

Simple but Beautiful: A Case Study on the ZHI Project of Traditional Craftsmanship

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Abstract

This essay offers a case study of the ZHI project, a digital craftsmanship project showcasing the beauty of traditional craftsmanship at three levels: knowing, making, and intelligence. The project began with a Designer Residency Program and was developed to answer three crucial questions: (1) How could we bridge the gap between enthusiastic outsiders and little-known creators of intangible cultural heritage? (2) How could we help students understand and participate in craftwork? and (3) How could we facilitate sustainable knowledge production about intangible cultural heritage among the audiences, students, and craftsmen so everyone benefits and contributes? The ZHI project uses minimal computing strategies to encourage craftspeople to pass their skills and knowledge onto others, particularly younger generations, through digitization and online exhibitions that use minimal computing practices. The project provides user-friendly, accessible information to researchers and craftspeople who do not possess expensive digital equipment or high-level technical skills. This offers them opportunities to virtually present their craft and research, share knowledge, and tell their own stories to audiences unfamiliar with craftsmanship.

Introduction

In 2003, UNESCO established their Lists of Intangible Cultural Heritage (ICH), “to ensure better visibility of the intangible cultural heritage and awareness of its significance, and to encourage dialogue which respects cultural diversity” [UNESCO 2011]. Subsequently, the Chinese government launched a national campaign to promote the recognition, discovery, and conservation of ICH. As a result, 42 types of ICH in China have been added to the UNESCO list and China is the country with the highest number of ICH elements on the list as of December 2020.^[1] The national and local governments in China consider the conservation and promotion of ICH to be crucial to enhancing national identity, amplifying cultural heritage, raising consciousness about the need to protect cultural heritage, and promoting Chinese culture both domestically and internationally.

High-performance technology was promoted as an important method for the conservation and distribution of ICH. Many IT companies are used to working with museums to digitize ICH. While it is important to promote ICH to broad audiences, high-performance technology requires technical skills and equipment that bear high costs. Moreover, it is crucial to work directly with craftspeople to better understand the goals and outcomes of conservation. Our work on ZHI: A Digital Project of Traditional Craftsmanship, developed by graduate students at Nanjing University's School of Arts, offers an alternative that incorporates minimal computing technologies and direct collaboration with creators of ICH.

The project began with our Designer Residency Program, developed in 2017 to bring together designers, craftspeople, non-governmental organization (NGO) workers, and administrators from cultural institutions. As we visited local studios and interviewed designers and craftspeople, we sought to understand the obstacles to digitally preserving and transmitting

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knowledge about craftsmanship in Nanjing. What became clear is that it was impractical to launch a multi-year training program to share Nanjing's ICH with amateurs or hobbyists. Seeking alternatives, we interviewed designers, craftspeople, students, and potential audiences interested in learning more about craftsmanship. We further explored digital technologies that would be user-friendly and economical for preserving ICH.

This research led to even more questions: How could we bridge the gap between enthusiastic consumers and the little-known creators of ICH? How could we create opportunities for students to learn about and contribute to craftwork? How could we facilitate a sustainable process of knowledge production about ICH among the audiences, students, and craftsmen so everyone benefited and had opportunities to contribute?

To answer these questions, we developed ZHI, a digital craftsmanship project.^[2] As indicated in the name, this project establishes a model of knowing and making to strengthen knowledge production on craftsmanship in the digital era. ZHI is dedicated to showcasing the beauty of traditional craftsmanship at three levels — knowing, making, and intelligence — and providing sources of imagination and cultural roots for contemporary hobbyists. As a shareable network supported by the community, it aims to provide a user-friendly, knowledge-based, and accessible website for craftspeople who do not possess expensive digital equipment and experienced skills to virtually present their craft or research, share their knowledge, and tell their stories to audiences who may only know a little about the craftsmanship.

