# DESIGN FOR INTERCULTURAL INNOVATION

## Cumulus Regional Seminar China Dutch Workshop Days

Cumulus Regional
Meeting Proceedings
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Cumulus Association

Xi'an Jiaotong-Liverpool University 西交利物浦大学

NL Netherlands

XJTLU | DESIGN SCHOOL

**Design for Intercultural Innovation. Cumulus Regional Seminar China— Dutch Workshop Days**

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# DESIGN FOR INTERCULTURAL INNOVATION

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# Forward

It is with great pleasure that I present the proceedings of the Cumulus Regional Seminar 2024, Design for Intercultural Innovation, hosted by the Department of Industrial Design at Xi'an Jiaotong-Liverpool University (XJTLU) in Suzhou, China.

Held over two vibrant days in November 2024, the seminar brought together academics, designers, practitioners, and students from across China and abroad, united by a shared commitment to exploring how design education and practice can thrive at the intersection of cultural traditions and emerging technologies. With participation from over forty leading Chinese institutions alongside distinguished guests from the Netherlands and the broader international Cumulus network, the event offered a rich and multifaceted dialogue on the future of design in an increasingly interconnected and technologically complex world.

The theme, Design for Intercultural Innovation, challenged us to think deeply about how we maintain, adapt, and reimagine traditions in the age of rapid digital transformation. Across keynote lectures, panel discussions, exhibitions, workshops, and parallel sessions, participants reflected on critical questions: How can traditions inform new forms of making and creativity? How do emerging technologies such as artificial intelligence reshape our educational practices? And how do we ensure that interculturalism remains at the heart of design innovation, rather than becoming lost amid homogenising forces?

The contributions collected in this volume represent a selection of the ideas, research, and creative practices presented during the seminar. They embody a broad range of perspectives — from explorations of craft and heritage in contemporary education, to investigations into AI-driven design processes, to new proposals for intercultural engagement in design pedagogy. Together, they demonstrate the diversity of thought and practice that characterises our global design community and affirm the critical importance of sustaining an intercultural dialogue in design education and research.

This seminar and its resulting proceedings were made possible through the collaborative efforts of many individuals and institutions. I would like to extend my sincere gratitude to all the authors, presenters, session chairs, organisers, and supporting staff who contributed to the success of the event. I am especially grateful to our colleagues

from the Netherlands for their close collaboration, and to the Cumulus Association for their continued support and encouragement.

As you read through the contributions in these proceedings, I hope you find not only new knowledge but also new questions to pursue — questions that inspire us to imagine more inclusive, responsible, and innovative futures for design. May the conversations initiated during the Cumulus Regional Seminar 2024 continue to grow and evolve, building bridges across cultures and disciplines.

**Cheng-Hung Lo, PhD**
General Chair, Cumulus Regional Seminar 2024,
Head of Department of Industrial Design,
Xi' an Jiaotong-Liverpool University

## XJTLU hosts Cumulus regional meet: Design for intercultural innovation

This event marks a significant milestone for Xi'an Jiaotong-Liverpool University as a member of the Cumulus Association. Since joining Cumulus in 2021 and introducing our school at the Rome conference, we've been active members eager to integrate into this vital community of like-minded institutions. We participated in the 2022 Town Halls preceding the Board and President elections, established the FINDER working group (Future of Industrial Design Education and Research), and contributed to annual conferences in Antwerp, Beijing, Budapest, and Monterrey. Hosting one of the first Cumulus Regional Meets – titled 'Design for Intercultural Innovation' – held deep meaning for our team, representing a moment of recognition and unity.

Xi'an Jiaotong-Liverpool University is an international joint venture university founded by Xi'an Jiaotong University and the University of Liverpool. We embody this cultural blend daily: our faculty come from across the globe, and it is through this synergy that we shape our vision for Industrial Design practice. The 2024 Cumulus Regional Seminar allowed us to welcome designers and educators from China, abroad, and notably the Netherlands, to discuss challenges and opportunities in design education amid rapid AI advancement and emerging technologies. To foster this dialogue, our two-day program featured keynote presentations by the Cumulus China network and Dutch design educators and practitioners, parallel sessions sharing academic and practice-based research, student workshops, art performances, PhD poster presentations, and vibrant networking moments enabling authentic human exchange.

The Proceedings present contributions from keynote speakers, authors, and participants of the Seminar, including research posters from XJTLU PhD students and creative projects from the parallel program. Each submission responds to the central theme, presenting either a research project in progress or an adaptation of existing work that addresses the Seminar's core question: formulating a response to technological disruption in intercultural design education. This short-format collection serves to document initial reactions and insights, thereby establishing a basis for future strategic development.

Cumulus events capture the essence of dialogues among designer-friends who share, evaluate, and debate design's critical issues. Through these exchanges, we build tangible outcomes that

stay in memory and inspire future generations. This event was an open invitation: to witness design's transformative power when embracing cultural complexity as its greatest asset, and to participate in shaping a globally engaged design ethos – one recognizing that resilient, equitable, and beautiful futures are woven from humanity's rich, diverse cultural threads.

Creating such meeting opportunities was my primary goal. I am profoundly grateful to all who made this possible: the Cumulus Association, President Prof. Lorenzo Imbesi, and Secretary General Eija Salmi for their support and online welcome; our dedicated Industrial Design team; the Cumulus China community; the Consul General of the Netherlands in Shanghai for backing the Dutch programme; our indispensable student volunteers; and every participant who infused this event with reality, warmth, and motivation for future ambitious endeavors.

**Mariia Zolotova, PhD**
Executive Chair, Editor, Assistant Professor,
Department of Industrial Design

## Seminar overview

## International seminar explores design for intercultural innovation

How can we better exchange our respective creative ideas to bring novel solutions to older problems? How do we contribute to the intercultural innovation of design? These were some of the questions asked at the Cumulus Regional Seminar on Inter-Cultural Innovation held at Xi'an Jiaotong-Liverpool University from 28 to 29 November. The event aimed to seek opinions and generate debate about the collective responsibility to maintain an intercultural dialogue about the role of creatives in fostering change in our world.



**Panel discussion of the seminar**

It gathered designers to discuss the ongoing challenges and opportunities in design education related to the rapid development of AI and other emerging technologies. It also welcomed design leaders from the Netherlands as part of the Dutch-Chinese collaboration on culture, innovation, and education.

The two-day seminar invited 11 keynote speakers from academia and industry to share insights and foster dialogue and collaboration.

It also incorporated two panel discussions, two workshops, 20 themed presentations, a PhD poster session, live performances, a digital exhibition showing design objects from the Stedelijk Museum Amsterdam Collection, and a game called "Refugeoly."



**Prof. Youmi Xi**



**Marjo Crompvoets**

Professor Youmin Xi, Executive President of XJTLU, said in his opening speech video that XJTLU believes in creating connections that overcome boundaries in cultures, academia, or industry.

> "This seminar exemplifies that belief, bringing together faculty, students, and professionals from across China and beyond to share ideas, explore innovations, and imagine the role of design in shaping a more inclusive and sustainable world."

Marjo Crompvoets, Dutch Consul-General in Shanghai, said that this seminar is a testament to the importance of collaboration and dialogue in shaping the future of design, education, and professional practice.

> "Intercultural innovation is more than just a concept. It is a call to action and an invitation to rethink how we educate, design, and create in a world that is more interconnected, and facing more challenges than ever before."

Professor Lorenzo Imbesi, the President of the Cumulus Association and Full Professor at the Sapienza University of Rome, delivered his greetings online.

Professor Lorenzo Imbesi
giving speech online

Ingeborg de Roode

"The topic of the seminar resonates very much with the mission of Cumulus, as we are now reaching nearly 400 members in 71 countries in every corner of the globe.

"The seminar is about developing new forms of local internationalisation, sharing the value of different cultures, and building an international space of knowledge," he said.

One of the keynote speakers, Ingeborg de Roode, an industrial design curator at Stedelijk Museum Amsterdam, talked about what design can do to make the world a better place.

"Nowadays, there are many more new challenges like climate change and sustainability. Finding materials that help against the climate crisis is one of the main issues for designers all over the world.

"Apart from that, more and more design now is about interfaces and non-material projects, such as services and online apps. This means that the focus of design has been shifting from product design to system design as an important development towards sustainability," she said.

Other keynote speakers included Dr Miaosen Gong from Jiangnan University, Dr Francesca Valsecchi from Tongji University, Professor Joseph Press from L'École de design Nantes Atlantique and the China Academy of Art, Dr Tian Ye from Gengdan Institute of Beijing University of Technology, Dr Li Yicheng from Soochow University, Professor

Marc Aurel Schnabel from XJTLU Design School, Dr Enza Migliore from Southern University of Science and Technology, and Professor Daan van Eijk, Dr Annemiek van Boeijen, and Stefan Persaud from Delft University of Technology.

Performance artist KIMVI, who is an assistant professor from XJTLU's Department of Architecture in collaboration with Senior Associate Professor Jacob de Baan and Research Assistant Boyi Zhou from the Department of Industrial Design, dedicated a live performance titled "Ambiguous Antiquity" to the event. She explored re-imagined uses of the oldest ceramic reconstructed vessel, to deepen the connection to the past while pursuing artistic inquiry of cultural artefacts.

The seminar was co-organised by the Department of Industrial Design in the Design School and Academy of Film and Cultural Technology at XJTLU. The organising committee included Dr Cheng-Hung Lo, Dr Mariia Zolotova, Jacob de Baan, Paul Denison, Emanuela Corti, Luis Felipe Moreno Leyva, Professor Richard Appleby, Aven Le Zhou, Dr Mengjie Huang, Zhongshan Chen, Andrew O' Dowd, Xiaokun Zhang, and Ferdinand Ogada.



**Kimvi Nguyen's live performance**
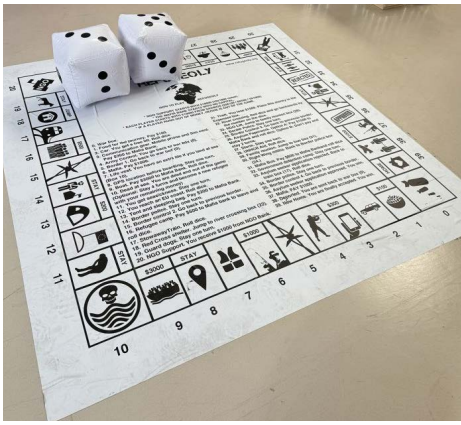
The game "Refugeoly", designed by Vicente Esteban, Associate Professor from XJTLU's Department of Industrial Design, invited participants to take on the role of a refugee as they try to navigate their way to safety

A "Mazha Workshop" was part of the seminar

# Feedback Dutch participants

### Ingeborg de Roode, Curator Industrial Design
### Stedelijk Museum Amsterdam

I liked my participation because the different lectures were complimentary. I was the only one who spoke from a design curator's perspective. I think that was especially interesting because Shanghai is developing an Industrial museum now in which the XJTLU might be a partner.

### Annemiek van Boeijen, Assistant Professor TU Delft
### & Ingeborg de Roode, Curator Industrial Design
### Stedelijk Museum Amsterdam

We liked the seminar a lot because although the conference was small in terms of number of participants, it was a very pleasant scale to get in touch with scientists, designers, people who work in the design practice, and finally design students. In terms of content, there was a lot of overlapping interests and values: social issues and concerns, the role of design and AI, and the attention for and relevance of form and its meaning. In short, it was an integrated program that fits well with what design is at its core, integration with the need for transdisciplinary cooperation. In addition, we were very well received and there

was enough time for social cohesion in the form of eating together, doing workshops, and guided tours. It strikes us that the design world uses everywhere in the world a similar language and discourse. At the same time, we see and know that we live in different societies with much that unites us and at the same time different needs, issues, paces of time, outcomes of design, design education etc. The suggestions below are not really improvements but topics of interest to make the exchange of different contexts explicit:

— One or more sessions (in small groups) to discuss (dialogue) the desires and needs for international cooperation from different perspectives.

— One or more sessions to discuss (dialogue) the future of design in Asian region versus European region. A practical point: a list with participants to be handed out when arriving could improve interaction even more.

It was very well organized. And I loved to be in China again and see all the developments.

## Stefan Persaud, Senior Lecturer TU Delft

I participated in the seminar as a key note speaker, panel discussion member And workshop organizer. I liked the seminar a lot because it was wonderful to really have time to meet people and see the spaces. It felt personal and engaging. Nice mix of several activities covering the topic of the seminar. I liked my participation because I was very pleased with the opportunity to share my insights in our approach to coaching student teams. The first workshop on Coaching Design teams focused on connecting team members through sharing your personal diversity so we provide opportunities for team members to see us with fresh eyes. Wonderful student conversations emerged, many smiling faces and a positive vibe. My second workshop on Coaching Design teams, focused on connecting to the heart through conversations about mothers and fathers (and grandmothers and grandfathers). I was very pleased the workshop was fully booked. Students were very enthusiastic. Many people from Europe were sceptic due to their bias of Chinese people not being open in conversations on personal matters. But the opposite was true. All students engaged

in beautiful conversations, surprising each other on their family stories, uncovering history and creating deeper connections. Conversation even continues long after the workshop. I was delighted to also be part of the keynote and discussion panel, listening to the industry perspective and hopefully also adding some of my own perspective.

I have the following suggestions for improving the seminar: It would be fantastic if we could set up more moments to create collaborations. Collaborations between student projects and educational approaches.

Bringing a Dutch Design group together with different perspectives on design: research, museum, international collaboration and education was more than just connection and we will take that home to Delft.

It was an unforgettable experience at the Cumulus Seminar at XJTLU. I shared many of the positive vibes to my department. I will be happy to take the collaboration further, beyond the friendships that have emerged.

Hopefully we can set up some collective educational research projects or other collaboration in addition to individual exchanges of students. Maybe we can team up on our research on Coaching design teams, but also Productive Failure Pedagogy which we use in our engineering courses or Design for Repair & Recyclability. Let's see if we can find some grands for that. Let's stay in touch and find a way so you can also come and visit us at Delft. The personalities of the organizers really shined through, well done.

**Yi Qian,**
External Liaison Officer for Design School, XJTLU

**Edited by Catherine Diamond,**
Editor, XJTLU

**Jacob de Baan,**
Dutch Programme Chair,  Senior Associate Professor,
Industrial Design Department, XJTLU

## Day themes.
## Design for intercultural innovation

As the title Design for Intercultural Innovation suggests, this seminar is broadly defined to seek opinion and to generate debate about our collective responsibility to maintain an intercultural dialogue about the role of creatives in fostering change in our world. It is our duty therefore to bring to bear the specificities of our differentiated experiences and educations to expose innovation which is truly 'across cultures'. To this end, the symposium asks the following questions: how can we better exchange our respective creative ideas to bring novel solutions to older problems; what do we expect from interculturalism? How do we measure intercultural innovation?

Beyond these central questions there are some premises from which this seminar emerges, notably the pressing debate about emergent technologies as they correspond to more traditional ways of doing things. Since the location for this event is a university, and since we can't do everything here, it follows that we should limit ourselves to those debates which embrace developing best educational practices at this pivotal moment in history.

## Day 1
## Theme: Old norms: Tradition at the intersection of new technology

How does the preservation of tradition encourage intercultural innovation? On this day we invite speakers to describe /explore their practice or the practices of others, from the perspective of 'tradition'. A tradition may be simply construed as a norm, or a historic practice. It can simultaneously refer to manual, analogue, pre-mechanical, pre-digital, craft or artisanal skills and practices. Since tradition and the preservation of 'heritage' are often bound up with museums, we also invite those who work at the intersection of museums and education to this strand. We might additionally consider the role of museums in the preservation of craft; the formation of Museum 3.0; craft revival and craft as opposition. How can craft, which is often characterized as 'local', also be intercultural? And, since craft is inevitably 'making', then it is crucial to discuss what value 'making' brings in the class-room. How important is it for students to draw, to make models, to know about materials? What human characteristics does making sustain?

Importantly, how are these norms shifting? What novel practices are evolving? What kinds of hybrid results are they producing? How does the changing face of tradition serve economic ends?

## Keywords:

Outsider / Borderless / Unlocated / Regional,
Post-Craft / New Craft / Hybrid Crafts,
Making / Co-creation / Co-production,
Community / Skilling / De-skilling / Re-skilling,
Museums 3.0 / New Museology / People Museums,
New Ludditism / Making in opposition,
Craft economy / Hybrid economies

## Day 2
## Theme:  New norms: True innovation, across borders, in the age of AI

There has been enough discussion already of how new and so-called 'artificial intelligences' challenge and enhance the education and practice of design? Since the focus of this symposium is the extent of interculturalism, we should therefore extend the debate by asking, how can our differentiated and local experiences of AI and emergent technologies be shared in the pursuit of innovative outcomes?

It is widely known that China's investment in AI and emergent technologies is strategically prioritized. For this strand we invite practitioners for whom this is becoming a norm. We welcome their views and anecdotes about the up-take of new practices. We solicit their perception of the merits and pit-falls of such novel approaches. We are especially keen to learn about how educational norms can be revised and whether such revisions be radical or incremental. And, critically, we ask whether AI leads to homogenization or depletion of creative outputs and if so, how can we avoid such a state?

Furthermore, regarding the future(s) of design education, what has China learnt that could be useful elsewhere? Since AI is fundamentally bound up with "prompts", how should educators address this? Should contextual studies now include the practice of prompting? Are students able to prompt without knowing design history and theory?

And back to Intercultural Innovation. Since our markets are increasingly global, and our communications eternally disrupted and polluted, how do we maintain the health of the global dialogue about design

activity for human well-being? How do we ensure the normal ethics of design practice do not diminish in the face of new imperatives?

## Keywords:
AI and Design Education,
Radical Education,
Homogenisation / Differentiation,
Teaching Prompting / Prompting the Prompters,
Speculating about the Design Profession 2050

**Paul Denison,**
Proceedings Editor in Chief,
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# Track 1 Keynotes

# A Zheng Sitting:
## A Chinese Case of Cultural Tracing and Design Innovation for Sustainability

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**Keywords:** Zheng Sitting, Cultural Tracing, Sustainable Design, Design Innovation

# Introduction

Today, human society is facing increasingly severe challenges of sustainable development, such as climate change, food security, health and other threats that are intensified day by day. Sustainable design is not only limited to materials, products, processes and other physical or technological factors, but also shifts to service system, lifestyle, social innovations and those referring to behavior changes for building a sustainable society (Manzini, 2015). While until now the goal of sustainable development seems getting farther than before ever. It's necessary to continue going deep into cultural perspective for sustainability since human's behavior and lifestyle eventually depend on the culture they have. As the only existing ancient civilization among the four, China has a long history and splendid culture. During most of the history of human civilization, it maintained a position as the world central empire with leadership in culture, economy and military. Those basic historical facts tell that Chinese civilization contains wisdom of sustainable development, and tracing the origin of Chinese culture may open a door towards a sustainable society (GONG, 2021).

This article presents a case of design for sustainability on the topic of Chinese culture tracing and design innovation at DESIS LAB of Jiangnan University. The case focuses on a common behavior in ancient Chinese daily life, Zheng Sitting, which has completely disappeared in daily life today in China. By cultural tracing, this article tends to explore its sustainable value, to find design opportunities in modern daily life, and puts forward design proposals, in order to bridge the excellent traditional Chinese culture and the contemporary sustainable lifestyles.

# Zheng sitting, sitting without chairs

Zheng Sitting, also called kneeling-sitting, a kind of sitting without chairs, is a normal way of sitting of Ethic Han people in ancient times in China. The Chinese word of "Zheng " also means "normal", "correct" or "straight", in practice, Zheng Sitting means to let knees kneel, legs flat on the ground, hips attach to heels, upper body keep straight, and hands stay on the knees regularly (Fig1,2). Such a sitting posture embodies dignity and concentration in communication, shows respect to each other, and indicates the Chinese ritual culture of self-cultivation and treating others. Furthermore, Zheng Sitting contains the aesthetic value of Chinese. In ancient times, people emphasized the gentleman's style of men and the dignified beauty of women. When the ancient people's clothes are

relatively broad, in the posture of Zheng Sitting, the man has a beauty of firmness and strong, and the woman has a beauty of grace and quiet.

Moreover, medical research indicates that Zheng Sitting has positive values in health as a physical and mental exercise, which enhances the circulation of body, decreases the burden of heart and relaxes the backbone and shoulders. It's particularly valuable for white-collar workers today who have problems of cervical vertebrae and lumbar vertebrae in general. From the perspective of Chinese culture and medical system, it's clear Zheng Sitting is the most correct way of sitting and fits the principle of unity of nature and human. Therefore, it also represents the orthodoxy of Chinese culture.



**Figure 1.** Stage Photo of Nirvana in Fire, 2017



**Figure 2.** Jade Artifacts from the Fuhao Tomb, Collection of the National Museum of China

## Cultural tracing on Mat-dwelling lifestyle

Zheng Sitting is not an isolated daily behavior, but an element of the ancient Mat-Dwelling Culture and lifestyle. The Mat-Dwelling Culture refers to the lifestyle of ancient Chinese people whose household life including sitting and lying stays on the plane of ground, which results in a different household space and furnishing from those of today (Fig 3).

In oracle bone inscriptions, we can find some characters directly displaying Zheng Sitting posture, such as "female" or "mother", "eating" "mat" and "hosting" (Fig 4). In addition, the unearthed mat at Hemudu Site in Yuyao, Zhejiang Province, can prove the existence of Mat-Dwelling lifestyle since 7000 years ago (Fig 5). We don't know the time of the beginning of the Mat-Dwelling lifestyle, but those historical evidences show that Zheng Sitting and Mat-Dwelling Culture were the main living cultures

and lifestyles of the ancient Chinese people. Zhang Lianggao studied Mat-dwelling Culture through ancient documents and related archaeological cultural relics. In his book "Seven Comments of Chinese Architecture", he confirmed that Mat-dwelling Culture can be traced back to the Shang Dynasty at least and last until the Han dynasty, when people used Zheng Sitting widely either the nobility or the common people. Then China had entered turmoil for hundreds of years, including disaster of "invasion of northern nomads in the fifth century", which largely destroyed the social and cultural ecology of China. After Sui and Tang Dynasties, Mat-dwelling culture and Zheng Sitting gradually retired from common daily life, and almost disappeared in modern society, while it's completely replaced by the new sitting posture and lifestyle as we see today except for few ethnic minorities in remote areas, such as Dai and She, still retained Zheng Sitting posture in their daily life. However, Mat-dwelling Culture had spread to Japan and Korea since Tang dynasty. It has been well inherited and evolved into Tatami, which has become the life and cultural characteristics of the Japanese people today.

Therefore, the disappearance of Zheng Sitting and Mat-dwelling culture in the history of China is not for reasons that they had no values



**Figure 3.** Portrait Brick of the Eastern Han Dynasty (AD 25–220). Collection of Sichuan Museum

anymore or they can't follow the progress of society. Instead, it results from centuries-long period of national catastrophes by invasion, and corresponding cultural disaster, which finally transmitted to daily life. In other words, in Chinese history, the degradation and disappearance of Mat-dwelling culture is a passive process rather than an active choice. We believe that retracing the traditional Mat-dwelling lifestyle and the value of Zheng Sitting will be conducive to the construction of sustainable behavior and lifestyle.



**Figure 4.** The Forms and Meanings of Oracle:
Woman, Mother, Eatting, Mat, Hosting. Drawn by Author



**Figure 5.** Mat from Hemudu Site, Zhejiang Province. Photo: Xinhuanet

# Design opportunites and proposals

How can we rediscover the value of Zheng Sitting and promote Mat-dwelling culture as a sustainable lifestyle today? This is a difficult design challenge. On the one hand, Zheng Sitting itself is a behavior, not a product. So it cannot be restored as artifacts. On the other hand, Zheng Sitting has almost completely disappeared in history and been forgotten. Moreover, the cultural, social and spacial contexts of Zheng Sitting have almost completely changed as well today. In other words, today people's living culture, household environment and lifestyle have undergone a great change since Qin and Han Dynasties. Under today's new condition, the restoration and promotion of Zheng Sitting is lacking in cultural, social and material basis. To answer the previous questions, we put forward four different design strategies: (1) Functional restoration strategy: In the current household environment, a series of furniture products are designed to restore a small space of Zheng Sitting for reading, working and leisure. "Home Series for Zheng Sitting" is a design proposal on this strategy (fig 6); (2) Features combination strategy: combining Zheng Sitting with other traditional life cultures, such as tea culture, to create more comfortable conditions for its application. "Tea Furniture Series for Zheng Sitting" is a design proposal on this strategy (fig 7); (3) Scenario



Figure 6. A Scenario of Home Furniture Set for Chinese Zheng Sitting © Siqi Zhou

Figure 7. A Scenario of Tea Furniture Set for Chinese Zheng Sitting. © Junyang Liu

adaptation strategy: towards the modern office environment that is difficult to adjust systematically, the variable structure is adopted to realize free switch between normal sitting and Zheng sitting. "Office Chair for Zheng Sitting" is a design proposal on this strategy (fig 8); (4) Cultural promotion strategy: regarding Zheng Sitting as a cultural symbol or gaming element, and promoting it in public places through the way of entertainment. "Game Experience of Zheng Sitting" is a design proposal on this strategy (fig 9). Through the above different design strategies, Zheng Sitting could partially return to different scenarios on household, social life, office, entertainment, etc., to realize the value transformation of its traditional culture.
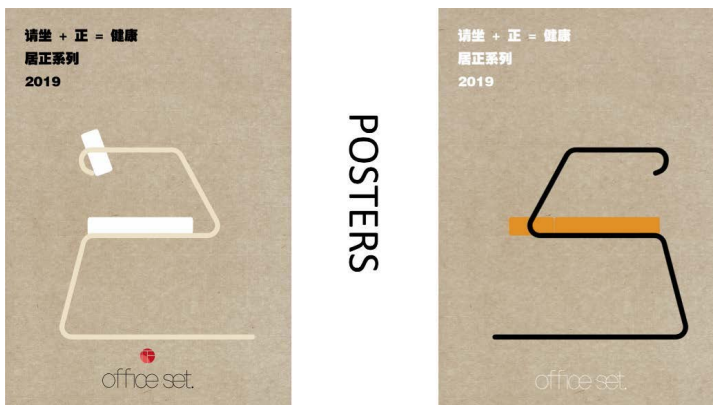


Figure 8. Posters of An Office Chair for Chinese Zheng Sitting. © Haoyuan Wang
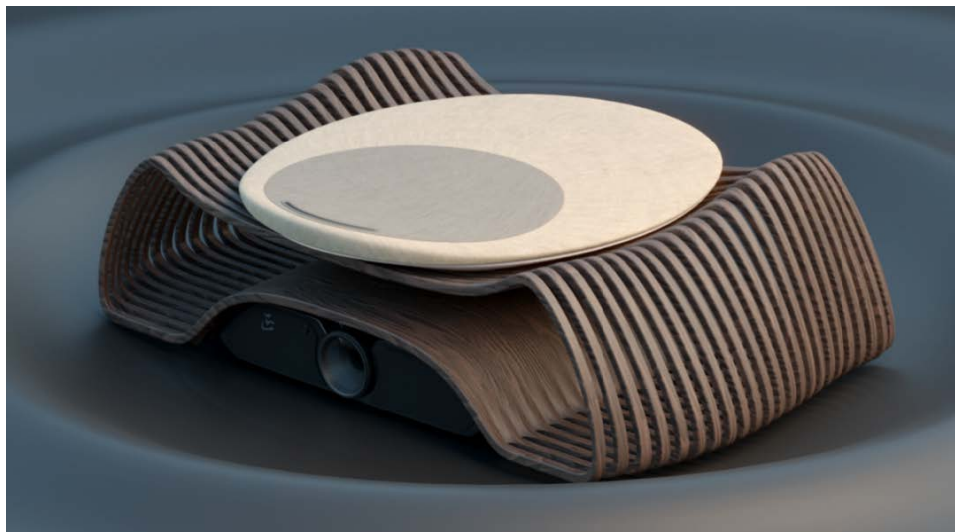
**Figure 9.** A Proposal of Product of Game Experience on Zheng Sitting
©Li haolin and etc.

# Reflection

This is a concrete case of sustainable cultural tracing and design innovation. In exploration of this case by tracing the origin of Zheng Sitting and Mat-dwelling Culture, we find the superiority of this culture and lifestyle that disappeared in history. In the perspective of Chinese culture, the disappearance of them and the change of daily life style are obviously a kind of cultural degradation instead of advancement. We are often confident about the achievement of science and technologies which dramatically change our lifestyle today in comparing that in history, at the meantime, we are facing so many challenges on health and sustainability. The gap of the contradiction, I think, is missing of cultures which we lost in history. Hence, we need to be modest and understand that human history does not always mean progresses. Looking back on history and discovering excellent traditional culture are a positive approach to avoid the continued degradation of human society.

It also tells that we cannot look into an isolated product, behavior or event in history, but need a more holistic view, which requires cultural tracing to understand the origan and process of evolution of them. However, the cultural tracing and systematic cognition on traditional culture don't mean we can fully recover and promote them. In design innovation of disappeared traditional culture like Mat-dwelling Culture, it's necessary

to well consider the current realistic environment and conditions, to define resilient design strategies, to find appropriate design opportunities, and to put forward innovative design proposals, so that excellent traditional culture can play a valuable role in current society again.

Therefore, sustainable design not only needs to face the current crisis and look forward to the future, but also needs to trace the history and study from the ancient. After studying on design for sustainability in western for years, I came back to China and started to study on Chinese traditional culture, especially on pre-Qin Classics and archaeological finds. Now I strongly recognized that Chinese ancient sages have prepared a complete thinking and culture of sustainability in terms of individuals, communities, nations or global society of human being at the beginning of the civilization. Unfortunately, we have almost forgot most of them and have lost the ability to identify the value of them. At least now it's clear to me that rediscovering of orthodox traditional culture will open a great door towards a sustainable society.

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# Tradition and Innovation in Dutch Design

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In this lecture I want to address how from the 1990s Dutch Design could become an international phenomenon, how designers dealt with high-tech/innovation and low-tech/tradition and why the mentality behind this might still yield good results for current issues.

## Functionalism in the lead

In the first decades after the Second World War (1939–1945), functionalism was leading in Dutch design. The influence of the Bauhaus, the German educational institute that existed from 1919 to 1933, of the artists' group De Stijl, which was founded by Theo van Doesburg in 1917, and of the international movement around these avant-garde positions was great in the Netherlands. Gerrit Rietveld and Indonesian born Kho Liang Ie were among the most important furniture designers and (interior) architects. A more organic style, anti-design, postmodernism and the like seemed to have no impact on Dutch product design. Npk design, founded by three designers, two of whom were trained at Delft University of Technology, has been one of the best-known representatives of the functionalist movement since the 1980s (Fig. 1). In addition, design departments of companies such as Philips were and still are important for this direction. They often design (technically) very innovative products with a high-quality appearance.



**Figure 1.** Npk design, Vitalab Eclipse photometric blood analyzer, 1989. Prod. Vital Scientific NV, coll. Stedelijk Museum Amsterdam. Polyurethane, steel

## Functionalism in the lead

While this functionalist movement remained strong, another type of design developed. Many designers were able to work without too much commercial pressure, partly because there were large commissions from enthusiastic art directors in the public sector, such as those at the Dutch Post (PTT) or the National Bank. A generous subsidy system was also developed, which allowed selected designers to work on their professional development for some time undisturbed. And many designers started producing under their own control.

