

P / REFERENCES OF DESIGN

LISTENING TO THE SHIPYARDS: DESIGN FOR SOCIAL INNOVATION IN POST- INDUSTRIAL REDEVELOPMENT AMIDST CONTESTED HISTORIES.

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ABSTRACT | “Listening to the Shipyards” is an engaging self-guided walking tour that combines ten sound design capsules and two augmented reality (AR) visual experiences to explore Nantes’ industrial heritage, the end-result of a 3-year research project into design for social innovation (DSI). The tour centers on a former shipyard undergoing rapid transformation and disappearing from the city’s landscape and provides a unique perspective on Nantes’ post-industrial landscape, offering insights to both locals and visitors alike. Following extensive field studies, students uncovered varying and contested redevelopment objectives among civic stakeholders and historians. As the area in question transitioned into a more traditional urban setting, conflicting goals emerged between: cultural actors that were the first to invest the abandoned industrial buildings for large, rowdy and public events; the syndicated union representatives deeply affected by the closure of the industrial base and resentful of its recreational re-use; and the city authorities aspiring to repurpose the area for residential, educational, and creative industry mixed-use. In an effort to mitigate dissensus around a shared vision, a proposal for an immersive sonic walking tour was presented to and endorsed by Nantes’ tourism agency, the Voyage à Nantes. This paper delves into how social innovation and digital design played a crucial role in identifying common objectives and fostering dialogue and collaboration among stakeholders with strongly divergent interests. As part of the Innov’Art 2 research project by the Institut Français d’Argentine, “Listening to the Shipyards” (À l’écoute des chantiers) contributed to the Voyage à Nantes 2022, providing a meaningful exploration of the city’s evolving identity.

1. Introduction

1.1 Design for Social Innovation

Design for Social Innovation (DSI) has emerged as a dynamic field that seeks to deploy the creative potential of design to address complex social challenges and drive positive change within communities. Rooted in principles of collaboration, inclusivity, and sustainability, DSI emphasizes the importance of engaging stakeholders in the design process to co-create innovative solutions that are contextually relevant and impactful (Manzini 2014, Manzini & Coad 2015).

At the core of DSI lies the concept of Participatory Design (PD), a collaborative approach that places stakeholders and community members at the center of the design process. By actively involving stakeholders in decision-making and problem-solving, participatory design tries to ensure that design interventions are responsive to the needs, aspirations, and lived experiences of those they seek to serve. (Bason 2010, Andersen & Mosleh 2021) This not only enhances the relevance and effectiveness of design outcomes but also fosters a sense of ownership and empowerment among participants. PD also recognizes that stakeholders working towards “changing situations into preferred ones” are designing (Simon 1996) and have legitimacy in the design process.

Murray et al. (2010: 4-5) highlighted four critical characteristics of the new social economy facilitated by Digital Social Innovation (DSI), which are evident in this three-year project: the extensive utilization of distributed networks for maintaining and managing relationships, supported by broadband, mobile, and other communication technologies; the diminishing distinction between the roles of producers and consumers; a focus on collaboration, along with ongoing interactions, care, and maintenance, as opposed to singular acts of consumption; and a significant emphasis on underlying values and missions.

According to Manzini (2014), this project is an example of top-down, incremental innovation, since it is driven by designers and experts to achieve systemic, institutional innovation for socially sustainable development. In this case-study, we apply participatory design principles (Chick 2012) demonstrating these approaches in the pursuit of design for social innovation, showing how PD helps mitigate and structure dissensus among partners in an industrial heritage project.

“The codesign process takes place de facto, thanks to the interactions that are not only uncoordinated but can even be conflictual.” (Manzini, 2015: 50)

1.2 Innov’ART2

The Innov’Art2 cooperation program of the Ministry of Foreign Affairs, led by the French Institute of Argentina, was launched in July 2019 to develop academic, scientific, and artistic exchanges between French and Argentine universities. Our Innov’Art 2 project was part of a bilateral cooperation project between our design school’s two graduate programs and two Argentine universities (and their departments of Social Communication in San Juan and Architecture in Tucuman) thematically centered around design’s response to urban trauma. Each partner addressed a local issue with a shared methodology, and the French context addressed the shipyard closure in 1986, the termination of its 60,000 strong workforces, and the significant urban decline brought about by the loss of the industrial city’s primary employer. This project situates itself within the broader context of international cooperation, and it underscores the global significance of addressing industrial heritage challenges and fostering interdisciplinary collaborations in urban design and heritage conservation.

1.3 Ile de Nantes and Its Post-Industrial Context

We explored the intricate interplay between industrial heritage preservation, urban redevelopment, and cultural revitalization in the new Quartier de la Création on the Island of Nantes. Against the backdrop of the island's industrial past, characterized by the presence of notable establishments like the Alstom engine factory and Dubigeon shipyards, our research delves into the multifaceted efforts aimed at preserving industrial-historical traces while fostering contemporary urban vibrancy, and the conflicts that can arise from its urban redevelopment. (Charles & als. 2016, Rapetti 2019, Renard 2018)

Central to our inquiry is an examination of the strategic decisions made by Nantes' public actors since the 1980s, which have shaped the island's landscape and identity. Emphasizing the significance of industrial heritage preservation and valorization within urban development master plans, we analyze the transformation of the Ile de Nantes into a dynamic extension of the historic city center, characterized by its dense urban fabric and burgeoning cultural scene.



Figure 1. Boat launch in the heyday of the Nantes Dubigeons shipyard. Image courtesy of the MHT.

This paper also scrutinizes the roles played by various stakeholders, ranging from governmental bodies like SAMOA and Nantes Métropole, to cultural institutions such as Stereolux, Maison des Hommes et des Techniques, and Le Voyage à Nantes, to historic preservation researchers and associations. Through case studies and empirical data, we explore how these stakeholders collaborate - and sometimes resist each other when goals diverge - to engage with the community, enhance industrial heritage appreciation, and promote tourism development.

