmental conservation. Malaysia's growing population and economy provide a significant market for upcycled products, fostering economic growth and development. Furthermore, upcycling can contribute to environmental conservation by reducing waste sent to landfills and promoting resource efficiency.

Upcycling has the potential to contribute significantly to sustainable development in Malaysia by addressing waste management challenges, promoting economic growth, and contributing to environmental conservation. However, to achieve these benefits, addressing the challenges faced by the upcycling industry in Malaysia, including a need for more awareness and understanding, limited government support, and fragmentation, is crucial. By promoting collaboration and innovation in the industry and establishing a supportive regulatory environment, Malaysia can realise the full potential of upcycling and contribute to sustainable development. *Noktah* aims to serve as a conduit to pursue the narrative, as a catalyst to initiate public discourse, and to pique their curiosity in a visually striking manner.

### **Design Process of Upcycled Display Surface**

*Noktah* began with an open call to create artwork for display during the 2024 Planetary Health Annual Meeting and Summit. A dynamic collaboration emerged among six academic artists from Sunway University's Department of Art, Design and Media, and Department of Film and Performing Arts. This fusion of talent and vision sparked research-creation, culminating in short videos for projection mapping on an upcycled surface. Over lunches and brainstorming sessions, these artists explored their diverse strengths collectively, seeking a unified expression that captivated audiences and championed sustainability and planetary health. One common goal underpinning the entire output is that the output needs to be sustainable and address sustainability issues and planetary health as seen in Figure 2.



Figure 2: The Upcycled Base for Projection Mapping Entitled 'White Trash'

The team members brought expertise in visual aesthetics, graphic design, filmmaking, and multimedia artistry. Artists were keen on composition, colour theory, and manipulating visual elements to convey meaning and emotion. Their proficiency extended to graphic design principles, allowing them to craft visually striking imagery communicating complex ideas with clarity and impact. Additionally, their background in multimedia artistry equipped them with the skills to seamlessly integrate various media forms, such as digital graphics,

animation, and interactive installations, into their creative repertoire. Team members contributed their specialised cinematography, storytelling, and audiovisual production knowledge. Filmmakers and performers within this department excelled in visual storytelling, employing cinematic techniques to evoke emotion, immerse audiences in narrative worlds, and convey messages through film language.

Their expertise encompasses the technical aspects of camera work, lighting, sound design and the art of narrative structure, character development, and thematic exploration. Through their mastery of audiovisual production, they brought stories to life on screen with depth, authenticity, and resonance. The artists found common ground in their commitment to sustainability and planetary health. This shared ethos guided their creative exploration, anchoring their collaborative efforts in a shared vision of using art for positive change. They embarked on a journey to explore the intersection of art and environmental consciousness, seeking to amplify their collective voice and inspire action towards a more sustainable future. Through their collaborative endeavours, they aimed to harness the power of creativity to raise awareness, provoke thought, and cultivate a deeper connection to the natural world.

Resolume Arena was used to project visuals onto the installation. Although open-source options like MapMap and VPT8 were initially considered, Resolume Arena was ultimately selected because of its advanced mapping features and flexibility, which proved essential given the complexity of the artwork's shape and the need for real-time adjustments during the exhibition as well as its stability in managing six different visuals over long periods.

Significant technical challenges were encountered while implementing projection mapping on *Noktah*. These included precisely calibrating projections to align with the installation's intricate curves and uneven surfaces. This process necessitated meticulous adjustments to ensure the seamless blending of visuals with the organic form of the artwork, effectively enhancing its dimensionality and creating a captivating visual display for audiences. Furthermore, all six exhibitors undertook extensive efforts to learn unfamiliar software for mapping visuals. This resulted in a trial-and-error process and learning experience.

A collection of video projections, conceived by six distinct artists, were meticulously aligned onto a three-dimensional art installation constructed from upcycled materials. The projection technique involved the utilisation of a projector to achieve visual effects on the three-dimensional, uneven projection surface. Complementing the visual spectacle, a sound bar was affixed beneath the installation to augment the immersive atmosphere. Additionally, informational posters were strategically positioned within the designated area to elucidate the conceptual underpinnings of each artist's contribution, thereby enriching the collective exhibition. The exhibition space was deliberately situated in a dimly lit corner to heighten the sensory engagement of attendees.

