The Multilingual QR Digital Visitor Interface at The Truhlsen-Marmor Museum of the Eye

Overview
The Truhlsen-Marmor Museum of the Eye is the only publicly accessible museum in the United States dedicated exclusively to the history, science, technology, and cultural significance of ophthalmology. Operating under the American Academy of Ophthalmology Foundation, the museum serves a wide-ranging audience—from students and families to clinicians, researchers, and seniors—through immersive exhibitions, educational programs, and digital initiatives.

The following is the corresponding case study documenting the design, research, and refinement of the Multilingual QR Code Integration Tool developed to address the critical accessibility gap at the Museum of the Eye: the museum's limited ability to serve non-English-speaking visitors despite San Francisco's substantially diverse linguistic population. The project replaces an previously created but underutilized mobile app with a web-based, QR-enabled system that delivers translated exhibit content through a clear, intuitive, and scalable digital experience.

Problem Statement
Although the museum had produced translated exhibit text in Spanish, Mandarin, and Tagalog, access was fragmented and limited to in-person, text-only files. The museum's mobile app—intended to solve this issue—saw low adoption, particularly among older visitors and those with limited technological fluency. Audio, remote access, and accessibility accommodations were largely absent.

The challenge was to design a system that:
- Delivered multilingual content without requiring an app download
- Supported accessibility standards (WCAG, screen readers, contrast modes)
- Integrated with existing museum infrastructure
- Allowed for future expansion across languages and platforms
- Remained simple enough for visitors of varied ages and abilities

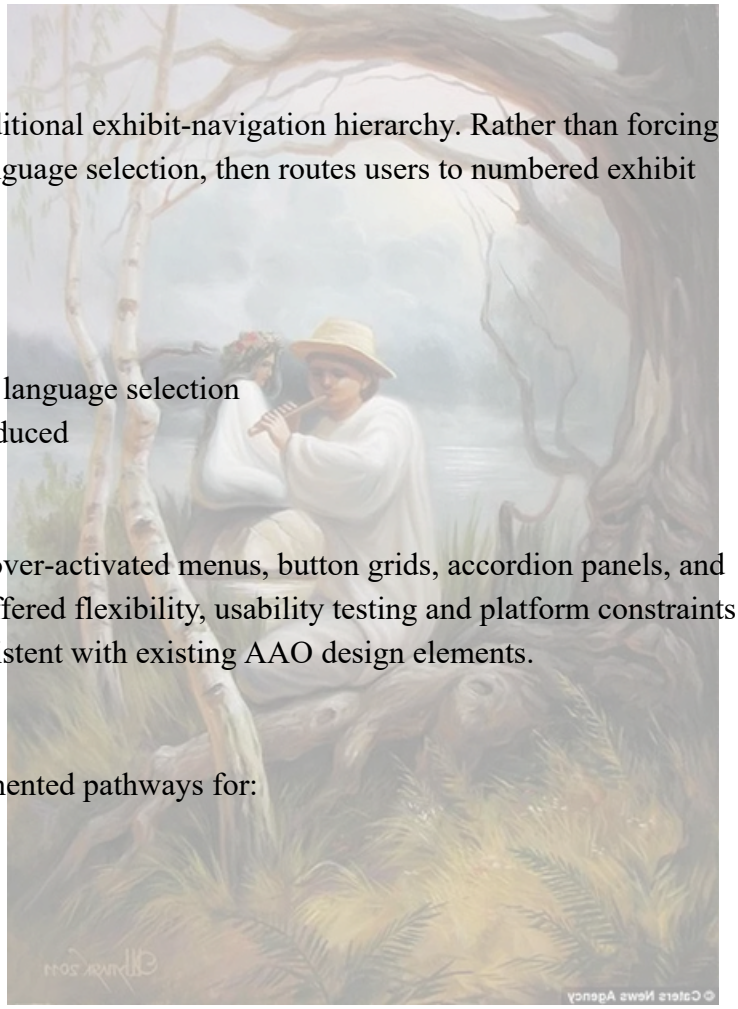
Project Objective
To enhance digital accessibility and visitor engagement by implementing a QR Code–based multilingual content system using a "Language First, Item Second" model—allowing visitors to select a preferred language before navigating exhibit content mapped directly to gallery objects.

Research and Discovery
Initial work focused on institutional and technical familiarization. This included:
- Reviewing the museum's CMS, collection management practices, and feedback survey infrastructure
- Conducting observational research during guided tours
- Analyzing visitor pain points related to navigation, comprehension, and language access
- Auditing existing AAO and Foundation web components to identify reusable design patterns
- Stakeholder discussions consistently emphasized inclusivity, sustainability, and operational feasibility—guiding the project away from custom-built tools toward adaptable, system-aligned solutions.

Design Strategy

Language-First Information Architecture:

The core design decision centered on reversing the traditional exhibit-navigation hierarchy. Rather than forcing visitors to locate objects first, the system prioritizes language selection, then routes users to numbered exhibit content via an interactive gallery map.



This approach:

- Reduces cognitive load for non-English speakers
- Prevents navigation dead ends caused by incorrect language selection
- Scales efficiently as additional languages are introduced

Interface Exploration

Multiple interface models were evaluated, including hover-activated menus, button grids, accordion panels, and simplified dropdowns. While a hover-based solution offered flexibility, usability testing and platform constraints ultimately favored a streamlined dropdown menu consistent with existing AAO design elements.