Making-as-knowing and Technological Needs for ICH

According to UNESCO's 2003 Convention, ICH connotes the “practices, representations, expressions, knowledge, and know-how, transmitted from generation to generation within communities, created and transformed continuously by them, depending on the environment and their interaction with nature and history” [UNESCO 2011, 4]. Its importance lies in the way it “adapts permanently to the present and constitutes cultural capital that can be a powerful driver for development. Food security, health, education, sustainable use of natural resources — intangible cultural heritage is a wealth of knowledge to be used in many aspects of life” [UNESCO 2011, 4]. Rather than emphasizing historical value, unique places, or material objects, ICH focuses on the “living” status of heritage in the communities — ensuring it can be known, learned, and transmitted from generation-to-generation and thus remain alive — as well as the human spirit that lies in communities and provides a sense of identity that promotes broader cultural and social effects. Starting from the understanding of ICH as “living heritage,” we adopted three key concepts to develop a sustainable model to help practitioners share the knowledge and skills of ICH. From the process of making and producing digital twins of ICH, supported technically by the strategies of “minimal computing” — that is, using accessible technologies — we designed a flexible website to showcase the knowledges, communities, and aesthetic values of ICH.

In the case of the ZHI project, digitization of craftsmanship is not simply duplicating products, but a process of making “digital twins,” a term used by Michael Grieves to describe “a virtual representation of what has been produced” in his project for his Product Lifestyle Management Development Consortium. Grieves suggests one could, “Compare a Digital Twin to its engineering design to better understand what was produced versus what was designed, tightening the loop between design and execution” [Grieves 2015]. By adopting and applying the term “digital twins” to cultural heritage, Pierre-André Jouan and Pierre Hallot indicate that implementing digital twins for the management and preservation of cultural heritage assets would assist with data collection and management for cultural heritage, which will in turn provide initial and long-term support for the conservation of cultural heritage. This all relies on the value attributed to the form of cultural heritage, while evaluation of that value itself depends on data preservation [Jouan and Hallot 2019]. In this sense, the ZHI project considers digitization, data collection, and analysis as a process of making digital twins of craftsmanship. This process requires knowledge about material, the skill of making, the emotion and time required, and the use of proper equipment. The outcomes — physical product and digital content — are interdependent and complement each other. Under the principle of making-as-knowing, digitization, data collection, and analysis provide an epistemological approach to the knowledge of craftsmanship and its virtual representations.

Emphasizing the principle of living heritage, we take the sustainable production of knowledge as the core of the ZHI project to encourage craftspeople to pass their skills and knowledge onto others, particularly younger generations, through digitization and online exhibition. During this process, we discovered that while craftspeople know how to make things by drawing on their skills, it is difficult for them to convert the knowledge that they learned from their practical experiences into what Ulrich Lehmann calls a systematic “knowledge shape.” Lehman notes this difficulty:

If making is knowing, it doesn't follow that all makers "know" their crafts. They might know how to produce an effective, economical, or detailed result. But this does not mean that they can change completely, reverse, or deconstruct their techne in such a way as to challenge established thinking about this craft. [Lehmann 2012, 151]

Lehmann reminds us that Plato and Aristotle's metaphorical expression of the distinction between "knowledge" and "techne" universalized and empowered making processes, such as weaving and clothes-making. These are epistemological processes of knowledge production that go "beyond material creation, and thus constitute[s] conceptual knowledge" [Lehmann 2012, 151]. Following Lehmann, epistemology is not just about the conditions of knowledge origins, its structures, and limits, but more importantly the creation, distribution, and consumption processes. Lehmann's study of pleated fabrics in the context of fashion illustrates his argument, but his analysis is largely analog, not digital. Yet, he raises crucial questions that are pertinent to our digital work:

If making is knowing, can its conditional base be separated and evaluated independently?.... Are craft techniques, the communal structures of craftspeople, the sociability of crafting, and the consumption of crafted forms to be seen as conditional for the generation of knowing? [Lehmann 2012, 151–160]

Extending these questions to the digital realm, is digital technology conditional for the making-knowing process of craftsmanship now? Does the digital making process also produce knowing/knowledge for the new generation?