## Birth of a new Dutch Design

In the early 1990s, this culminated in a generation of designers (born in the 1960s and mostly trained at art or design academies, not at technical universities) who created work that was characterized by surprising combinations of materials and techniques, reinterpretations of familiar product types, a focus on the idea or concept behind a design and sometimes a restrained kind of humour. With designers such as Ineke Hans, Marcel Wanders, Jurgen Bey, Hella Jongerius, Tejo Remy, Richard Hutten, Piet Hein Eek, and Claudy Jongstra, it turned out to be a very strong design generation. Design historian/publicist Renny Ramakers and designer/teacher Gijs Bakker recognized this new direction and brought many of these designers together under the umbrella of design platform Droog (initially called Droog Design, literally meaning Dry Design). Their first exhibition at the Milan Furniture Fair in 1993 put this variant of Dutch Design on the map in one fell swoop. With this, 'Dutch Design' no longer only stood for 'coming from the Netherlands', but also for that specific type of design. The idiosyncratic designs often featured a combination of technically advanced and traditional materials and/or techniques: high-tech combined with low-tech. As in the most famous example, the Knotted Chair by Marcel Wanders (1995–1996, Fig. 2): hand made in macramee technique from a cord consisting of a carbon fiber core with aramid braided around it. Sometimes you were misled, such as with the Black Beauties furniture by Ineke Hans, which looks like it is made of wood, but is made of recycled plastic, or with the Long Neck and Groove Bottles by Hella Jongerius (Fig. 3) of ceramic and glass that would fall apart without the tape wrapped around them. We often see conscious imperfection and craftsmanship. In this way, the designs clearly distinguished themselves from the industrially produced utensils where functionalism still predominated. At that time, there was no question of

Figure 2. Marcel Wanders, Knotted Chair (prototype no. 5), 1995–1996. Droog collection, coll. Stedelijk Museum Amsterdam. Aramide, carbon, epoxy, sandblasted

cooperation with the industry for the Droog designers, but the attention of the industry was aroused. Due to the success of Dutch Design, more and more students from abroad came to study in the Netherlands (especially at the Design Academy in Eindhoven), such as the Italian designers Andrea Trimarchi and Simone Farresin, who established their studio Formafantasma in the Netherlands in 2009). Other designers came to the Netherlands after their studies and continued to live and work there, such as Indian-born Satyendra Pakhalé. The designers of the first generation of Dutch Design eventually received major commissions from international companies such as Alessi, Vitra, Tarkett and Christofle. The Dutch Design world became more and more international.

## Later generations

Designers from later generations continued the line. In the case of Dirk Vander Kooij's 3D printed furniture, the 3D printing was carried out with a machine that actually delivers rather 'simple' work at a time when it was already possible to work in much more detail. Combinations of high-tech and poetic design can be seen in the work of Bertjan Pot and DRIFT. The continued focus on crafts can be seen in the designs of Maarten Baas, Aldo Bakker and Mae Engelgeer, among others. With the latter two, we also see a strong interest in collaborating with artisans and companies from other parts of the world. Engelgeer was commissioned by Hosoo (Kyoto, JP) that used to produce fabrics for kimonos to design interior fabrics and the company's house style (Fig. 4).

Figure 4. Mae Engelgeer, Diaphanous no. 9190 interior fabric, 2024. Prod. HOSOO, coll. Stedelijk Museum Amsterdam. Polyester, washi paper and rayon, woven with the Jacquard and Nishijin technique

## New challenges

The idiosyncrasy that characterizes almost all these designs is an important feature that can also be helpful in current developments. Now that sustainability is one of the most important challenges, we need visionaries who, like Boyan Slat (The Ocean Cleanup), take up the fight against the plastic soup and its origins, or like 'solar designer' Marjan van Aubel (Fig. 5), focus entirely on promoting renewable energy. Marjan van Aubel is a 'self-producing designer' who brings innovative products to the market for consumers with her own label. At a time when AI is on the rise, the creativity of designers is their strongest weapon, precisely to prevent predictable (and sometimes even discriminatory) outcomes. Increasingly, as in some other countries, the potential of this creativity is seen in the

Netherlands. For example, PONT was recently launched, a three-year government-funded project that looks at how designers can be involved in major issues in the public domain. Then the focus has shifted from product design to system design.
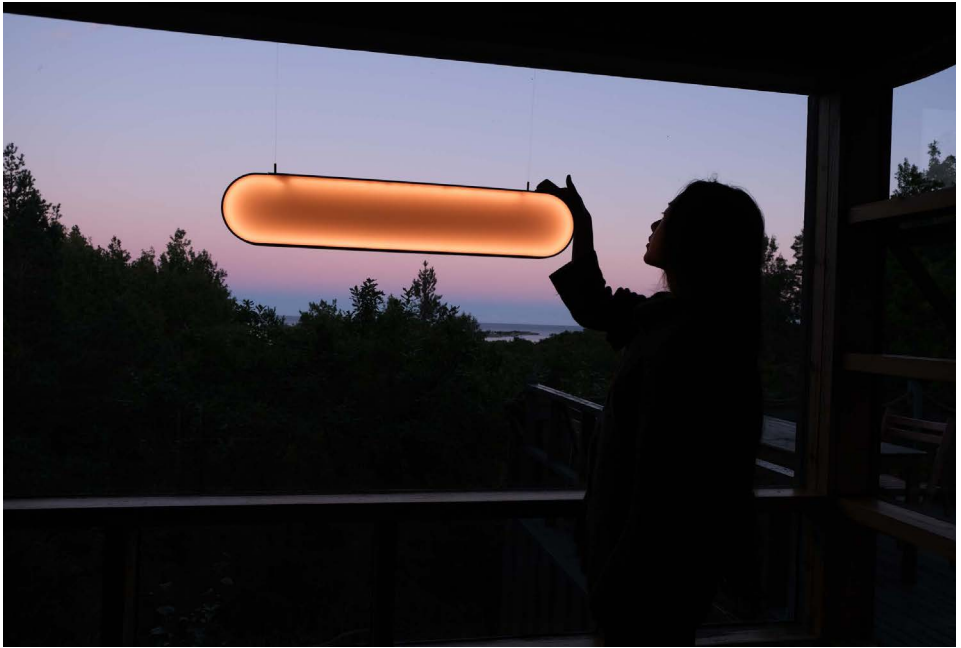


**Figure 5.** Marjan van Aubel, Sunne lamp, 2021. Prod. Studio Marjan van Aubel, coll. Stedelijk Museum Amsterdam. Aluminium, solar cell, steel . Photo Studio Marjan van Aubel.

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# Trans-Cultural Innovation Between Societies and Nature

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## Introduction

The dialogue between tradition and innovation reclaims critical tools and methods for investigation, education, research, and strategic envisioning. An interpretation of the current intercultural innovation challenge is the relationship between society and ecosystem, a relationship that has been overlooked for decades but became crucial for human and environmental sustainability, prosperity, and significance. A culture of the "more-than-human" seems challenging the culture of "human-centered design" which is the ground of decades of our discipline development. Whilst some people interpret more-than-human as "nature", others' interpretation include "technological organisms and structures".

Such dualism seems repeating, if not reinforcing, a dichotomy between nature and culture that environmental studies recognize as a rooted cause of the ecological crisis.

Therefore, this paper offers a look into the "intercultural" dialogue between tradition and innovation from the premises of a culture of complexity, examining notions that consider cultures as an opportunity of systemic relationship more than isolated identities, and therefore re-frame the notion of more-than-human across tradition and innovation. Ecosystem may be our best alley for the understading how the framework of tradition is a space for innovation to occur: it provides a terrain for system learning, relational values, resilience, and management of diversity.

## Transcultural Hypotesis

The "transcultural hypothesis" offers a different outlook to the cultures of "tradition and innovation". The concept is mutuated from anthropology theories, in particular from the work of Welsh (1999) in defining culture as a dynamic and relational concept. Welsh refuses the notion of culture as something internally homogenous and distinct. He argues that this concept is no longer applicable in the age of globalization, when the prominent dynamic become "interconnectdness". Therefore, the concept of transculturality acknowledges the internal complexities of cultures and the ways they are becoming more connected; this definition goes beyond culture as a geographical origin or a territorial boundary, and it extend to social, community, and organisation constructs, as Welsh mentions: "By transculturality, we refer to the features of cultural formation as hyperhybrid and border-transcendent in today's societies".

The relational value of transculturality breaks traditional understanding of cultures as "identities" and recalls instead the value of

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connectedness in complex systems; at the same time, the intrinsic trans-formative drive of transculturality (and by extension, of anything that has the prefix of trans-) when seen through design paradigm, refers to a "creative process" through cultures. The author hypothesis is therefore to look at tradition/innovation through systemic lenses, and argue how design research and education can experiment on this terrain and define principles and practice for transcultural encounters.

## Design principles for transculturality

Author offers four meta-design principles that support the investigation and implementation of transculturality in the design discourse, therefore referring to tradition, technology, society, and nature, as the continuum of a paradigm of change. These principles could be elaborated in greater details, but they define critical aspects of a system view towards innovation.
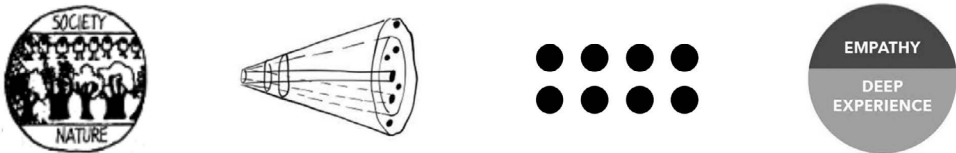


Figure 1. Symbolic representation of the four "meta-design principles" for transcultural design: macroscope (De Rosney), future cones (Voros), the rule for governing the commons (Ostrom), and ecological design thinking (Author)

The first principle recalls De Rosney's concept of "macroscope", developed in 1972 to define a symbolic instrument made of a set of methods and borrowed from very different technical disciplines, that allows new way of seeing, understanding and acting in the framework of complexity. The macroscopes let us observe what is at once too great, slow, or complex for the human eye and mind to notice and comprehend, and thus offer ne ways to look at the "infinitely complex" which is defined by the continous interaction between society and nature (Fig. 2).

The second principle recalls the "future cone" as defined by Voros in foresight disciplines (2003); the cones is useful for the definition of different types of futures, ie. exploring the possible, analysing the probable, shaping the preferable. If we think of the transcultural encounter as a design scenario, then the complexity of the "preferable" is the "space
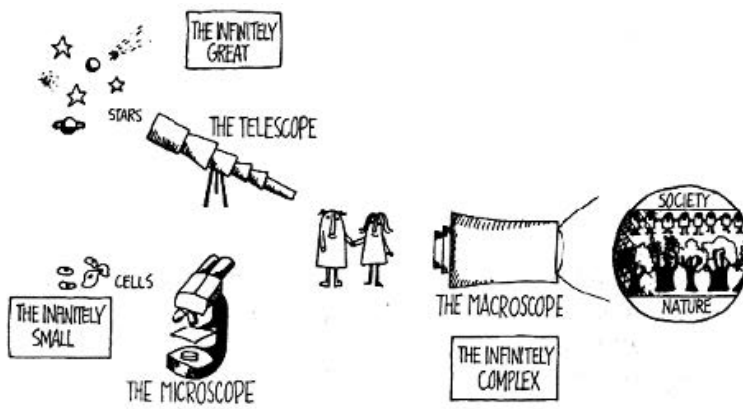
for agonism", that "enable creative confrontations between conflicting and altering views" (DiSalvo 2010) and reconcile them in the domain of creative possibilities and the expression of preference. The "preferability" of a future responds to the transcultural encounter, requires the creative negotiation between cultures, and remains open to continuous change, as Porritt (2013) manifests in a book of entirely plausible and entirely preferable scenarios.

The third principle of transculturality in design brings attention to the "commons", as "those things that we all own together, that are neither privately owned, nor managed by the government on our behalf" (Ostrom, 1990). The concept of commons and the eight principles Ostrom defined for its management are called to be applied as an organisation framework for innovation that helps us to design in the space of the environmental crisis — by considering the ecology as a space of commons' responsibility — and in the time of technology development — by reclaiming the public ownership of technology and the advocating for technological literacy as a foundation of innovation.

From this, the fourth principle is proposed, as the interpretation of Design Thinking methods and tools in light of an ecological discourse (Fig. 3, author). The integration of design thinking and deep ecology has been utilised as a teaching methodology to explore design contexts and intervention in the transcultural space of society and nature, to define ecological significance as a scope of the design process, and ecological literacy as an outcome of design innovation.
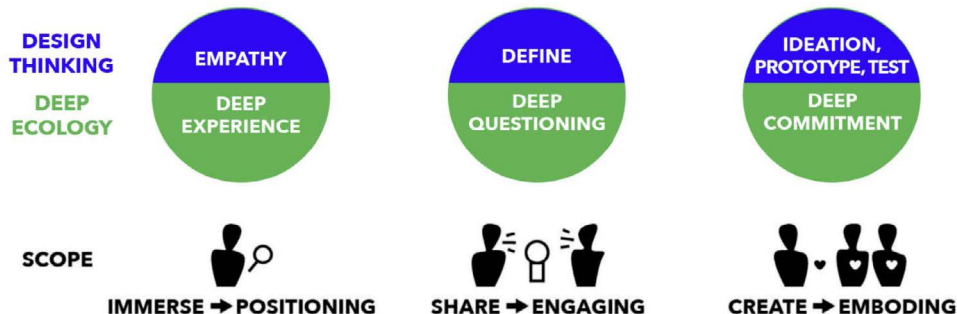
**Figure 3.** Diagram to illustrate design thinking process framed by the "macroscope" lens of deep ecology (Authors, 2021)

## Discussion

Transculturality is posed as a complex outlook in the relationship between tradition and innovation. When looking at ecological challenges and technology opportunities, the possibility to overlook "cultural conflicts" in light of "cultural encounters" offers epistemological and educational lens for design, in definining scope, methodology, and context of intervention. In a system perspective, transculturality strives for "harmony", as a value that has played a central role in diverse cultures for thousands of years, "from aesthetic to ethics, from politics to sustainability, from mathematics to algorithmic optimisation" (Lomas & Xue, 2021). Harmony is not as "sameness" or the lack of conflict, but rather a dynamic process of integrating diverse elements in a whole, and the integration of elements in a continuous dynamic of change. Therefore, harmony represents a transcultural design concept, to integrate the well-being of individuals, organizations, society, and nature, and the benefits that innovation and tradition can weave together to manifest this well-being as a ultimate measurement of innovation.

## Acknowledgments

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# Generating Intercultural Intelligence:
## Explorations with GenAI in Designing Sustainable Futures

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## General guideline

As generative artificial intelligence (AI) advances, it offers new ways for designers to envision sustainable futures that respect cultural identities and encourage community participation. The recently published book Designing Sustainable Futures (Press & Celi, 2025) explores how generative AI can support vision generation, enabling designers to create immersive, culturally resonant, and intercultural innovation that align with sustainability goals.

As examined and elaborated in Chapter 3 of in Designing Sustainable Futures (2025), vision generation as a critical stage in the design process for achieving cultural and environmental sustainability. The authors identify vision generation as the link between anticipating better futures, creating sustainable experiences, and leading societal transitions. It introduces a participatory, action-research approach, which encourages collaboration across disciplines and communities. Informed by these foundational principles, this abstract hypothesizes that GenAI, when integrated into design processes, enhances the capacity to engage diverse perspectives, foster intercultural dialogue, and address the complexities of sustainability in actionable and context-sensitive ways.

## Framework: genai opportunities in vision generation

The framework for GenAI's application in design emphasizes five critical dimensions:

1. **Crafting Immersive Narratives:** AI-generated storytelling creates engaging and culturally nuanced scenarios. For instance, the immersive artwork of Refik Anadol illustrates how AI can convey environmental and cultural narratives through evocative visuals, fostering deeper emotional connections to sustainability themes.

2. **Visualizing Sustainable Infrastructures:** Tools like GenAI enhance participatory design by generating models of place-based sustainable infrastructures. Community-engaged experiments, such as the NACAA Master Design Studio project for Longmen Village, showcase how AI facilitates collective visioning rooted in local cultural contexts.

3. **Conceptualizing Circular Economies:** GenAI helps designers reimagine resource flows and consumption patterns, visualizing circular economies that reduce waste and maximize sustainability.

4. **Simulating Social Impacts:** AI simulations allow designers to anticipate the social, economic, and environmental effects of proposed interventions, enabling equitable and informed decision-making.

5. **Forecasting Policy:** GenAI aids in projecting the long-term effects of policies, offering insights to policymakers and designers working toward adaptive, sustainable strategies.

## Case examples: community, university, and corporate engagements

Experiments in vision generation demonstrate the adaptability of GenAI across domains. Community projects, such as the "Drag Queen Police Station" design concept, reimagine public spaces through inclusive cultural narratives. Similarly, university-led initiatives like the "Future of Milan Mobility" project engage students in participatory foresight, exploring AI's capacity to visualize sustainable urban futures. Corporate engagements, such as the Agrolimen Campus vision, highlight AI's role in aligning workplace design with global sustainability goals. These examples underscore GenAI's versatility in creating inclusive and actionable visions.

## Intercultural intelligence and and future directions

Generative AI holds significant potential for inter-cultural design by enabling sustainable, culturally sensitive vision generation by enabling immersive storytelling, infrastructure visualization, social impact simulation, circular economy conceptualization, and policy forecasting. GenAI can cultivate intercultural intelligence by enabling the integration of diverse perspectives into cohesive, culturally resonant visions. By guiding participatory design interventions, GenAI offers a scalable platform for addressing sustainability and inclusivity in vision generation. The integration of participatory methodologies supplemented by ethical safeguards increases the likihood that GenAI can enhance cultural engagement and equity in design processes. While cases and methodologies discussed in Designing Sustainable Futures illustrate how AI can empower communities to co-create futures that resonate with their cultural values and environmental needs, futher research is required to fully understand the potential and pitfalls. Future research should focus on longitudinal studies, action research, and the refinement of AI tools to maximize their potential for creating sustainable, intercultural futures.

This reserach is critical in order to ensure AI-driven design will play a vital role in building a intercultural, inclusive futures of a better world for all.

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* All references provided in this abstract can
   be found in the referenced book

# Strategic Reorganization to Promote Intercultural Innovation in Design Education

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**Keywords:** Strategic Reorganization, Design Education, Inter-Cultural Innovation, AI, Educational Transformation

# Abstract

This paper aims to delve into how universities ought to acknowledge and address the transformations and challenges that artificial intelligence (AI) poses to education. In response to these changes and to foster intercultural innovation in education, Gengdan Institute of Beijing University of Technology (BGD) is implementing a strategic reorganization plan rooted in a platform-based approach, encompassing three key aspects: physical spaces, programme document, and professional training programs. Throughout this process, the field of design has served as both a pioneer and a connecting link. We firmly believe and advocate that design education should shoulder more responsibility and play a more prominent role in the future transformations of education.

# I. Background

Over the past three decades, discussions regarding the transformative impact of technology on education have persisted, giving rise to a myriad of concepts and initiatives, including MOOCs (Massive Open Online Courses), micro-lectures, SPOCs (Small Private Online Courses), flipped classrooms, blended learning, and the Stanford 2025 initiative. The unveiling of ChatGPT in November 2022 has further highlighted the potential of AIGC (Artificial Intelligence Generated Content) technology, subsequently igniting widespread debate concerning the disruptive transformations occurring within the realm of education. In this AI era, do universities still constitute the optimal "vehicle" for delivering higher education?

# II. Why will AI disrupt education?

Humans have consistently served as the principal architects and executors of educational goals, content, processes, and evaluations. Technological advancements, spanning from the printing press to the internet and multimedia, have significantly bolstered the efficiency of information and knowledge dissemination, thereby ensuring education's scale and quality with heightened efficiency and reduced costs. However, AIGC (Artificial Intelligence Generated Content) elevates information processing capabilities to a new level. Through training on human-generated information, machines are increasingly capable of supplanting humans in furnishing tailored solutions to individualized problems and even generating novel knowledge. This shift necessitates a transformation not only in learners' objectives and content but, more crucially, empowers machines to generate

teaching materials, design instructional processes, respond to, and even proactively engage in interactions and tutoring with learners, as well as conduct personalized assessments. Consequently, the roles of teachers and the organizational structure of classrooms are poised to undergo substantial changes. We have compelling reasons to anticipate that higher education will soon witness disruptive transformations.

## III. Strategic reorganization based on a platform-based approach

Emphasis on nurturing students' intercultural and interdisciplinary competencies, humanistic literacy, innovative mindset, and critical thinking. Nevertheless, the task of designing and implementing such an educational process presents a formidable challenge. Educational innovation geared towards the future necessitates the collaborative engagement of students, teachers, professionals, and international experts. In response to this, Gengdan Institute (BGD) has put forth a strategic reorganization plan grounded in a platform-based approach.

### (I) Physical space reorganization

The campus is being reimagined as a comprehensive platform for lifelong learners, catering to their diverse learning, working, living, and social needs. Over the past five years, BGD has integrated enterprises, established master studios, and collaborated with corporate R&D centers. By providing exhibition, R&D, training, and office spaces, BGD has secured industry projects and offered students career mentoring, professional faculty, and real-work environments. A 50,000-square-meter engineering center for enterprises will open in March 2025. BGD strives to create an inviting environment for students, faculty, enterprises, and international experts, with learning spaces for participatory learning and discussions, and living and social spaces tailored for all ages, including sports, music, reading, dining, and accommodation. All facilities are freely accessible.

### (II) Professional module reorganization

Based on a platform-based approach, we proactively cultivate demands for interconnections among students, teachers, professionals, and international experts, encouraging and supporting their collaborative engagement in the innovation of professional modules.

Starting from August 2023 with design and preparation, interdisciplinary workshops, co-led by mentors from industry and overseas along with

internal faculty, were first introduced as elective modules and then became compulsory for all students in the Design School. By September 2024, these workshops had evolved into mandatory components for nine programs across three schools: Business, Engineering, and Design. For two weeks each year, students from diverse disciplines collaborate intensively on projects sourced from industry, international mentors, or national-level student competitions.

Come September 2025, these interdisciplinary workshops will be an integral part of all BGD programs, encompassing 1,400 third-year students, approximately 70 BGD staff members, and an additional 70 mentors hailing from industry and overseas. Within the same timeframe and physical space, under the umbrella of this unified event, participants will engage in communication and mutual observation, fostering industrial-academic cooperation, international exchange, enhancing teachers' innovative capacities, and promoting the development of teaching cases and professional modules.

## (III) Programme document reorganization

In China, the swift advancements in economy and industrialization render students' professional knowledge and career plans obsolete at an accelerated pace. The impending AI transformation is poised to prolong this transient phenomenon, necessitating a programme document that is future-oriented and rapidly iterable. From this perspective, this article presents two case studies of programme document reorganization.

Programme document of Gengdan Academy of Design: The core strategy revolves around enhancing students' cognitive, decision-making, and practical abilities. The first year serves as a foundational year, nurturing students in design, innovation, and critical thinking, as well as fostering professional awareness and planning skills. The keywords here are "inspiration" and "cognition." The second year delves into specialized learning, where studio project courses with professional attributes assist students in selecting their majors. The keywords are "support" and "choice." In the third year, majors are once again dissolved, with studio projects taking center stage. Supporting modules are tailored to meet the needs of these studio projects, emphasizing "choice and subsequent support." The fourth year focuses on advanced practices such as internships and final year projects, with supporting courses encompassing comprehensive project management and portfolio compilation.

Strategic Reorganization to Promote Intercultural Innovation in Design Education

Continuous Cultivation of AI Competencies Across the University: Commencing in February 2023, BGD has systematically advanced its AI initiatives. This includes organizing over ten comprehensive training sessions for all faculty members, encouraging teachers to integrate AI into lesson preparation and explore AI applications within their professional domains, and facilitating university-wide sharing sessions. By May 2024, the continuous cultivation of students' AI skills was integrated as a fundamental component in the professional talent cultivation plan for each major. In November 2024, the academic affairs office completed the review of syllabi for courses pertinent to AI skills development. Plans are underway to assess outcomes and initiate iterative improvements in the future.

## IV. Conclusion and outlook

BGD's strategic reorganization, rooted in a platform-based approach and intercultural innovation in education, draws not only from past experiences but also from the pressures and opportunities presented by the impending AI era. Design education inherently embodies intercultural and interdisciplinary attributes, with a strong emphasis on humanistic qualities, innovative thinking, and a critical spirit – all of which align closely with talent cultivation in the AI age. Many of the practices discussed in this paper originate from the early explorations conducted within the university's design discipline. We firmly believe and advocate that design education should shoulder more responsibility and take a leading role in shaping the innovation of future educational models.

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# Track 1
# Contributions

# Embodied Cognition Perspectives of Bamboo Woven Crafts: Design and Making

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**Keywords:** Bamboo Woven Design, Embodied Cognition in Design, Creative Cognition, Mind-Body-Design Environment

## Introduction

Bamboo woven design and making processes offer a unique interplay between material responsiveness and the core principles of embodied cognition. Conversely, with standard cognitive science, embodied cognition looks at how cognitive processes are deeply rooted in the body's interactions with the world (Wilson, 2002). By examining the hands-on designing and crafting process, this study seeks to understand how the physical interaction with bamboo strips shapes the cognitive understanding and design outcomes of bamboo artisans. This study weaves the author's design and research practices related to bamboo weaving, including augmented reality-assisted bamboo weaving, machine learning in bamboo woven design for pattern recognition and generation, and embodied cognition. In particular, this presentation looks at how technological advancement can be derived from expert weaver's embodied cognitive actions. The research question the author seeks to answer is **"How does real-time interplay distributed across mind, body, and environment differ in the bamboo woven design process compared to pen-and-paper during the idea generation stage?"**

## Related literature

Embodied cognition views organisms as being at the centre of the body, brain, and environmental experience. It has been considered to provide an extended view of standard cognitive science, as Shapiro (2011) posits. Cognitive scientists typically view cognitive processes as computational, which consist of manipulating symbols with symbolic inputs and symbolic encoded outputs. The crucial difference with standard cognitive science is that cognitive science limits the investigation of processes within the head. There are different key claims, themes, threads and key questions posited by scholars such as Wilson (2002), Clark (2008), Shapiro (2011) and Wilson and Golonka (2013). The more recent application in creative cognition is explored in the context of the early design phase in a series of publications within the scope of architecture and product design (Tedjosaputro and Yi, 2018). Notably, the study investigated the process of sketching and using mental imagery in the design ideation stage. In related crafts studies, a more recent study by Kaur (2018) on Kashmiri carpet weaving's distributed cognitive activities highlights that they are distributed among actors (designers-coders-weavers) through their tools and artefacts. On the other hand, bamboo-woven designing processes exhibit a similar distribution of cognition. Until the time of

writing, cognitive processes in bamboo weaving design and making have not been thoroughly studied, and this observed research gap is the point of departure of this study.

## Research methodology

This preliminary research is to be conducted by collecting empirical data from: an expert bamboo artisan with more than 10 years of experience and three designers who use pen-and-paper to generate ideas. Representative of 240 hours of basket making processes illustrated by the artisan is analysed and compared with the traditional pen-and-paper activities. Design processes are recorded, and subsequently, design moves are segmented and classified into three categories (cognitive — body — environment), and relationships between design moves are to be generated. Each design move represents one singular action. The concept of linking ideas is to be adapted from Linkography, popularized by Goldschmidt (2014). Subsequently, data is analysed by comparing how bodily experience and environment contribute to each design process.

## Results and discussions

Adapting from Wilson and Golonka (2013), three key questions, which were posited based on the view of built bodies perceptually coupled to specific environments to replace complex internal structures, were used to aid the discussions. Exact adaptations in the study are listed below:

1. **What is the task to be solved?** It identifies the task one is trying to solve at the time. Embodied cognition solutions solve specific tasks, identifying how an organism produces a given behaviour means accurately describing it. In the design processes in this study, the tasks can be identified by classifying five design intentions.

2. **What are the resources that the organism has access to in order to solve the task?** Task analysis should involve an exhaustive list of resources available that might contribute to the mind, body, environment and the relationships between them. In this study, the tri-fold coding scheme (cognition-body-environment related activities) is used.

3. **How can these resources be assembled so as to solve the task?** Assembling the required sources (distributed over mind, body

and environment) into a dynamic system to solve the task. In this study, the interaction and interplay of the tri-fold categories are to be identified in terms of possible combinations.

It is anticipated that in comparison to the use of pen as a designing tool, the use of tools used for bamboo woven activities frequently occurs across five different design intentions (situation, problem, pattern, solution and domain-related intentions) and the fifteen sub-intentions. Another comparison is also drawn in terms of how writing or sketching aids are used during the ideation process in bamboo woven design.

## Conclusion

It is summarised that the interplaying roles between internal and external representations in bamboo woven design and making processes have different characteristics in comparison to the utilisation of pen-and-paper. Observation includes a more holistic approach to the use of tools (knife, sharpener, stool and bowl of water), suggesting that design and making acts concurrently take place for an expert bamboo weaver. This result, however, perhaps is slightly different from how novice designers (with less than three years of experience) navigate their designing activities, which can be the next investigation. This research paves the way to understanding how technology-enhanced bamboo weaving can be taught to novice designers, particularly a set of design heuristics tailored for novice designers.

## Acknowledgments

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# Reimagining Intangible Cultural Heritage:

## Technological Innovations in Opera Costume Preservation

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**Keywords:** Opera Costumes, Technology, Cultural Preservation, Cross-Cultural Innovation, Digital Design

## Abstract

This paper explores the integration of technology into traditional opera costumes, highlighting cross-cultural innovations that enhance preservation and presentation in both Eastern and Western contexts. The study examines notable examples from Yue Opera and Qin Opera in China, alongside advancements in Western opera productions. Through virtual simulation, artificial intelligence, and digital scenography, these innovations not only safeguard cultural heritage but also engage modern audiences. The findings suggest that the fusion of tradition and technology can revitalize operatic arts, ensuring their relevance in contemporary society. The work build on a previously published paper where the authors describe the inclusion of a kinetic device into Khun Qu Opera's costume to hybridize traditional crafting techniques and digital manufacturing and soft robotics.

## Introduction

The art of opera is a multifaceted discipline that combines music, drama, and visual spectacle. Costumes are integral to this art form, as they convey character, setting, and historical context. However, preserving traditional costumes poses significant challenges due to their delicate nature, the exclusive nature of traditional opera and the evolving preferences of contemporary audiences. Recent technological advancements — such as virtual reality (VR), augmented reality (AR), 3D modeling, and digital scenography — have emerged as powerful tools for revitalizing traditional operatic costumes while maintaining their cultural significance.

## Methodology

This study employs a qualitative approach to examine various case studies where technology has been integrated into traditional opera costumes. The research focuses on notable examples from both Eastern and Western operatic traditions, analyzing how these innovations contribute to the conservation of cultural heritage and enhance audience engagement. The chosen methods include literature review and case analysis of specific productions that exemplify the fusion of technology with traditional costume design.

## Findings

Yue Opera, one of China's most prominent traditional operas, has successfully integrated 3D virtual simulation technology to preserve its costume

heritage. Researchers have developed digital representations of traditional Yue Opera costumes, allowing for detailed analysis and modern reinterpretation. This approach not only aids in conservation but also facilitates the dissemination of Yue Opera's cultural elements through virtual displays (Jin et al., 2022). By creating a digital archive, audiences can engage with these costumes without the risk of damaging the physical artifacts.

Similarly, Qin Opera has embraced digital technologies for costume preservation. A study utilized 3D modeling to digitally restore Qin Opera costumes by analyzing their colors, patterns, and structures. This process involved transforming two-dimensional images into three-dimensional models, allowing for innovative designs that respect traditional aesthetics while appealing to modern sensibilities (Wang et al., 2022). The use of virtual try-on technology further enhances this process by enabling designers to visualize how costumes will appear on stage before actual production.

In Western opera productions, digital scenography has emerged as a transformative force. This approach incorporates advanced technologies such as motion capture, real-time interactivity, and holography to create immersive experiences that enhance storytelling (Vincent et al., 2021). For instance, the integration of digital backdrops allows for dynamic scenery changes that can reflect the emotional landscape of the opera without the logistical challenges of physical set changes.

A notable example is the use of LED lighting and projection mapping in productions like Wagner's The Ring Cycle, where designers have employed these technologies to create visually stunning effects that complement the narrative (Cohen et al., 2022). These innovations not only modernize classic works but also attract younger audiences who are accustomed to high-tech visual experiences.