Accessibility Considerations

Accessibility was addressed at every stage, with documented pathways for:

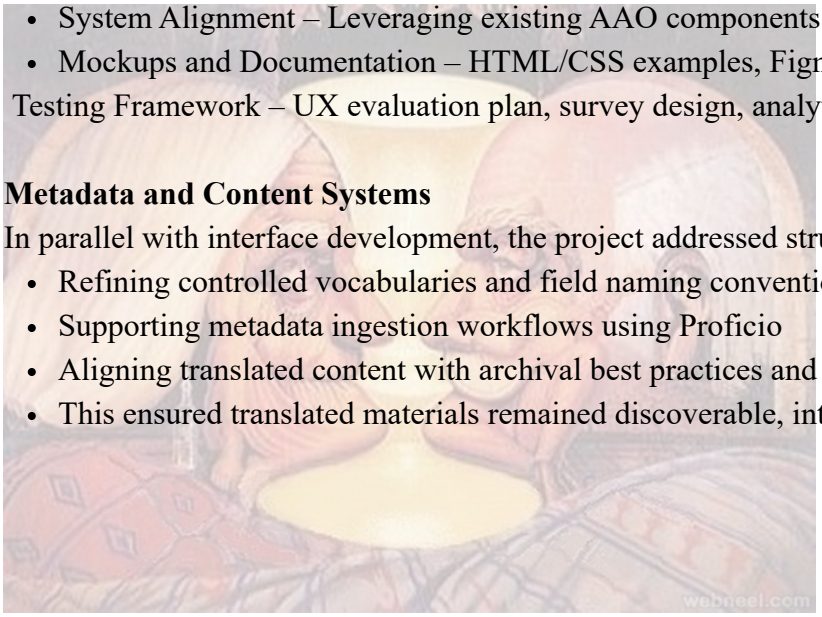
- Screen reader compatibility
- Text-to-speech integration
- High-contrast modes
- Audio guide expansion via Cuseum

Development Phases

The tool was developed over six structured phases:

- Foundational Research – Institutional review, platform assessment, stakeholder alignment
- Concept Definition – Formalizing objectives and confirming the Language First, Item Second model
- Design Exploration – Interface prototypes, content layouts, interactive map logic
- System Alignment – Leveraging existing AAO components to reduce development overhead
- Mockups and Documentation – HTML/CSS examples, Figma designs, metadata refinement

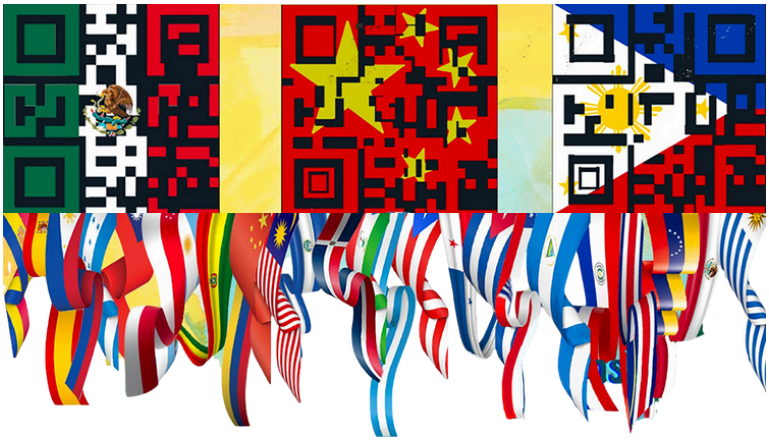
Testing Framework – UX evaluation plan, survey design, analytics strategy



Metadata and Content Systems

In parallel with interface development, the project addressed structural content integrity. Contributions included:

- Refining controlled vocabularies and field naming conventions
- Supporting metadata ingestion workflows using Proficio
- Aligning translated content with archival best practices and AIP requirements
- This ensured translated materials remained discoverable, interoperable, and preservation-ready.



Deliverables: The project produced ten comprehensive deliverables, including:

- Initial configuration report
- Design-option risk analysis
- Interactive map and content layout documentation
- UX testing plan
- HTML and graphic mockups
- Adaptive language-expansion strategies
- Menu and navigation alternatives
- QR code interface exploration
- User feedback framework
- Timeline, risk mitigation, and future enhancements

Each deliverable was written for cross-functional clarity, balancing technical specificity with editorial precision.

Target Audience and Impact: Primary beneficiaries include Spanish-, Mandarin-, and Tagalog-speaking visitors from San Francisco's local and tourist populations, with future scalability for additional languages such as Vietnamese, Arabic, Hindi, Cantonese, and Korean.

Secondary audiences include:

- Researchers and clinicians accessing multilingual academic content
- Educators incorporating translated materials into curricula
- Remote visitors engaging with online exhibits

Outcomes and Value

The Multilingual QR Code Integration Tool:

- Improves access without increasing technical burden
- Aligns with inclusive design and universal access principles
- Strengthens the museum's educational mission
- Establishes a replicable model for other cultural institutions

While implementation will continue beyond the internship timeline, the framework positions the museum for long-term accessibility growth.

Reflection

This project bridged editorial strategy, UX research, and technical systems design. It required translating complex institutional constraints into clear, audience-focused solutions—while maintaining consistency, accuracy, and AP-style clarity across extensive documentation.

The result is a scalable, human-centered model for multilingual museum engagement—demonstrating how rigorous research, structured design thinking, and disciplined editorial refinement can transform accessibility challenges into sustainable digital solutions.

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