Yes, we think so. Our work is inspired by projects like the Making and Knowing Project, a "research and pedagogical initiative in the Center for Science and Society at Columbia University that explores the intersections between artistic making and scientific knowing," where craftspeople represent their skills and knowledge through their own voices and stories [The Making and Knowing Project 2021]. While our project emphasizes the role of digital technology in the conservation of cultural heritage, the Making and Knowing Project provides a research-driven model of pedagogy by creating an open-access digital critical edition of an anonymous French manuscript through text- and object-based research and hands-on reconstruction. Students not only reconstruct 16th- and 17th-century culinary recipes but also collect data and record the acquisition process through field notes; this illuminates the making-as-knowing process as students undertake working processes similar to those of artists or craftspeople. What they have explored and examined, as presented on the project's website, fills the missing spots in the historical documents: students have decoded and brought tacit components of knowledge back to the surface from the deeply encoded texts in the 16th and 17th centuries through their digital representations and the work of remediation. The students' digital engagements transform tacit knowledge of the early modern period into comprehensible common knowledge, bringing insights from the early modern period to contemporary audiences.

Inspired by the "making as knowing" principle and the Making and Knowing Project, the ZHI project invited the craftspeople to work with the undergraduate and graduate students. During the collaboration process, craftspeople learned to use language that young people understand to explain the tacit knowledge behind the texts and objects. Students also needed to learn how to use texts, images, and videos — the digital content that represents not only the material craft product but also the knowledge and emotions of craftspeople — to demonstrate the value of crafts to users in virtual environments. This is a making process of both material media and translations of knowledge across different languages systems.

Strategies of minimal computing undergird this work on the ZHI project because it fits our needs and provides a framework for theorizing our practices. In "The User, the Learner and the Machines We Make," Alex Gil asks the question, "What do we need?" to open a discussion of necessity-based technical practices, articulating a concern about "how to produce, disseminate, and preserve digital scholarship ourselves, without the help we can't get, even as we fight to build the infrastructures we need at the intersection of and beyond our libraries and schools" [Gil 2015]. We fully agree with Gil's argument that the orientations of digital knowledge production should be towards the "ease of use, ease of creation" [Gil 2015]. Because ZHI is a student-based research project with little grant funding, ensuring the sustainability and affordability of both labor and technology was the first, perhaps most important, concern for the project.

In contrast, the digital heritage community in China trends towards fetishizing technology. The more "advanced" and expensive digital technologies or devices are, the more popular they are. Recently, virtual reality and augmented reality (VR/AR) have become popular in the national digital heritage community. However, not all types of cultural heritage or ICH are suitable for VR/AR, even though VR/AR have been strongly recommended and supported by the Ministry of Culture and Tourism. Are they necessary for the ZHI project? No. The required terminal display equipment and the cost of modeling 3D

content, as well as easily outdated operating environments, are unaffordable luxuries for individual craftspeople and students. Even with the possibility of grant funding, the question remains about who could continue maintaining content and customized technologies for VR/AR when the funding runs out. Rather than following the VR/AR trend, we considered the purpose of using technologies, focusing on the question of “what we need.” We further considered which technologies would allow ZHI project participants to engage in the hands-on making-as-knowing process with digital technologies, rather than outsourcing the making process and turning our technologies into a figurative “black box” for craftspeople and students. With the strategic framework of minimal computing, the ZHI project maximizes the use of only the most necessary technologies and the most effective ways to expose the most important, but often neglected, aspects of ICH: the beauty of handcrafts and the wisdom of craftspeople.

Simple but Beautiful as a Core Approach

Inspired by the concepts listed above, the ZHI team examined three types of traditional craftsmanship in Nanjing: Yunjin brocade, gold foil forging, and velvet flower making. In addition to originating in Nanjing, all three are closely related to the silk industry. Due to existing market needs, especially for gold foil, craftspeople are still living within self-identified communities. To preserve ICH, craftspeople need to collaborate with researchers to digitally conserve and promote the crafts. The ZHI project helps facilitate such collaborations.

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Our team consists of graduate and undergraduate students from different disciplines and our approach combines the study of documents and images with fieldwork and collaboration with craftspeople. The first stage of the project focused on identifying challenges to the preservation of intangible cultural heritage through fieldwork. Through our international Designers-in-Residency program, we worked closely with designers, craftspeople, NGO workers, and administrators of cultural institutions. We visited local studios and interviewed designers and craftspeople, discussing the obstacles of digital preservation for Nanjing’s ICH.

