

Dois Mundos, Uma Tela: *Framework* de Design Visual Contrastivo para *Worldbuilding* de Patrimônio Cultural em Videogames

Title: Two Worlds, One Screen: A Contrastive Visual Design Framework for Cultural Heritage Worldbuilding in Video Games

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Abstract. Introduction: Most heritage video game art treats cultural reference as surface decoration rather than structured visual language. **Objective:** This paper documents a contrastive visual design framework for *Siecha*, a game set during the Muisca–Spanish colonial encounter (1537), in which protagonists Tisqa and Alejandro are designed so that cultural identity is legible through visual form alone. The framework constitutes a research-through-design methodology grounded in primary historical sources. **Methodology:** Primary records (Muisca goldwork, ceramics, textiles; Spanish colonial armour and engraving) were analysed to extract formal principles, translated into five contrastive design parameters: silhouette, texture, colour palette, outline technique, and compositional posture, and extended to differentiated UI systems and gameplay mechanics. **Expected Results:** A blind identification test ($n = 30$, 100 % correct attribution) confirms perceptual effectiveness, validating cultural contrast as structural design logic rather than decorative theme. **Keywords** video game art, character design, cultural visual identity, visual worldbuilding, Muisca culture, contrastive aesthetics, art direction.

Resumo. Introdução: A maioria das artes de jogos de patrimônio cultural trata a referência cultural como decoração superficial. **Objetivo:** Este artigo documenta um framework de design visual contrastante para o jogo *Siecha*, ambientado no encontro Muisca–colonial espanhol (1537), no qual os protagonistas são projetados para que a identidade cultural seja legível apenas pela forma visual. **Metodologia:** Fontes primárias (ourivesaria, cerâmica e têxteis Muisca; armaduras e gravuras coloniais espanholas) foram analisadas para extrair princípios formais traduzidos em cinco parâmetros contrastivos: silhueta, textura, paleta cromática, técnica de contorno e postura compositiva, estendidos a sistemas de UI diferenciados e mecânicas de gameplay. **Resultados Esperados:** Teste de identificação às cegas ($n = 30$, 100 % de atribuição correta) confirma a eficácia perceptiva do sistema. **Palavras-Chave** arte de videogame, design de personagem, identidade visual cultural, worldbuilding, cultura Muisca, estética contrastante, direção de arte.

1. Introduction

A player looking at two characters from opposite sides of a 16th-century colonial encounter should not need a caption to know which one belongs to the land and which came to conquer it. Shape, colour, texture, and posture carry that information if the design system was built to communicate it. This is the central premise of *Siecha*, a video game set during the Muisca–Spanish colonial encounter of 1537. The design challenge is specific: can visual style alone, without text or dialogue, communicate cultural identity and the worldview behind it?

Most heritage game art treats cultural reference as costume applied to generic templates. As Balela and Mundy [Balela e Mundy 2015] document, this systematically reproduces visual stereotypes because design decisions are not grounded in primary source analysis. We propose a contrastive visual design framework in which the formal opposition between two cultural visual systems constitutes the structural logic of the game’s art direction and worldbuilding [Wolf 2012], framed as research-through-design [Frayling 1993]: the design artefact and its documented process are the primary contribution. This paper documents the design of Tisqa (Muisca warrior) and Alejandro (Spanish colonial soldier), detailing how formal properties from primary sources were translated into five visual parameters and extended to differentiated UI systems. A blind identification test ($n = 30$, 100 % correct attribution) validates perceptual effectiveness.

2. Related Work

Visual design in video games functions as an independent narrative system [Soriani e Caselli 2022, Wu 2012] in which consistent style creates immersion and visual choices shape emotional identification before any interaction occurs [Isbister 2016, Krippendorff 2006]. In heritage game design, Liu et al. [Liu et al. 2022] propose cultural accuracy frameworks; Türkmen and Savasta [Türkmen e Savasta 2024] examine how museum artefacts translate to interactive experiences; Politopoulos et al. [Politopoulos et al. 2019] analyse historical authenticity in AAA production. A persistent gap is that cultural elements are evaluated for *presence* rather than *communicative function*, and single-culture representation dominates over cultural contrast as structural design logic. This paper addresses both through the Muisca/Spanish colonial case.