Furthermore, this case-study sheds light on the participatory nature of heritage conservation efforts, exemplified by workshops involving representatives from academic, cultural, and governmental spheres. By examining the outcomes of such collaborative endeavors, we elucidate the challenges and opportunities inherent in the preservation, valorization, and appropriation of post-industrial urban areas, showing *how DSI can help mitigate and structure dissensus among partners in an industrial heritage project*.

2. Methodology: Multi-Phase Fieldwork and Iterative Development Phases

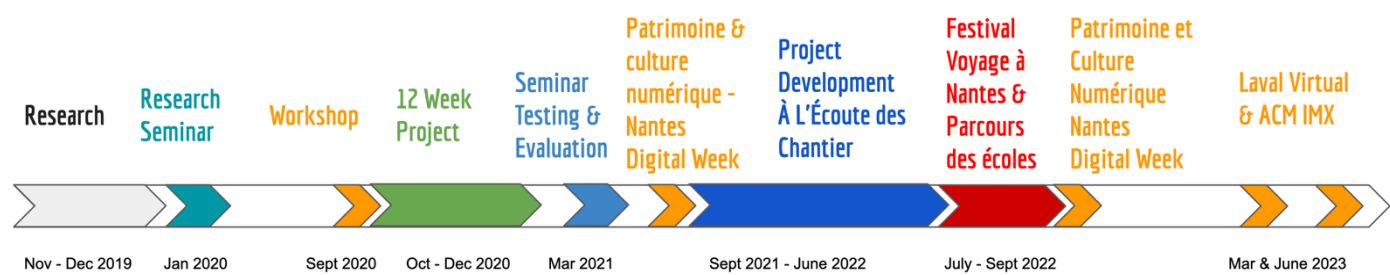


Figure 2. Project timeline from 2019 to 2023: field research seminars and participatory design workshops led to a studio course for initial design propositions, followed by nine months of production. Note: gaps are due to Covid19 lock-downs. “A l’écoute des chantiers” was launched in July 2022, and is still deployed.

2.1 Phase 1: Initial Fieldwork in Fall 2019

The initial phase of our fieldwork centered on identifying and conducting interviews with key stakeholders involved in the redevelopment of Nantes’ industrial heritage. The lead researchers engaged in comprehensive interviews and site visits to delve into the area’s history, map out the stakeholder networks, and clarify their goals, challenges, and any points of contention with other involved parties. These detailed interviews were crucial in pinpointing the major entities driving the redevelopment efforts on the island, culminating in the compilation of a network of essential stakeholders presented in Table 1. Drawing on Mitchell et al. (1997), we concentrated on stakeholder classes with significant influence and/or legitimate interest in the industrial heritage and urban redevelopment of Nantes, specifically focusing on Dominant, Dependent, and Definitive stakeholders. (Krupa et al. 2022) This group comprises individuals from agencies responsible for the area’s redevelopment, maintenance, preservation, and enhancement (including DPARC, Samoa, and VAN), as well as civic actors engaged in historic preservation (such as MHT and Nantes University).

Table 1. Expert interviews by Innov’Art 2 research team leaders.

May 2019	SAMOA - Hangar 32 - Interview of International project manager + Commented tour of Ile de Nantes, Creation District	SAMOA, a publicly funded organization, oversees the redevelopment of the Ile de Nantes. Initially working with Dominique Perrault (architect of the Bibliothèque Nationale de France) in 1995 and later replaced by Alexandre Chemetoff who submitted the master plan after a participatory design phase.
	Director, Maison des Hommes et Techniques (MHT) - Parc des Chantiers - Commented tour of the naval industry museum	The MHT was established by a collective of former shipyard builders and workers, with its headquarters situated on the ground floor of the former Dubigeons administration building. Since its inception, the organization has undergone minimal changes. There is a strong opposition between the redevelopment goals of MHT, Samoa, Voyage à Nantes and Nantes Métropole on the notions of industrial heritage of a post-industrial site. Significant archives are located in the few remaining structures.
Dec. 2019	Director, Historic Preservation Departement, Nantes Municipality (DPARC)	Historic Preservation has forged strong connections with residents and broader civil society, encompassing concepts of architectural heritage, cultural heritage, and industrial heritage, documenting not only from public archives but also from private sources such as industries, businesses, and personal archives, cataloged within the Nantes Patrimonia website.

	Project Manager, Le Voyage à Nantes (VAN)	The VAN is a private organization that serves as Nantes' official tourism bureau and runs a large number of services and cultural events for the metropolitan area, including the maintenance of the Parc des Chantiers (PdC), a privately-run public-owned public park on the former shipyard of the Ile de Nantes. PdC is the place for festivals, cultural, sportive and leisure activities, and is a very well known leisure park, with difficulties depending on its temporality, notably between the public nuisances and safety of its nightlife and recently-arrived local residents.
	President of the association of industrial heritage of Nantes	1985-86 : Closing of the factories on Ile de Nantes – Alstom, Dubigeons Shipyard. 1993 - 1995 : creation of the industrial historic preservation association Conflicts between the first tabula rasa redevelopment plan (Perrault) and historians and union representatives in a socialist city. Chemetoff's subsequent plan is for a city rebuilt without erasing its industrial remains ¹ .
	Vice-President, Nantes University	The relocation of port activities to Saint Nazaire, orchestrated by Nantes' town hall and the Chamber of Commerce & Industry, marked a pivotal moment in the city's industrial landscape. As shipyard closures ensued, deindustrialization exerted profound effects on both blue-collar employment and indirectly impacted service jobs in Nantes. The election of JM Ayraud, a socialist mayor, in 1989 heralded a period of significant urban transformation. The ZAC de la Madeleine project, initiated from 1990 to 1995, saw the establishment of the Civic and Convention Center, setting the stage for the subsequent replication of this urban renewal model on the Ile of Nantes from 1995 to 2000. Key public-private entities like SAMOA, along with urban planning figures like Alexandre Chemetoff (succeeding Perrault), spearheaded efforts to reimagine the city's urban fabric, particularly around public spaces. Central to this vision was the preservation of Nantes' industrial port heritage, manifesting in the repurposing of vacated urban spaces by the town hall. The cultural and creative industries found fertile ground in refurbished old factories characterized by their distinctive metal and glass frames, symbolizing Nantes' economic rejuvenation. Question: Does Nantes' resilience come from the modernity of urban heritage policies and has been driven by cultural and artistic production? Recommendation: Insist on the relevance of heritage issues with the general public to find a link between the different actors of the Parc des Chantiers (MHT, VAN, NM, SAMOA, University of Nantes).