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Through our visits and interviews, we identified two challenges. First, craftspeople do not have a systematic digital record of their products, skills, tools, and stories, since they are not part of the museum system. As a result, the value of their work has not been recognized by cultural heritage authorities. Some organizations, such as television stations, interview craftspeople but not all of these organizations give copies of images, audio, videos, and texts back to the craftspeople. Additionally, craftspeople do not have their own physical or virtual archives to preserve their work, documents, and ephemera.

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Second, it is almost impossible to help designers from different cultural contexts understand an artifact with a 2000-year-old history of complicated techniques, complex meanings behind colors and patterns, or that these groups of people spend their whole lives weaving a textile or making a fan. They can respect it but not understand it. This happens with students too, even when they share the same cultural contexts as these craftspeople. Students love these beautiful artifacts and enthusiastically want to know more about them, but they do not know how to acquire that knowledge. Not all students are from the local area, so some are unfamiliar with the culture. But, more importantly, as a younger generation, they do not have first-hand knowledge and experience of traditional craftsmanship — just surface knowledge from books, museums, tourist stores, and TV shows, which are carefully illustrated, elucidated, encoded, and programmed by authoritative researchers, professionals, and product designers. Students seldom have a chance to have hands-on experiences with the making process that is needed to acquire the deep, tacit knowledge of craftsmanship and craftspeople themselves.

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Based on the insights from the first stage of our project, in the second stage we chose to establish a digital website to virtually represent craftsmanship to general audiences and create an archive for craftspeople to digitally preserve their works, processes, and stories. We also adopted a research-driven pedagogical model; the process of developing the website engaged students in making-as-knowing, as they worked with the craftspeople to select, digitize, design, and interpret content, with the help of collaborators, such as researchers, photographers, and programmers.

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The ZHI project carefully chose four ways to collect data: (1) taking photos, (2) making short video clips, (3) searching for free copyright images, and (4) conducting oral history interviews (see Figure 1). Most of the filming is done on students’ phones, and they can edit them on their laptops with video editing software. We ask them to strictly follow our protocols of data collection, which have been designed and customized by us, so the filming and editing work is also part of the scientific investigation process and includes consent of the craftspeople (see Figures 2 and 3). For example, students have to clearly understand the name and purpose of every step in the development of a craft, as well as additional considerations, such as why we should take a photo of silk yarn from a particular perspective — because the reflection of silk yarn in a different light

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will affect color representation. Students also have to understand why particular patterns have to be arranged next to another one — because royal rules in ancient China dictated the whole pattern for clothes. All of this detailed information about ICH has to be included alongside the photos, videos, and interactive games they create.



Figure 1. Screenshot of the interview page, “记忆之场：云锦.” ZHI 艺：非物质文化遗产虚拟展示平台, <https://artlab.nju.edu.cn/heritage/brocade/yjheritage/>.



Figure 2. Screenshot of “The tricks of the Yunjin Brocade” page, “手口相授：云锦.” ZHI 艺：非物质文化遗产虚拟展示平台, <https://artlab.nju.edu.cn/heritage/brocade/yjkoujue/>.



Figure 3. Screenshot of the homepage's silkflower video banner, featuring the theme “Teach by oral instructions and hands-on examples,” ZHI 艺：非物质文化遗产虚拟展示平台, <https://artlab.nju.edu.cn/heritage/>.

Since the content is lightweight, we designed an HTML5/PHP-based, highly flexible website for images, videos, texts, and interactive games with a freelance developer.^[3] All of the modules are image-based and can be edited as needed (see Figures 4 and 5). For example, we designed an interactive coloring game of Yunjin brocade to illustrate the rules and principles of

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color selection and matching in brocade making. All elements of the game are image-based and can be replaced and changed accordingly so the game can be extended to different patterns with different color palettes. For now, we use a line drawing named 翠蓝地加金缠枝莲花牡丹妆花 from the book *Yunjin Patterns* (1959), drawn by Chen Zhifo, a very famous artist and educator of the last century, and a color palette digitized by us from the physical color card of a craftsman, Wang Jisheng, who has been working on silk dyes for decades. Users can easily interact with the pattern to make their own design and then download the image as a calendar page to their computer (see Figures 6, 7, and 8).