Kress and van Leeuwen’s [Kress e van Leeuwen 2006] Grammar of Visual Design provides the semiotic foundation for this work. In their framework, visual communication is governed by three metafunctions: the *representational* (what is depicted and how participants and actions are structured), the *interactive* (the relation constructed between image and viewer through gaze, distance, and modality), and the *compositional* (how elements are organised into a coherent whole through salience, framing, and information value). Applied to character design, this framework clarifies why the five contrastive parameters are semiotic resources rather than aesthetic preferences: silhouette and posture encode agency and relation to environment (representational metafunction); colour palette and texture calibrate how “natural” or “technologically mediated” each character reads, modulating social distance between figure and viewer (interactive metafunction); outline technique modulates the degree of abstraction from perceptual coding and organises compositional weight (compositional metafunction). Tisqa’s warm, high-modality palette

and gestural line position the figure as embedded in the natural world; Alejandro’s precision rendering and cold metallic surface signal technological imposition upon it. The grammar thus provides a systematic vocabulary for tracing how specific design choices produce specific cultural readings turning design decisions from intuitive judgements into documented semiotic operations.

3. Historical and Aesthetic Foundations

3.1. Muisca Visual Language

The Muisca (c. 600–1537 AD), a confederation of chiefdoms on the Colombian Altiplano, positioned gold as solar-spiritual substance rather than wealth [Langebaek 2019, Laverde 1990]. *Tunjos* — votive anthropomorphic figures cast in tumbaga (gold-copper alloy) — express deliberate surface roughness, hierarchical proportions, and asymmetric balance through symbolic density [Villegas e Martínón-Torres 2012]. The textile record [Moreno 1990] adds spiral and zoomorphic motifs in earthy ochres with visible weave structure and deliberately irregular edges: a visual language of organic fluidity, tactile surface presence, and warm matte materiality.

3.2. Spanish Colonial Visual Language

The colonial Spanish system of 1537 operates by opposing formal logic. Burke [Burke 2020] analyses how Renaissance treatises applied Euclidean geometry as ideological instrument: geometric ordering was itself colonial assertion. Plate armour produces angular segmented planes and axial symmetry. Colonial painting [Carrión 2006] encodes hierarchy through scale and elevation — authority figures frontally lit and enlarged, subordinate figures reduced and shadowed — communicating power before content is read.

3.3. Contrast as Structural Principle

The opposition is epistemological: the Muisca language communicates integration with natural cycles; the colonial communicates domination through geometric precision. Table 1 summarises the formal principles constituting the design vocabulary.

Tabela 1. Duality of Visual Principles

Dimension	Muisca	Colonial Spanish
Base forms	Curves, spirals, organic	Straight lines, angles, geometric
Textures	Rough, natural, tactile	Smooth, metallic, reflective
Symmetry	Asymmetric, dynamic balance	Symmetric, axial, rigid
Palette	Earthy, warm, opaque	Intense, cold, bright
Materiality	Ceramic, fiber, hammered gold	Steel, carved stone, polished metal
Symbolism	Nature, cycles, ritual	Power, order, hierarchy



Figura 1. Primary historical sources grounding the formal vocabulary of each visual system.

4. Design Methodology

The framework follows a research-through-design model [Frayling 1993] in four phases: (1) **Pre-production** — historical and iconographic research, ethical framework, community consultation plan; (2) **Visual storyfication** — formal principles translated into design vocabulary, concept art, style guides per culture; (3) **Cultural worldbuilding** — visual grammar extended to UI, environments, and interaction systems; (4) **Integration and validation** — prototype assembly, expert critique, semiotic coherence check.

4.1. Five Contrastive Visual Parameters

Phase 2 produced five visual parameters, each directly traceable to documented cultural practice (Table 2). They operate simultaneously across perceptual channels, producing a unified cultural impression.

Tabela 2. Contrastive visual parameters for Tisqa and Alejandro.

Parameter	Tisqa — Muisca	Alejandro — Colonial
Silhouette	Fluid, asymmetric; organic curves	Angular segmented planes; geometric subdivision
Texture	Rough, matte; granular noise from tumbaga casting	Smooth, reflective; cold metallic sheen
Palette	Warm ochres, terracotta, matte gold	Deep blue, carmine, cold silver
Outline	Variable-weight gestural line; rupestre painting	Uniform clean line; engraving precision
Posture	Low gravity; asymmetric; weight toward earth	Vertical, frontal, axially symmetric

Tisqa uses layered digital paint with visible brushwork and granular noise referencing the rough, process-visible quality of tumbaga [Laverde 1990]. Ornamental elements extract the visual logic of Muisca decoration — asymmetric density and zoomorphic integration — without reducing the design to costume. Alejandro’s geometric



Figura 2. Concept art of Tisqa (left, Muisca) and Alejandro (right, Spanish colonial) showing the organic/geometric formal opposition.

planes reference Renaissance plate armour; his palette of deep blue, carmine, and cold silver follows documented heraldic tinctures, maximally contrasting Tisqa's warm earth tones.