Our initial interviews uncovered some conflict among essential civic stakeholders, each with differing visions for the area's redevelopment. Each party clearly articulated their perspective, legitimacy, and stakes in the redevelopment process, and identified allies and points of tension with other parties. The MHT advocated for a renovation that would honor the historical integrity of the shipyard's remaining structures. In contrast, organizations such as VAN and cultural entities like Les Machines, Stereolux, and Trempolino aimed to infuse the space with vibrancy and cultural significance. DPARC and Nantes University found themselves navigating a middle path, striving to balance the preservation of the site's industrial legacy with the practical ambitions of fostering a dynamic, multifunctional community. A notable contention arose over the acknowledgement of other stakeholders' needs and ambitions, with highly polarized stakeholders and newer entrants to the redevelopment discussion often perceived as lacking legitimacy by others. This issue seemed disconnected from the actual influence or authority of the institutions involved.

¹ <https://www.cilac.com/definition-histoire>

2.2 Phase 2: Research Seminar: M1 level students, Jan. 2020

At the école de design, graduate research projects frequently serve as practical learning experiences, and the Innov'Art2 project was aligned with this educational approach. Tasked with exploring Nantes University's research question on public perception regarding the area's redevelopment, a weeklong research seminar was organized. During this seminar, 24 first-year Masters students engaged in comprehensive research of a specific area. Their goal was to assess its present condition and explore potential redevelopment strategies that prioritize social innovation. This involved conducting interviews with both the general public and local businesses. The students were divided into five teams, with each team assigned to delve into one of the five identified challenges, analyzing their findings accordingly:

- **Challenges:** Addressing nuisances, public space dynamics, noise, waste management, disorderliness, and criminal activities.
- **Heritage and Identity:** Exploring aspects related to industrial heritage, cultural identity, museum development, and nostalgia.
- **Community and Economy:** Delving into topics concerning urban economy, revitalization efforts, urban planning strategies, and the overarching master plan.
- **Cultural and Creative Revitalization:** Investigating the appropriation of industrial heritage by cultural and creative enterprises.
- **Patterns of Use:** Analyzing usage patterns ranging from informal to formal, spontaneous to planned activities within the designated area.

The comprehensive territory diagnosis revealed a significant gap between the current perceived state of the neighborhood and the sustainable development and cultural aspirations held by civic stakeholders and the local community. The neighborhood's minimalist high-tech architecture and deserted appearance, frequently exacerbated by ongoing construction, was highlighted, especially during the Covid lockdowns, which limited business operations to only essential services. This insight provided a foundation for future strategies aimed at bridging this gap and fostering a redevelopment process that aligns with the community's needs and aspirations. A longer student project was planned with a participatory design workshop to kick it off.

2.3 Phase 3: Participatory Kick-Off Workshop - M2 Level Students, September 2020

“Conversation among individuals and groups who set design initiatives rolling at the networks’ nodes of the networks they are part of: a social conversation in which actors interact in different ways (from collaborating to conflicting) and at different times (in real time or off line).” (Manzini, 2015: 49)

With the student’s fieldwork identifying and confirming public divergence with the civic actor’s redevelopment objectives, a 12-week prospective design project was initiated with a four-hour participatory workshop that brought together graduate students and key civic stakeholders concerned with the preservation, valorization, planning, and tourism development of urban post-industrial heritage. The following “neutral” brief clearly identified every stakeholder’s role and legitimacy in the discussion:

“Since the 1980s, Nantes has prioritized the preservation and modernization of its industrial heritage as a key component of urban redevelopment. The west of Nantes Island, historically home to heavy industries like the Alstom engine factory and Dubigeon shipyards, has been targeted for development. City actors have chosen to maintain traces of Nantes' industrial past within the island's landscape, reflecting its role as a commercial and industrial port. This commitment to heritage preservation is evident in development master plans.

Today, Nantes Island serves as an extension of the historic city center, characterized by urban density and a diverse array of services. Cultural activities, driven by creative industries and tourism, thrive on the island. Institutions like the Maison des Hommes et des Techniques, housed within the Ateliers des Chantiers Navals buildings, offer museum spaces to showcase the history of Nantes' shipyards. Le Voyage à Nantes manages public spaces like Chantiers Park, while SAMOA oversees urban planning and shares responsibility for Quartier de la Création with Nantes Métropole. The Heritage and Archaeology Department engages users through co-construction efforts via patrimonia.nantes.fr. The University of Nantes contributes to industrial heritage enhancement by investing in Hall 6, while Stereolux and Scopitone play vital roles in the cultural industries of Chantiers Park.”

The workshop sought to establish a consensus regarding the challenges identified by various stake-holders during the area’s redevelopment process, and identify potential solutions to be further developed by first-year master's degree students in the Care and Digital Design programs. Experts participating in this workshop included representatives from the following institutions: Maison des Hommes et des Techniques (MHT), Stereolux (major cultural venue), University of Nantes, Historical Preservation Department of the city of Nantes (DPARC), SAMOA, Le Voyage à Nantes (VAN), Territorial Management Direction of Nantes Métropole, Care Design and Digital Design Lab directors, course leaders and workshop facilitators.