## **Findings and Discussion**

As part of this research-creation process, the interdisciplinary design theory is adapted as a guiding theoretical framework. Interdisciplinary design theory is an approach that emphasizes integrating knowledge, methods, and perspectives from multiple disciplines to address complex problems, create innovative solutions, and foster holistic understanding (Menken & Keestra, 2016). This theory operates on the principle that no single discipline can adequately address the multifaceted challenges of contemporary issues, such as sustainability, planetary health, or urban planning. Instead, it advocates for the collaboration and intersection of



various fields to produce more comprehensive and effective outcomes (Repko et al., 2019). By transcending traditional disciplinary boundaries, interdisciplinary design theory encourages flexibility and creativity, making it particularly effective in tackling complex, real-world challenges that demand multifaceted and innovative solutions.

For *Noktah*, the concept and design process began with a brainstorming session to visualise the collaborative endeavour. A chart was created to map the individual strengths and interests of each artist. Keywords included sustainability, upcycling, filmmaking, documentary, trash to treasure, visualisation, heritage preservation, sustainable development goals, impact, surface, and shape. As expected, the mind map grew exponentially and included a section naming the collaborative project. Some key initial words included Earth and Sphere, which the team agreed upon but decided to translate into the Malay language instead to promote the national language at a poignant international event.

This collaborative mapping identified overlapping areas where strengths intersected, signalling opportunities for synergistic collaboration. This visual representation provided a roadmap for the collective journey, ensuring that each artist's contribution found resonance within the broader thematic sustainability framework. Guided by shared principles, creating a series of short films tailored for projection mapping commenced. Each short film serves as a narrative vignette, exploring diverse facets of sustainability and planetary health through the lens of artistic expression. Drawing inspiration from nature, technology, and human interaction, the short films offer a poignant reflection on the interconnectedness of global ecosystems and the imperative of collective action.

There were three iterations for the projection mapping surface. The first version was the most ambitious; it used three sets of projectors, one mounted and projecting downwards, and two others on the floor projecting upwards onto a semi-spherical shape representing the Earth mounted on the wall. Collective research revealed how difficult it would be to quickly create such a surface from sustainable materials. The second iteration would use three projectors to project short films onto three smaller semi-spheres in a row, mounted on a wall. Figure 3 shows a 3D rendering visualising the latter, showing the impact would be more significant with a larger sphere. It was back to the drawing board for the team.

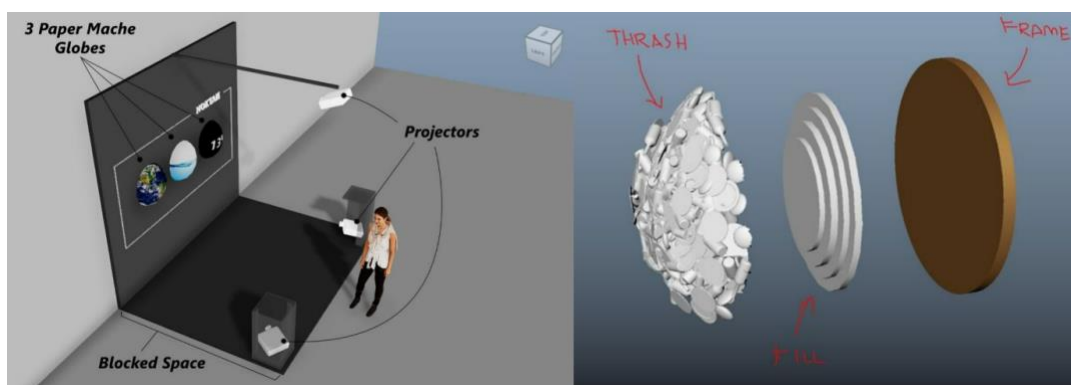


Figure 3: 3-Dimensional Visualisation of Ideas 2 and 3 for Spatial Impact

Considering the cost and potential visual narrative impact, the team decided to utilise simple techniques and materials rather than custom-ordering a brand-new structure using new raw materials just for this project. Hence, discarded objects were transformed into a giant canvas with an engaging uneven surface for projection mapping, breathing new life into forgotten relics of extensive consumer culture. It was painted white for projection purposes, and it was

entitled 'White Trash' as shown in Figure 4. From leftover wood panels to repurposed toys, packaging, car parts, e-waste and metal scraps, the projection mapping surface now infused a vibrant tapestry of light and sound. This process of creative reimagining, which is filled with various narratives, invites more significant potential for discourse. Conventional notions of waste and consumption were challenged, inviting audiences to contemplate the transformative power of art in shaping sustainable futures.



Figure 4: Projection Mapping on 'White Trash'

The immersive nature of projection mapping provided a dynamic platform for artistic exploration, transcending traditional boundaries of space and perception. As depicted in Figure 5, the collection of short films unfolded across the uneven textured landscape of upcycled surfaces, creating distorted imagery; they invited audiences on a multisensory journey through realms of imagination and possibilities. By seamlessly integrating art and technology, the aim was to provoke thought, evoke emotion, and inspire action to support planetary health.