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Figure 4. Screenshot of the content management system for Coloring Yunjin Brocade: The Color Schemes of Yunjin; ZHI 艺：非物质文化遗产虚拟展示平台, artlab.nju.edu.cn/heritage/manage.

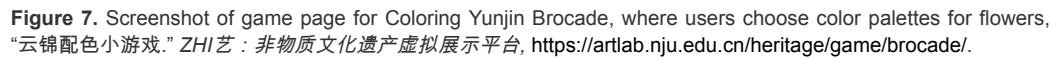
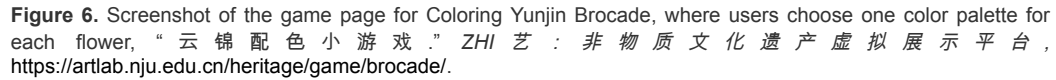
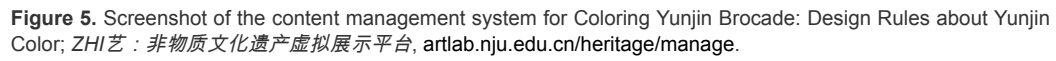




Figure 8. Screenshot of Coloring Yunjin Brocade, where users can download their work as a calendar page, “小游戏.” ZHI 艺：非物质文化遗产虚拟展示平台, <https://artlab.nju.edu.cn/heritage/game/brocade/>.

Simple does not mean inelegant. On the contrary, we want to make the website simple but beautiful. By studying the materials, tools, making process, and products, and talking with craftspeople, we developed our “3S principle” as we found that the *scales*, *scene*, and *scenario* are very important for virtual representation. This principle begins with the idea that beauty is based on understanding, not intuition alone. For example, to present a pattern, an image should present a minimal unit of pattern with an explanation of the meaning of each element, rather than showing a photo with just a title. In this sense, *scale* is crucial for understanding (see Figure 9). Second, beauty emerges in context. Craftsmanship is rooted in history, so we have to go back to the *scene* of history to understand it. While craftsmanship may have seemed to have disappeared from daily life, we can trace it in some *scenes* of contemporary culture, such as paintings or TV soap dramas (see Figure 10). Finally, beauty is constructed by narratives. Beauty is complex but we can select specific *scenarios* and the most tangible and touching moments for storytelling (see Figure 11).

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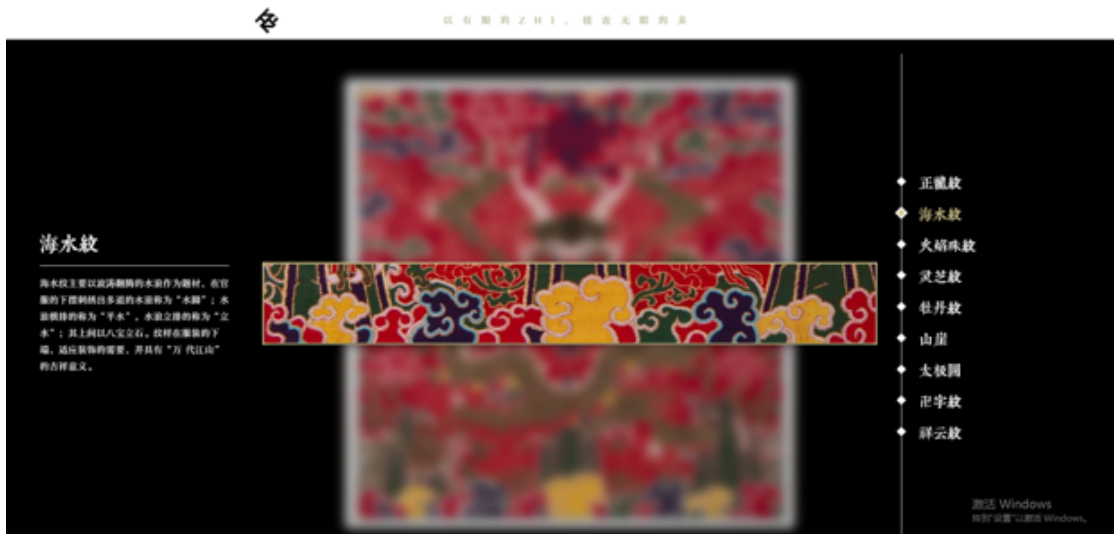