Figure 3. Stakeholders collaborating during the first project’s kick-off workshop (during Covid19) in one of the renovated industrial buildings managed by Nantes University.

Participative design workshop - results

GROUPE 1



How can we create a unity that fosters closer ties (historical, cultural, social, human...)?

GROUPE 2



How can we encourage people to stop and enjoy their heritage?

GROUPE 3



Create a map / device for new residents.

GROUPE 4



How can the MHT open up onto the park, highlighting the history of the shipyards?

Figure 4. Four resulting goals from the participative design workshop: reinforcing community ties, valorizing industrial heritage, mapping the new neighborhood, and opening up the MHT and the former shipyard's history to visitors.

The kick-off event took place in a spacious, repurposed industrial building, ideal for accommodating large groups while adhering to the social distancing guidelines in place following two significant Covid lockdowns. This event served as a crucial psychological break for participants, offering relief from extended periods of social isolation. Additionally, it acted as a catalyst for re-establishing communication among civic stakeholders, particularly between the MHT and the VAN, who had stopped working with each other. This “thawing” of relations led to making the VAN the leading partner in subsequent phases of the project, seeing its potential as the social lubricant to enable the MHT's cooperation with the VAN.

2.4 Phase 4: Developing Preliminary Concepts and Augmented Reality Experiences

Since InnovART'2 expected a creative production as its final deliverable, the students were separated into two interdisciplinary projects from October to December 2020. "design fiction" and "Innov-AR" with Digital and Centrale engineering masters' students. The first project named “design fiction” involving Care and Digital masters' students was a low-tech approach to imagine alternative solutions to persistent problems with the new neighborhood, while “innov-AR” was an augmented reality exploration to visualize the industrial structures that had disappeared from the area. At this stage, the projects' focus was less on structuring dissensus in Digital Social Innovation (DSI) perspectives and more on crafting unified deliverables for presentation at the conclusion of the three-year research project.

The “Design Fiction” project aimed to create alternative yet pragmatic scenarios for urban development that would enhance community engagement and preserve historical integrity. Seeking consensus rather than design fiction's usually provocation function, it involved five interdisciplinary design teams, each tackling specific objectives: creating new communal spaces on the esplanade, designing night-time illumination for the esplanade's pathways, developing a low-tech method for exploring Nantes' industrial past, devising innovative approaches to sharing industrial heritage culture, and crafting a sound design experience to celebrate industrial heritage. The project that garnered significant acclaim from both the VAN and MHT (who monitored the student projects) was a sound design walking tour (Fig. 5) that narrated the former shipyard's history, and initiated the final round of design production.



Figure 5. Images of the initial student proposal for a circular sound design walking tour on the grounds of the former shipyard.

The “Inno-AR” project consisted of five teams, each developing an Augmented Reality (AR) application designed to visually resurrect industrial structures in Nantes that had long since disappeared. These interactive smartphone applications allowed users to explore massive historical structures such as the Transborder Bridge, dismantled in 1958, and the Calle des Sous-marins, demolished in 1985. Other projects included an AR experience of the Quai des Armements, highlighting the collective bartering strike of 1955, and Boatlaunch 2, which showcased the Scandinavia ferry. Launched in 1981, the Scandinavia ferry was the largest ever constructed in Nantes and led to financial difficulties due to the scale of investment in equipment. Another application brought to life Boatlaunch 3, featuring the Grue Titan Jaune (1954) and Le Brissac (1960-61), highlighting a period when Nantes' shipbuilding industry was at its zenith.



Figure 6. Initial student proposal for the former Transborder (ferry) bridge in augmented reality on the existing bridge.

Two augmented reality projects stood out for their exceptional execution and were thus chosen for inclusion in the final walking tour project: The Transborder Bridge and the Brissac ferry featured on the Boatlaunch 3.

Due to the VAN's encouragement, a funding request was drafted to create a walking tour with augmented reality experience for inclusion into the Voyage a Nantes summer festival, and as the proposal was winding

its way through budget committees, another research seminar was launched to test the five low-tech “design fiction” proposals.

2.5 Phase 5: Research Methodology Seminar - Industrial Heritage, Cultural Industries and Social Appropriation - Parc des Chantiers – M1 Level Students

First-year masters design students developed research tools and deployed testing protocols like semi-directive interviews, SWOT, 5W’s + H, spider net, PESTEL, and stake-holder maps for the five design proposals in a one-week research seminar. The user testing methods deployed in field investigations included: *Interviews* (Bystanders, Professionals, Spider net), *Discreet Observer Design Ethnography* (QR code interactions, Line pathway, Sound testing), and *Mapping* (Empathy map, Commerce mapping).

Below (Tables 2-4) are screenshots of the user tests of students’ initial sound design walking tour concept; however, the final project’s user interactions, pathway, media choices and narrative design approach are very different from those proposed by the initial student project, since the mandate extended beyond the initial area to encompass the green line pathway of the Ile de Nantes over several kilometers. The test did serve to validate user interactions with QR codes and develop design questions for the final applications to consider and/or resolve.

Table 2. Examples of mapping field investigations for the initial student concept of the walking tour.