Another significant trend in Western opera is the collaboration between opera costume designers and contemporary fashion designers. This cross-disciplinary approach has led to innovative creations that blend traditional operatic elements with modern fashion sensibilities. For example, Gucci's collaboration with the Metropolitan Opera for Tristan und Isolde resulted in costumes that were both visually striking and reflective of contemporary trends (FasterCapital, 2024). Such collaborations enhance the visibility of opera within popular culture while preserving its artistic integrity. A more radical approach was adopted by the authors in their redesign of a Khun Qu Opera's costume, yet the design project was approached with the help of a local fashion designer,

Bin Zhang, a renowned opera costume designer and founder of Sizhi (Suzhou) Cultural Development.

## Cross-cultural innovations

The blending of technology with traditional costume design highlights a broader trend of cross-cultural innovation. Both Eastern and Western operas are increasingly utilizing similar technological tools to address common challenges such as audience engagement and cultural preservation.

Technologies like AR and VR are being employed across both traditions to create interactive experiences that deepen audience engagement. In Western productions, AR apps allow audiences to explore costume details before or during performances, enhancing their understanding of character development and historical context (Fiveable, 2024). Similarly, Eastern operas are exploring interactive displays that provide insights into costume design processes and cultural significance.

Both traditions recognize the importance of preserving their unique cultural heritages while adapting to contemporary artistic expressions. The use of digital archives in Yue Opera serves as a model for Western operas looking to safeguard their historical costumes. Conversely, Western innovations in digital scenography can inspire Eastern productions to explore new storytelling techniques that resonate with modern audiences.

## Conclusion

The integration of technology into traditional opera costumes represents a significant evolution in how these cultural artifacts are preserved and presented. From virtual simulations in Yue Opera to digital scenography in Western productions, these innovations reflect a growing trend toward cross-cultural collaboration and adaptation. As both Eastern and Western operas continue to explore these intersections between tradition and technology, they pave the way for a more inclusive future for operatic arts — one that honors historical legacies while embracing modern creativity.

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# Design Innovation with an Ancient Tool:

## Pan Jianfeng's Brush Practice and Visual Communication for an Interconnected World

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Inquiry into alternative histories and future trajectories of design has been gaining prominence in the recent years. Partly it is fueled by efforts to resist homogenization of design practice and visual cultures across the world. Partly it stems from ongoing strive to reconsider existing 'global' narratives of design and creative thinking, which marginalize or misrepresent many experiences outside of the 'West' (Hara 2007 & 2008; Lau et al, 2004, Tunstall 2023). Shanghai, despite its multiple cultural entanglements throughout the 20th century and layered design legacy (which before WWII implied a thriving community of Chinese graphic designers combining local art and print traditions with emerging avant-garde aesthetics emerging in Japan, Europe and USSR), continues to receive rather limited attention in the global overviews of typography and visual communication design (Pan, 2008).

At the turn of the 20th and 21st century, when Shanghai was designated to raise to global prominence as China's most modern, prosperous and cosmopolitan city, a young generation of Chinese graphic designers faced multiple challenges of cultural mediation between China and the world in commercial exchange, tourism and cultural promotion. Given the political and aesthetic disruptions of the earlier decades, a major part of this challenge was to understand what is the value and relevance of traditional tools and aesthetics in the world of new values, technologies and transnational engagements.

I propose to contribute to the conversation on differentiated experiences, educations and "innovation which is truly across cultures" by taking a closer look at the extraordinary practice of Pan Jianfeng, who at the turn of the century became one of China's foremost typeface creators and design strategists. In his highly experimental professional practice, he combined skills and approaches inherited through classical calligraphy training (which he received at home starting in early childhood) and design methodologies learned during his oversea studies at the University of Central England. He began his career in Shanghai working in senior positions at JWT and McCann Erickson, and later he established his own creative studio SHTYPE. Many of his experimental and commercial typography designs received major international awards and helped to improve public image of prominent foreign brands and institutions in China. He contributed to global conversations about design by taking part in international conferences and workshops, and published a critical overview of the unique era in Shanghai design in the book What Can We Do? Cross-Cultural Visual Communication and Chinese Typography (2013).

Design Innovation with an Ancient Tool

Recently Pan Jianfeng moved to Finland where he applies his design experience to ink art and continues to develop unusual visual works using Xuan paper, ink and soft brush.

In this paper I seek to extend perceptions of the brush from cultural legacy to active creative energy by analyzing a number of design works and design concepts developed by Pan Jianfeng over the years, and therefore deepen the overall DII Seminar reflection on cultural inheritance, innovation, cross-cultural communication and technology.

Firstly, I will discuss how thoughtful use of an ancient tool — namely soft brush maobi 毛笔 — combined with modern technologies and imaginative design practices can help tradition meet economic ends without compromising in terms of skills or cultural values. In other words, I will reflect on the possibilities which graphic design practice offers in terms of cultural inheritance and cultivation of traditional values. Pan Jianfeng's creative practice, developed in critical conversation with emerging technologies, offers fascinating insights concerning lasting importance of human creativity, traditional tools and organic materials. As such it deserves our attention as we debate the value of tradition and design in AI Era. It is also worthy of attention in the context of threats caused by the increasing commercialization of calligraphy in China, which promotes a hyperfixation on visual aspects while disregarding the spiritual values.

Secondly, I will focus my attention of the soft, changing line created by the calligraphy brush and discuss the implications it may have for the reimagining of design history and global design practice. Initially inspired by reflections of such calligraphers and scholars as Zhang Yanyuan (c.815–c.877), Dong Qichang (1555–1636) and Shitao (1642–1707), my research unfolds alongside more current academic frameworks such as Tim Ingold's work on the anthropology of lines (Ingold 2007, 2015). What if in our design thinking we were able to move beyond the straight scientific lines inherited from Western modernity? What conceptual shifts would become possible if the void or illegibility were perceived as a major component in design process, design drawing or graphic design? What opportunities for exchange of ideas would emerge for the global design community if the visual framing of the conversation about word, image and visual communication design embraced aesthetics developed in China and Japan?

Thirdly, I will discuss the broader implications of reimagining brush practice as at once traditional and modern, ancient and timeless, Chinese and transnational/transcultural (Welsch, 1999). Following Pan Jianfeng's

innovative cross-cultural work and observations he made in his writing on design training and practice, I will offer a few remarks on how designers can benefit from brush practice without necessarily becoming fluent in Chinese language or calligraphy itself. How can brush practice — pursued first of all as a self-cultivation practice — foster creativity and innovative solutions in different fields and industries? How may brush practice be utilized beyond the superficialities of aesthetic or visual effects — those easily and cheaply reproducible by available softwares and AI — to inspire new qualities of global visual design? How may we adjust the "teaching" of brush practice into instead a proposition of the brush as a lifelong endeavor, a form of creative healing, and an inclusive aesthetic project, relevant for many areas of design — far beyond typography design and visual communication?



**Figure 1.** Pan Jianfeng, A–Z, ink on Xuan paper. Image source: Courtesy of the Artist

## Acknowledgments

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# Oldest Ceramic Vessel Reconstructed Project

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This research aims to reconstruct the world's earliest vessel to validate its function and explore its potential as a source of inspiration for modern design. The study spans the interdisciplinary fields of archaeology, social studies, and industrial design, aligning with the theme of Inter-Cultural Innovation.

## Project description: oldest reconstructed ceramic vessel

According to Pollard and Gosden (2023), the Yuchanyan vessel is the oldest surviving ceramic relic in the world, where archeological studies from the material remains have already provided significant insights into the use and purpose of the vessel. These include studies of the heating effectiveness of the mineral mixture and constructed form, the original methods of making and firing of the vessel, and many other related aspects that indicate people's way of life between 18,300–15,430 cal BP (Liu, 2021). The purpose of this research project is to set up a range of prototype explorations to re-create the form, construction and particular ceramics minerals mixtures, to test the functional performance, physical reliability, emotional and aesthetic affordances in the human-vessel emotional relationships. These findings will provide considerable design insight and technical information to improve the user performance and experience and the manufacturability of contemporary vessel and container products.

## Background Information

Yuchanyan Cave is a karst rock shelter south of the Yangtze River basin in Daoxian county, Hunan province, China. According to Yuan (2013), Yuchanyan's deposits contained the remains of at least two nearly complete ceramic pots, securely dated by associated radiocarbon dates at having been placed in the cave between 18,300–15,430 cal BP. The Yuchanyan Vessel exhibited in the Hunan Museum, is the earliest reconstructed example of pottery in the world. As it is the earliest reconstructed ceramic vessel on earth it raises question about skills, time investment and physical properties involved as well as usage in daily life. It is an all dark brown, coarsely-made vessel with a loose and sandy texture. The pot was hand-built and low-fired (ca. 400–500 degrees C); kaolinite (a common mineral in soils) is a major component of the fabric. The paste is thick and uneven, with walls up to 2 centimeters thick. The clay was decorated with cord impressions, on both the interior and exterior walls. As Figure 1 has shown, enough sherds were recovered for the scholars to reconstruct the large, wide-mouthed vessel (round opening 31 cm in diameter, vessel

height 29 cm) with a pointed bottom; this style of pottery is known from much later Chinese sources as a "Fu cauldron".
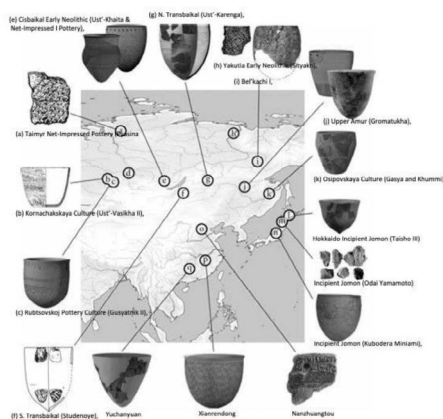
## Methods and Results

### 1. What were the skills, time investment and physical properties involved in creating this early vessel?

Replicating the manufacturing process using clay, additives, tools and techniques shed light on the skill, time investment and physical properties involved in creating these early vessels. We did make many samples of ceramic testing investigating handmade techniques. Proces 1: Creation of a 1:2 scaled 3D printing mold, splashing the clay on the top of the mold. Demolding and drying the clay before proceeding with the baking process. Following specific temperature curves baking in the oven. Proces 2. Making a sample by starting with a volume of clay bouncing by hand making it hollow. Using cord marking process (Figure 2). Both results baked at 585 °C heating. Following specific temperature curves baking in the oven (Figure 3).

**Figure 2.** de Baan, J. & Zhou, B.Y (2024). Making and testing process
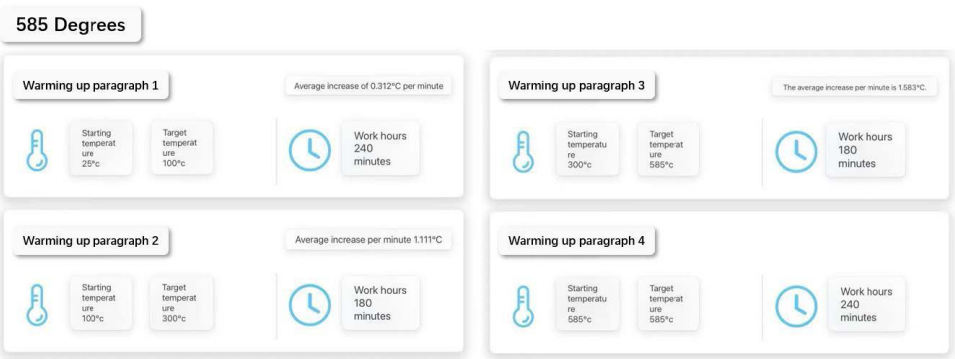


**Figure 3.** Zhao, J.X (2024). Temperature curves

## Conclusions

The shown samples appeared too dense. Apparently the denser the clay, the harder it gets and it breaks. The chosen clay is very fine and probably too mono-industrial and pure. Most archeological clay made objects with big wall thickness like this vessel in cross section have a sandwich-like structure (Figure 4). The middle part is usually darker than the outer parts as the inside layer contains grass additions that are burnt only and not fully transformed. These clays were taken directly from nature and were already equally mixed by natural processes.

**Questions:** Which rock fragments? Which organic material? How much water was added?

Figure 4. de Baan, J. (2024). Details of the clay

## 2. What insights can be gained about intended functions, heating effectiveness?

Considering ergonomics and affordances by handling and using replica vessels revealed insights about intended functions and heating effectiveness. Based on the vessel's shape, the following figures illustrate hypotheses regarding the potential methods ancient people may have used to heat food with this vessel.

As Figure 5 has shown, the pointed lower part of the vessel may facilitate burial in the ground and provide stability. An alternative hypothesis is presented where the vessel is supported by stones on the ground to facilitate heating. Further investigation is required to explore the morphology of the bottom part and the overall shape of the vessel, as well as the craft techniques used by ancient people in making such forms. A hypotheses is that this vessel was not for cooking. The wall thickness of 2 cm is too big. This a 'no-go' as cooking can not be efficient. Most likely the vessel was for storing something. Furthermore the vessel lacks a blackened down part. It is other proof that it was most likely never put in a fire for cooking.
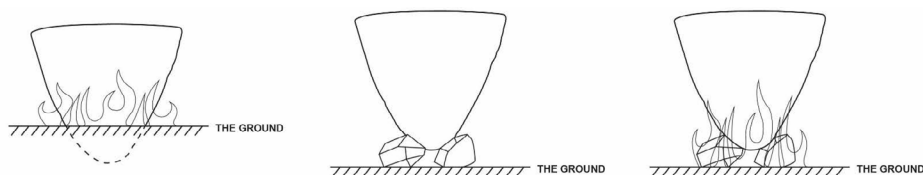


Figure 5. Zhou, B.Y (2024). Hypotheses of heating methods

## 3. Is the shape of the vessel well defined?

By creating 3d files a variety of possible shapes can be proposed. Based on a 3d scanning file of the Vessel in Hunan Museum, two 1:1 3d printed models were created (Figure 6). The 3d printed sample of the vessel is very helpful to get an understanding of the overall shape and dimensions. However, it is too perfect (Figure 7). The main question is if the vessel was circular or more elliptical or even an undefined 'round' shape. In the middle part of the vessel an almost full circle can be identified. Next step is to check the middle diagonal part of the vessel section and reshape the whole vessel accordingly. It will stay unclear if the bottom part of the vessel is rounded or sharp as there are no scarf elements there. It seems a speculative guess.
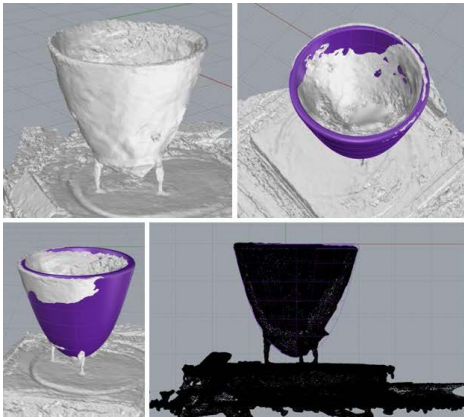


**Figure 6.** Li, S.J (2024). 1:1 reconstructed 3D model (refined shape)



**Figure 7.** Zhou, B.Y (2024). 3D printed model

## 4. Can the vessel be an inspiration for present and future design projects?

As a first step using AI methods to create new designs based on the images of the Vessel (Figure 8). Next step will be designing a series of objects inspired by the vessel a first step can be made to answer this question.

REQUEST | RESULT

**Figure 8.** Zhou, B.Y (2024). Test through AI (ChatGPT 4.0)

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# Re-imagining the Mazha:
## Heritage and Community in Urban Beijing

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This paper describes an approach to community-building and place-making which is rooted in research into local traditions, crafts, and architecture. It questions the value of craft activity, heritage and preservation in the contexts of community and urban living. Indeed, we take the essence of these cultural elements and reimagine them within a contemporary context, creating designs that are both meaningful and exciting.

Studio HVN is a multidisciplinary design practice specialising in space, furniture, and product design, equipping us to think big while working with high attention to detail. Our studio aim is to connect people through the richness of culture. We believe that highlighting the intelligence, beauty, and unique contributions that diverse cultures bring to our environment is more important then ever. By fostering these connections, we aim to stimulate meaningful social interaction and make a positive impact on the modern challenges we face. Whether we're designing spaces, furniture, or products, our work is a celebration of cultural diversity, infused with innovation and creativity.

The "Mazha Workshop", which is an interactive project that invites participants to create their own Mazha stools, was inspired by the cultural importance of Mazha stools in Beijing—where they are traditionally used in community gatherings. This regular workshop engagement emerged from conversations during Studio HVN's Mazha exhibition at Beijing Design Week 2012. The workshops aim to foster a sense of community, enabling participants to connect through the shared experience of crafting their own stools.

The Mazha, also known as a bench or folding stool, originated in China around 2,600 years ago, initially as the Huchuang. This folding furniture was highly portable, likely inspired by northern nomadic designs. Over time, it evolved, particularly in the Song Dynasty, incorporating backrests and armrests for added comfort, becoming the Jiao yi. The Mazha, praised for its durability and ease of transport, ultimately transitioned from outdoor or field furniture to a refined piece in homes and social settings, contributing to Chinese cultural and furniture heritage. These days the stool is known in throughout China, but especially in Northern regions, Beijing, as a symbol for impromptu social gatherings on the streets of the nationals capital.

Each workshop starts with a history and craftsmanship introduction, emphasizing the art of weaving that's central to Mazha stool-making. Participants are introduced to basic weaving techniques, with examples to inspire them as they create their own unique stools. The goal is to deepen

appreciation for traditional craftsmanship while fostering creativity and community. In some cases, finished Mazha stools are exhibited to showcase personalized designs, highlighting the importance of learning and passing on craft skills, fostering creativity, and celebrating cultural heritage.

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Master's from the Royal College of Art. Founder & Design director at Studio HVN: Spatial, Furniture, Product Design. His mission revolves around blending contemporary aesthetics with the rich tapestry of culture.

# The Photo-synthesizing Artist:

## An Exploration of Creative Metamorphosis

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# 1. Introduction

Contemporary views increasingly recognize nature as an active force that coexists with human culture (Christophers, 2018), challenging the notion of nature as a passive resource (Maniates & Meyer, 2010). Instead, a sustainable future depends on understanding the agency of non-human entities (Bowden, 2015). Scholars and artists are exploring this interplay, acknowledging that both humans and non-humans actively shape our world, while traditional art often limits nature to a static role (Droz, 2021).

Photosynthesis offers a metaphor for this dynamic engagement, with plants transforming sunlight into usable energy through three key phases: absorption, transformation, and diffusion. Plants first absorb sunlight and water, then transform this energy into essential compounds, finally diffusing it back into the ecosystem to nourish life.

Our proposed methodology draws on these phases, envisioning the artist as a "photosynthesizing" agent. Here, nature collaborates actively with the artist through environmental absorption, studio-based transformation, and creative diffusion. This "photosynthesizing" approach provides an ecologically integrated perspective, in which the artist co-creates with the surrounding landscape, enriching both the artwork and its connection to the environment.

# 2. Related Work

The power of image-making as a tool for interpretation and communication cannot be overstated. Yet, tracing its trajectory through Western culture, we encounter a narrative steeped in anthropocentrism and linear progression. Techniques rooted in objectivity and linear perspective (Edgerton, 2009) have shaped visual representations and cultural narratives, often portraying nature as a conquest to be subdued for aesthetic pleasure or financial gain. Artists like Claude Lorrain, John Constable, and Frederic Edwin Church have etched landscapes that reflect societal values and aspirations while simultaneously perpetuating cultural norms and ideals (van der Heide & Heijman, 2013).

On the other hand, the Shanshui tradition, deeply rooted in Chinese culture, provides a framework that resonates with the ethos of contemporary movements, yielding enhanced dialogues with the non-humans. This tradition departs from dualistic perspectives, advocating for an interconnected and diverse understanding of the world. Notable examples include Yan Jun's performative interpretations of Shanshui (Wang, 2020), Gao Shiqiang's expansion of Shanshui into moving image (Gao, 2020), and

YongLiang Yang's (Tan, 2016) photographic reimaginings of Shanshui's visual essence. These contemporary adaptations reflect a transformative approach to Shanshui, laying the groundwork for new methodologies that constitute this study's approach.

This approach aligns closely with current ecological and creative discourses by incorporating cyanotype photography (Ware, 1998), painting, and technical imaging (Flusser, 2011) within the evolving Shanshui tradition (Law, 2001). Through the application of a cyanotype-led field technique, the project merges the performative act of Shanshui-inspired nature engagement into a documentarily interweaving process that allows for a "photosynthesizing" transformation. This transformation is precisely the promoting agency for a needed planetary interconnectedness (HUI, 2024).

## 3. Method

The project's method unfolds in three distinct phases, each designed to deepen our engagement with the environment and explore the interplay between nature and artistic creation using the photosynthesizing principle. Inspired by Shanshui painting philosophy and contemporary artistic practices, our approach incorporated a blend of traditional and innovative methodologies to investigate the transformative role of nature in art.

### 3.1 Phase One: Environmental Absorption and Material Exposure

This phase involves "absorbing" environmental influences as raw material. We conducted fieldwork in Tai Lake, using cyanotype techniques to create artworks directly influenced by the surroundings. By placing photosensitive materials in direct contact with elements like sunlight and water, we allowed the landscape to co-create the artwork, capturing unique environmental details such as light intensity and weather effects. Here, nature acts as a co-creator, imprinting itself onto the artwork as an initial layer.

### 3.2 Phase Two: Creative Energy Transformation in the Studio

With the cyanotype canvases now holding an "energetic" imprint, the studio phase allows for the "transformation" of these influences into more complex, layered artwork. Techniques like painting, printmaking, and overlay enable the artist to interpret and build upon the environmental imprints, creating a dynamic exchange between human interpretation and nature's original mark.

### 3.3 Phase Three: Artistic Diffusion and Environmental Expression

In this final phase, we "diffuse" the creative energy by incorporating digital techniques, including scanning and digital manipulation, which resonate with the concept of "diffraction" as ideas and forms expand across media. The artwork "fixes" and amplifies nature's influence across multiple formats, engaging viewers in an ecological dialogue that transcends traditional media boundaries, reinforcing the interconnectedness between nature and artistic creation.

## 4. Results and Discussion

To demonstrate the results, two artworks, depicted in Figures 1 and 2, are presented below as primary examples of our art approach. These pieces emerged from the spontaneous interplay of cyanotype surfaces, ambient light, and local ecological elements at the Tai Lake site. Unlike traditional art, these images were not crafted directly by hand but developed through natural interactions within the environment.

Despite their subdued tones, these artworks vividly showcase the unpredictability and vitality of the natural landscape, highlighting the environment's role as an active participant in the artistic process. This collaboration portrays the transient nature of the interaction between the artist and the environment, where the artwork itself becomes a medium for deeper contemplation on the perception and understanding of the natural world. The resulting complex and iterative images resonate with our perceptual experience of nature's intricate patterns and energies. Yet, they also reflect nature's enigmatic essence that remains beyond our complete understanding (Adorno, 1997).

## 5. Conclusion

"The Photosynthesizing Artist" investigates how artists can transform their perceptions into art, positioning creative activity as an ecological process. By synthesizing insights from Adorno, Benjamin, and Shanshui's philosophy, the project adopts an interdisciplinary approach that combines fieldwork, technology, and artistic practices. This framework captures nature's dynamism and reflects on humanity's role within ecological networks. Through this work, we encourage reimagining human-nature relationships, proposing that art can become a medium for cultivating environmental awareness and stewardship.

**Figure 1.** Cyanotype recording natural elements



**Figure 2.** The mystical, ethereal quality of Cyanotypes

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# Innovation Through Preservation

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Archivio Magazine is Promemoria Group's publishing project to oxygenate ideas and experiment with new curatorships of archival content. In September 2024, Archivio published the Design Issue inviting guest editors Jasper Morrison (British designer) and Marco Sammicheli (Director of the Museo del Design Italiano at Triennale Milano) to unveil, explore and examine a selection of international archives in the design world.

In recent years, a hybrid form archive-museum has emerged in Europe: the historical archives of designers, companies and organizations have undergone significant musealization to become a cultural repository, professional domain and leisure destination. The research paper will examine the musealization of three categories of historical archives across different cultures and explain how exhibition, design, emergent technologies and interdisciplinary programs revolutionized the canon of museology. At this point, I must emphases on design museum specifically, its ideologies and hegemony. I will refer to the writings by Paola Antonelli, senior curator of the department of architecture and design at Museum of Modern Art, New York, Alice Rawsthorn, critic, curator and former director of Design Museum, London. I will also reference the publication "Design Objects and the Museum" by Joanna Weddell and Liz Farrelly.

The paper will examine the Italian architect and designer Achille Castiglioni's foundation in Milan. The former studio of the architect has been transformed into a studio-museum, its function is not restricted to scientific preservation but permitting temporary exhibition and ritual performance. The paper will review the exhibitions "Dimensione domestica" (Domestic dimension) and "Projects to serve. Restaurants by the Castiglioni brothers" at the Fondazione Achille Castiglioni and demonstrates how the "ceremonial nature" of museum space is demythologized. Architect Renzo Piano refers to his archive as "seaport" and "living archive", the paper studies the documentary film "The Power of Archives. Renzo Piano Building Workshop" and examines a variety of programs Fondazione Renzo Piano organizes to educate young architects. Case in point, the paper will examine the exhibition "Renzo Piano: The Art of Making Buildings" (2018-19) at Royal Academy, London and "Renzo Piano Building Workshop, Living Buildings" at By Art Matters OōEli Complex in Hangzhou China in 2023.

Museimpresa (Business museums) is an association of Italian business archives and company museums established in 2001 to safeguard company's tangible and intangible heritage as well as promoting Italian production. The paper will examine one of the members of Museimpresa —

Bitossi ceramic company and its archive-museum launched in 2021. The archive-museum is a delicate architectural intervention and museographic project executed by Luca Cipelletti and curators Porzia Bergamasco and Marina Vignozzi. Cipelletti, in an interview with Hans Ulrich Obrist argues that revolution can happen through preservation and "musealization of historical archive". The paper will reference the newly opened Curore Centre for Studies, Archives, Research in Triennale Milano by Cipelletti. The Curore epitomizes the hybridization of archive and museum; instead of segregating the Triennale historical archive from the museum, the Curore is situated prominently on the ground floor. Moreover, the unique set up and display have made the archive (over 300,000 works ranging from objects, drawings, photographs, correspondence and books across the discipline of design, visual art, architecture, theatre, graphic design) easily accessible to visitors, scholars and the scientific community.

The world's oldest museum of manufacturing is also undergoing a major transformation. The V&A East Storehouse, due to open in 2025 will be a new typology of museum creating a new cultural experience by turning its half a million collection and archive 'inside out' and facilitate visitors to interact with the museum's daily operations. Furthermore, the V&A East Storehouse works closely with young people to devise programs (Your Collection: V&A East in Schools) for East London's diverse and underrepresented community. The paper will reference the notions of "eco-museology" and "community museology" in Kevin Walsh's "The museum as a facilitator". Interestingly, the 2025 ICOM General Conference's theme is "The Future of Museum in Rapidly Changing Communities" with emphases on intangible heritage, youth power and new technologies.

Young people are born with digital technologies and are the creators of tomorrow's tangible and intangible heritage, museum's ability to evolve and reinvent determine its relevance and existence. In China, the Shanghai Museum of Glass anticipates the rise of technology-savvy young people (under 25) and diverse demographic audiences, the museum launches SHMOG NXT in 2023 — a 3D virtual experience combining creativity and human-centric innovation. The paper will interview Tilman Thürmer, design director and Vice President of the Shanghai Museum of Glass and founder of Coordination Asia (COO) and discover how game engines, metaverse and AI programming generate a "phygital" museum that brings together art, design and technology.

In conclusion, the paper aims to demonstrate that the purpose, function and practice of preservation are under scrutiny and innovating ways of working with archive can oxygenate new ideas for designers, companies and organisations across different cultures. The paper also examines a hybridized cultural arena in the name of archive-museum and its disruption on the ideologies and hegemony of (design) museum.

## Acknowledgments

**Figure 1.** V&A East Storehouse
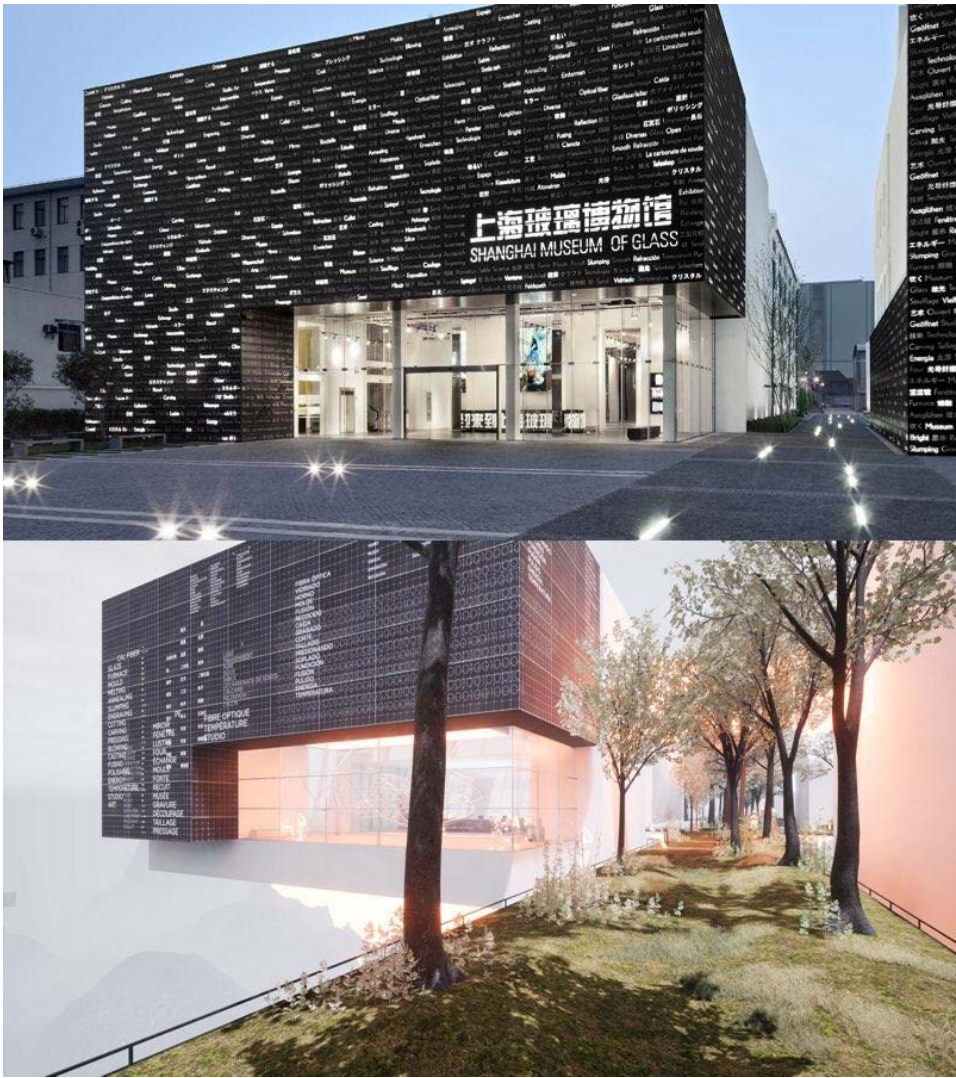
**Figure 2.** Real / Virtual SHMOG NXT by Coordination Asia (COO)

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# The 'Living Museum':

## Exploring Tradition Preservation and Craft Revival Through Communities

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## Abstract

Much like all living things, traditions, and Culture grow and Change. They go beyond the lifetime of an individual making them more than just organic, but supra-organic (SU LMS, n.d.). This desire for knowledge has driven societies to uncover, document, and showcase artifacts in museums. According to the International Council of Museums, a museum is a permanent establishment that exhibits and interprets the heritage of its society (International Council of Museums, 2023). Traditionally, museums have separated artifacts from organic society, creating structures to protect and control elements of the past for education. Although this model has served societies well, evolving societal needs demand a new approach.