Figure 9. Screenshot of a minimal unit of a wave pattern with the meaning explained in Yunjin Brocade; “帝王之气：云锦.” ZHI 艺：非物质文化遗产虚拟展示平台, <https://artlab.nju.edu.cn/heritage/brocade/animalism/>.



Figure 10. Screenshot showing use of the silk flower as a headdress in history and contemporary usage, “日常之光：绒花.” ZHI 艺：非物质文化遗产虚拟展示平台, <https://artlab.nju.edu.cn/heritage/velvet-flowers/rhusage/>.



Figure 11. Screenshot of the gold foil video banner featuring the theme, “As then as a cicada’s wings,” “薄如蟬翼：金箔”. ZHI 艺：非物质文化遗产虚拟展示平台, <https://artlab.nju.edu.cn/heritage/gold-foil/craftsmanship/>.

Insights from the ZHI Project

Since the launch of the ZHI website, we have received compliments and feedback from craftspeople and researchers alike. Reflecting on our process, we can summarize the lessons we learned. First, developing a sharable knowledge network is essential. We are fortunate to have many collaborators working with us on the ZHI project, including craftspeople, dyeing experts, scholars, designers, and museum curators. They examine our workflow, protocol, and principles, and give students seminars and workshops on dyeing and color analysis. The students work very closely with craftspeople to record and annotate all the photos of procedure and craft works. During this process, tacit knowledge is circulated among this collaborative community and students’ experiences merge into knowledge production and become a new branch of the digital twin of craftsmanship. Consequently, three students from the team decided to work in cultural heritage fields after they graduated — another outcome of this project.

Next, based on the principle of mutually beneficial sharing, all photos, video, and oral history texts taken by us from the local studios and craftspeople are given back to them as documents. Meanwhile, all materials are authorized by craftspeople and local museums and presented on our website as *their* own archives, so it is not necessary for them to establish another one. Our team routinely visits their studios to help them digitize and record their newly made craft works.

Further, establishing data collection specifications from the beginning and following them throughout the research and technical processes is crucial to sustainability and scalability. Minimal computing shaped our decision to set a variety of rules

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before the “actual work” began and to undertake both data collection and our technical work carefully. For example, the students record all of the scientific data as they learn about dyeing and, in turn, all images of craftsmanship on the website are also color-managed so that accurate and effective color analysis can be performed.

Our hope is that the ZHI project offers a model for others working to present ICH digitally in an economic and aesthetic way. While ZHI tries to decode the knowledge of craftsmanship and present the beauty of craftsmanship with minimal computing, several concerns arose with the launch of the website, chiefly sustainability and permanence. The construction of the website was largely supported by Nanjing University, Nanjing Art Foundation, and established partnerships with craftspeople, but the operation and maintenance of the website requires continued investment in human and financial resources. At the same time, we have started to promote the ZHI model to the community of elders as well as to middle school students. Through these new developments, we aim to develop a new operational model to promote ICH in the broader community.

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Acknowledgments

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Notes

[1] See 中国入选联合国教科文组织非物质文化遗产名录（名册）项目 - 中国非物质文化遗产网·中国非物质文化遗产数字博物馆, 2020年10月10日, available at <http://www.ihchina.cn/chinadirectory.html>.

[2] In Chinese, one pronunciation with different tones can correspond to different words, and sometimes one tone can represent many words. “Zhī” means knowing (知), intelligence (智), and making (制).

[3] ZHI艺：非物质文化遗产虚拟展示平台, October 10, 2020, <https://artlab.nju.edu.cn/heritage/>.

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