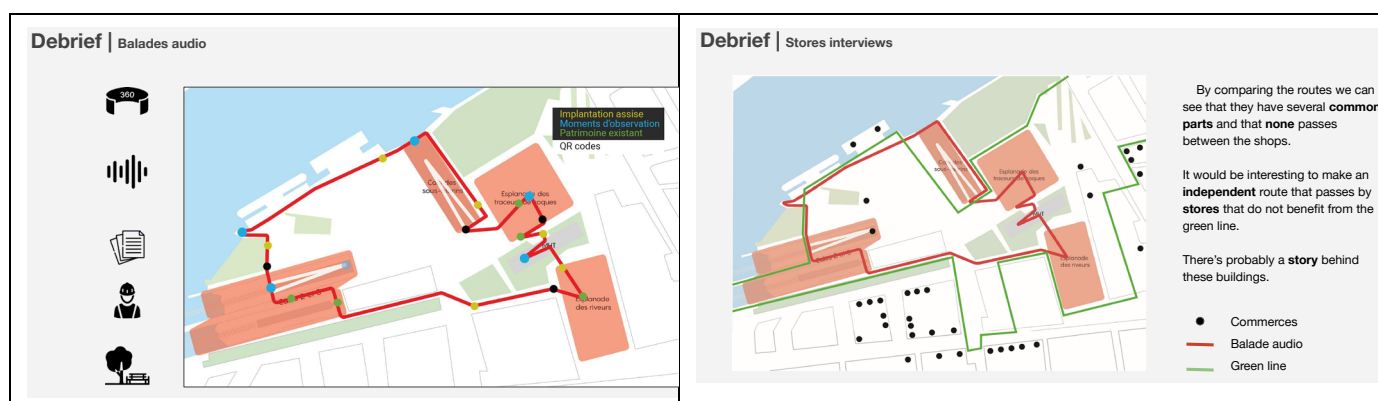


Table 3. Results of interviews with a wide variety of park visitors and local store owners.

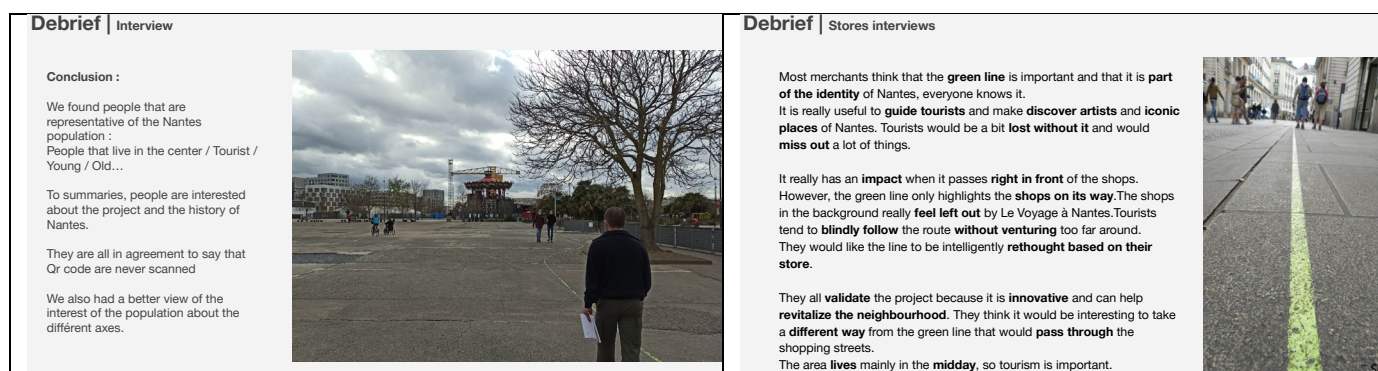


Table 4: Testing student design concepts of the walking tour through guerrilla design ethnography.

Debrief Qr codes Qr codes on the ground 30 min 42 people cross the Qr code. Only 8 take care of the Qr code but no one scan it. 81% didn't care 19% looked 0% scan After 1 day, we had one scan Qr codes on eye level (Panneau) 31 people crossed the Qr code. Only 5 people looked and 4 scanned. 71% didn't care 16% looked 13% scan	  According to a woman that looked at the qr code, the A3 papers look suspicious. If it was painted it would've gave a better impression and maybe more people would've scanned it.	Debrief Line experience On the 31 people that followed the green line, nobody followed our line. The quality of the line looks suspicious and people don't want to follow something that they don't know. A real line will be probably more attractive. 
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The user tests brought forth design questions for walking tour design team:

- **What sounds would be played?** Sound tools? Machinery? Long track? Ambient background vocals? Speech vocals? Ambient music? Always the same ones?
- **Route type?** Is it safe? What's the distance? Changes from time to time? Public transportation? Why not connect with the green line?
- **Will people be interested?** Is the app accessible to everyone? Is it free (+ ad-free)?
- **What type of graphics?** Digital only? Flyer with information? Static signs?
- **Will it be eco-friendly?** Why paint such big QR codes? Eco paint? Merge QR code with green line?

The PESTEL Analysis of the sonic walking tour identified the following issues:

- **Politics:** Valorise the historical heritage of the city. Remember the obstacles Nantes had to surpass.
Link with the Popular past of the city.
- **Economics:** Valorize the empty space with more or less 0 expenses. Bring peoples to roam the streets, and to use the proximity commerces by doing so.
- **Sociology:** Giving a good reason for people to go outside after Covid. Giving a better understanding of the context on which the city is built.
- **Technology:** 360° Photography to immerse in the past. Use of Qr code to materialize marks.
- **Environment:** No environmental dimensions, non- organic paint.
- **Legal:** Authorization for putting QR codes and putting signaletics. Rights to use the sounds and pictures.

Its SWOT Analysis identified the following issues: **Strength** : Immersion in the history of Les Chantiers Navals; **Opportunity** : Using new senses to discover Les Chantiers Navals; **Threat** : Area is dangerous at night. Not understandable without the app; and **Weakness** : Will people take time to download an app for visiting a small place like Les Chantiers?

2.6 Phase 6: Development of the Final Application: *A l'écoute des chantiers*

Once the proposal for an immersive walking tour with sound design capsules and augmented reality experiences was pitched to the VAN, they commissioned *A l'écoute des chantiers* (Listening to the shipyards) for Voyage à Nantes 2022 summer festival. This would be a smartphone app for “accidental tourists” that would stumble across its signage and for artistic patrons who followed the summer art festival. Once the project received funding for its development from Nantes Metropole, the Digital and Care design students whose proposal had been retained continued developing the project into their final year at the school. In all, 35 students, 8 instructors, 10 external partners, a software developer and three external designers were involved in its production. The archives of the Historic Preservation Department (DPARC)

and Maison des Hommes & des Techniques (MHT) were to serve for its scientific grounding, and therefore, the VAN assured that the funding request made its way through the bureaucracy.