Museum 3.0 aims to incorporate technology and digitalization, creating more accessible and immersive experiences, especially for remote audiences (What Is Museum 3.0? — Museum of UnRest, 2023). Shen et al. (2024) found that AR museum experiences reduced anxiety and heightened attention. While innovative, this model might widen the gap between users and their culture.

This study explores a novel museum model grounded in community engagement, utilizing a pre-digital approach to realize Museum 3.0, preserve traditions, and revive crafts. Two case studies in Zambia — Zeela Art Gallery and Mukuni Village — were selected based on their distinct community-driven experiences. Information was gathered through personal tours, with verbal consent for photographs and handwritten notes. The cases were evaluated using a simple 'yes' or 'no' method based on Museum 3.0 elements.

Figure 1,2. Touring through Zeela Art Gallery and Homestay. (Tusankine Salasini, 2024)

Launched in 2017, Zeela Art Gallery stands firmly on three values; Nature, Culture, and Art (About Us – Zeela Art Gallery, n.d.). The gallery is not a building separately owned by the family rather, it is within the family's home. The family believes that Zambian art was portrayed in the handicrafts of our ancestors and how it was closely tied to their homes in the form of different carvings or artifacts that were made for day-to-day use. The family believes that our culture should not be displayed away from us but instead dwell with us and continue to grow with us in our ever-changing communities. The model promotes opportunities to learn and actively engage with the family creating a strong sense of community regardless of background and this promotes rich intercultural exchanges within and across borders in a friendly and familiar environment.



Figure 3,4. Experiencing Mukuni Village culture and crafts. (Tusankine Salasini, 2024)

Much like Zeela Art Gallery, Mukuni Village is a working community that was not initially created for tradition and heritage preservation but instead opened itself up over time to the public to learn and experience one of the many cultures in the country. Founded in the 13th Century, the Royal Village of Mukuni still maintains its traditional way of life and has recently opened its gates to give visitors a glimpse into how Zambian tradition truly appears in different forms from architecture to food (Mukuni Village Cultural Tour - Winning Tours and Travel, n.d.). The Village is economically sustained mainly by Crafts. Because of the large population of elephants in the area reducing agricultural economy, the community took to leveraging the fallen trees from elephant movement. The leya people make most of their crafts from the wood of these trees which promotes a craft economy and heritage preservation in the village.

| Elements | Zeela Art Gallery | Mukuni Village |
|---|---|---|
| Digital Integration | No | No |
| User-Centric | Yes | Yes |
| Intercultural exchange | Yes | No |
| Dynamic and Flexible Spaces | Yes | Yes |
| Community Engagement | Yes | Yes |
| Craft Economy | No | Yes |

**Table 1.** Presence of Museum 3.0 Elements

Table 1 shows that although both models rate high in containing aspects of the new museum model, both lack digital integration. In as much as It can be argued that the case studies are taken from a country in the world where digital advancements are not prominent, it can be seen as something these existing models can take into consideration in the future. Otherwise, both models can be seen as 'people' museums as they are made for the people, by the people. Unlike Zeela Art Gallery, Mukuni Village does not have much intercultural exchange as its model leans more towards sharing the traditions of the village with others than vice versa. Similarly, Zeela Art Gallery also lacks a strong craft economy but makes up for it in recent programs released for children which encourages making and creation in school children. Ultimately, Museum 3.0 is still a 'work-in-progress', and explorative studies like this can help to create a broader picture of what it may be and how it can reflect in different parts of the world. Although there are no set guidelines or frameworks that can be used to truly determine what the new museum model should be based on, this explorative study can still be seen as a way to further understand how traditional preservation can be achieved through other unconventional means. Furthermore, regardless of the many limitations faced in this study such as minimal existing data and undefined frameworks, it still revealed some eye-opening information that future researchers, especially in Zambia, can use to develop the concept of 'Living Museums'.

## Acknowledgments

**Tusankine Salasini**
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# Architectural Narratives in the Digital Age:

## The Museum of the Future and the Social Media's Role in Shaping the Identity and Perception of Dubai

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# Abstract

This extended abstract investigates the dynamic interplay between architecture and social media in shaping public perception and identity in Dubai, focusing on the Museum of the Future as a case study. The research delves into how contemporary architectural designs and public spaces are increasingly tailored for visibility on social media platforms while examining the strategies governments employ to leverage media for tourism promotion and urban branding. This trend significantly impacts architectural design, urban experiences, and education. The influence of social media, digital platforms, and artificial intelligence is transforming the way spaces are perceived and experienced. A mediated understanding heavily reliant on image-based representations disseminated through social media channels is replacing the traditional, direct engagement with architecture. This shift raises critical questions regarding contemporary architecture's enduring impact and interpretation as it becomes more intertwined with ephemeral, curated online representations. The Museum of the Future serves as a pivotal example of this phenomenon. Opened in
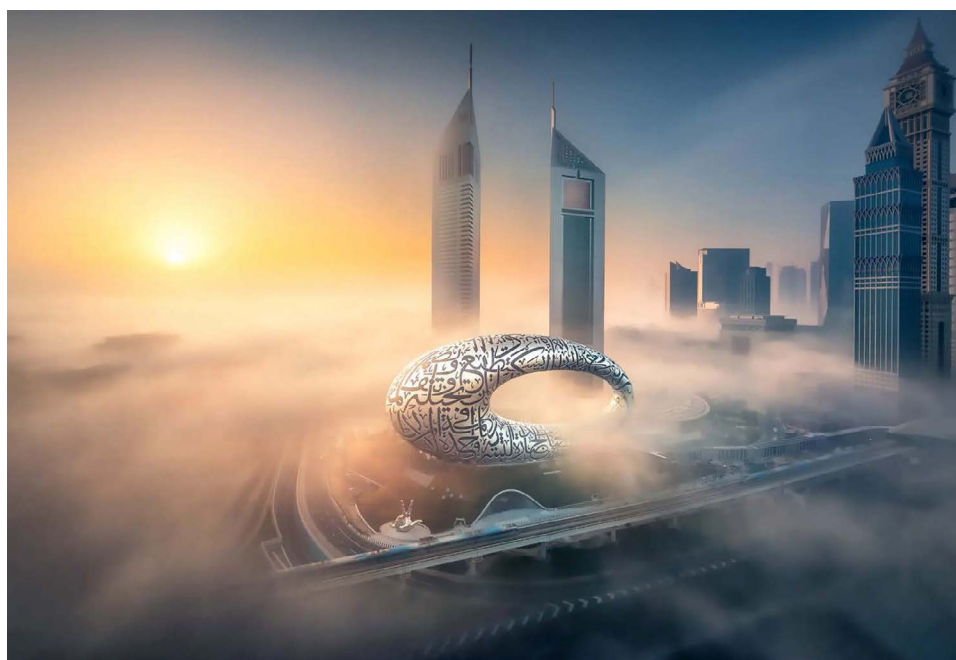
**Figure 1.** The Museum of the Future. Killadesign, (2022), "Museum of the Future", available at https://www.killadesign.com/portfolio/museum-of-the-future/ (accessed 28 April 2024)

February 2022, it has quickly become an iconic structure in Dubai, characterized by its innovative design and use of advanced technologies such as Building Information Modeling (BIM) and parametric modeling (Corti, Pasina, 2023). The museum showcases futuristic concepts and engages visitors through immersive experiences that blend physical presence with digital interaction, integrating traditional cultural values (Killa Design, 2022). As such, it exemplifies how architectural landmarks can be strategically positioned within the social media landscape to enhance visibility, promote tourism, and leverage the country's soft power.

The role of social media in shaping perceptions extends beyond mere visibility; it influences the branding of cities like Dubai as global tourism hubs (Jahmani et al., 2020). Influencer partnerships and user-generated content play crucial roles in this ecosystem, amplifying brand exposure and fostering authentic connections with potential visitors. This reliance on social media for architectural promotion raises important considerations about the authenticity of experiences and the potential commodification of cultural identity. This research underscores the necessity for architects and urban planners to critically reflect on how their designs will be interpreted within an increasingly digital context. As social media shapes public perception, it is imperative to consider how these platforms can both enhance and distort our understanding of spaces. The implications extend into educational realms, where a mediated understanding of architecture may influence future generations' engagement with built environments.

Social media shape Dubai's narrative and identity: platforms like Instagram have become essential for promoting the city's attractions and engaging with residents and tourists. The UAE government actively utilizes social media to disseminate information, promote initiatives, and foster community engagement (UAE Government portal, 2024). The "#MyDubai" initiative launched by Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum exemplifies this strategy, encouraging citizens and visitors to share their experiences using a collective hashtag. This initiative aims to create a shared narrative reflecting the emirate's diverse experiences (Michaelson, 2021). Social media's impact on tourism is particularly noteworthy; research indicates that many travelers rely on social media content for vacation planning. The influence of digital platforms has led to an increase in bookings among travelers who engage with social media content related to their destinations (Sheperd, 2024). Consequently, Dubai has positioned itself as a leader in "Insta tourism," capitalizing on its visually appealing architecture to attract visitors. Place brand-

ing encompasses both tangible elements—such as architecture and economic characteristics—and intangible aspects like emotional connections and experiences associated with a location (Hanna & Rowley, 2015). By fostering positive perceptions through strategic branding efforts, cities can instill pride among residents while attracting businesses and tourists.

The UAE's commitment to technological advancement is evident in its investment in information and communication technologies (ICT). Recognized as a leader in ICT adoption within the Arab world, the UAE government prioritizes digital initiatives that enhance e-government services and smart city concepts (Gugler, 2021). This focus on technology facilitates communication and positions Dubai as a global hub for innovation. Integrating technology into everyday life has transformed how residents interact with their environment. Online platforms are increasingly used for research and commerce, reflecting a shift towards digital engagement that complements traditional methods (Sayed et al., 2015). By blending innovation with cultural heritage and leveraging technology for effective communication, Dubai has established itself as one of the world's most dynamic cities. Its strategic approach to place branding enhances its global reputation and fosters community engagement among diverse populations.

With this paper we argue that social media has transformed how architecture is communicated and perceived, shifting the focus from traditional publications to visually driven platforms. This transition democratizes architectural discourse, enabling individuals without formal training to share their experiences and influence public perceptions. However, the paper also highlights a "flattening effect," where architecture is often appreciated for its visual appeal rather than its functional qualities. The prevalence of "Instagrammable" spaces and the influence of social media personalities can dictate public expectations, potentially compromising architectural integrity (Akyol and Yurttaş, 2023). Moreover, the paper raises critical questions about the future of architectural design in this mediated environment. It explores whether this democratization enhances public involvement in design or distorts architectural meaning by prioritizing aesthetics. The integration of Artificial Intelligence in creating alternative realities further complicates these dynamics, prompting reflections on how digital representations might overshadow physical experiences. Ultimately, the analysis underscores the profound implications of social media on architectural representation and engagement, suggesting a need for architects and educators to navigate these evolving perceptions thoughtfully.

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# Curating the Virtual:

## XR Technologies and the Evolution of Heritage Experiences

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# Abstract

The integration of digital technologies, particularly Extended Reality (XR) tools such as Augmented Reality (AR) and Virtual Reality (VR), has fundamentally transformed the way museums and heritage sites engage with audiences. XR has the potential to enhance understanding, engagement, and retention by creating dynamic, multisensory environments that actively involve the user (Cranmer, 2019). However, their implementation in cultural heritage contexts presents significant challenges, such as high implementation costs, technological reliability, the need for regular maintenance, and the ongoing tension between technological innovation and the preservation of authenticity (Cerquetti, 2018; Menegaki, 2022).

This research examines the intersection of traditional museology and emerging XR technologies, exploring how these digital tools can be integrated into cultural heritage experiences while addressing the challenges and opportunities they present. The study employs qualitative interviews with practitioners across China, Europe, and North America to understand how cultural heritage XR projects are ideated, developed, and implemented. Ultimately, the study aims to encapsulate a new framework that will help practitioners and academia understand the processes that inform the development and implementation of meaningful and authentic XR heritage experiences.

The design of digital experiences requires increased interdisciplinary collaboration, bringing together curators, designers, technologists, graphic designers, educational specialists, and, on occasion, users themselves (Mason, 2015). This collaborative approach ensures that digital interventions are well-integrated with the educational goals and thematic narratives of the heritage sites (Mason & Vavoula, 2021). However, this leads to several challenges in the design process, requiring extensive collaboration, communication, and shared processes to create successful digital products (Popoli & Derda, 2021). Heritage managers and museum curators must often relinquish some authority in the process, which can be a challenging organizational shift, especially when using new and unexplored technologies (Davies, 2010).

Responding to these complexities, researchers and practitioners have developed frameworks to curate digital museum and heritage experiences. In line with new concepts of museum engagement—more dynamic, visitor-focused, and immersive—frameworks now emphasize technology integration, user-centered design principles, iterative processes, multidisciplinary collaboration, and balancing engagement with educational

authenticity (Damala et al., 2019; Davies, 2010; Popoli & Derda, 2021; Spadoni et al., 2023). Earlier models focused on static exhibitions, while recent ones embrace immersive technologies and active user involvement. Few frameworks address curation specifically for heritage sites, and even fewer consider XR applications beyond museum walls.

Key findings highlight differences between traditional museum practices and XR heritage projects. XR projects often begin with more diverse ideation, including external developers, artists, private sector organizations, or communities, rather than solely museum staff. This creates a non-linear, iterative process where ideas evolve as new stakeholders join. Collaboration and communication are crucial for success, with project management processes ensuring alignment among curators, technologists, and designers.

Technical challenges include sustainability, data storage, long-term maintenance, and avoiding technological obsolescence. High costs limit adoption, particularly for smaller institutions. Nevertheless, XR offers opportunities for diversity, interdisciplinarity, and multi-perspective storytelling. While these tools allow creative flexibility, they demand careful handling of historical accuracy and authenticity.

The research contributes to theoretical understanding and provides practical perspectives from varied cultural and professional backgrounds. Future work should explore detailed case studies, best practices, and user perspectives on XR in cultural heritage.

## Acknowledgments

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initiatives, emphasizing the interplay of
diverse perspectives and conflicting
interests in selecting and interprerting
heritage assets.

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# Traditional Craftsmanship as an Endangered Species in the G-Code Era

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We live in a world in which we rely on countless objects to accomplish our daily tasks, and this has been integral throughout human history. Our evolution is deeply connected to our capacity for creative thinking, enabling us to ideate and produce artifacts, tools, and various machines that make life easier and more efficient. While high-tech machinery and advanced ways of producing objects are nowadays common in our daily lives; traditional craftsmanship has historically held a unique position in the relationship human-object. The relevance of such a way of making is because represents an important cultural asset, reflecting one of the most vital elements of our intangible cultural heritage, helping to preserve the unique identities of different cultures worldwide. Based on the previous points, traditional craftsmanship represents a fundamental aspect of cultural heritage, comprising skills, techniques, and knowledge passed down through generations (UNESCO, 2003).

From a modern perspective, industrial design and manufacturing methods are evolving with advancements in technology, new materials, and innovative processes to address the complex-wicked issues faced by all societies across the planet; this leads to processes of generating ideas and tangible solutions heavily dependent on G-Codes, which are a series of commands sent by computers to manufacturing tools such as CNC and 3D printers instructing them on how to interpret the commands, as well as what to do and how to move (Najia, 2024). Contrary to that approach, traditional craftsmanship is based on manual dexterity and a more analogue way of producing objects; however, it is also relevant to highlight that preserving traditional craftsmanship is not about nostalgia but about recognizing its importance as a tangible and intangible means of cultural heritage. This heritage's significance lies not only in the crafted objects but also in the skill, dedication, and methods used to create them, demonstrating an advanced understanding of materials and processes. Traditional skills and the knowledge passed through generations offer insights into sustainable practices, emphasizing the importance of knowing how to use materials in a sustainable and resourceful way, which are qualities often overlooked when manufacturing mass-made objects.

Given the need to safeguard and integrate traditional craftsmanship within modern industrial design practices, particularly in regions with a rich history and cultural legacies, it is important to acknowledge the potential benefits of incorporating traditional techniques, skills, and knowledge into the curricula of industrial design programmes in Higher Education Institutions, particularly in those situated in regions where

Traditional Craftsmanship as an Endangered Species in the G-Code Era

traditional craftsmanship is disappearing. By doing so, contemporary product-industrial design students and teachers can value not only digital tools such as 3D printers but also the basic manual skills and practices that artisans have developed and refined. Combining these approaches fosters a holistic design perspective, where respect for cultural heritage complements the adoption of technological advancements.

Moreover, as traditional craftsmanship is at risk globally, the author classifies its practice as an "endangered species" due to the quick changes brought by modernization. Consequently, the creation of a digital platform is proposed to create awareness and stimulate dialogue on preserving traditional crafts. The purpose of this platform is to highlight how traditional techniques can enrich industrial design processes in both professional and academic contexts, providing a way to contribute to sustaining cultural heritage and supporting the livelihoods of communities dependent on traditional craftsmanship. Also, in a rapidly evolving world where technology accelerates production to meet the demands of a growing population, the platform aims to raise awareness about the value of traditional craftsmanship and the benefits of a slower and more sustainable approach to designing and producing objects. In addition to being a resource for designers and any person interested in the topic, the platform could serve as a space for cultural exchange, connecting artisans, students, and creative professionals across geographies (Risatti, 2004).

Although the problem presented in this paper may seem relevant mostly to traditional craftsmen who witness how their techniques and crafts disappear due to phenomena such as migration from rural areas to cities, globalization, modernization, adoption of new technologies, and a general lack of interest from younger generations to learn about the traditional crafts and the ways to preserve them; this is in fact, a challenge faced by all humanity because, on a larger scale, these issues contribute to the loss of both tangible and intangible cultural heritage; therefore, preserving traditional crafts is not about resisting technology and change but about safeguarding ways of life, cultural identity, and traditions.

To address the previous concerns, the proposed digital platform can start at a local level, focusing on a region where traditional craftsmanship is endangered, to later expand progressively while aiming to create awareness about the relevance of sustainable practices linked to the preservation of cultural heritage and by presenting in a simple-intuitive way relevant information about traditional crafts.

Some of the tentative main sections are:

- **Inspire me:** The users access this section to learn about different traditional crafts from all around the world, getting inspiration from different regions every day. The section includes assets going from photographs of different crafts to engaging stories behind them and interviews with craftsmen from all around the world.

- **Crafts near me:** An interactive section that allows users to find small-medium size shops offering traditional manufacturing services and sale of handmade products, which are certified as socially-environmentally responsible shops. Furthermore, this section could include the contact details of traditional craftsmen in the area where the user is located to promote direct selling with no intermediaries.

- **Let me try:** In this section, the users can learn how to make the crafts themselves in a DYI style while being guided by the master craftsmen using recorded videos. This would be useful to promote the preservation of the making techniques.

In conclusion, the purpose of the digital platform project and this proposal is to enhance the understanding and preservation of traditional craftsmanship as an invaluable resource that can contribute to contemporary design and the sustained livelihood of the communities comprised by craftsmen.

**Luis Felipe Moreno Leyva**
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# Track 2
# Keynotes

# Future Trends in Design Academia

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**Keywords:** Future Trends, Design Academia, Design Education,
Design Research, Impact

Looking at the future of Design Academia, we identified 15 trends grouped into the domains of education, research, and impact. This work is the updated result of desk research, interviews with design specialists, and discussions within a team of design researchers and educators at the Faculty of Industrial Design Engineering at TU Delft in the Netherlands.
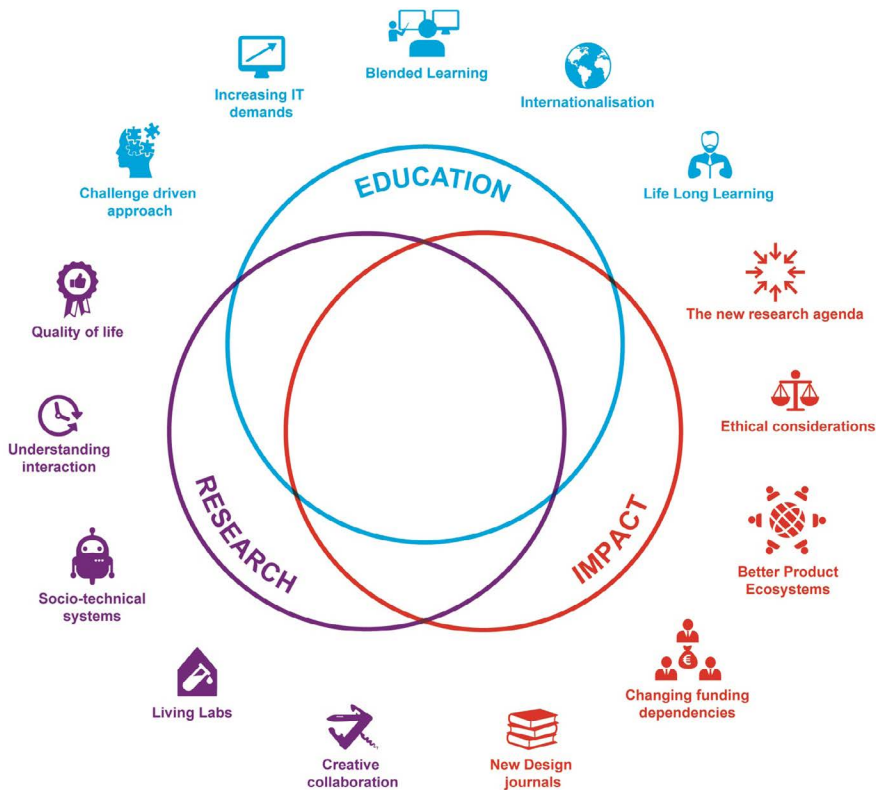


**Figure 1.** 15 Future trends in Design Academia grouped into the domains of Education, Research and Impact

# Education

**Challenge driven approach: involved attitude**
Project-based education is increasingly (societal) challenge-driven. This requires students to have an open, involved and inquisitive attitude towards their society and culture. This attitude will help them develop a more

moral and critical attitude. Students want an education programme that best fits with their desires and needs: self-choice is an essential part of this.

### Increasing IT demands: relevance of digital knowledge and skills

The multidisciplinary nature of our professional field requires students to have relevant T profiles. Given the increasingly dominant role of the digital domain, IT knowledge and programming skills will continue to become more important, specifically integrating artificial intelligence and virtual reality.

### Blended Learning: combination of onsite and online

Blended learning is on the rise; education programmes are developing an optimal mix of face-to-face and online learning methods. This motivates students more than either pure classic or pure online education. Important factors when considering online education are supervision/coaching, communication, and certification processes. As a result, the faculty will become a place where people (physically) meet each other. So, in the case of collaborative-learning, aspects like motivation, attitude and cultural-acclimatisation will become increasingly important. This requires the development of surroundings that facilitate these aspects.

### Internationalisation: increase of mobility and competition

International knowledge exchange is becoming more and more important, leading to an increase in international contacts, which in turn stimulates professionalization. This is a result of improved external mobility, as well as the internationalisation of our own internal organisation. Both students and lecturers possess the knowledge and skills that enable them to work together with and live with other organisations and citizens.

**Life Long Learning: the need for continual development**
It is becoming increasingly important for people to continually develop their knowledge, skills and competences throughout their lives. This is not only related to their working environment and professional development but extends to improving their social and societal perspectives.

## Research

**Quality of life: design for long-term wellbeing**
The shift from the fulfilment of individual needs to quality of life and society: there is a need to understand how design can aim for long-term personal well-being and a healthy and sustainable society, by impacting people's behaviour, experience, and standards.

**Understanding interaction: in context, over time**
The need to understand interaction in context and over time, rather than to focus on immediate usability or user experience. An understanding of how products and services fit into people's daily routines and social practices is essential.
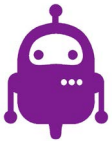
**Socio-technical systems: moving towards complexity**
The transition from personal systems to complex socio-technical systems. This entails an understanding of the multiple actors (from people to intelligent devices, or 'things') and values that play in an increasingly connected world.

**Living labs: experiments in a real-life environment**
Real experiment labs or direct user research by agile methods and system testing. This includes real computing and experiment-based working support as well as flexible adaptation to the specific demands of designers, projects, etc.

**Creative collaboration: across disciplines and distance**
Increasing collaboration across disciplines, companies and locations, to tackle future complex scientific and societal

problems, and to face increasing competition. There is a need for more creative connections between different scientific fields, and for increased cooperation and crossovers with the industry and societal institutions. This will bring the best together, aiming for the highest impact.

## Impact

**The new research agenda: innovation for societal impact**
The global challenges we face today demand innovative research that prioritizes societal impact. The United Nations' Sustainable Development Goals (SDGs) provide a framework for aligning innovation with these critical challenges. In the context of a new research agenda, focusing on societal impact involves embedding the principles of the SDGs into academic inquiry, technology development, and systemic innovation.

**Ethical considerations: more inclusive and responsible approach**
Ethics entails tackling key challenges and seizing opportunities to foster a more equitable and thoughtful academic environment. By adopting these principles, design academia can equip future designers to approach their work with a strong sense of responsibility and inclusivity.

**Better Product Ecosystems: more integrated and better working**
By applying systems thinking, harnessing emerging technologies, and prioritizing sustainability, designers can develop integrated, efficient, and impactful ecosystems. These ecosystems will address complex real-world challenges by ensuring that products, services, and technologies work seamlessly together.

**Changing funding dependencies: external and participatory strategies**
It is essential to form strong international partnerships or consortia with peers and industry, to ensure a greater

success rate of project funding. The faculty needs a living database of potential (project) partners. To strengthen the link with industry and to influence the subsidy agenda, it is essential that qualified people are positioned in the right, strategic networks.



**New Design journals: broadening research impact**
New Design journals are being established in several (upcoming) regions. This development will lead to a substantial growth in the total number of manuscripts for publication, due to the growth in numbers of design scholars in these upcoming regions. If these global research topics connect to our strategy and research directions, this can provide a valuable opportunity for broadening our research impact.

## Acknowledgments

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# Culture Sensitive Design Education

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How can design be understood from a socio-cultural perspective? We first go back in time. Design as I have come to know it from Western Europe emerged from a period of industrialization and free market thinking, particularly in the United States of America and countries in Western Europe. Products, including cars, were mass-produced and increasingly efficiently, and after an initial saturation of the market, the need for distinction arose. In addition to comfort and safety, aesthetics became an important value with which companies began to distinguish themselves and with which new markets could be served in which competition was the driving force. Economic growth and technological innovation as the holy grail for a good life for as many people as possible has changed the world considerably. The human population has increased enormously in recent decades; from 1.6 billion in 1900 (Roser & Ritchie,2023) to a predicted number of approximately 10 billion in 2060 (Ritchie & Rodés-Guirao, 2024). And relatively fewer people live in poverty (Roser 2016; Rosling, 2018). However, in a world strongly connected and entangled by digital means, it is revealed how this form of prosperity is exhausting the earth. Design can no longer be seen as a solution for individual users but, something that influences the lives of millions of people in one way or another socially, economically, politically and culturally. Solving a problem for an individual means creating new problems for others, non-humans included. Limits previously identified by, for example, The Limits to Growth of the Club of Rome (1974) and described in the Brundtland report Our Common Future (1987) have been exceeded. Humans and non-humans experience problems like drought; floods; lack of labour due to ageing, or high unemployment due to rapidly growing populations; oppression of minorities; extinction of plants and animals due to deforestation and overfishing. Movements advocating for circular economies, diversity and inclusion, sustainability, and justice lead to new design flags and labels (Stappers et al., 2024), such as social design (Papanek & Fuller, 1972; Margolin & Margolin, 2002; Manzini, 2015; Resnick, 2019; Tromp & Vial, 2023), politics of design (Keshavarz, 2018), designs for the pluriverse (Escobar, 2018), decolonizing design (Tunstall, 2023), sustainable and design for circular economy (Bocken et al., 2016), more-than-human-design (Tarcan et al., 2023), and systemic design (van der Bijl-Brouwer, 2022). Designers are using their broad knowledge, creative skills and methods to promote social and ecological interests in collaboration with minorities. For example, rivers are protected against entrepreneurial and governmental plans by collaboratively mapping local

interests, making them visible and designing policies in which these rivers are given legal rights and the status of legal entities (O'Donnell, & Macpherson, 2019; Rey-Hernández, 2023).

These developments reveal how the local context matters. After all, the economic, political, demographic, socio-cultural situation influences the meaning of design, and — vice versa — design influences how we give meaning to our lives. If we continue to assume that design stands for change, then we will first have to know the current context. We need to understand the past, the culture of a society, a country, a group of people who must work together in one way or another and have built moral systems for this purpose. Things and less materialized designs such as services mediate these moral, culture-shaped norms and values (Verbeek, 2005). 'Anyone who ignores these moral influences or claims that culture is nothing but decor — thereby reducing it to aesthetic pleasure and entertainment — denies the most basic human and moral motives that underlie every object, activity, and social development.' (van Boeijen & Zijlstra, 2020, p.17). 'However, it is our own culture that blinds us to the meaning and importance of culture in the design process' (van Boeijen & Zijlstra, 2020, p.11).

I advocate a dynamic approach in which designers both zoom in to see and acknowledge the needs of individual people and other living beings and zoom out to see and understand the larger contexts and relationships. In this movement, we do not only look at utilitarian needs, like mobile phones that fulfil a practical function, namely 24/7 distant communication with others. We also study socio-cultural needs and developments and the associated systems of which mobile phones are part of; servers, apps and the people and other species that somehow or another are involved and affected. How does design influence the way people interact with each other? What new social rules are emerging? Who is excluded and who is included, where exactly and when? These are complex questions to be able to answer, therefore transdisciplinary approaches are necessary, including wisdom from humanities. Disciplines that help to see people and other living beings not only as users and consumers, but part of systems, including bystanders and even victims of design. To be able to understand each other, we need a shared language and a way of looking, and tools. Guides such as the Delft Design Guide (Eds.) (van Boeijen et al., 2020) and Culture Sensitive Design (van Boeijen & Zijlstra, 2020) provide designers with a foothold. Systemic models such as the Circuit of Culture model help to think about how cultural meanings are created (du Gay et al., 1989; van Boeijen, 2020). Dimensional models

**Figure 1.** Image that represents the new master course on Social Design

such as Socio-cultural dimensions help to think about which culture-specific values we need to question. The Cultura (Hao, 2019) integrates compositional models, helping to ask culturally sensitive questions when mapping a local context (van Boeijen, 2015; van Boeijen & Schifferstein, 2023). And in addition to classical methods like Observation and Interview, design methods such as Rolemapping, Timeline, Artefact analysis and Probes for Storytelling (van Boeijen, 2020) help to investigate not only the social but also the material culture. Perspectives on design, design approaches, models and methods give structure and simplification to a multifaceted and complicated process. However, the risk is that they lead to a reductionist attitude in which humans are reduced to users of things. That is why designers must collaborate with disciplines that are trained to problematize to see more. I therefore advocate transdisciplinary and transnational collaborations. Cultural sensitivity is an indispensable factor in this. Ultimately, it is about expanding the area in which we are aware, because as Marshall McLuhan wrote in 1967 'We shape our tools and thereafter our tools shape us.'

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ing reflective, critical, and affirmative
design methods. The work involves
developing imaginary futures and envi-
sioning alternative design approaches.
Annemiek's goal is to develop methods
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# The Design for All Thinking and Method

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Caring for vulnerable groups is an important topic of concern to today's society. Design is an artificial adaptive system that achieves the goal of adaptation in a certain way, and how to make this system better suitable for different stakeholder groups in the era of pluralism and globalization, make them equally enjoy the results of design together is a key issue facing the design community.

Design for All, proposed and gradually formed in the nineties, first studied and practiced in the Nordic region, has greatly developed in Europe over the past two decades and has become an indispensable element of sustainable development strategies. Adaptive design thinking starts from the reality of people, starts from people in life, and takes the scale of all people, including special groups of people, as the core, to understand and grasp the relationship between real objects and subjects, grasp the value of design objects to the subject and the dynamic interactive relationship, and reflect the essence of human nature of Design for All.