Figure 5: Projection Mapping Setup With Upcycled Décor Pieces



The research-creation journey culminated in short films illuminating the intersection of art, sustainability, and planetary health. Through projection mapping on upcycled surfaces, the confines of conventional art forms were transcended, harnessing the power of collective imagination to spark dialogue and drive positive change.

### Significance of Short Films and SDG Mapping

Each short film carries the themes of the UN SDGs (Programme, 2023). These films transcend the boundaries of traditional storytelling, weaving together elements of artistry, activism, and advocacy to provoke thought, stir emotion, and inspire action, as noted in Table 1 and Figure 6, respectively.

Table 1: Description and Mapping of Short Films to SDGs

<b>Title &amp; Description</b>	<b>SDG Target</b>
<b>Fisherman Tiram</b> <i>A short film highlighting the necessity for further support to bolster the oyster farming industry and combat poverty.</i>	1 (No Poverty) <i>Poverty eradication through targeted interventions for vulnerable populations and enhancing resources for communities facing conflict and climate-induced crises.</i>
<b>Culture, Heritage &amp; Nature</b> <i>Derived from culture and heritage digitisation in VR360 Data Capture format.</i>	11 (Sustainable Cities & Communities) <i>Strengthen efforts to protect and safeguard the world's cultural and natural heritage.</i>
<b>Resonance Reclaimed</b> <i>Composed of upcycled materials for projection mapping.</i>	12 (Responsible Consumption & Production) <i>Managing resources, reducing pollution, promoting recycling for sustainable consumption, food security, and transitioning to a resource-efficient economic model.</i>
<b>Fading</b> <i>Visualises global temperature data, aiming to raise awareness of climate change by presenting academic information in a visually captivating manner.</i>	13 (Climate Action) <i>To mobilise US\$100 billion annually for developing nations to mitigate climate disasters, support sustainable development, and limit global warming.</i>
<b>Wasteful Echoes</b> <i>Confronts societal consumption habits through motion graphics, urging introspection and a shift towards sustainability, justice, and compassion.</i>	14 & 15 (Life Below Water & Life on Land) <i>Preserving marine ecosystems from pollution and acidification, advocating conservation through international legal frameworks and conserving biodiversity for food security, climate resilience, and peace.</i>
<b>O</b> <i>Experimental film exploring the cyclical nature of existence, inviting audiences to reflect on universal rhythms.</i>	17 (Partnership for the Goals) <i>Facilitating technology to spur innovation and promote investment in underdeveloped regions.</i>



Figure 6: Display of Artist Expressions for *Noktah* on Discarded Boxes

## Conclusion

This paper discussed how projection mapping through *Noktah* has become a platform to create awareness by creating discourse about the UN SDGs. *Noktah*, through its ability to transform its surface made from recycled items into a dynamic campus, becomes a powerful apparatus for further engagement about critical subject matters. As *Noktah* signifies a symbol of growth, continuity, and the forward march towards a sustainable future, it has become the focal point for a transformative group exhibition delving into issues regarding planetary health. Through research creation, the *Noktah* short films projected onto an upcycled display surface helped to raise awareness, provoke meaningful discourse, and inspire collective action about the UN SDGs. The week-long exhibition, which explores the connection between artistic expression, global sustainability, and planetary health, has discussed critical global issues that can be narrated visually. Using themes related to six SDG targets puts forth our current challenges' urgency, interconnectedness, and intricacy.

Overall, the *Noktah* projection mapping was well-received, garnering positive feedback from audiences. The audience was drawn to the uniquely shaped installation, and the visual was projected onto the artwork, inviting them to experience the artwork more dynamically and in an immersive way. This approach to showcasing art in a non-traditional setting sparked meaningful conversations about the intersection of art and technology and its potential to convey powerful messages about planetary health. Its captivating projection mapping and thought-provoking themes sparked meaningful discussions around sustainability and planetary health. The engagement with the audience was notable, with many expressing admiration for the innovative approach to addressing pressing global issues through art, including using discarded boxes to mount the exhibition posters rather than opting to mount them on foam boards.

The positive reception has allowed the artwork to be displayed again for the 2024 Times Higher Education conference week. This extended opportunity not only underscores the resonance of *Noktah* but also highlights its potential to continue inspiring dialogue and action in diverse settings. There is an opportunity to further amplify the impact of *Noktah* by speaking with visitors during the upcoming exhibition. This presents a chance to gather

valuable insights, reflections, and reactions from those who experienced the artwork firsthand, providing valuable feedback for future iterations.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

Authors declare the use of generative AI and AI-assisted technologies in the writing process.

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