With the VAN, MHT and DPARC each laying out their ideas for points of interest for the tour and for the sound design capsules, quite a bit of negotiating was needed to bring their number down to a manageable size. MHT wanted exclusive focus on shipbuilding and union history, while the DPARC and VAN wanted to extend the visit to the tourist hotspots beyond the shipyard, like the grey Titan Crane and banana hangar on Nantes' former merchant port. The walking tour grew to include areas beyond the former shipyard, starting at the St. Anne Bridge and following the Voyage à Nantes famous painted green line all the way to the docks (Quai des Antilles).

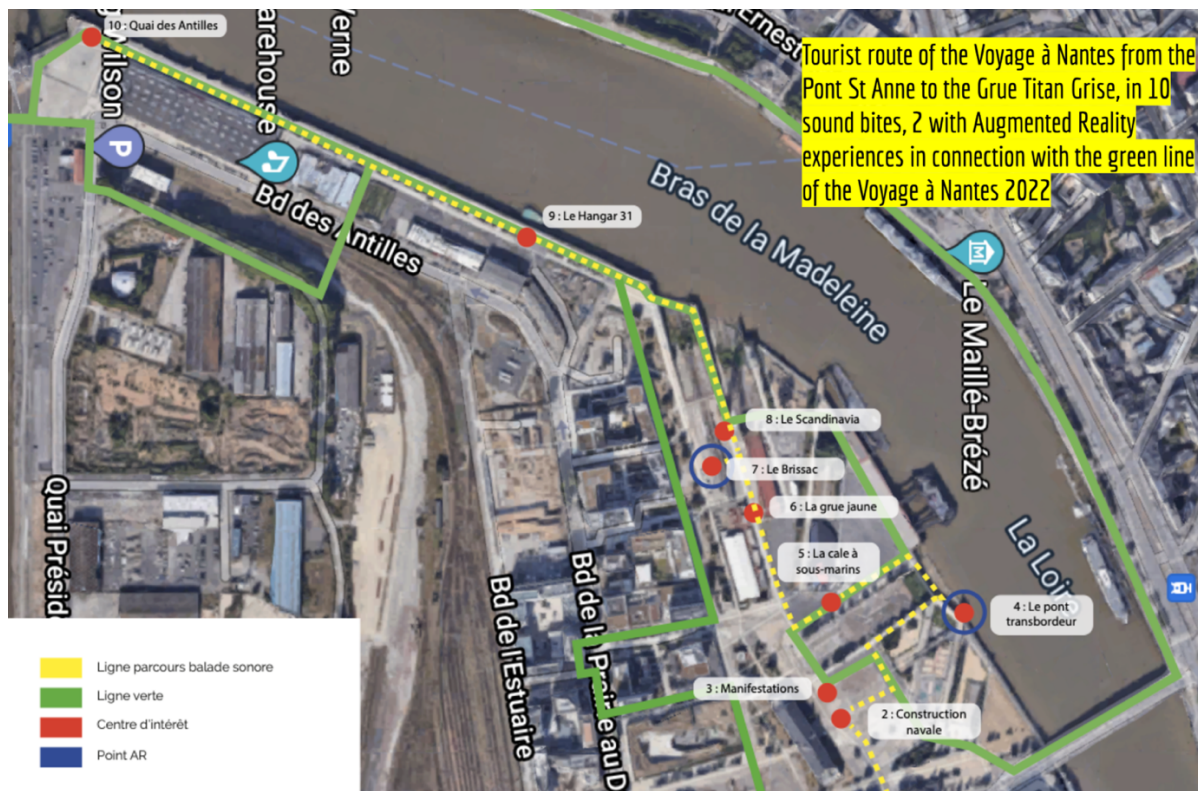


Figure 7. Redefined walking tour beyond the former shipyard to other touristic venues on the Ile de Nantes.

Finally, ten sound design capsules were designed and carefully crafted, incorporating archival footage, interviews with former shipyard workers, and ambient industrial sounds. These capsules were produced in MP3 format to ensure both efficiency, frugality and longevity, and are accessible via an iOS and Android applications, as well as on the web² and on patrimonia.nantes.fr. Additionally, two augmented reality experiences were integrated into the applications, allowing for an immersive exploration of the content. Geolocation features, when enabled, and navigation through ArcGIS Storymap further enhance the visitor's experience. The applications were developed using Unity.

To meet the Voyage à Nantes festival opening deadline of July 2, a narrative designer, a graphic designer and sound designer were enlisted, recognizing the time constraints and urgency of the task at hand.