Marginalised groups face the dilemma of social exclusion to design exclusion, and they are isolated from the main group of the society.

This presentation discussed the sources and ethical foundations of "Design for All", a concept that is not well known in China as a social innovation activity, which is in a process from "social exclusion" to "universal sharing".

The method of Design for All is a system design methodology. The whole process reflects the starting point from the stakeholders, starting from the needs of special groups, obtaining the content of early communication according to the needs of special users and definitions, completing the program results or products through creative design and prototypes, user testing and analysis, and finally evaluating by users and experts, giving feedback on whether it is easy to use, easy to learn and whether the function is reasonable, and then promoting the application. Among them, system co-design is the focus of the Design for All method approach.

The goal of Design for All is "design acceptable to all", and people with special needs must be considered and included in the design process at the beginning. In terms of design logic, this is a transformation from specificity to universality, in terms of design purpose, the special population is truly integrated into the sharing society, and in the design philosophy, from local ethical concerns to a comprehensive harmonious society. Whether the steering and promotion of this design is effective is positively verified through the definition and deduction of the essence of design, through the social practice cases of Design for All, and at the same time, it

also tests the social and life value of Design for All. It focus on humanistic ethics and includes different groups by design intervention, enhanced the value of design. The attention and deep understanding of humanistic ethics of Design for All transcends the understanding of material functions of design, so that vulnerable groups can embody the dignity of human nature in life, thereby enhancing the value of design, and human society is a society with true harmonious value.

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as a researcher of Industrial Design, worked with extensive experience and long-term practice in field of Design for all, Inclusive Design and Universal Design. Lived in China and Northern Europe during the last decade, working as a designer and teaching in Soochow University.

# Immersive Design Legacies:
## Intelligent Design Innovation

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## Introduction

Design has transitioned from purely aesthetic and functional exercises to a dynamic medium capable of addressing complex global challenges, such as environmental sustainability, cultural preservation, and social inclusion. By leveraging advanced technologies, including computational tools and speculative virtual environments, design pushes creative boundaries to generate adaptive systems that respond to diverse social, environmental, and cultural needs. As Rogers et al. (2019) argue, these methodologies are not just instruments but integral frameworks that reshape how designers conceptualise and engage with their practice, introducing philosophical dimensions and rethinking traditional design paradigms.

This paper investigates how design functions as both a cognitive and cultural act, highlighting its potential to reshape industries and societies. It examines the integration of digital frameworks and socio-cultural elements in computational design methods, emphasising their transformative effects.

## From tools to thinking frameworks

Historically, design tools were passive extensions of the designer's creativity, aiding material realisation. However, the rise of digital technologies has fundamentally altered this relationship, transforming tools into thinking frameworks that facilitate conceptual exploration and cognitive synthesis. Schnabel (2007) describes parametric design as a pivotal methodology where designers dynamically interact with constraints and geometries, enabling deeper engagement and generating innovative outputs.

This transformation invites a re-examination of Descartes's dualism, which considers the interplay between mind and body. Computational design introduces a third component: the tool itself, which becomes an active collaborator in the creative process. Algorithms and data enable iterative exploration of diverse solutions, synthesising cultural and contextual boundaries into meaningful designs. Designers and instruments now collaborate symbiotically, generating outcomes that are both culturally resonant and contextually relevant.

## Authenticity

Authenticity remains an essential principle in immersive design, but its definition must be reconsidered in the context of digital environments. Rather than confining authenticity to faithful replicating physical forms, immersive design expands it to include preserving and reinterpreting cultural, emotional, and functional values.

Rushton and Schnabel (2022) highlight how immersive environments offer new ways to explore cultural authenticity. Instead of prioritising photorealistic visualisations, VR creates interpretative spaces where cultural narratives and intangible heritage are embedded into spatial configurations. For instance, VR can challenge traditional notions of physical rituals or localised spatial behaviours, offering alternative modes of engagement that extend user experiences.

The integration of community-driven narratives is central to fostering authenticity. Current design instruments provide unprecedented opportunities for participatory processes, enabling stakeholders to co-create environments that reflect their lived experiences and aspirations. Designers increasingly act as facilitators of these narratives, ensuring projects resonate with communities while remaining relevant to broader contexts.

## Adaptive and Intercultural Innovation

The convergence of computational and immersive technologies opens new horizons for adaptive and intercultural innovation. Artificial intelligence (AI) systems, for instance, enable environments to respond dynamically to user preferences, creating simultaneously functional, emotionally resonant, and culturally meaningful spaces. With transparency and accountability, blockchain technology offers a framework for equitable collaboration in large-scale, multi-stakeholder projects. These systems foster trust and integrate diverse inputs into cohesive outputs by recognising and valuing cultural contributions.

As the boundaries between physical and digital spaces blur, cultural narratives must adapt to hybrid environments. Aydin and Schnabel (2016) argue that unmediated technologies offer innovative ways to engage with cultural heritage. For example, VR spaces can integrate local cultural patterns into global frameworks, allowing environments to evolve with user needs while fostering intercultural collaboration. These adaptive systems ensure that design remains both functional and culturally resonant.

To embrace these innovations, designers must expand their roles as facilitators, collaborators, and cultural interpreters. Computational instruments, despite their increasing accessibility, demand a more profound synthesis of technical proficiency, cultural literacy, and social engagement. Designers must navigate complex systems of data, narratives, and technologies while ensuring their work reflects creative innovation and cultural authenticity.

## Conclusion

Contemporary design represents a profound shift in how we approach creativity, cultural engagement, and problem-solving. By leveraging intelligent technologies as frameworks for thought, designers transcend traditional paradigms, creating adaptive, authentic, and inclusive environments that reflect the aspirations and values of global communities.

This paper underscores the transformative potential of computational instruments, illustrating how these innovations inform reality, foster cultural authenticity, and expand the role of designers. As industries and societies navigate a rapidly changing world, intelligent design offers a path forward, enabling designers to address global challenges while celebrating local identities. Future research and practice could further explore how hybrid spaces, participatory processes, and intelligent tools can continue to redefine design as a cognitive and cultural act.

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# Hybrid Intelligence for Material Design:

## Developing a Teaching Framework that Integrates Material-Driven Design, AI, and Speculative Design

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**Keywords:** Hybrid Intelligence, Speculative Material-Driven Design, Material Design Education, Future Scenario Building, Interdisciplinary Facilitation

## Background and introduction

As a design foundation, materials manifest the profound interconnection between design and society through their innovation, uses, and cultural trends.

Since the 20th century, the functional suitability of materials has been at the center of design (Ashby, 2011). More recently, the concept and methodology of Material-Driven Design emphasizes the importance of promoting design innovation through in-depth evaluation and experience of the meaning of materials (Karana et al., 2015). New materials are constantly emerging with the development of science and technology, and people's lifestyles are also changing.

Our study explores how artificial intelligence affects materials and material design, starting with design education.

The constant innovation of materials has changed design practice and led to critical discussion and public participation in society's future development. In this context, Speculative Design has emerged, which promotes people's profound reflection on the future through prospective thinking about science, technology, and society (Dunne & Raby, 2013).

Artificial Intelligence (AI), combined with the speculative process, offers new opportunities for envisioning and reflecting on the future (Lin & Long, 2023). Hybrid Intelligence, a mode of thinking and practice combining human creativity and machine intelligence, shows great potential in the design field (Demartini, 2015; Jarrahi et al., 2022). By collaborating with AI, we argue that designers have unprecedented possibilities to speculate on future material changes while critically rethinking their impact. This research aims to develop a design framework that leverages the collaboration of designers with AI to explore materials unconventionally and cross-disciplinarily. We are developing our approach through teaching activities to offer a way of design education that guides students through a "speculative" material-driven design enabled by hybrid intelligence methods and tools.

## Methods

This research, conducted by a team of one researcher in product and material design, one in design futures and speculative design, and one in material science, adopts a combination of Material-Driven Design and Speculative Design enabled by AI. We developed a workshop-based teaching approach to explore and integrate the concept of hybrid intelligence in design education. Through a brief that proposes materials as an entry

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point, students explored the combination of material experimentation with future scenario building, guided through two core workshops. The specific steps are as follows:

## Workshop 1: Material experimentation and AI visualization

Students first analyzed and experimented with their chosen materials, gaining a deeper understanding of their properties. They then created a glossary of technical terms to solidify their knowledge. Next, students used AI tools like Midjourney and ChatGPT to speculate on and visualize potential material forms, exploring possibilities such as material comparison, fusion, replacement, and aesthetic modifications. Material science experts have guided the students in understanding the scientific properties of materials, ensuring AI-generated results are scientifically accurate and relevant. The main goal of this activity was to produce visual material to quickly and effectively reflect on.

## Workshop 2: Constructing future scenarios and stakeholder mapping

In this workshop, by framing their ideas around the "what if?" question, students developed a range of experimental and imaginative future scenarios that challenged the status quo and adopted a specific material as an entry point for societal and environmental changes. Students created a timeline of the future scenarios related to their selected materials, outlining key trends and developments that might lead to material applications in the future. They then mapped the key stakeholders (e.g., users, producers, regulators, communities) involved in these scenarios, defining their roles, interests, and interactions with the materials. Using the 5W1H method (Who, What, When, Where, Why, How), students further refined and detailed the future scenarios, making them specific and actionable. Finally, students either storyboarded key moments of material use or quickly prototyped the application of the materials in the future, using visual or digital tools such as Midjourney for enhanced storytelling.

## Results

The workshops successfully integrated AI tools with material design practice, allowing students to understand better their chosen materials' properties while speculating on innovative future material forms in unconventional ways. Midjourney and other AI tools provided a visual platform for

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students to present their speculative material designs, while expert involvement ensured that AI-generated content remained scientifically grounded. In terms of future scenario development, students created detailed and feasible application scenarios for their materials, demonstrating the practical potential of their designs. Visualizations such as storyboards and prototypes helped to solidify the concepts, making them more tangible and realistic.

## Discussion

This study highlights the significant potential of hybrid intelligence in design education, particularly in material experimentation and future scenario development. By integrating AI tools with material science, students gained a deeper understanding of material properties and were able to push the boundaries of their design practices. However, challenges arose as students sometimes focused too much on the visual effects of AI-generated designs, neglecting the scientific analysis of materials. The integration of speculative design allowed students to envision materials as they are and could be in the future, encouraging creativity through the "what if?" framework. Despite this, many students struggled to fully embrace a speculative mindset, often defaulting to practical, engineering-based solutions instead of exploring more radical, speculative possibilities. To address these challenges, future workshops should emphasize balancing creativity with scientific accuracy, ensuring students maintain a grounded understanding of materials while encouraging speculative thinking. Providing additional tools and frameworks for speculative design could help students navigate this balance and foster a more imaginative and open-ended approach to material innovation.

## Conclusion

Hybrid intelligence offers a novel perspective for design education by integrating artificial intelligence with traditional material science and design methods. This approach allows students to push the boundaries of traditional design methods and empowers them to design innovative and sustainable materials. Future research should explore the optimization of AI in design education, helping students strike a balance between creativity and scientific accuracy and ensuring that their design ideas are both imaginative and feasible.

Hybrid Intelligence for Material Design

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# Connect:
## The Secret Formula of Coaching Design Teams

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**Keywords:** Coaching, Design Teams, Inclusivity, Diversity

# Reflections on coaching student design teams

As coordinators of large design courses, we have had the opportunity to guide over 200 student teams in developing innovative and complex product systems. Our team of coaches is committed to helping these teams achieve their full potential, and many students consider this course a highlight of their master's program.

We are proud of our students' achievements, including several annual Dyson awards and numerous patents resulting from their research. However, what we value most are the lasting friendships formed during the course. Our students work diligently, face and overcome challenges, reinvent themselves, and often describe their projects as a "once-in-a-lifetime team experience." Their dedication and growth make this course a truly rewarding experience and is considered as the highlight of their master's program.

This book is based on our journey of coaching various student design teams in the creation of highly complex product systems. Throughout this annual course, we have encountered a variety of coaching challenges. While some issues relate to project management and technical content, the most significant ones stem from the diversity in cultures, educational backgrounds, emotional dynamics, and individual competences among team members.

In our journey of dealing with diversity, we stumbled upon some eye-opening realizations about our coaching team. Cultural disparities within our international teams posed a significant challenge, particularly for our predominantly white male coaches. Seeking guidance, we turned to experts in cross-cultural collaboration. Erin Meyer was one of them. Her culture mapping approach sparked meaningful dialogues among team members, shedding light on our values and unique traits. As we navigated these differences, we found ourselves not only learning from each other but also refining our teamwork skills on the fly. It was a process of growth and adaptation, as we collaboratively tackled issues and worked towards effective solutions.

Every new year marks the beginning of fresh adventures for us. With each adventure, our team gains insights into navigating various challenges, from interpersonal conflicts, to confronting issues of racism. As you may have experienced, students often hesitate to flag team troubles promptly. Their fragile trust in you and fear of failure when facing failing team dynamics create significant barriers to communication. They opt to wait, hoping problems will resolve themselves or attempting to manage

them alone until it's too late to intervene. Recognizing dysfunctional team behaviour poses a challenge for us coaches. To address this, we've developed the Coach Journal, drawing on the principles of Theory U, to proactively identify early signs of dysfunction. Employing connective conversational techniques such as "dialogue," we foster a space for active listening and asking probing questions, moving beyond mere discussion or debate. Dialogue facilitates understanding, uncovering common ground, and reaching solutions that all team members can endorse. Sometimes this leads to renewed team synergy, while at other times it results in choosing the least unfavourable outcome. These dialogue sessions cultivate empathy, deepen interpersonal connections, and enhance collaboration by subordinating individual egos to the collective good of the team. While it's often said that "Trust takes years to build, seconds to break, and forever to repair," we've found that aspects like credibility, intimacy, and other-orientedness are qualities of trust rather than mere functions of time. Establishing "quality-based trust" proves essential and resilient within teams.

This book shares our experiences through anecdotes, inviting you to see yourself in them. From these stories, we've crafted a series of questions and answers to prompt reflection on your own coaching experience. Alongside, we've developed workshops and tools aimed at assisting you, your coaching team, and student groups in addressing various team-related challenges. This book serves as a gateway to further readings for those intrigued by the subject of coaching multi diverse student design teams. It's just the beginning of your coaching journey — a launchpad into the realm of professional coaching. Dive in, absorb, and let the content provoke your reflections on coaching. Lets encounter the intercultural diversity in designteams, the boundless learning opportunities they present in your future endeavours in design education and professional practice.

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framework which encourages learning
through mistakes. In 2023, he was
awarded an Education Fellowship to
advance this work, advocating PF's
core idea that embracing mistakes is
essential for deep learning.

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# Track 2 Contributions

# Track 2
# Contributions

# Cultural Bonding through AI-mediated Emotional Engagement with Selfie

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## Introduction

Generative AI (GenAI) has rapidly advanced, transforming numerous sectors of the creative and design industries (Hughes et al., 2021). However, its application in interaction design, particularly for fostering emotional engagement with digital cultural artifacts, remains underexplored. This case study revisits an early implementation at the Shanghai Museum from 2018-2019, where a style transfer AI was employed to enrich visitor interactions with cultural artifacts. By examining this successful application of GenAI, this study seeks to reveal how AI-driven interaction design can facilitate emotional connections and cultural bonding between the visitors and the cultural artifacts, offering insights into the effective integration of such technologies within digital museum experiences.

## Case overview

This study focuses on a case (i.e., Known Beauty) of new interactive experience that enables visitors to engage with digital artifacts via an AI-powered interaction design. Using style transfer technology (Gatysn et al., 2016) (shown in Fig.1), visitors upload selfies that are then transformed to reflect the artistic style of selected museum artifacts. These stylized selfies are subtly embedded within the digital representation of each artifact, inviting users to "discover" their transformed selfie images in a gamified 'hide and seek' experience. This interaction design, as illustrated in Fig.2, intends to capture visitors' attention and foster a personal and emotional connection by merging individual identity with the museum's cultural narratives.



**Figure 1.** Style transfer integrated with interactions. @Authors

**Figure 2.** The essential "hide and seek" interaction flow. Step 1: Visitor uploads selfie; Step 2: AI style transfers the selfie and embeds it within the digital image of the artifact as "hide" it; Step 3: The visitor "seeks" their selfie in the artifacts. @Authors

## Interaction design

The interaction design of the Known Beauty combines the engaging mechanics of a "hide and seek" game with the personal relevance of self-ies, resulting in a layered experience that is both immersive and educational. This approach leverages the appeal of a gamified search while using selfies—a contemporary medium for self-expression (Bodroža et al, 2022)—to build emotional connections with artifacts. The challenge of locating their image within the cultural context of the artifact deepens visitor engagement, transforming the museum experience into an exploration of personal identity and cultural heritage.

## Technical implementation

The technical implementation of Known Beauty was designed to integrate seamlessly within the museum's digital infrastructure. Custom style transfer models were developed for each of the museum's 30 most popular artifacts by training a specific deep neural network, namely style transfer, to adapt the artifacts' colors, patterns, and textures to user-uploaded selfies. The interactive experience was deployed as a WeChat mini-program, chosen for its accessibility and social sharing capabilities. At the conclusion of the interaction, a digital poster featuring the artifact and the user's stylized selfie was automatically generated, enabling users to share their unique, culturally-infused selfie on social media, thus extending the museum's cultural reach.

Cultural Bonding through AI-mediated Emotional Engagement with Selfie

## Discussion

When applied Donald Norman's emotional design framework (Norman 2007) to analyse this work, it clearly surpass traditional digital museum experiences by creating an emotionally resonant environment. It enhances emotional connections through visceral, behavioral, and reflective design elements:

- **Visceral Design:** The transformation of selfies into the artistic styles of artifacts creates an engaging visual experience that captures visitors' attention, merging personal identity with cultural heritage in a memorable way.

- **Behavioral Design:** Gamified "hide and seek" mechanics make artifact exploration interactive and enjoyable, combining entertainment with educational content to deepen visitors' engagement with the museum's offerings.

- **Reflective Design:** The use of selfies creates a bridge between visitors' identities and the cultural narratives presented. This reflective component prompts visitors to contemplate their own identities in relation to cultural heritage, fostering a deeper emotional engagement and introspection.

## Conclusion

This case study of Known Beauty illustrates the potential of combining emotional design principles with AI technologies to transform digital museum experiences. By enhancing visitor interactions through personalized, gamified experiences, this project offers a blueprint for future applications of AI in museum settings. The study demonstrates that even nascent AI technologies, when applied using emotional design principles, can significantly enhance visitor engagement and provide valuable cultural insights.

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# AIGC-Driven Smart Product Design Curriculum:

## AI assist Innovations in Design Methods and Practice

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# Abstract

## Background

The advent of artificial intelligence-generated content (AIGC) is transforming educational practices in industrial product design, offering unprecedented opportunities for accelerating design workflows and enhancing creativity (Wu, 2023). Existing research highlights AIGC's advantages in facilitating rapid iteration and creative expansion, particularly in generating design concepts, refining details, and rendering scenarios (Li, 2021). However, the integration of AIGC across different stages of product design remains underexplored. This study, based on the "AI Robotics and Innovative Design" course, examines how AIGC reshapes the smart product design process and provides students with a comprehensive interdisciplinary design experience. Centered on the design needs of smart agriculture and future urban contexts, the course positions AIGC as a core tool to cultivate innovative thinking and practical skills, offering a viable AI-driven teaching model for other design institutions.

## Methods

The course structure revolves around the Alibaba Cloud PAI-ArtLab platform (Alibaba Cloud, 2024) and follows a three-step workflow: "Defining Design Direction – Detail Refinement – Scenario Rendering." Initially, students employ text-to-image (T2I) techniques to define stylistic inspirations and generate preliminary visual concepts. Next, using LoRA style libraries and ControlNet models, they adjust design details or introduce new images to regenerate concepts through image-to-image (I2I) synthesis, enabling a gradual transition from concept to model. Finally, leveraging AIGC's batch rendering functionality, namely, image-to-scenario (I2S), students quickly generate diverse scenario-based visuals that meet contextual needs. This structured approach integrates generative AI tools into practical design workflows, ensuring feasibility and adaptability in addressing real-world design challenges.

## Results

The study's results indicate that AIGC-enhanced workflows significantly improve design efficiency and output quality. Compared to traditional workflows, the AIGC-supported process drastically reduces the time and effort required for sketching, concept generation, modeling, and CMF (Color, Material, Finish) research, while enhancing design detail preci-

sion. Additionally, students reported that AIGC offered more accurate creative support in concept generation and detail refinement stages, leading to a more seamless and cohesive design process.

Moreover, the AIGC-assisted design process substantially reduces human, resource, and coordination time required across all design stages. During the stage of appearance design, a group of three students generated, iterated, and polished 50 concepts within 2 weeks. In contrast, achieving the same amount of work under traditional methods typically takes 12 weeks, according to standard design workflows. This approach effectively reduced the appearance design time by at least 80%, significantly accelerating the overall project timeline. This trend foresees the emergence of "individual design teams" as a significant industry model, empowering designers to express unique styles and perspectives on user and societal needs. As a result, AIGC-driven design will deliver the benefits of new technology directly to users and society, promoting social advancement.

## Analysis and discussion

This study further explores AIGC's potential impact on design education and practice. One notable advantage lies in its capacity to achieve interdisciplinary and cross-domain design goals by bridging technological capabilities and creative thinking (Ji & Chen, 2024). The integration of AIGC not only catalyzes shifts in design thinking but also reshapes the designer's creative process, prompting a reconsideration of their role as both creators and curators of AI-generated content. However, the reliance on AIGC raises concerns about the homogenization of design outputs, as tools often favor efficiency over originality. To mitigate these risks, the course emphasizes training students in prompt engineering and multi-style generation control, equipping them with the skills to maintain unique creative expression while leveraging generative tools.

Additionally, the broader societal implications of AIGC adoption require reflection. As senior designers increasingly manage projects independently with AIGC support, opportunities for junior designers to gain experience and develop their personal style may diminish. This trend, termed the "newcomer ceiling," risks creating significant imbalances in the design talent pipeline. Design education institutions must therefore evolve their curricula to address these challenges, focusing on collaboration between humans and AI while instilling ethical and professional standards.

AIGC-Driven Smart Product Design Curriculum

## Conclusion

The application of AIGC technology opens new pathways for smart product design education, offering a flexible and culturally adaptive innovation method in a rapidly evolving field. By integrating AIGC into design workflows, curricula can empower students with both technical proficiency and creative autonomy, enabling them to navigate a technology-driven design landscape effectively. This study provides a concrete example of AIGC integration, highlighting its potential to advance global design education and promote cross-cultural practices.

However, the rise of AIGC also presents urgent societal challenges. The widespread adoption of AI-driven workflows could exacerbate inequalities within the design industry, particularly for junior designers seeking entry points into the profession. Addressing this issue requires a multi-stakeholder approach. Educational institutions should focus on developing holistic project view and prompt engineering, while policymakers and industry leaders must implement targeted support programs for emerging designers and small studios. Such measures would preserve diversity within the design talent pool and safeguard innovation from stagnation.

In the long term, the design industry must balance technological advancements with human-centered values. Ensuring that AIGC supports not only efficiency and market demands but also creative expression and career development will be critical. In a design ecosystem that values both innovation and humanity, the synergy between designers and AI has the potential to deliver meaningful, impactful outcomes for society.



**Integration of AIGC into Workflow Changes in Product Design**
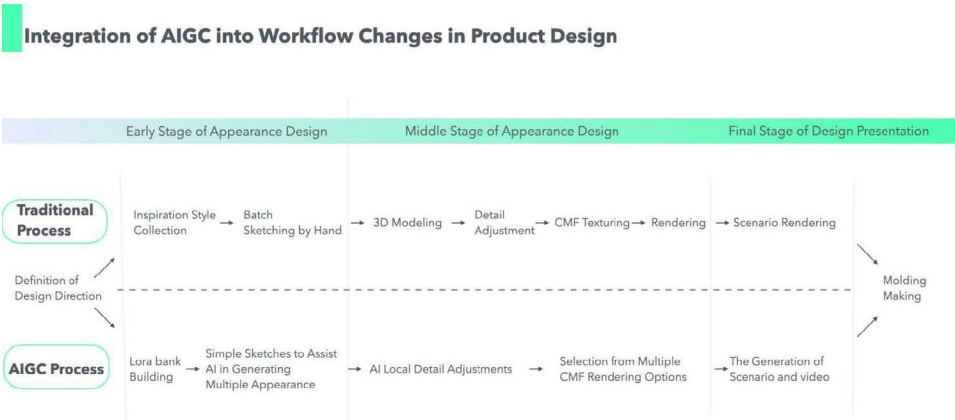
**Figure 1.** Workflow comparison between traditional design process and AIGC design process

AIGC-Driven Smart Product Design Curriculum

# AIGC Workflow example in Early stage of Appearance Design
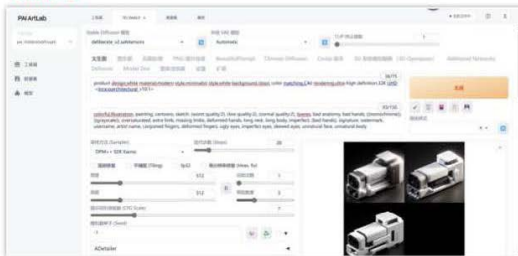
**STEP 1**

**STEP 3**



**STEP 2**

Figure 2. AIGC Workflow example in Early stage of Appearance Design

# AIGC Workflow example in Middle stage of Appearance Design

**STEP 1**

**STEP 2**

**STEP 3**



Figure 3. AIGC Workflow example in Middle stage of Appearance Design

AIGC-Driven Smart Product Design Curriculum

**AIGC Workflow example in Final stage of Design Presentation**
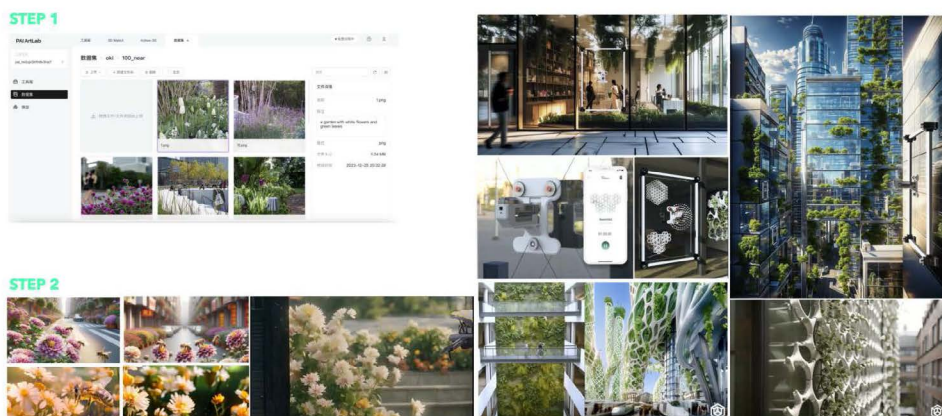


Figure 4. AIGC Workflow example in Final stage of Design Presentation

**Comparison of AIGC design scenario & Physical Model**



AIGC Scenario                                        Physical model

Figure 5. Comparison of AIGC design scenario & Physical Model

## Acknowledgments

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# Buffering Strategies for Fashion Design Education in Response to the Development of GAI

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# 1. Introduction

Generative Artificial Intelligence (GAI) has made substantial inroads in the field of artistic design, particularly in fashion design, disrupting conventional workflows. The rapid pace of technological iteration has left current educational systems lagging behind. This paper focuses on how GAI impacts design education, particularly in fashion, and how curriculum structures, teaching content, and educator roles must evolve to facilitate a harmonious coexistence between traditional educational practices and GAI technologies.

# 2. Challenges in fashion design education

## 2.1 Contradiction between technology iteration speed and talent cultivation cycles

Historically, the transition from technology emergence to industry application and then to educational adoption was a lengthy process, allowing ample time for educational systems to adapt. Photoshop has revolutionised the means of visual design over the last 30 years, but its use has been based on traditional working principles and has shown an incremental pattern of development. AI, however, has leapfrogged beyond the normal pattern of technology iteration cycles. For example, tools like OpenAI's ChatGPT and image generators like Stable Diffusion,MidJourney and DALL-E have transformed design processes, leading to an urgent need for educational reform in response to the fast-evolving technological landscape. Current curriculum designs often reflect outdated workflows, impeding the timely integration of new technologies into educational practices(Figure 1).
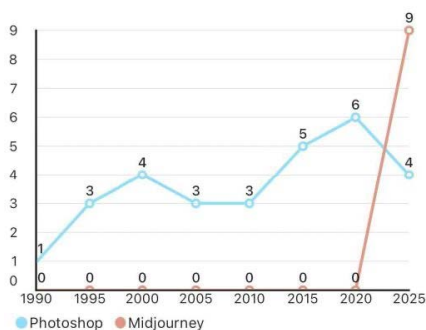


**Figure 1.** Comparison of Photoshop and Midjourney's development rate, X-axis representsyear, Y-axis represents frequency.Created by the author

## 2.2 Compatibility issues between new technologies and teaching systems

Traditional fashion design education typically consists of a practical module and a theoretical module. The theoretical module is used to explore design ideas, while the practical module is used to implement the design concepts. In the practical module, initial design ideas often rely heavily on physical materials to shape and validate them, leading to more optimized solutions. The human and material resources involved in this process were once necessary expenditures.
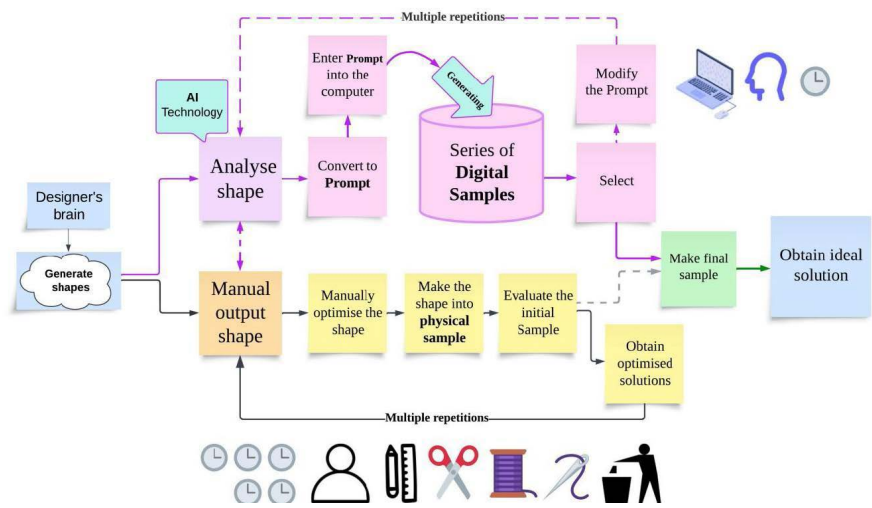


**Figure 2.** Traditional vs. AI Design Workstyles. Created by the author

However, GAI technology has fundamentally changed the design process, especially in image-centric design fields. Design no longer rely on manual drawing, but are instead automatically generated through input prompts. At the same time, GAI's high-fidelity rendering of physical materials also eliminates much of the trial-and-error cost that would traditionally be spent on creating physical prototypes to evaluate the effects(Figure 2). Due to the reduced costs, this application trend has rapidly gained traction in the fashion industry. This shift makes it essential for current educational content to stay aligned with new digital technologies in a timely manner. This transformation is not just about the application of technology; it represents a comprehensive change in educational philosophy, teaching methods, and management models.

For example, can the current teaching staff and hardware meet the conditions for offering GAI-related courses to students? If not, will the evaluation criteria for design assignments completed by students using GAI technology differ? In a course, at which stages are students allowed to use GAI? Have teachers undergone systematic training to understand the typical characteristics of GAI-generated content, which is crucial for supervising the teaching process and maintaining academic integrity?