² <https://alecoutedeschantiers.lecolededesign.com>

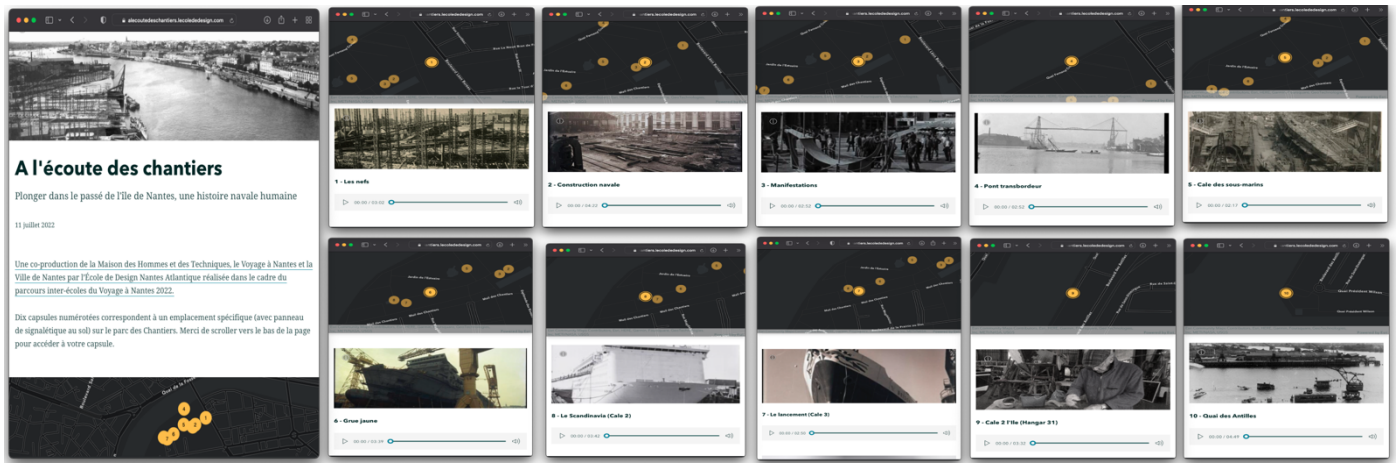


Figure 8. Ten sound design capsules were created to tell the story of the shipyard through the eyes of its workers using interviews, industrial ambient sounds and historic video soundtracks.

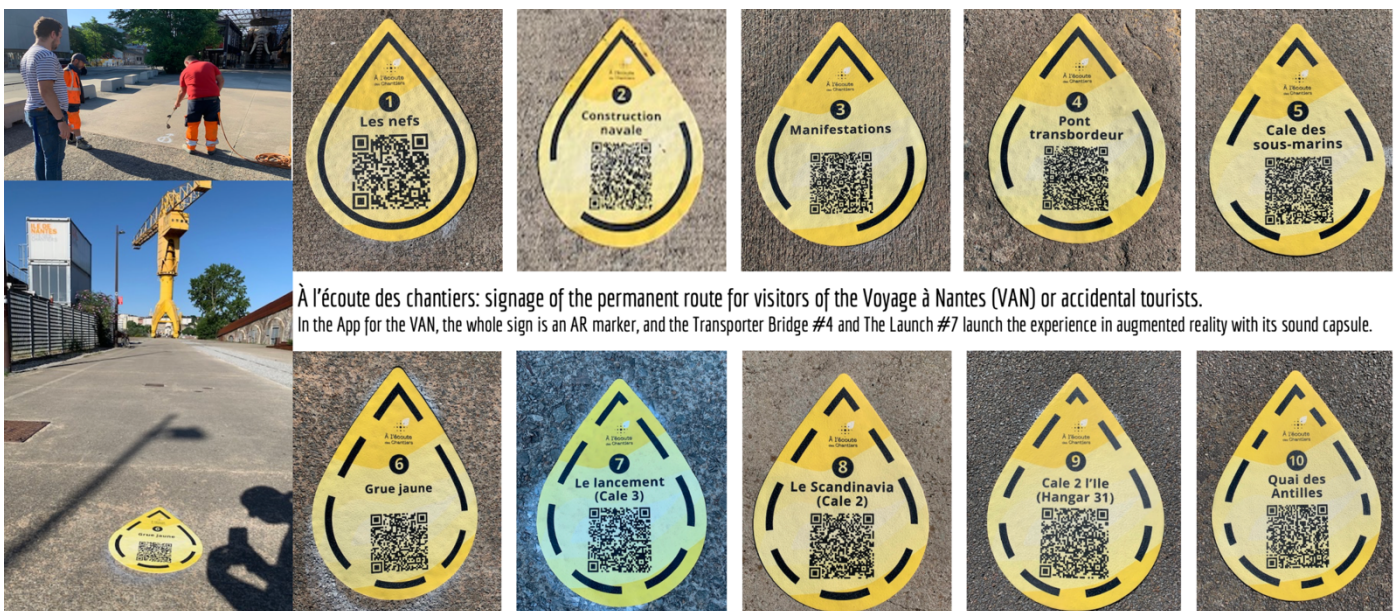


Figure 9. Vinyl signage installed for visitors and tourists to scan with their smartphone.

The signage, printed on tar-backed anti-skid yellow vinyl, was selected to endure Nantes' sweltering summers and heavy winter rainfall. Installed in June 2022, the signage remains in active service. Despite limited engagement with the students' initial QR code field tests, participation in the official Voyage à Nantes program, along with professional printing and installation, yielded much more satisfactory outcomes. The walking tour, initiated via the signage's QR codes, attracted over 2500 visitor sessions in July and August 2022.

The project is still in use as of 2024 and can be accessed at the following website:

<https://alecoutedeschantiers.lecolededesign.com>.

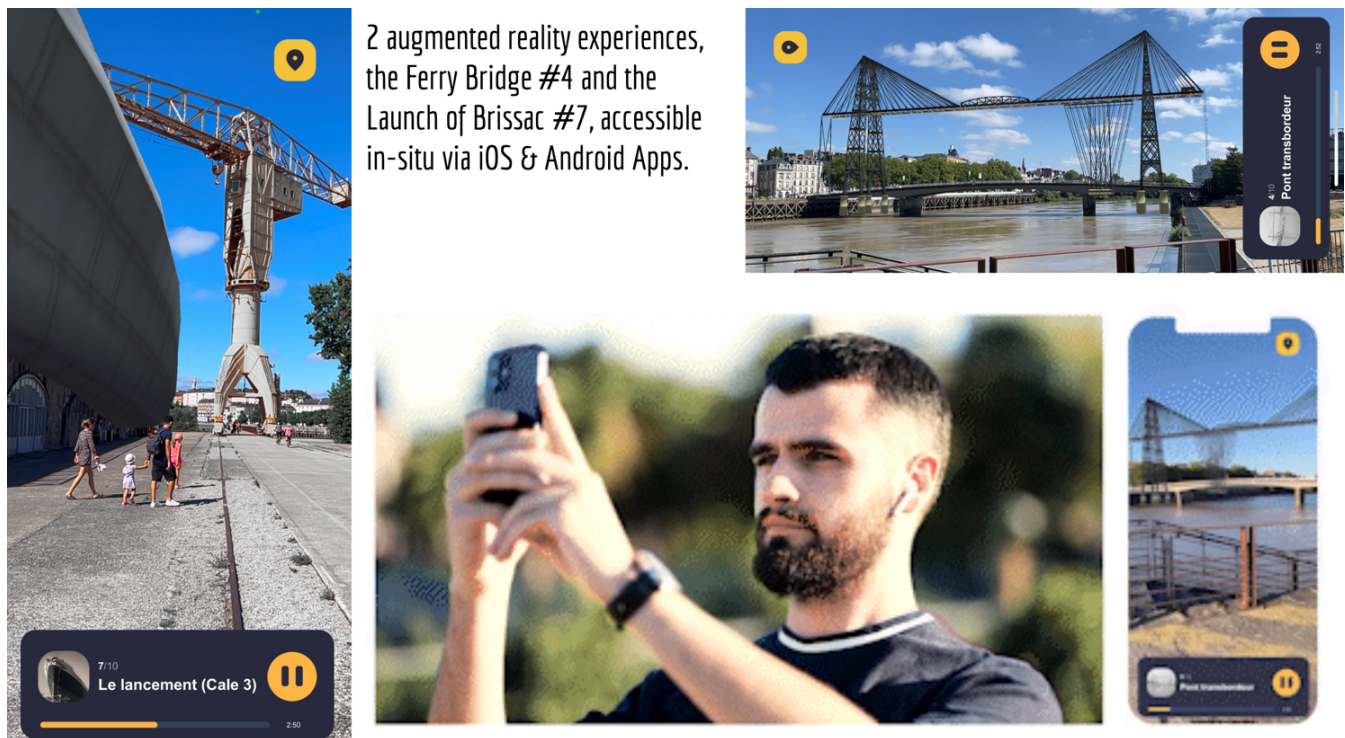


Figure 10. The two augmented reality (AR) experiences available through the iOS and Android apps when onsite.

3. Discussion

Voyage à Nantes (VAN) and the Historic Preservation Department (DPARC) recognized the potential of developing a walking tour application to enhance heritage exploration in the city. Understanding the significance of such an initiative, they jointly approached Nantes Métropole to request funding for the project, emphasizing the benefits of leveraging technology and sharing of historical archives to offer residents and visitors an engaging and informative experience of Nantes' rich historical and industrial heritage.

One of the project's most compelling features lay in its capacity to facilitate collaboration among diverse cultural and civic actors in the city, each with their own perspectives and objectives. By bringing together VAN, renowned for its innovative cultural endeavors, and the Maison des Hommes et des Techniques (MHT), focused on preserving Nantes' industrial heritage, the project aimed to reconcile previously opposing stakeholders under a unified purpose. Despite MHT's steadfast commitment to preserving the area solely as a historic testament to its industrial past, rather than for tourism or recreational purposes, this collaboration marked a significant stride in aligning efforts toward the common goal of enhancing Nantes' industrial heritage and its cultural vitality.

For DPARC and VAN, supporting this initiative held significant allure. Beyond the evident benefits of enriching tourism and cultural offerings in the city, the project presented a distinct opportunity to foster synergy between VAN and MHT. This involved integrating the MHT museum into the Voyage à Nantes summer event, effectively expanding its accessibility during previously closed periods in July, August, and weekends. This collaborative endeavor not only enhanced the content and reach of the walking tour application but also underscored Nantes' commitment to nurturing partnerships and collective efforts aimed at community betterment and a deeper understanding of its industrial heritage.

Despite being the primary sponsors of the immersive walking tour, VAN and DPARC consciously minimized their overt influence on the project, mindful of MHT's sensitivity and reluctance towards tourist-centric approaches to industrial history. To this end, measures were taken to maintain the appearance of impartiality. For instance, while DPARC held the full ArcGIS development license, the ArcGIS Storymap web

application was accessed through the school's DNS server, appearing neutral in its accessibility. Similarly, the augmented reality apps were released under the school's license on iOS and Android App Stores, rather than under the VAN, DPARC, or Nantes Métropole's licenses. Although this arrangement posed no significant issues due to the apps being free, contractual terms stipulated the delivery of the full source code and media files to DPARC.

In instances where production meetings encountered roadblocks due to strategic disagreements, concerted efforts were made to find common ground. Several meetings involving school representatives, VAN, and DPARC were convened to navigate forward despite MHT's dissenting stance. Strategies were devised to present negotiations in a manner acceptable to MHT, ensuring progress towards project common objectives while respecting diverse viewpoints as much as possible.

4. Conclusion

In summary, the three-year design process for this project exemplifies a solutions-oriented DSI project. Beyond creating a mere digital artifact, the project served as a platform for engaging diverse stakeholders in collaborative decision-making. By carefully incorporating their perspectives and insights, the design process structured dissensus among civic stakeholders towards a common goal — in this case, a valorization of the industrial heritage for tourists, residents and cultural patrons — and promoted a sense of ownership, collaboration and empowerment within the stakeholders.

Through this multi-phase participatory approach, the project not only addressed the tangible need for heritage mediation for tourists and residents, but also facilitated social cohesion and collective action by its most invested civic actors. What started as a project to get once hostile parties to share their respective archives and know-how towards a common goal has had long-lasting beneficial effects for ongoing collaborations between the MHT and the VAN, bringing much more traffic to the MHT, and visibility for Nantes' industrial and union heritage. In essence, by embracing principles of DSI, the project's lasting impact lies in the unity it has cultivated among once-divergent stakeholders, in shaping the future of Nantes' cultural landscape.

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