If the adoption of new technologies relies solely on teachers' self-directed learning and random involvement, rather than systematic training and the integration of new and old course resources, compatibility issues may arise between the new technology and the existing teaching system.

## 3. Proposed buffering strategies

## 3.1 Adjusting course content and interrelationships

Gradually introduce GAI training courses and adjust the focus of existing courses to alleviate compatibility issues between old and new teaching technologies. For example, traditional fashion illustration courses must adapt to the fact that they no longer rely entirely on manual drawing, but instead focus on developing students' ability to write accurate prompts for generating GAI content. Hand-drawing training shifts its focus from technical skills in form creation to enhancing aesthetic sensitivity."If foundational skills that can easily be replaced by artificial intelligence are not cultivated, the development of creative thinking and innovation abilities will become extremely challenging. It is precisely these foundational skills that form the solid foundation for stimulating innovative thinking."

Technological iteration will change the weight of the support relationships between courses. Art theory courses not only help students understand art history and fashion culture, but also provide an accurate vocabulary and concepts for GAI applications. These courses will no longer be optional cultural electives but will become an important support for GAI-based image generation techniques.

In the context of "Prompt-Based Creativity" . The ability to invoke design references through keywords will become an essential skill in the design process, rather than just a supplementary teaching content. GAI generation tools rely on accurate textual input to produce design outcomes, particularly relevant vocabulary related to historical styles and fashion trends, forming the basis for designers to guide AI in generating works.
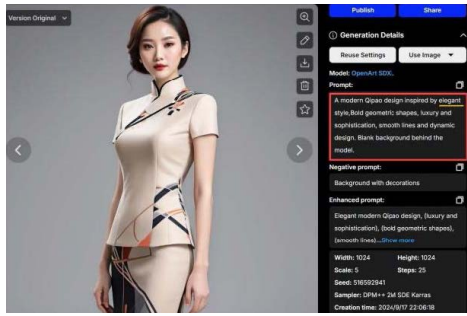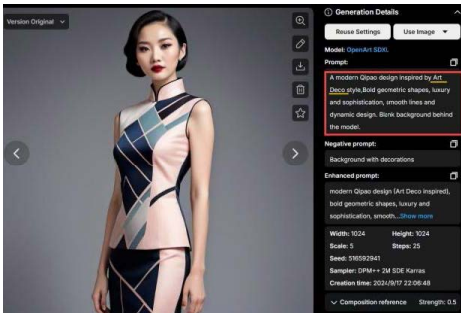
**Figure 3.** Comparison of style generation results before and after using the 'Art Deco' prompt. Images created by the author

The PROMPT with the exact definition is closer to the intended geometric style of the design, while the one without is just a random use of colour blocks and geometric shapes.
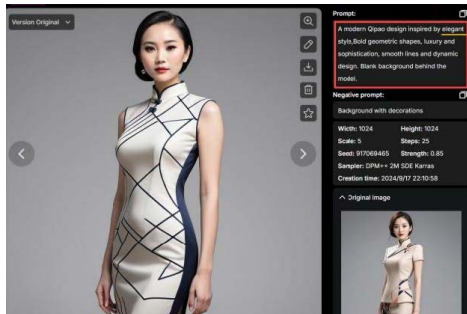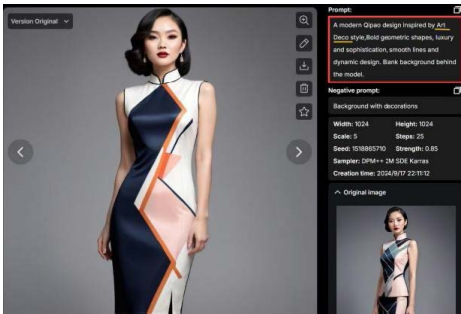


**Figure 4.** Comparison of seeded images before and after using the Art Deco prompt. Images created by the author

Professional terminology in art history and design theory is no longer merely background knowledge; it has become critical directives that directly influence design results. This indicates that mastery of professional design terminology and cultural definitions will be an important professional quality for GAI designers. The typical images and textual knowledge involved in art history have become essential operational skills for designers interacting with GAI. Insufficient artistic literacy and cultural accumulation may hinder designers from effectively expressing design concepts and intentions through precise inspiration in the context of GAI technology (Figure 3, Figure 4). In this new paradigm, in-depth study of design history and related cultures can enhance a designer's creativity and work efficiency more than ever, making it easier to integrate design practice with design culture.

Buffering Strategies for Fashion Design Education in Response to the Development of GAI

## 3.2 Updating educational technologies and the role of teachers

Revise the methods for training future designers and redefine the roles of schools and teachers to address the challenges posed by the rapid talent development cycle. The role of teachers must shift to that of a technology guide and collaborator, helping students use the AI environment to integrate resources and efficiently complete their learning plans. Educational institutions should provide the feasibility and convenience for this role transformation.

Schools should actively offer professional digital skills update training for teachers, encouraging them to independently learn and master the knowledge and basic capabilities related to GAI technology. This will enable teachers to guide students in using GAI effectively within the course. Additionally, fashion design schools must maintain awareness and foresight regarding the academic integrity and design ethics issues that may arise in the AI era.

## 4. Conclusion

As GAI technologies reshape the fashion design field, educational institutions must adopt proactive strategies to remain relevant. This will provide support for students to adapt and cultivate creativity in an increasingly AI-driven design environment.

Despite the critical voices within the art and design community regarding the threat of AI technologies to human creators' identities, it is imperative to acknowledge that, much like all technological revolutions in history, the unstoppable momentum of AI will inevitably trigger profound industry upheaval. Ultimately, this will compel talent cultivation and professional training in product design to align with these changes. Therefore, making adaptive adjustments and preparations as swiftly as possible may be the wisest choice.

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# Podcast Studio Design:
## Form, Culture and Technology

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# 1. Introduction

Podcast has evolved from a niche audio format to a central component of digital media, reflecting changes in technology, media consumption, and audience needs. Initially, podcasts were audio-only, accessible through devices like iPods, offering portable, on-demand content. Over time, the format has expanded to include video and immersive elements, becoming a crucial tool in modern newsrooms. Podcasts complement traditional media by offering flexible formats for both quick updates and in-depth coverage. Their on-demand nature suits the mobile-driven lifestyles of today's audiences, allowing listeners to engage with content while multitasking or commuting (Bonini, 2015).

In multicultural newsrooms, podcast provide a unique opportunity to explore a wide range of voices and perspectives. The format allows news organizations to present stories with greater depth and context, addressing the diverse cultural backgrounds of their audiences. This flexibility supports the coverage of topics that may not fit within the constraints of traditional media, enabling newsrooms to foster stronger connections with diverse listeners (Katz & Ahern, 2019).

As the demand for inclusive and global content grows, the design of podcast studios has evolved. Newsrooms now require versatile production spaces that can accommodate diverse cultural needs while supporting the integration of augmented and virtual reality for immersive storytelling (Boyer, Hensley, & Dale, 2018; Zhou, Duh, & Billinghurst, 2008). These spaces are designed to cater to a wide array of formats, ensuring that podcasts remain adaptable to both current trends and the multicultural needs of a global audience.

# 2. Related work

A media production hub was commissioned in early 2024 for a newsroom in Singapore, where I served as the studio consultant under PTS Consulting Singapore Pte Ltd. This production hub includes podcast production studios, video production studios and post-production studios, all conceptualized by the stakeholders as a "coworking" production hub to foster collaborative media creation, supported by a dedicated production crew. This approach aligns with trends in shared media spaces, which are increasingly being adapted for multi-purpose use and greater accessibility in the media industry (Pérez-Gómez & Pelletier, 2020).

Given Singapore's multicultural and multilingual (English, Chinese, Malay, Tamil) landscape, it was essential to consider the diverse needs of

cultural groups, which made inclusive and adaptable design a top priority. The project began with engagement sessions involving representatives from the various production groups, aligning with research that emphasizes user-centered and culturally responsive design to enhance inclusivity in shared media spaces (Blesser & Salter, 2007).

## 3. Methodology

The design was conducted in 4 distinct phases (1) User Engagement and Concept Design (2) Detailed Design (3) Construction (4) Testing & Commissioning. All designs were collaborative work with various consultants including Interior Designer (ID), Acoustics, Mechanical and Electrical (M&E). Construction was performed by a primary contractor awarded by the post detailed design tender process. The entire cycle from design to completion took 1 year, which is a very rushed project given the level of complexity in terms of spatial design and retrofitting an existing site.

In the context of this design presentation, Phase 1 User Engagement and Concept Design is the most critical in defining the concept design. User engagement were conducted for the English, Chinese, Malay and Tamil production groups, followed by management stakeholders. Results gathered from the engagements were used to generate 2 critical surveys that helped designers and stake holders for decision making.

## 4. Results and Discussion

### 4.1 User engagement

User engagements deriving at the 2 critical surveys revealed interesting results. Every newsroom has their existing podcast studio which was less than ideal, and responses correlate to their experiences. The main cultural differences between the different newsroom are correlated to the language used, its targeted audience, podcast hosts and guests.

English is the first language in Singapore, and the English newsroom received the most varied types of guests for podcast production. Their podcast is restricted to audio-only format, while the form of roundtable interview was produced in their video studios for important guests. Their podcast studio has a more conference style setup, with limited height and depth for camera works.

Chinese is the majority ethnic group in multicultural Singapore, and the Chinese Newsroom have more focus on the Chinese speaking countries like China including Taiwan, and Malaysia. The Chinese newsroom

has very limited video production space, and podcast is conducted in their video production space equipped with a simple software-based video switching system vMix (Anderson, 2021). The Chinese Newsroom also produce commercial podcast series, and the demand for story-telling podcast is strong. All podcast production were audio-only format, and they aspire to produce video podcast and immersive storytelling.

The Malay Newsroom has a relatively relaxed setup in their very basic production space. They prefer to have comfortable couch seating. The Tamil newsroom occasional shares the podcast studio with the Malay Newsroom, but they prefer to their podcast production using greenscreen to be superimposed with scenes from videos or live feeds.

All newsroom reflected the occasional invitation of local and internal bands, and the need to cater for small bands in podcast production will be a desirable feature.

Management stake holders reflected their desire of "all corners in the studio compound (not just podcast studios) can be turned into video production location". The providence of XR in general was being pushed back attributed to cost and unclear utilization.

## 4.2 Design aims
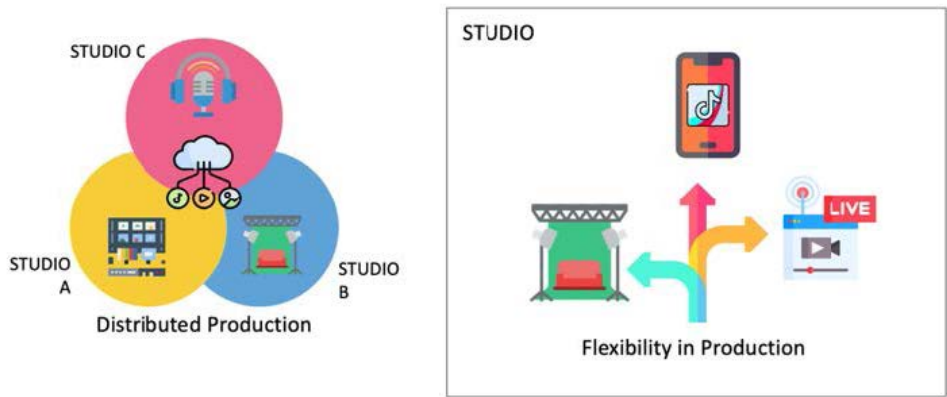


**Figure 1.** Design aims

Distributed Production enables studios to be merged for larger productions, while Flexibility in Production optimizes the use of each studio, making these design aims essential for ensuring the client's best interests in a consultancy task.

## 4.3 Concept design
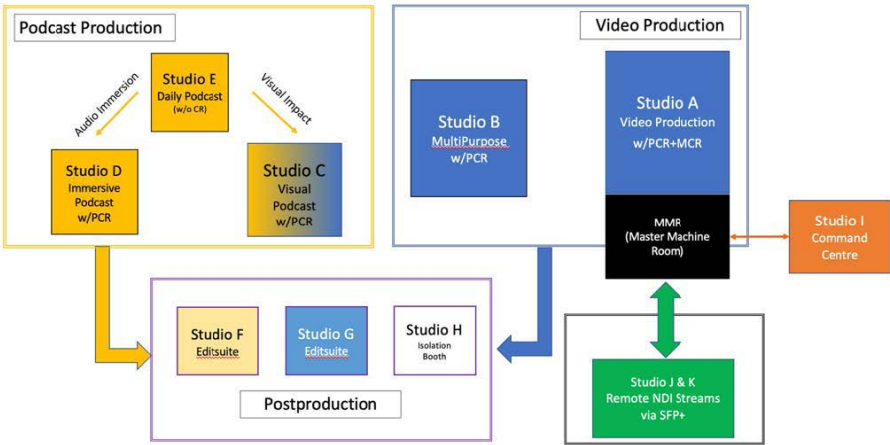


Figure 2. Studio concept design

The concept design centers on the evolving podcast form, shaped by diverse cultural preferences and enabled through advanced studio integration technology. Daily Podcast address the needs of basic podcast features, Immersive Podcast expands on audio immersion and Visual Podcast expands on Visual impact. The conference style setup was materialized in Daily Podcast, while the relaxed couches-style setup in Visual Podcast and Immersive Podcast, and the latter caters to immersive audio production and post-production. A basis production and post-production workflow was proposed, detailed in Section 4.5, to uniform podcast production and facilitate Distributed Production detailed in Section 4.6. Distributed Production derived at the following concept design:

1. Audio Video Control (AVC) Networking configured with a Spine-Leaf network architecture.

2. Implementation of NDI (NDI, n.d.) as the primary video networking protocol and Dante (Audinate, n.d.) as the audio networking protocol.

3. A Command Center designed for centralized control and monitoring of the entire media production hub.

Flexibility in Production led to the concept design where each studio serves a secondary function:

1. Daily Podcast studio for video conference

2. Immersive Podcast studio for immersive audio post production

3. Visual Podcast studio for simple video production studio

4. Multi-purpose studio for live events with audience

5. Video Production studio to be equipped for future XR expansion
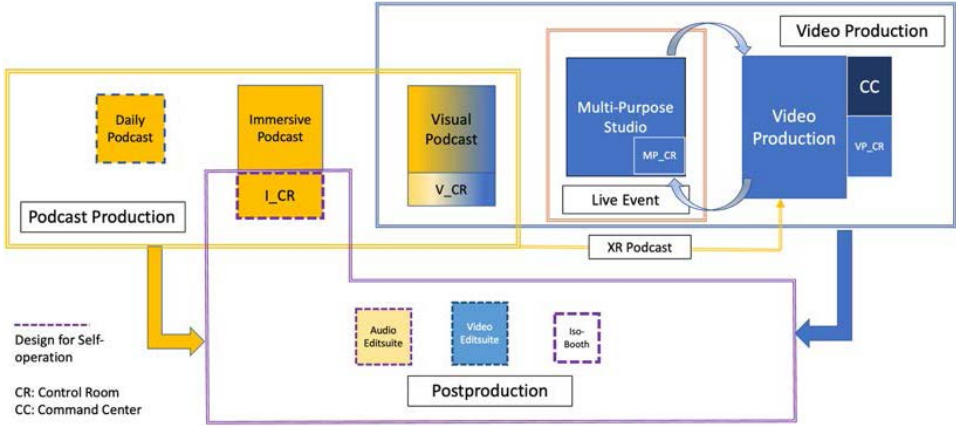


**Figure 3.** Flexibility in production

## 4.4 Spatial planning

Spatial planning was developed concurrently with user engagement workshops. The space covers a total area of 1,022 square meters and includes structural pillars, with variable usable height due to immovable existing infrastructural elements, such as chiller pipes. These constraints presented a significant challenge, as the spatial design needed to be guided by acoustic principles and the functional requirements of studio production. Figure 4 to 10 abstracts the spatial planning and results from the final construction.

# Studio Layout



### Legend

| | Studio | Name |
|---|---|---|
| | A | Video Production Studio |
| | | Virtual Production Control Room & Master Machine Room |
| | B | Multipurpose Studio |
| | | Multipurpose Control Room |
| | C | Visual Podcast Studio |
| | | Visual Podcast Control Room |
| | D | Immersive Podcast Studio |
| | | Immersive Podcast ACR & VCR |
| | E | Daily Podcast Studio |
| | F&G | Edit Suites |
| | H | Isolation Booths |
| | I | Command Center |
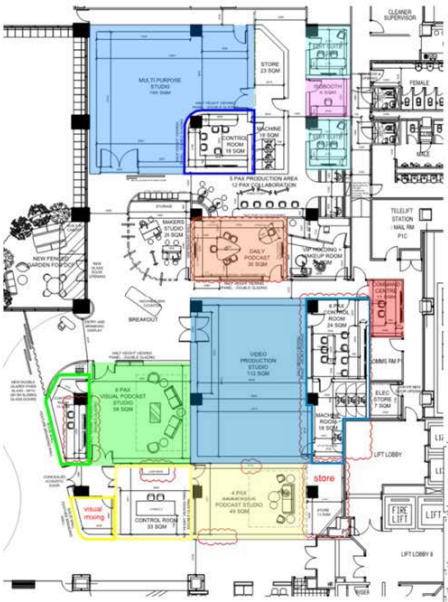
**Figure 4.** Studio layout

# Daily Podcast Studio – Layout
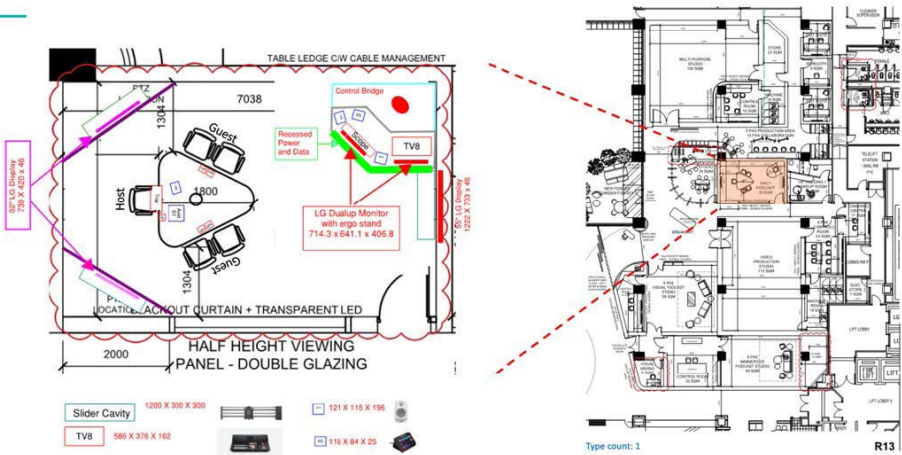


**Figure 5.** Daily podcast studio layout

**Figure 6.** Daily podcast studio

## Immersive Podcast Studio - Layout
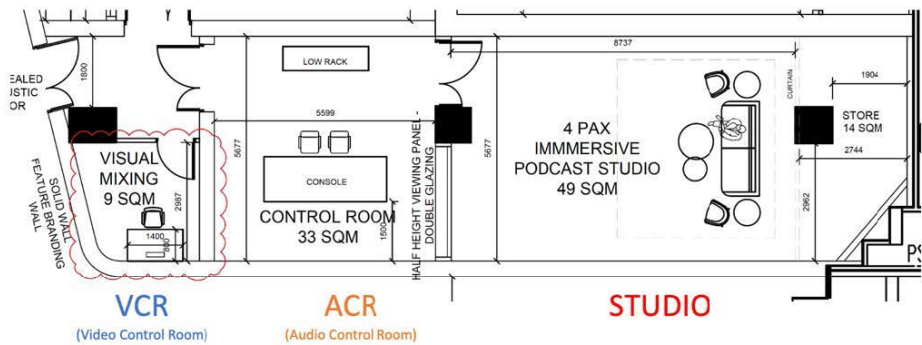


**Figure 7.** Immersive podcast studio layout

**Figure 8.** Immersive podcast studio

# Visual Podcast Studio - Layout
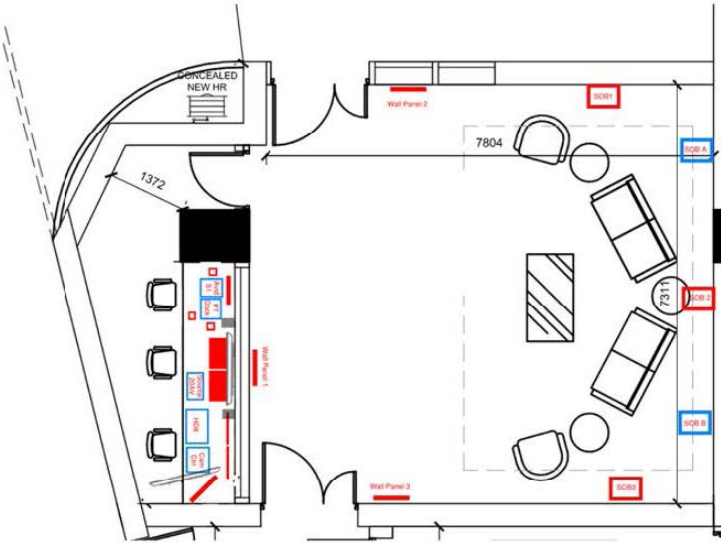


**Figure 9.** Visual podcast studio layout



**Figure 10.** Visual podcast studio

## 4.5 Basis production and post-production workflow

A basis production workflow was created to address the efficiency that is needed by a newsroom.
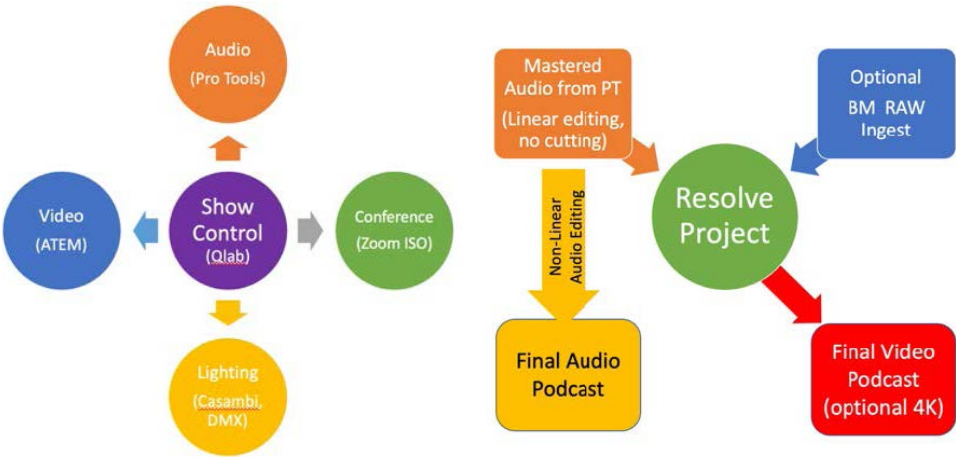


**Figure 11.** Basis production (left) and post production (right) workflow

Post Production workflow for a production requires a network backbone to support MAM/PAM (Media Assets Management / Production Asset Management system). MAM usually refers to the system for produced media, while PAM refers to production media. There are many systems in the market, with both Cloud and On-Premise deployment. All MAM/PAM systems have plugins to integrate with video editing platforms, and they incorporate services for AI speech to text transcription.

## 4.6 Distributed production

The design aim of distributed production is facilitated by the Spine-Leaf network architecture specific to Audio-Video-Control (AVC).
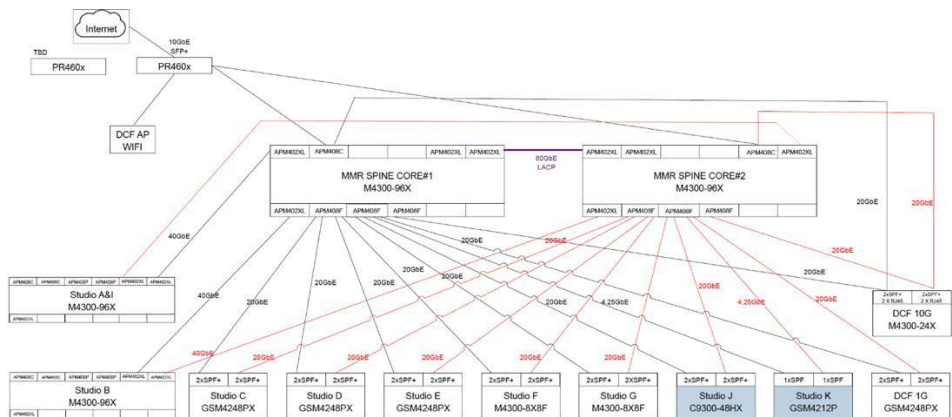


**Figure 12.** Spine-leaf avc networking topology



**Figure 13.** Combined podcast production

## Broadcast Audio Mixing for Live Venues

- Multi-purpose Studio and Video Production studio will be Live venues, with live audio mixers.

- Audio mix for media distribution is very different from live mix. For critical broadcast event, audio can be routed to Editsuite suite or Immersive Audio CR for broadcast mixing.



Multipurpose Studio to Edit Suite #2
(physical audience mix & online audience)

Video Production Studio to Immersive Podcast Control Room (surround sound mix)
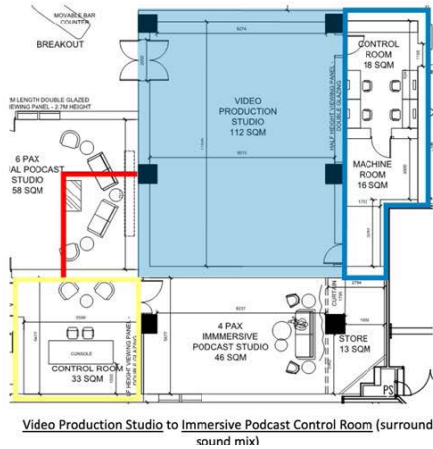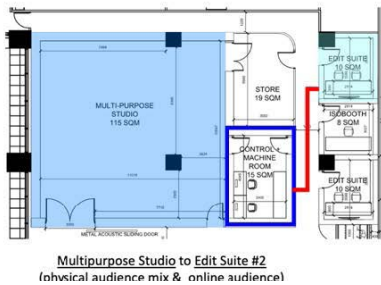
**Figure 14.** Broadcast audio mixing for live events

## 4.7 Outcomes

Post project commissioning, the production hub was handed over to the client, and the local production team takes over for their further adaption accordingly. The outcomes were inferred from videos that were publicly released.

## 4.7.1 Daily podcast studio

Daily Podcast Studio was designed to facilitate a hybrid video conferencing style, accommodating both on-site and online guests. The configuration emphasized full automation of audio mixing and video switching. The podcast host was positioned centrally, facing a frontal camera and video monitor, while the guests on either side were equipped with crossed-style video monitors and cameras, allowing for over-the-shoulder shots.

It appears that the current implementation favors a more open and flexible approach, as evidenced by the inversion of the triangular table. However, the hybrid conferencing application with automated video switching was not observed. Despite this, the design has significantly transformed the podcast format from audio-only to include video, enhancing its impact and engagement.

**Figure 15.** Daily podcast from Tamil Newsroom (left) and English Newsroom (right)

## 4.7.2 Visual podcast studio

Visual Podcast Studio featured comprehensive lighting capabilities to enhance its visual focus. Dante-based wireless microphone system and in-ear monitors (IEM) were key to enable a production style tailored for video-focused content. Figure 16 showcases video podcasting from the English Newsroom and the Tamil Newsroom, while Figure 17 highlights a community talk show produced by an extension of the Chinese News-room. Both setups demonstrated improved lighting control, with the former utilizing podcast-style microphones and the latter employing hands-free wireless microphones.



**Figure 16.** Video podcast from the English Newsroom (left) and the Tamil Newsroom (right)



**Figure 17.** Community talk-show produced by an extended group of the Chinese Newsroom

### 4.7.3 Immersive Podcast Studio

The Immersive Podcast Studio leverages advanced acoustics to elevate the production quality of immersive audio podcasts. Due to the focus on acoustic design and the constraints of limited ceiling height, a comprehensive lighting system was deemed unnecessary. Instead, the studio features adjustable track lighting, supplemented by auxiliary floor-standing lights when required. Figure 18 presents the welcoming podcast setup in the Tamil and Malay Newsroom, Figure 19 demonstrates the use of auxiliary lighting, and Figure 20 showcases a video podcast featuring a musician.



**Figure 18.** Video podcast from Tamil Newsroom (left) and Malay Newsroom (right)



**Figure 19.** Video Podcast from that uses auxiliary lighting in the Immersive Podcast Studio



**Figure 20.** English Newsroom video podcast with musician in the immersive podcast studio

Although the studio design aimed to promote immersive podcast storytelling, the general lack of a suitable surround sound format for distribution was acknowledged during the concept design phase. It appears that plans for immersive podcast production are in development, especially with recent initiatives by Dolby, podcast platforms, and audiobook services. Dolby's guide, Getting Started with Dolby Atmos Podcasts and Audiobooks (2024), alongside collaborations like Audible and Dolby Atmos: A New Way to Experience Stories and Spotify's Dolby Atmos Demo for Podcasts, suggests momentum in this space. However, Vrtonung (n.d.) argued that Dolby Atmos for podcasts and audiobooks falls short for immersive experiences, citing the lack of a head-locking feature.

### 4.7.4 Distributed Production

A talk-show produced by an extension of the Chinese Newsroom was spotted. It suggested a form of distributed production between the Immersive Podcast Studio and the Multi-Purpose studio. However, indeterministic.



**Figure 21.** A form of distributed production?

## 5. Conclusions

The facility completed testing and commissioning in January 2024, embodying the integration of Form, Culture, and Technology — a design philosophy that not only enhances media production capabilities but also responds to the cultural diversity and evolving technological demands of the media environment (Katz & Ahern, 2019). In the context of this forum, the project showcased — from design to completion — the evolution of a production space for a medium traditionally limited to on-demand and audio-only, now expanded to include broadcast and video, and further pushing its boundaries to incorporate immersive and XR formats.

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# Architecture and Humanities:
## Speculative Mapping of a Fictional Society

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# Introduction

Speculative mapping becomes an intersection of traditional learning and innovative thinking approaches to architectural and societal design exploring the habitus of a person's cognitive and motivating structures regarding their self and built space and eventually an exploration of a society (Archer, 2005). It provides a tabula rasa to process a statement of data and comparison of socio-architectural and humanistic constellations (Delitz, 2018). This abstract looks into the role of speculative mapping as a pedagogical tool in the Architecture and Humanities course by having grouped students engage in the creation of fictional societies' living that mirror contemporary real-life issues with driving solutions and problem solving through cartography. The emphasis of making and creating through a speculative map design fosters conversation between students that becomes a catalyst to critical thinking and problem solving in discussion within a contemporary context whilst understanding how traditional practice of drawing co-exist and benefit in today's digital driven world. Some of the questions and statements that prompt the beginning of the project are:

- Creativity and Innovation: How creatively does the design approach the theme? Are there unique architectural or societal solutions?

- Application of Humanities in Architecture: Does the design reflect an understanding of the humanities' role in architecture, considering cultural, social, and environmental aspects?

- Clarity and Presentation: How well does the map communicate the society's structure and theme? Are the annotations and legend clear and informative?

- Design and Aesthetic Quality: Does the use of a monochromatic or minimal colour palette enhance the design? Is the overall aesthetic coherent and compelling?

- This project challenges students to think beyond conventional architectural practices, envisioning societies that address contemporary and future challenges through innovative design and planning. The student's speculative maps will serve as a creative exploration of how architecture can respond to and shape human experiences in diverse societal contexts.

# Case Study: Speculative mapping of fictional societies

The project content assigned each student group to the themes as shown in table 1. Each group explored different societal constructs and their interactions and how this is reflected through several structures and processes implemented in the project of the speculative mapping.
The research, conceptualization, design and presentation of the speculative societies was structured through several stages. Through the initial research and conceptualization, the groups research their themes, considering societal, architectural and environmental implications.

| Themes | Description |
| --- | --- |
| Resilient Society of Refugees | Envisions a society built on resilience, adaptability, and communal support, focusing on creating a safe, sustainable, and cohesive environment for long-term stability and prosperity |
| Women and Children-Centric Society | Designs a society that maximizes space through innovative solutions focused on women and children, reflecting on safety and inclusion |
| Farming Urbanism | Imagines a society where farming integrates into every aspect of urban life, promoting food security and green living |
| Waterborne Society | Creates a society that lives on water, with floating or stilted structures, focusing on adaptability and resilience |
| Animal-Centric Society | A society where architecture and urban planning prioritize the coexistence and welfare of animals and humans equally |
| Senior Citizen-Centric Society | A community designed to cater to the needs, mobility, and leisure of the elderly, promoting intergenerational interaction |

**Table 1.** Themes exploring different societal constructs and their interactions

The preliminary ideas are sketched to guide the next process. The design and mapping stage has the groups drawing the societies on an elongated A3 paper integrating a body of water (river) at a suggested 1:500 scale, considering the direction, architectural elements, public spaces, infrastructure and environmental considerations that are influenced and directed by the assigned theme. A monochromatic or minimal colour was suggested for clarity and consistency at the initial stages. Annotations and legend creation highlighted key features, innovative solutions and thematic elements, symbols clarity, and areas within the society that helps the viewer understand the design of the cartography of the map. The students were asked to reflect on their decisions based on the

suggested themes and any additional components that strengthens the application of their ideas of the themes.



*Mountain:hiking*   *Waterfront Park:Camping*   *Lake Park:Walking*   *District greening:Playing*

**Figure 1.** Speculative mapping of a fictional society of women and children-centric society that shows suggested land use and urban solutions. Image source from ARC110 student group project



**Figure 2.** Speculative mapping of a fictional society of animal-centric society where spur roads and paths, development of wetland green belt and protected forests for harmonious co-existence. Image source from ARC110 student group project

## Analysis and discussion

The project of speculative mapping has effectively integrated critical thinking, collaborative learning and experimental methods to address contemporary societal challenges through cartography with an array of architectural forms of representation of landscape, urban spaces, bodies of water, scale, topography and infrastructure. The process is imaginative yet executed through a structured process where students develop an understanding of socio-economic, cultural, and environmental dynamics through themes such as refugee resilience, gender inclusivity, urban farming, waterborne living, animal welfare and elderly care. The exercise

itself emphasises the importance of making and creating where the approach fosters collaborative learning through group discussions and self-critique enhancing their ability to articulate and refine their design execution and choices.

## Conclusion

In conclusion, speculative mapping serves as a dynamic intersection of traditional learning and innovative thinking in architectural and societal design of marginalised societies that are often overlooked in theoretical canons (Alatas, 2011). This pedagogical tool engages students in creating fictional societies that mirror real-life issues, fostering critical thinking and problem-solving through cartography. The emphasis on making and creating speculative maps encourages dialogue among students, acting as a catalyst for deeper understanding and innovative solutions and a narration of spatial understanding (Psarra, 2009). Through the exploration of diverse societal constructs — ranging from refugee resilience to waterborne living — the project cultivates an appreciation for the interplay between traditional drawing practices and future execution of the project will look an integration of contemporary digital tools. This approach not only enhances students' design skills but also their ability to address complex socio-cultural and environmental challenges, ultimately shaping their capacity to envision and influence future human experiences.

## Acknowledgments

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# AI as a Creative Partner:

## Rethinking Design Innovation

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# Introduction

This paper explores the integration of Generative Artificial Intelligence (Gen AI) as a collaborative tool in retail design, focusing on an industry-integrated project at the Shanghai Institute of Visual Arts (SIVA). Part of the Themed Environment Design (TED) course, the project tasked students with redesigning Dispensary No. 1, an iconic Shanghai pharmacy specializing in Traditional Chinese Medicine (TCM). The project had multiple objectives: creating a more engaging retail environment, expanding the pharmacy's customer base, enhancing the public's understanding of TCM, and incorporating technological advancements through omnichannel design, all while maintaining the pharmacy's appeal to its core demographic of elderly patrons.

Students developed experience design themes based on customer research and trend analysis, integrating technological advancements and omnichannel design principles. Gen AI was used throughout the process to analyse customer behaviours, identify trends, and aid in creative ideation, enabling students to merge tradition with modern retail practices. The omnichannel approach allowed for seamless digital, physical, and human experiences, ensuring broader customer engagement.

Generative AI tools facilitated quick exploratory research, enabling students to efficiently review and analyze trends and use cases while supporting critical analysis. These tools helped build a deeper understanding of customer behavior and preferences through the creation of synthetic users, expanding the ideation process by generating a wide range of creative possibilities. Additionally, the feedback provided by AI helped students critically refine and evaluate their ideas, resulting in a more thorough exploration of design concepts and the development of well-rounded, customer-focused solutions.

Despite these benefits, challenges arose with the integration of Generative AI. One significant concern was the risk of homogenization in design outputs, as AI relies on pre-existing datasets that can reinforce dominant trends, potentially stifling creativity and diversity. Bias in AI-driven outputs also posed a challenge, particularly when maintaining cultural relevance in sensitive contexts. Students were encouraged to balance AI's structured insights with human creativity to ensure unique and culturally relevant designs.

Due to restrictions on access to global AI tools like ChatGPT in China, students are increasingly relying on local platforms. This raises important questions about the future impact of such a divide. Will the use of differ-

ent AI tools across regions lead to greater technological fragmentation, or could culturally tailored platforms help reduce bias and offer more relevant local solutions? These uncertainties leave open important questions about the long-term effects on global collaboration, innovation, and the broader AI landscape.

This case study underscores the importance of guiding students to view AI as a collaborator that enhances creativity without replacing it. The project demonstrates AI's potential in fostering innovative, customer-centered retail environments while addressing key ethical concerns. The paper advocates for integrating AI into design education, ensuring students are prepared for a future where human creativity and AI-driven innovation work hand in hand.

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# Pocket Studio:
## Learning Support for Design Studio in the Era of GenAI

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This research aims to address two main challenges in current design studio education. Firstly, while generative artificial intelligence (GenAI) has become increasingly integrated into students' learning, there is a need for clarity on its proper usage in design studio activities and an understanding of its advantages and limitations (Bartlett & Camba, 2024; Fleischmann, 2024). Secondly, students in studio activities often lack a comprehensive understanding of lab resources, such as available materials and processing methods in labs and workshops.

Therefore, we propose a system called the "Pocket Studio" that incorporates an AI Toolbox and a Lab Toolbox to facilitate learning in modules with design studio activities. Pocket Studio system serves two main functions: 1) AI Toolbox provides guidance and instructions on using GenAI in studio activities, covering key aspects such as usage skills, advantages, limitations, and maintaining usage records to ensure proper usage of GenAI; 2) Lab Toolbox connects lab resources relevant to studio activities, aiming to enhance students' understanding and benefit their design works.

The research spans one year, divided into three phases for gradual implementation. The first phase aims to preliminarily establish the Pocket Studio system and conduct initial testing, including designing App prototype (AI and Lab Toolboxes) and producing physical bags (kits and pamphlets), aligned with studio activities for testing. The second phase focuses on refining and developing the Pocket Studio system based on initial test results, involving drafting comprehensive GenAI guidelines and instructions, enriching the lab resources in details, and improving the system design and user experience. The last phase will apply and finalize the system and conclude the research, by deeply integrating Pocket Studio into teaching practice, and incorporating the App and physical bag into studio activities, with student feedback collected through surveys and interviews.

The "Pocket Studio" designed by us integrates digital and physical components, as shown in Figure 1. The digital component comprises a "Pocket Studio App", planning to develop two embedded (AI and Lab) toolboxes. Through this App, students can conveniently access these toolboxes using mobile devices. Additionally, the App can serve as an assistant in studio classes and be seamlessly integrated into teaching with digital resources of GenAI and labs. Meanwhile, the physical component involves a "Pocket Studio Physical Bag" distributed to each student at the start of the studio activity, containing necessary physical kits and materials supplied by the Lab or workshop, tailored to the module

requirements. Additionally, the physical bag includes paper pamphlets providing a brief overview of lab resources, an introduction to GenAI, and an appendix for students to record GenAI usage during studio activities.



Figure 1. Design and testing of the Pocket Studio App and the physical bag

The Pocket Studio system showcases its application potential for modules with studio activities in the programme of industry design by being implemented into teaching practice. Additionally, it can be extended to other studio-based courses in the design disciplines, offering customized learning support through the App and physical bag. The digital component of Pocket Studio shows high potential for future promotion and marketability. The system's App can be expanded to include more toolboxes, with promising prospects as a learning assistant, demonstrating future potential in the App market. Furthermore, the research outcomes will bring positive impacts in a broader context. Pocket Studio is expected to generate positive impacts on cross-school, cross-university, and global context. It can serve as a reference case with a shared platform, providing valuable insights for current studio teaching practices in the era of GenAI.

## Acknowledgments

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# Design Education & Tomorrow's Distance Learning:
## from Behind to Beyond

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# 1. Education and technology

Technological advancement has transformed Higher Education (HE) in multiple ways. Among others, it enabled the online growth and expansion of the learning environment, empowered the appearance of new teaching and learning modalities or forms, made geographic barriers inconsequential and time zone distances an accommodable inconvenience. All contributed to a more accessible and inclusive learning experience for a broader range of learners worldwide. The modality proved critical amid the COVID-19 pandemic, allowing HE to pivot online and keep going uninterrupted (Bernardo & Duarte, 2020). However, when the precautionary measures eased, institutions did not rush back to the old "normal". Some remained online as a safeguard, while others favoured a phased hybrid return. In both cases, the online modality would maintain its status as a reliable medium for teaching and learning, in both synchronous and asynchronous forms.

Nonetheless, the conditioning imposed by the use of display-based systems during this period accentuated feelings of distance in participants and magnified their perceptual sense of isolation. Furthermore, it bottlenecked expressiveness, impaired social-emotional development and personal sense of meaning or belonging otherwise natural to co-located contexts, characteristic of design-related fields (Bernardo & Duarte, 2021). In an HE industrial design studio context, where multimodal interaction, diverse social-cultural environments and experiential learning, among others, play a significant role in developing design proficiency (Davis, 2017), the inability to reproduce some of these virtually (at similar levels) heeded the transition to online detrimental by comparison.

# 2. From behind to beyond

The fitness to digitally move from the narrowness of a two-dimensional (2D) display-based human-computer interaction (HCI) while countering feelings of distancing or isolation is an expectancy behind the use of immersive Virtual Reality (VR) in education and one that gains renewed strength in the fallback of the pandemic (Bernardo & Duarte, 2023). The future use and integration of VR aims to break the inelasticity of the 2D interaction model by opening access to simulation platforms that can afford multimodal interaction in three-dimensional (3D) virtual space, which are likely to redefine current educational paradigms (Serna-Mendiburu & Guerra-Tamez, 2024). Ongoing research and development include projects such as MIT's Media Lab CocoVerse that is exploring

constructivist and exploratory learning (Project Overview ‹ CocoVerse: A Playground for Co-Creation and Communication in Virtual Reality — MIT Media Lab, 2024), or NVIDIA's Holodeck and OmniVerse platforms which are attempting to reframe remote collaborative work by bringing designers and stakeholders together in shared 3D virtual spaces. Mark Zuckerberg's, who foresees a paradigm shift in education towards immersive learning (Newton, 2021), is also branching Meta into this space with the release of Horizon Workrooms. Common to these and other ongoing developments seeking similar outputs is the emphasis on the critical role that Extended Realities (XR) technologies will play in the future of work and education, alluding to a plausible near-future online experience that moves beyond the 2D window display into reality-virtuality threshold.

## 3. Tomorrow's distance learning

To better understand the role that VR may play in remote design education in the near future, this study proposes a comparative investigation against the current existing baseline. The aim is to evaluate and assess its potential impact on:

1. Augmenting the range of interaction and communication

2. Alleviating sentiments of physical distancing and/or isolation

The study takes place in Lisbon, Portugal, at IADE — Faculty of Design, Technology e Communication, Universidade Europeia. Participants are randomly picked from a pool of student volunteers who chose to participate in the study by responding to an open call. Participation is open to currently enrolled students active at the undergraduate level and operating within the same course level. The study employs a mixed-methods approach to gather primary data, which derives from a series of experiments with two groups of participants (control: CRTL; experimental: EXPR), questionnaires (pre- and post-) and group interviews. Each group is comprised of six participants who are split into two teams of three.

All participants undergo two VR training sessions to develop familiarity with the equipment and system, tools, and interaction in collaborative, shared 3D virtual spaces. The training sessions intend to acclimatize them to system use and cancel, through anticipation, the influence or effect that novelty could play during the experiment and later data capture.

The study comprises a total of four separate experiments; all take place in the week after training and on the same day. One team from CRTL and one from EXPR undergo the experiment simultaneously during the morning, and the two remaining do it in the afternoon. Twenty minutes before the start, each participant is led to an empty classroom equipped with a video-conference-enabled computer system and a pre-installed set of digital tools. Teams in the CRTL group are conditioned to the baseline online communication toolset used during the COVID-19 pandemic at XJTLU (Learning Management System, Zoom or Microsoft Teams, Miró) but free to use any design software (e.g., Adobe Creative Cloud, Rhinoceros, KeyShot). Teams on the EXPR group are subject to the same baseline setup plus access to an HTC VIVE VR headset and Meta's Horizon Workrooms platform. The primary intent is to observe if and how the addition of a VR system and platform to the baseline influences (or not) the dependent variable: the level of communication and perceptual sense of distance between remotely located team members when collaborating online on an industrial design project in a HE context.

For the experiment, both groups undergo a one-hour design sprint. At the start, participants answer a pre-questionnaire that records their physical and emotional baseline; upon completion, they gain access to the project briefing, connect with their team members online and conjointly address the task. All physical and digital interactions are recorded for later review; these include video-recording participants in-location, using a digital video camera, and their computer displays with screen-capturing software. One hour later, participants upload their work to a cloud folder and complete a new questionnaire that asks the same questions as the pre-questionnaire. The intent behind having identical pre- and post-questionnaires is to have a measure of contrast between the beginning and end of the experiment to understand what changes occurred throughout and gain insight into what kind or type of impact the conditioning may have had on participants. Some of the questions were retrieved and adapted from previous existing questionnaires, including Brooke's (1995) System Usability Scale, Lewis's (1995) Usability Satisfaction, Kennedy et al. (1993) Simulator Sickness Questionnaire, and Witmer and Singer's (1998) Presence Questionnaire, while others built explicitly to explore other dimensions of the study. These aimed to gather participant input concerning screen-mediated interactions, digital expressivity, personal connectivity, and engagement. Group interviews occur later, after primary data analysis, and aim to add clarity and depth to questionnaire results and user observations.

In both groups, CRTL and EXPR, the environmental setting intends to emulate a context of social isolation, similar to what occurred during the COVID-19 pandemic — participants are isolated in separate rooms, adequately equipped for the experiment, and all interactions occur through web-mediated devices. This first initial study limits the time variable to one hour; however, in many cases during the COVID-19 pandemic, students were subjected to far more extended periods online. In this sense, conducting additional future experiments with different durations and participants would be pertinent to stress the time variable. This post-work would enable the measuring and evaluation of digital fatigue, performance, attention spans, and cognitive saturation, among others, as participants' time online increases and while using different digital toolsets.

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# Integrating Gamification and VR in Intercultural Type Design Education:

## A Dual-Phase Framework Inspired by Ancient Chinese Characters

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**Keywords:** Gamification, VR-Based Creations, Oracle Bone Scrip, Type Design Education

## Introduction

The study of Oracle Bone Script and Flower-and-Bird Script reveals the pictographic roots and decorative evolution of Chinese characters, offering insights into symbolism, visual balance, narrative, and structural coherence in type design. This study proposes a gamified, VR-based framework to deepen students' understanding of character structure and visual semiotics, broadening their appreciation of non-alphabetic systems and enriching intercultural type design education with unique perspectives.

## Background

Both Western and Easter scripts have undergone centuries of refinement, gradually developing distinct systems of character formation. Western writing, based on the Latin alphabet, prioritize legibility and uniformity, often structured with clear, geometric forms that adapt well to print and digital media (Song, 2023). Unlike linear Western alphabets, Chinese characters prioritize spatial balance, rhythm, and structural consistency, requiring designers to create visual harmony within a square form while preserving narrative coherence (Tam, 2018). In type design education, exploring Chinese characters deeply allows students to understand non-alphabetic, symbolic systems, broadening their appreciation for typographic diversity. This intercultural insight enriches students' design perspectives, enabling them to create typography with global resonance — an essential skill in today's interconnected world.

Central to this exploration is the Oracle Bone Script, widely acknowledged as the earliest manifestation of Chinese characters. Its creation to some extent reflects the six fundamental principles that later shaped Chinese character formation, encompassing pictograms and ideograms (Chen, 2007; Xu, 2004). This script exerted a profound influence on the development of Chinese writing by achieving a harmonious balance between aesthetic simplicity and functional clarity. Drawing inspiration from natural forms and everyday objects, it intricately incorporates aspects of daily life within its structure (Zhu, 1999). Building upon these foundational principles, the Chinese further explored the integration of natural graphic elements to embellish characters anew, exemplifying a progression from simplicity towards elaborate ornamentation. This culminated in the emergence of decorative scripts such as the Bird-Worm Seal Script and its subsequent evolution into the Flower-and-Bird Script (Chen, 2018). Encapsulated within these ancient Chinese characters are

modern design principles rooted in visual abstraction, simplicity, narrative expression, and symbolic representation (Zhou, 2009). Understanding these principles alongside their evolutionary trajectory: from Oracle Bone Script's structural economy to Flower-and-Bird Script's ornate style, provides crucial insights into striking a delicate balance between functional clarity and aesthetic adornment that underpin essential skills in contemporary type design.

## Methodology

This study proposes a novel pedagogical approach aimed at immersing students in the fundamentals of Chinese character construction through a playful and embodied creative experience. Thirteen students aged 12 to 13 from a local school participated in this study. The school provided access to its VR education lab, and all participants had prior knowledge and experience with virtual reality before attending the study.
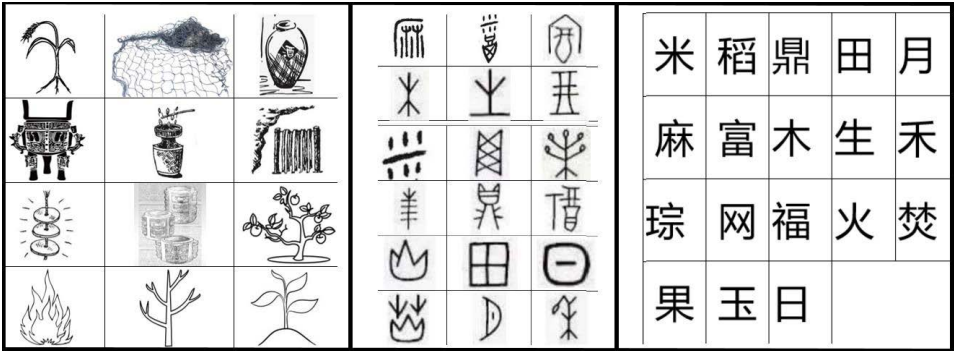


**Figure 1.** Three columns of the original Oracle Bone Script: real object images, Oracle Bone Script, and modern simplified Chinese characters (from left to right)

In the first stage, the study utilized an original Oracle Bone Script game, structured into three columns: images of objects, Oracle Bone Script, and modern simplified Chinese characters (Figure 1), wherein the participants need engaged in group discussions to connect the visual representations across each column. Through this stage, students identified links between familiar objects, the ancient Oracle Bone representations, and corresponding modern characters. This interactive approach introduced students to foundational principles of character formation, such as pictograms, ideograms, and associative compounds, deepening their understanding of how ancient characters evolved from visual

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symbols. Following this game, students used VR headsets with painting software (Tilt Brush) to select a Chinese character and design a decorative version inspired by Flower-and-Bird Script principles, moreover, they also gave their creative reinterpretation to their VR works (Figure 2).



Figure 2. The students were using VR equipment to create their Flower-and-Bird characters

This combined methodology, linking traditional character formation concepts with modern digital tools, provides a mixed-media framework for future type education. By engaging in both analysis and creative application, students not only gain insight into the design principles of Chinese characters but also acquire valuable experience in decorative type design.

## Results and potential applications

In the initial phase of the Oracle Bone Script matching game, all thirteen participants actively engaged in collaborative discussions, achieving an accuracy rate exceeding 80% (Figure 3). This activity facilitated students' comprehension of fundamental character formation principles, such as the systematic reduction of natural forms and the semantic interconnectedness between characters (associative compounds). Such engagement allowed participants to appreciate how ancient script design distilled complex imagery into simplified, yet meaning-rich symbols, and fostered an understanding of how visually similar characters could convey diverse meanings.

In the subsequent VR-based Flower-and-Bird Script creation phase, participants engaged in a "reverse" character design process, adding elaborated, naturalistic elements to modern Chinese characters. By integrating floral, faunal, and other organic motifs into the chosen characters, students articulated individual interpretations of each character's semantic essence. For example, two participants who selected the character

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"福/Fu" (happiness) collaboratively depicted a paradisiacal scene within the VR space, portraying an idyllic landscape of harmonious birds and flowers, thereby symbolizing happiness as an experience of natural beauty and harmony (Figure 4).



**Figure 3.** The students were playing the original Oracle Bone Script game



**Figure 4.** The two samples of students' VR character creative work serve as a demonstration of their comprehension of the concept "福/Fu" (Happiness)

These two instructional stages demonstrate potential applications for enhancing type education. With further refinement, this dual-phase process could introduce students to a nuanced experiential approach, whereby they engage with both simplification and elaboration in type design. Furthermore, this direct-experience-oriented educational method with further improvement. In the first stage, the game's content design will

Integrating Gamification and VR in Intercultural Type Design Education

be enhanced by incorporating elements from oracle bone script, aligning with the "Six Principles of Character Formation." This will focus on stroke simplification and structural combination, enriching the student experience through a deeper understanding of Chinese character construction. In the second VR-based creation phase, we will strengthen the Chinese character structure principles that the students will be guided to elaborate on individual strokes of Chinese characters, preserving their spatial integrity while transforming simplified forms into complex, decorative compositions. This process will foster a deeper comprehension of the spatial, proportional, and structural principles that underpin Chinese character design, enhancing both aesthetic complexity and visual understanding. Ultimately, this approach offers a valuable opportunity for students, particularly those from intercultural backgrounds, to explore the fundamentals of Chinese typography through visual engagement, independent of linguistic comprehension, thereby broadening their design perspectives.

## Conclusion

This pedagogical project demonstrates the value of integrating historical insights with digital tools in teaching type design. Through the Oracle Bone Script game, students explored foundational character formation principles, gaining an appreciation for the semantic and structural simplicity of early Chinese writing, which is quite different with the alphabetic western characters. The VR-based task further enabled students to reinterpret modern Chinese characters with decorative elements inspired by the Flower-and-Bird Script, merging natural motifs with symbolic expression, immersively experiencing the spatial structure of Chinese squared characters. This dual-phase approach combines analysis with creative application, enhancing students' understanding of both simplified and decorative design while fostering cross-cultural design literacy.

## Acknowledgments

**Yunpeng Xiang, PhD (Cand)**
is an enthusiastic designer and researcher on cultural heritage innovation. With a background in architecture and industrial design, currently engaged in research on innovative cultural heritage interpretation, skilled in employing modern visual technologies to advance heritage interpretation projects.

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# Posters

# Gamification in Design Education: Establishing New Norms Through AI-Enhanced Educational Technology

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## Track 2  New Norms: True innovation, across borders, in the age of AI.

## Introduction

While traditional design education has been valuable for establishing foundational skills, there is a pressing need for it to evolve into a student-focused, research-led, and science-based approach to meet the challenges of the modern industrial and information revolutions [1] . Gamification and educational technology, integrated with artificial intelligence (AI), could serve pivotal roles in enriching learning experiences and optimizing educational outcomes [2]. This study explores the pedagogical challenges in design education and examines potential approaches that integrate gamification and AI-driven educational technology to transform teaching practices, thereby preparing the next generation of designers.

## Research Objectives

This study aims to identify the pedagogical challenges inherent in traditional design education and to explore how gamification and AI-embedded educational technology can empower educators to develop innovative teaching practices.

## Methodology

A comprehensive literature review and content analysis were conducted to identify pedagogical challenges in design education. The study reviewed literature based on three main keywords—gamification, educational technology, and design education—and their synonyms. Publications from 2010 to 2023 were collected from five databases, including Scopus, IEEE, and Web of Science. The articles were analysed to generate a set of pedagogical issues, which were subsequently categorized and evaluated based on three criteria: significance, alignment with new educational models, and the capabilities of AI.

Learning scenarios from the students' perspective

Preparation scenario from the educator's perspective

## Challenges in traditional education

### Immature Hybrid Modes of Learning

While the COVID-19 pandemic accelerated online learning, hybrid learning in design education remain rudimentary, often limited to web-based instruction without skill training environments. The findings highlight issues such as inadequate interaction between instructors and students, ineffective supervision and management, and the lack of skill training environments, which are crucial for the practical nature of design education [3].

### Overemphasis on Aesthetics

Design practice has evolved to encompass both tangible and intangible elements, requiring skills beyond aesthetics. Findings indicate that design education disproportionately emphasizes aesthetics, rooted in its origins in art and craft traditions. Furthermore, design decisions often rely on experience and intuition rather than quantitative performance predictions, leading students to prioritize visual appeal over functionality and knowledge-based considerations essential to contemporary design [4].

### Cross-Disciplinary Challenges

To address the complexities presented by real-world design problems, design education should equip students with cross-disciplinary knowledge, including areas such as science. The findings indicate that traditional, discipline-based educational structures constrain students' capacity for cross-disciplinary engagement, which is crucial for effectively tackling these challenges [5].

## Solutions through Gamification and AI

### Adaptive learning paths

To address the limitations inherent in current hybrid models, adaptive learning paths present a student-centred approach. AI-driven algorithms, including those leveraging machine learning and predictive analytics, analyze students' real-time performance data to dynamically adjust instructional content. This personalized adaptation ensures that each student engages with material that is appropriately challenging, thereby enhancing motivation and engagement. Furthermore, the integration of gamification elements—such as feedback, reward, and progress—further personalizes content delivery by adjusting pacing and difficulty levels. These features collectively contribute to a more effective and interactive learning experience in hybrid models.

### Evidence-based design decisions

Moving beyond an overemphasis on aesthetics requires a shift toward evidence-based design through a research-led approach. AI tools utilizing machine learning algorithms can critique design decisions by providing data-driven feedback that balances visual appeal with functionality. Educational technologies can introduce students to research methodologies and data analysis techniques, enabling them to make informed design choices. Gamification like free to fail and voting motivate students to engage deeply with the analytical aspects of design, encouraging a harmonious blend of aesthetics and functionality based on empirical evidence.

### Real-world simulation

Incorporating real-world simulations into design education effectively addresses cross-disciplinary challenges by providing immersive and practical experiences. AI-enabled educational platforms can construct environments that replicate complex, cross disciplinary problems by integrating insights from science and other relevant fields. Advanced AI technologies, including the potential integration of large language models (LLMs) with image and video generation models, enable the personalization of simulations to align with each student's unique learning needs. This personalization offers real-time feedback and guidance. Gamification like narrative, competition, trading, enhance engagement within these simulations, making the learning experience more compelling and relatable. This science-based approach equips design students with the ability to tackle real-world cross disciplinary challenges, overcoming the constraints of traditional, discipline-based educational structures.

## Direction for design opportunity

Given the current pedagogical challenges and the solutions identified, there is a compelling opportunity to reimagine design education through the development of an AI-enhanced Learning Management System (LMS) that seamlessly integrates gamification. This LMS would be purpose-built for the unique requirements of design students and educators, focusing on a student-focused, research-led, and science-based model. Key features of the system would include gamification—such as progress, voting, and narrative—to foster enhanced engagement and cultivate a more interactive learning environment. Furthermore, AI-driven adaptive learning algorithms would be employed to personalize educational content dynamically, optimizing difficulty levels and pacing to align with each student's individual progression. The integration of AI analytics would facilitate an evidence-based approach to learning, offering students real-time insights and guidance to inform balanced design decisions that equally prioritize aesthetics and functionality. Additionally, the LMS would provide immersive simulations that replicate complex design challenges, thereby mimicking real-world dynamics and necessitating the application of cross-disciplinary knowledge from domains such as science and technology. Ultimately, the LMS would foster a student-focused, research-led, and science-based education model that aligns with contemporary industry expectations, transforming design education into an adaptive and effective way.

## Conclusion

In conclusion, the integration of gamification and Artificial Intelligence in educational technology presents a transformative opportunity for design education. This study has identified key pedagogical challenges—immature hybrid learning modes, overemphasis on aesthetics, and cross-disciplinary limitations—that hinder the effectiveness of traditional design education. By proposing solutions such as adaptive learning paths, evidence-based design modules, and real-world simulation environments, we demonstrate the potential of leveraging gamification and AI to create a more engaging, effective, and holistic educational experience.

The development of an integrated LMS that embodies these innovative approaches offers a tangible pathway to redefine learning norms in design education. Such a system not only enhances student motivation and engagement but also promotes evidence-based decision-making and interdisciplinary collaboration. By aligning educational practices with contemporary industry demands, this LMS has the capacity to transform design education into a more student-centred, research-led, and science-based discipline. Ultimately, this advancement prepares students to meet future challenges and contribute meaningfully to the modern design landscape.

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XJTLU | DESIGN SCHOOL

# Dii

## Design for improved acceptance of wearable medical devices for elderly diabetic patients

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### Track1 "Old Norms: Tradition at the Intersection of New Technology"

## Introduction

Population ageing is now a global phenomenon, with the proportion of the world's population aged 65 or over expected to rise from 10% in 2022 to 16% in 2050 [1]. As the population ages, the need for healthcare for older people will continue to increase. The traditional hospital-centric face-to-face healthcare model is shifting to a home-centric telemedicine model [2]. However, when wearable devices are adopted, older adults still show discomfort with the devices, complaining of uncomfortable and unattractive devices, as well as frequent connectivity barriers, ultimately leading to low acceptance of wearable devices [3]. There is a gap between older adults' perceived and actual utility of technology adoption [4]. Most older patients develop an attitude of fatigue towards wearable devices, with a significant proportion of wearable devices being discarded within the first six months of use [5].

## Research Objectives

This study aims to review and analyze the current challenges in wearable devices. Through an analysis of these challenges to identify design-oriented solutions to resolve conflicts between technology and users and enhance user experience. The aim of this study is to provide design strategies for the future design, promotion, and optimization of wearable devices.

## Methodology

Bibliometrics is one of the most widely used methods for literature review analysis, offering new perspectives on the current state and development trends in specific research fields [6,7]. Since high-quality scientific literature undergoes rigorous peer review and strict scrutiny by publishing journals, its research outcomes have higher disciplinary representativeness [8]. By analysing highly cited literature, this study organises the challenges in wearable devices and further discusses future design trends.

## Challenges in Wearable Devices

### Technical Aspects
The device needs to be compact and lightweight while providing sufficient power [9].
Wearable devices typically need to transmit and integrate data with other devices or applications. However, current technology still faces obstacles in data transmission and integration, limiting the devices' usability and the data's effectiveness [10].

### User Experience Aspects
Users are often sensitive to the weight and shape of wearable devices [11].
Users may be unfamiliar with new technology, the interface design, function and operation [9].
Users may have concerns regarding the security of their health data, fearing that prolonged use might expose their privacy [12].

### Ethical Aspects
As devices record and process personal information, users increasingly question their legality and ethicality [13].
The widespread use of wearable devices could alter social interactions [14].

## Design Solutions

By optimizing design and material selection, it is possible to create lighter, more ergonomically friendly devices.
Innovative design concepts that combine technology with user needs can enhance device compatibility and improve data transmission methods.

Ergonomic design is a key factor in improving user experience. For instance, creating a lightweight device that conforms to the body's curves can reduce discomfort from prolonged wear.
An intuitive user interface and simplified operation steps can make it easier for users to operate the device.
Designers can integrate data encryption and privacy protection mechanisms during the design process to ensure secure storage and transmission of user data.

Designers can play a role in increasing public awareness and skills related to the use of wearable devices, thereby reducing privacy risks stemming from misuse or misunderstanding of wearable wear. By creating intuitive, user-friendly interfaces and providing clear instructions, they can help users better understand and manage their personal data, privacy-first design principles ensures that users are fully aware of data collection and usage and provides them with greater control over their information.



North America and Caribbean
An increase of 23%
62 million / 46 million

Middle East and North Africa
An increase of 110%
82 million / 39 million

Europe
An increase of 16%
67 million / 58 million

South and Central America
An increase of 62%
42 million / 26 million

Africa
An increase of 156%
41 million / 16 million

South East Asia
An increase of 84%
151 million / 82 million

Western Pacific
An increase of 15%
183 million / 159 million

Adults are living with diabetes
An increase of 48%
629 million / 425 million

The role of designer in Biodesign model

### Number of people with diabetes worldwide in 2017 and 2045 (ages 20-79)

The role of designer in Biodesign model.

PHASES: Identify — Invent — Implement

STAGES:
1. Needs finding
2. Needs screening
3. Concept generation
4. Concept screening
5. Strategy development
6. Business planning

Project launch

1.1 Strategic Focus
1.2 Needs Exploration
1.3 Needs Report Creation
2.1 Disease State Fundamentals
2.2 Existing Solutions
2.3 Stakeholder Analysis
2.4 Market Analysis
2.5 Needs Selection

3.1 Ideation
3.2 Initial Concept Selection
4.1 Intellectual Property Fundamentals
4.2 Regulatory Fundamentals
4.3 Reimbursement Fundamentals
4.4 Business Model
4.5 Concept Generation and Testing
4.6 Final Concept Selection

5.1 Intellectual Property Strategy
5.2 Research and Development Strategy
5.3 Clinical Strategy
5.4 Regulatory Strategy
5.5 Quality Management
5.6 Reimbursement Strategy
5.7 Market and Stakeholder Strategy
5.8 Sales and Distribution Strategy
5.9 Competitive Advantage and Business Strategy
6.1 Operational Plan and Financial Model
6.2 Strategic Integration and Communication
6.3 Funding Channels
6.4 Alternative Pathways

## Conclusion

Today, the application of wearable devices faces multiple challenges; effective design strategies can help alleviate these obstacles. This study explores the challenges related to user experience, ethical problems, and technology issues and proposes corresponding design strategies to enhance the effectiveness of wearable devices in applications. In the future, designers should continue to integrate user needs with technological advancements, leveraging innovative design concepts to reduce the gap between wearable technology and users. Designers can contribute to device aesthetics, user interface optimisation, and interaction experience improvements, ensuring that devices meet technical requirements while providing an excellent user experience. Through collaboration among designers, technology developers, policymakers, and societal stakeholders, the application of wearable devices across various fields can be further expanded and deepened.

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# Preserving the Past, Augmenting the Future: Museums and Cultural Heritage in the AR Era

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## Track1 "Old Norms: Tradition at the Intersection of New Technology"

## Background

With the arrival of the digital age, especially the young generation gradually grows up as the main cultural consumption group, the traditional museum experience form is facing new challenges. Many museum exhibitions are still dominated by static physical displays. Although this traditional visiting mode is important in protecting cultural relics and inherits culture, it may not be attractive enough for young audiences who are accustomed to using electronic devices such as smartphones and pursuing interactive and immersive experiences. In recent years, the needs of audiences have gradually changed from simple knowledge acquisition to the pursuit of emotional resonance and experience. How to meet the digital demand for cultural content of this generation has become an important issue for museums.[1][2]

Although many museums have begun to try to introduce digital technology, such as multimedia navigation systems, virtual reality (VR) and augmented reality (AR), there are still many problems in the process of technology application. First of all, the application of digital technology pays more attention to the display of novelty than the deep exploration of traditional cultural values, which makes it difficult for some audiences to obtain a sense of belonging and identity.[3] Secondly, the combination of technology and exhibition content often seems disconnected, and some applications are formal and shallow, which cannot truly enhance users' sense of immersion and participation.[4] In addition, there are differences in the acceptance and use ability of digital technology among different audience groups, and current designs are often difficult to accommodate diverse user needs.

Therefore, how to balance technological innovation and cultural value inheritance in the process of digital transformation, and build a museum experience that is both traditional and modern and can meet the needs of different audiences, is the key issue faced by current museums. This study aims to take AR technology as the breakthrough point, explore its potential in improving the user experience of museums, analyze the existing problems

## Methodology

This study uses bibliometric analysis to search literature data in Web of Science (WoS) database to explore the research status and trends in the combined fields of AR, museum, and user experience. Specifically, "augmented reality", "museum" and "user experience" were used as keywords for subject search, and the limited time range was from 2005 to 2024, and a total of 342 relevant literatures were obtained.

In order to ensure the accuracy and scientificity of the search results, the papers in the WoS Core Collection are selected. Then, the search results were visualized and analyzed using CiteSpace software, and the keyword clustering map and timeline map were constructed to reveal the research hotspots, interdisciplinary intersections and development trends in this field. In addition, the change in the number of research publications over time was also counted to quantitatively analyze the growth of research in the field.

## Results and Discussion

### Number of Publications
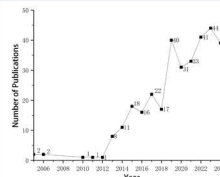


Figure 1. Number of Publications

As can be seen from the trend graph of the number of publications [Figure 1], between 2005 and 2014, the research in the field of AR, museums and user experience was relatively sporadic, with a small number of publications, which basically stayed in the single digits every year. However, from 2015, the number of studies grew significantly, reaching 22 articles in 2018. Of particular interest is the significant rise in the number of publications from the outbreak of COVID-19 in 2020, which peaked at 40 in 2020. This trend reflects the role of the epidemic in driving the digital transformation of museums. During outbreaks, museums are forced to close or restrict offline visits, and AR technology provides an innovative way to present online, enhancing the remote interactive experience for visitors. As a result, there has been a rapid increase in AR-related research to explore its potential for application and adaptation in the context of

### Keyword Timeline Analysis
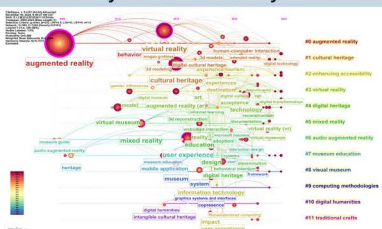


Figure 2. Keyword Timeline Analysis

The keyword timeline graph [Figure 2] illustrates the evolution of research topics between 2005 and 2024. In the early years (2005-2014), research focused on the traditional themes of VR and cultural heritage preservation, reflecting the initial exploration of the application of digital technologies in the cultural field. Since 2015, the keywords have gradually shifted to AR and user experience design, indicating that research has begun to pay more attention to enhance the interactivity and immersion of cultural presentations through emerging technologies. From 2018, keywords such as "Mixed Reality" and "User Acceptance" appear frequently, showing that research has entered a deeper stage of combining technology and user needs.

## Keyword Cluster Analysis



Figure 3. Keyword Cluster Analysis

### #1 Augmented Reality

"Augmented Reality" is the core cluster of this study, focusing on the application of AR technology in cultural heritage preservation and presentation. Keywords include "behavior", "museum experience", and "collaborative interaction", demonstrating the research's focus on how AR technology can improve visitor perception and engagement through interactivity and immersive experiences. Particularly during the pandemic, AR provided an alternative way of displaying and enhancing the accessibility of cultural content. This cluster is also related to attitudes and mobile devices, showing that research is increasingly focusing on user acceptance and the adaptability of the technology on everyday devices.

### #2 Cultural Heritage

The "Cultural Heritage" cluster reflects the importance of AR technology in cultural preservation. Keywords such as "digital cultural heritage" and "tourism experiences" suggest that research is not only focusing on static displays of cultural heritage, but also attempting to enhance the dynamic experience of viewers in tourism and cultural scenarios through technology. It is worth noting that the emergence of specific cases such as "Mogao Grottoes" indicates that research has begun to pay attention to how representative cultural heritage sites can achieve a balance between preservation and dissemination through AR technology. In addition, the frequent use of "3D modeling" and "human-computer interaction" suggests that technological innovations offer new solutions for cultural heritage

### #3 Enhancing Accessibility

This cluster highlights the potential of AR to enhance the accessibility of cultural content. Keywords such as "technology", "user acceptance", and "destination" suggest that research attempts to enhance cultural participation through technology for a wider range of people, including people with disabilities and remote users. Especially in the post-epidemic era, how to utilize AR technology to enable audiences to access cultural heritage anytime and anywhere is an important issue. The study also focuses on "decision making" and "digital transformation", emphasizing the strategic role of AR technology in transforming the operating model of cultural institutions.

### #4 Virtual Reality

As an early research theme, "virtual reality" continues to play an important role in technological applications and cultural scenarios. Keywords such as "digital culture" and "virtual museums" suggest that research seeks to provide immersive cultural education and entertainment experiences through VR technology. VR emphasizes cultural exploration in a completely virtual environment compared to AR, but as AR technology matures, the line between the two is beginning to blur, creating crossover areas such as Mixed Reality.

### #5 Digital Heritage

The "Digital Heritage" cluster focuses on the digital preservation and dissemination of cultural heritage. Keywords such as "embedded interaction" and "exhibition design" suggest that research is exploring how technology can be used to provide more vivid and educational cultural experiences. In addition, the emergence of 'social media' and 'data visualization' suggests that research is beginning to focus on the role of digital platforms in heritage communication, and in particular how social networks can be used to expand the reach and impact of culture.

## Conclusion

This study reveals the hotspots and trends of AR technology in the field of museum and user experience research by analyzing 342 related literatures. From the temporal changes in the number of publications, it can be seen that the pandemic has played an important role in promoting the application of AR technology in the field of museums, especially in addressing the needs of museums for digital displays in special situations. From the analysis of the keyword timeline and the cluster graph, it can be seen that the focus of research has gradually shifted from the early topics of "virtual reality" and "cultural heritage protection" to "augmented reality" and "user experience design", which focuses more on the interaction between the technology and the audience.

Specifically, cluster analyses indicated that AR is becoming increasingly important in cultural heritage preservation (#0 and #1). Research focuses on how AR can be utilized to enhance dynamic displays of traditional culture, making them more vivid and attractive; it also proposes many innovative solutions in terms of technological accessibility and diversity (#2). In addition, studies related to "digital heritage" (#4) and "virtual reality" (#3) further indicate that technological innovations need to be combined with the transmission of cultural values to enhance user experience and educational significance by means of embedded interaction and data visualization.

In the future, museums should pay more attention to the in-depth combination of technology and content in the process of digital transformation, not only providing interactivity and immersion through technologies such as AR, but also emphasizing the authenticity of cultural content and educational functions. Further research can start from user needs, explore diversified technology application scenarios, promote the sustainable development of cultural institutions driven by technology, and provide audiences with experiences with both modernity and cultural depth.

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# Insights into Interactive Conflicts among Senior Patients in Onsite Digital Healthcare

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## Introduction

**Track1 "Old Norms: Tradition at the Intersection of New Technology"**

Digital technologies are widely used in healthcare delivery today (D N et al., 2024). **In healthcare, the ageing population constitute the largest audience** (Frishammar et al., 2023). Previous research has focused on telemedicine solutions that rely on digital technology (Cajita et al., 2018), but numerous diseases still require travelling to the site to obtain further treatment. Many services have transitioned to a human-digital medical device interaction model in onsite healthcare. This shift has created a technology gap for senior patients, also known as the "digital divide". This study, therefore, aims to provide insight into the barriers to interaction for senior patients in onsite digital healthcare and to identify future research priorities under this category of Human-Computer Interaction (HCI) topics. China is, therefore, an ideal location for the study because of its combination of an ageing population and the prevalence of health information technology (Li et al., 2024).

**Digital Medical Service Devices** are a class of interactive computer terminals that integrate digital and physical interfaces. These devices can independently perform specific healthcare tasks, such as self-service registration, payment and access to healthcare reports.



Fig. 1: % of the ≥ 60 aged population in China, 2023(Census., 2021).

Fig. 2: % of visits to hospitals at all levels, 2021(NHC, 2023)

Healthcare institutions in China are categorized into 3 levels in descending order based on size, from small to large: First-level, Second-level, and Third-level (NHC, 2017).

## Results

From the patient's perspective, the digital services of healthcare scenarios primarily rely on the delivery of various types of digital devices to enable patients to register, pay, sign in, wait, pick up examination reports and medical expense vouchers, and a variety of other processes, which constitute the digital touchpoints in the healthcare service process. Below is a generalised healthcare delivery process in China that relies on digital devices.



Fig. 3: Universal on-site digital healthcare delivery processes.

The data collection activities of the observation method lasted from June 2024 to the end of September. We converted the observations into text and used the **AEIOU framework** to categorise and record them, focusing on analysing the interaction behaviours. After removing unavailable cases, **a total of 40 (n=40) complete observation cases** were collected (where H1=16, H2=16, and H3=8). The first author starts by organising the textual content and marking (by colour coding) the peculiarities, which all the authors then discuss to identify the pain points they are supposed to cluster. Each barrier is assigned an ID (method-category code-number), e.g. Obs-C-1, which indicates a particular barrier attributed to the Cognitive and Information Processing category as derived by the observation methods.



Fig 4: Profiles of digital healthcare service devices.

Table 1: Distribution of features of the observed cases.



## Methods

This study used a **non-invasive naturalistic observation** method to objectively document the naturalistic behavioural performance of senior patients (≥60 years of age) while interacting with digital medical devices. To obtain insight into more characteristic data and promptly capture it for analysis to produce enlightening outcomes. The observation procedure was based on the **AEIOU framework**, which is effective for background checks in ethnographic investigations (Brenner et al., 2016). Observations were counted and analyzed along five dimensions: **Activities, Environments, Interactions, Objects, and Users.** The observations focused on the scenario's digital services, interaction patterns, and barriers for older persons during Human-Computer Interaction. H1, H2, and H3 are the abbreviations for the three Third-level hospitals in Suzhou.



Fig. 5: Flowchart of the observation method.

## Discussion

After completing the extraction of the content of all observed cases, **a total of 13 interaction barriers were summarised.**

Table 2: Content summarization and coding for interaction barriers.

| Code(s) | Colour Label | Barriers |
|---|---|---|
| Obs-C-1 | ● | Insufficient Information Decoding Capability |
| Obs-C-2 | ● | Imbalanced Attention Allocation |
| Obs-C-3 | ● | Ambiguity in Medical |
| Obs-C-4 | ● | Decision-making Difficulty in Complex Situations |
| Obs-C-5 | ● | Cognitive Load in Multi-item Interaction |
| Obs-P-1 | ● | Insufficient Inductiveness of Device Physical Layout |
| Obs-P-2 | ● | Insufficient Perceptibility of Device Interaction Feedback |
| Obs-P-3 | ● | Limitation of Interaction Ability due to Sensory Function Decline |
| Obs-S-1 | ● | Dependence on Interpersonal Support |
| Obs-S-2 | ● | Lack of Confidence in Self-Operation |
| Obs-S-3 | ● | Self-Avoidance Behaviour towards Technology |
| Obs-L-1 | ● | Imitative Learning Cognitive Strategy |
| Obs-L-2 | ● | Existing Operational Mindset |

Based on the intrinsic links that these barriers possess, they were then grouped into four broader categories of interest in the HCI process, which were **cognition and information processing, perception and interaction feedback, social psychology and emotional impact,** and **learning and behavioural adaptation.**



Fig. 6: Frequency and classification of interaction barriers.

## Conclusion

This early study focuses on the **natural behaviours of senior patients** to analyse their prevalent digital interaction barriers in healthcare scenarios. It was classified into four developmental stage categories through the psychological perspective, which revealed research priorities to be focused on the **human factor aspects of HCI** in the elderly population to support further research in the future.

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# Dii

## Traditional meets Innovation:
### Design and Evaluation of an Augmented Reality Board Game for Museum Artifacts

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**Track 1 "Old Norms: Tradition at the Intersection of New Technology"**

## ABSTRACT

There is a growing emphasis on the social role of museums. Besides ordinary exhibitions, museums are exploring various activities to enhance the visitor experience. This study designed and evaluated an augmented reality (AR) technology-based board game aimed at enhancing cultural heritage learning and facilitating cross-cultural communication in museum settings. Preliminary results from a user study demonstrate the game's usability, effectiveness for cultural heritage learning, and positive user experiences, highlighting the potential of AR technology to enrich museum educational experiences.

## 1 BACKGROUND

As institutions dedicated to the public good, museums bear the responsibility of conducting research, amassing, conserving, interpreting, and presenting both tangible and intangible cultural heritage. Concurrently, they offer a diverse and immersive platform for educational enrichment, aesthetic appreciation, and knowledge dissemination, fostering cross-cultural education and exchange [1].

Traditional museum exhibitions often face limitations in providing audiences with close-up access to cultural artifacts. However, the integration of **AR** technology with digital replicas of artifacts offers users expanded perspectives and interactive capabilities, including rotation and zoom functions. Additionally, **serious games** have been shown to provide users with **educational** and **entertaining** experiences.

Therefore, we designed and evaluated an AR technology-based board game to explore its potential for players to gain knowledge in an enjoyable environment, deepen their understanding of cultural heritage, and facilitate cross-cultural communication. We conducted the user study in the wild, and the preliminary results demonstrated the usability of the game, its effectiveness for cultural heritage learning, and a positive user experience.

## 2 DESIGN AND IMPLEMENTATION


Fig. 1. Demonstration of the setup materials, include game board, mobile device holders, mobile devices, tokens, cards, quick answer bells, and dices.

**Design goals:**
Following the requirements of valid serious game, we design the mechanism according ot three design goals:
- **Playability** [2]: enabling successful and enjoyable game interaction.
- **Edutainment** [2]: converting the tenets of effective learning into game features.
- **Social interaction** [3]: supporting socialization during the game play.

**Game Question Design:**
With reference to the Museum of Wu's core curriculum manual, **32 single-choice questions** were designed for the **eight artifacts**.

## GAME RULES

**Gameplay**

**a) Rolling Dice:** Players take turns rolling a six-sided dice and move their token clockwise around the board the numperof spaces rolled.

**b) Landing on Spaces:**
- **Artifact Property:** You can buy it its an unowned property.
- **Owned Property:** You should pay the rent if it owned by another player.
- **Chance:** Scan the chance card through the AR app and follow the instructions.
- **Clue:** Scan the clue card through the AR app and read one of the tips with artifacts.
- **Challenge:** Answer the questions to gain scores.


Fig. 2. Demonstration of AR application interfaces and some AR interaction.

**Ending the Game**
The game continues until all property were brought or all questions were right answered.

## 3 USER STUDY

The user study was conducted in Museum of Wu. We organized two workshops to collect feedback on the usability, game user experience, and learning outcomes of AR board game through questionnaires.

**Preparations and Props:** 1. AR application; 2. Physical props.



| Phase 1: Warm-up (15 min) | Phase 2: Game Play (60 min) | Phase 3: Knowledge Post-test (10 min) | Phase 4: Discussion (20 min) |
| --- | --- | --- | --- |
| Introduction, tutorial, and consent form | Game Play | Knowledge Post-test | Discussion |
| Knowledge Pre-test | | SUS, UEQ, GEQ | Debrief |

Fig. 3. The flow chart showing the workshop procedure.

### Demographic

29  ♀ 17  ♂ 9  3

- Age: 21 ~ 53 (M=32.52, SD=7.70).
- Familarity of AR: Moderate (M=2.62, SD=0.94)
- Familarity with board game: Moderate (M=3.03, SD=1.05).

## Results

- **System Usability Scale:** Satisfactory usability (SUS score=70.17).
- **User Experience Questionnaire** (see Fig. 4):
  ✓ **Pragmatic quality:** Above average (top 50% to 25%)
  ✓ **Hedonic quality** and the **overall experience:** Excellent (top 10%).
- **Game Experience Questionnaire** (see Fig. 5):
  ✓ Competence    ✓ Negative affect
  ✓ Sensory and Imaginative Immersion
  ✓ Flow    ✓ Positive affect
  ✓ Tension/Annoyance    ✓ Challenge
- **Learning Outcomes:** Significant (Z=-16.5, p<0.001).
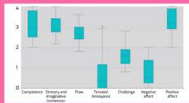

Fig. 4. The user experience results.


Fig. 5. The game experience results.

## CONCLUSION

We presented An AR board game design and conducted the user study in the Museum of Wu, Suzhou, China. Our analysis reveals satisfactory usability and user experience, as well as significant cultural heritage learning outcomes. The results show the potential of the AR board game to enrich museum activities and promote cultural heritage education.
In our future work, we would like to conduct further user studies to improve our design.

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Cumulus Association    Xi'an Jiaotong-Liverpool University 西交利物浦大学    NL Netherlands    XJTLU | DESIGN SCHOOL

Vicente Esteban. Industrial Design Associate Professor

# REFUGEOLY



## What kind of game is Refugeoly?

Refugeoly is a Serious Game whose main purpose is not just to play for fun but to understand this humanitarian crisis. This game is designed to understand the dramatic journey of a refugee trying to get into a country of asylum. Playing Refugeoly will turn you into a refugee and become conscious of the real circumstances a refugee must go through on the journey to safety. Refugeoly has been built into a game with the testimonies of refugees and NGO volunteers in refugee camps in Greece, Turkey, Spain and France.

An important fact about Refugeoly is the use of money to play this game by the players that become refugees when playing. To reach a country of asylum, the refugees require huge amounts of money, and playing Refugeoly shows how this money disappears from the hands of the refugees to ends in the hands of the Mafia.

The main inspiration for creating Refugeoly is the famous game Monopoly (Refugee+Monopoly= Refugeoly) because of its simplicity and the use of money to buy and speculate on property. In the case of Refugeoly, this money serves to pay the Mafia that will cross the Mediterranean Sea to pay for asylum papers or simply to buy a tent.

The game is available to download at:

[www.refugeoly.com](www.refugeoly.com)

**The Vertical Farm** is a research project funded by the design school of XJTLU Teaching Innovation Fund (TIF) and developed by Vicente Esteban, associate professor at IND and Program Director of our Master's of Design. This project is aimed to create awareness about the problem of food delivery bags and plastic containers. These are difficult, costly and sometimes impossible to recycle.

However, these can be reused for other purposes. This Vertical Farm is built with recycled materials. The main structure is made out of reused bamboo from architecture projects, the water bottles come from a nearby by neighbourhood. The current plants are a type of lettuce. They grow under an LED lighting system that simulates sunlight and has very low consumption.

The watering system is aimed to be fully automated. This vertical farm is the perfect project to talk about food and waste and how to encourage and inspire our students to grow their own vegetables and reuse them as much as possible. Finally, we need to be aware of our responsibility as designers.
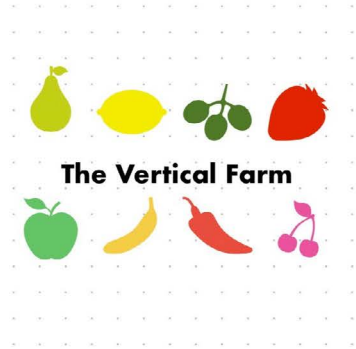
**The Vertical Farm**

TheVerticalFarm

Scan QR code to view my channel

Cumulus Association

Xi'an Jiaotong-Liverpool University 西交利物浦大学

NL Netherlands

XJTLU | DESIGN SCHOOL

Authors : Artist KIMVI nguyen , Senior Associate Professor Jacob de Baan, Research Assistant Boyi Zhou

Affiliation : Xi' an jiaotong-liverpool University , Fontys Academy of the Arts

**Track1 "Old Norms: Tradition at the Intersection of New Technology"**

Live performance action as part of the XJTLU Cumulus Conference: "Design for InterCultural Innovation."

Performance artist KIMVI, from the XJTLU ARC Department, collaborates with Senior Associate Professor Jacob de Baan and Research Assistant Boyi Zhou from the XJTLU IND Department for KIMVI'S ongoing artistic research project "Performing Public Space", at Fontys Academy of the Arts.

De Baan and Zhou's research project, " The Oldest Ceramic Vessel Reconstructed", in collaboration with Hunan Museum and University of Leyden in the Netherlands centers around fragments of the Yuchanyan Vessel. This vessel was discovered as a cluster of shards evacuated from Yuchanyan Cave, a rock shelter located south of the Yangtze River basin in Daoxian County, Hunan province, China, during the 1990's. Radiocarbon dating confirms that it was placed in the cave between 18,300 and 15, 430 years ago. The Yuchanyan Vessel, displayed at the Hunan Museum, is the world's earliest reconstructed example of pottery. Scholars recovered enough shards to reconstruct this large, wide-mouthed vessel featuring a pointed bottom, a style that later Chinese sources call a " Fu Cauldron". This discovery prompts inquires into the skills, time investment, and physical properties involved in its creation, as wells its functional role in daily life based on the characteristics of its form.

Inspired by the ambiguous origins of the Yuchanyan Vessel, KIMVI's performance will engage with the speculated intended function of the vessel, both past and present. The performance will revolve around De Baan and Zhou's 3D-printed replica of the completed Yuchanyan Vessel, created from transparent PETG filament. Through this performance, the aim is to explore reimagined uses of the original vessel, examining its materiality and the contrast between organic materials and the innovative technologies and hitman-made materials of the 21st century. This performative research approach seeks to deepen the connection to the past while pursuing artistic inquiry through the study of materiality and cultural artifacts.



IMAGE CREDIT : Boyi Zhou 2024

# Exhibition

241    Tradition and innovation
in Dutch design

# Tradition and innovation in Dutch design

Exhibition prepared for XJTLU in collaboration with the Stedelijk museum Amsterdam curated by Ingeborg de Roode.

## Team:

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Visual Designer

Accompanying the Cumulus Regional Seminar China 2024 'Design for Intercultural Innovation' and Dutch Workshop Days at XJTLU, 28–29 November, industrial design curator Ingeborg de Roode made this 'virtual exhibition'. She selected 'Dutch Design' objects from the permanent Stedelijk Museum Amsterdam collection on the topic of 'Tradition and Innovation in Dutch Design'. All designers were living and working in the Netherlands when designing the objects and therefore were, and often still are, part of the Dutch design world. Tradition and innovation always have been strong in Dutch Design, not seldom combined in one object. The virtual exhibition was projected on over 100 screens in ES ground floor and all XJTLU SIP and Taicang campuses.

## Images from the virtual exhibition by Stedelijk Museum Amsterdam / overview of Dutch Designers:

- Marjan van Aubel, Sunne lamp

- Jacob de Baan, Spettro 02 from Non Electrical Collection

- Maarten Baas, Clay Furniture (chairs)

- Aldo Bakker, Urushi Stool (prototype)

- BELéN (Lenneke Langenhuijsen en Brecht Duijf), Shadecloth

- Hil Driessen, Illusion series, interiorfabrics

- Piet Hein Eek, Scrapwood Cupboard

- Mae Engelgeer, interior fabric Diaphanous no. 9190

- Ineke Hans, products for children from the Black Beauties series

- Olivier van Herpt, Curves vase

- Dirk van der Kooij, furniture pieces from the Endless series

- Don Yaw Kwaning, Medulla side table and other pieces from the series

- Janne Kyttanen, data and 3D printed wardrobe and bag Lost Luggage, preferably also the animation

- Npk design, photometric measuring instrument for blood, Vitalab, contact lense boxes for mailing lenses in a regular envelop

- Bertjan Pot, Random Chair

- Bertjan Pot in cooperation with Marcel Wanders, Heracleum lamp

- Richard Hutten, carpet from the Playing with tradition series

- Hella Jongerius, Long Neck and Groove Bottles

- Claudy Jongstra, Wall hanging Tangible Transformations II

- Studio Klarenbeek & Dros, Diatom Glass

- Satyendra Pakhalé, Kalpa vase/bowl

- Tejo Remy, Milk Bottle Lamp

- Daan Roosegaarde, Smog Free Ring

- Michiel Schuurman, clothing fabric Billes (dessin A 2008)

- Christoph Seyferth, sunglasses Tattoo and Diabolo

- Wieki Somers, Chinese Stools — Made in China, Copied by the Dutch

- Marcel Wanders, SLS-vase, Knotted Cha

STEDELIJK MUSEUM AMSTERDAM


STEDELIJK MUSEUM AMSTERDAM

# TRADITION AND INNOVATION IN 'DUTCH DESIGN'

THIS VIRTUAL EXHIBITION IS A COLLABORATION BETWEEN THE DESIGN
SCHOOL AT XJTLU AND THE STEDELIJK MUSEUM AMSTERDAM, THE
NETHERLANDS.

IT IS PART OF THE CUMULUS REGIONAL SEMINAR
'DESIGN FOR INTERCULTURAL INNOVATION',
AN ACADEMIC SEMINAR BEING HELD IN
THE SCHOOL OF DESIGN AT XI'AN JIAOTONG-LIVERPOOL UNIVERSITY
28-29 NOVEMBER 2024

STEDELIJK MUSEUM AMSTERDAM



STEDELIJK
MUSEUM
AMSTERDAM

**Marcel Wanders, *Knotted Chair* (prototype
no. 5), 1995-1996, Droog collection**

Aramide, carbon, epoxy, sandblasted

STEDELIJK MUSEUM AMSTERDAM

STEDELIJK MUSEUM AMSTERDAM

**Hella Jongerius, *Long Neck and Groove Bottles*, 2000**
**Prod. Jongeriuslab**

Glass, glazed porcelain, synthetic tape to hold the two pieces together

**Aldo Bakker, *Urushi Stool* (prototype), 2006**
**Prod. Sergej Kirilov and Gerard Boerhof for Aldo Bakker**

Wood, urushi lacquer, polished

Acquired with the generous support of the Mondriaan Fund

**Olivier van Herpt, *Curves* vase, 2016**
**Prod. Olivier van Herpt**

3D printed ceramics

**Bertjan Pot (design) in cooperation with**
**Marcel Wanders (technique), *Heracleum II***
**lamp, 2010**
**Prod. Moooi**
Copper, Electrosandwich technique,
polycarbonate

Gift of Moooi BV
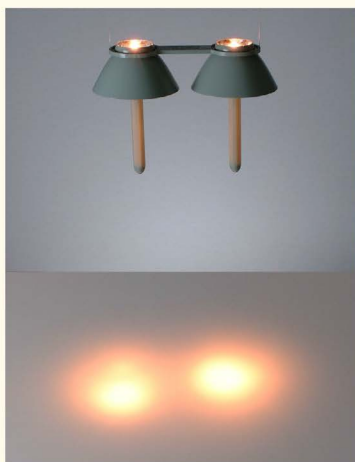
**Jacob de Baan, hanging lamp *Spettro 02* from the *Non Electrical Collection*, 2002 Prod. Studio Jacob de Baan**

Aluminium pendant light with candles

Photo credits: Frans Feijen

STEDELIJK MUSEUM AMSTERDAM



**Claudy Jongstra, Wall hanging *Tangible Transformations II*, 2023**

**Wool felt, with biological dies (partly self produced)**

Collection Stedelijk Museum Amsterdam, in loving memory of Julius Vermeulen/EENWERK (1953-2004). Acquired with generous support of Rob Defares, Bob and Renée Drake, Max Vorst and Stichting Droom & Daad.
Photo: Galerie EENWERK

STEDELIJK MUSEUM AMSTERDAM

**Design for Intercultural Innovation.
Cumulus Regional Seminar China—
Dutch Workshop Days**

# Cumulus Regional
# Meeting Proceedings
# 2025