4.2. Cultural Worldbuilding: Differentiated UI Systems

Phase 3 extends the visual grammar to interface design. Two culturally differentiated UI systems were developed in which every component — health bars, minimap, typography, iconography, and animation timing — translates the same historical principles. Tisqa's interface features organic frames from spiral motifs [Moreno 1990], zoomorphic symbols, humanist typography, and fluid asymmetric animations. Alejandro's adopts heraldic geometry, military iconography, classical serif typography, and rigid symmetric timing.

Switching between characters produces intentional cognitive friction, converting a conventional usability problem into a worldbuilding mechanism: understanding the other requires adapting to a different visual logic.

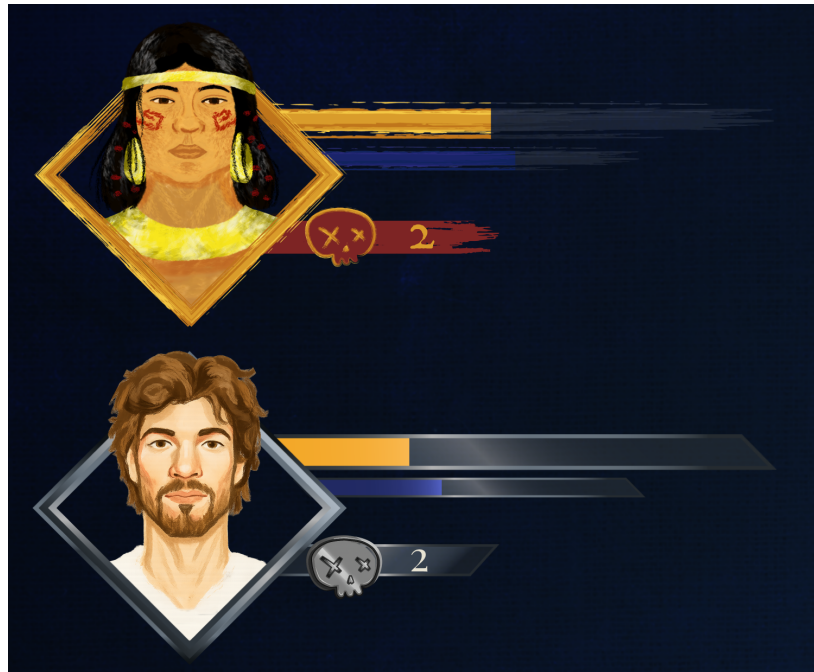


Figura 3. Culturally differentiated UI systems: Tisqa (top) and Alejandro (bottom).

4.3. Visual Contrast and Gameplay Mechanics

The contrastive visual framework extends beyond aesthetics into the game's mechanical design. Both protagonists possess distinct ability sets whose visual feedback: animations, particle effects (VFX), and interaction cues, is derived from the same formal principles governing character design. Tisqa's combat abilities draw on fluid, earth-rooted movement and organic VFX referencing natural cycles: earthy particle bursts, spiral energy forms, and asymmetric attack arcs that echo the zoomorphic dynamism of Muisca ritual objects. Alejandro's abilities are expressed through geometric, angular motion paths, metallic impact effects, and bilaterally symmetric attack patterns that reflect the hierarchical precision of colonial military training.

This mechanical differentiation addresses a critical design risk identified in postcolonial game studies [Tuck e Yang 2012]: that visual contrast between an “organic/natural” indigenous culture and a “geometric/technological” colonial culture can inadvertently naturalise the power asymmetry it depicts. *Siecha* confronts this risk through narrative positioning. Both characters are player-controlled protagonists given equal mechanical depth and agency; neither is presented as primitive or superior. Alejandro is not designed as a villain but as an ordinary person — a common soldier seeking better opportunities, compelled by institutional structures he did not choose — while the Muisca side foregrounds a sophisticated cosmological and social order under threat. The visual asymmetry between the two systems is thus deployed to *expose* the historical power asymmetry rather than to celebrate or naturalise it. How narrative agency positions the player's ethical judgement relative to that asymmetry is a design question addressed in future work on interactive narrative design.

5. Validation

To validate the cultural identification of the characters, a blind identification test was designed in which participants were shown both character designs — Tisqa and Alejandro — with no names, titles, or cultural labels visible. Participants were asked to attribute each design to one of two cultural contexts (Muisca or Spanish colonial) and to identify the visual cues that informed their decision. Subsequently, a five-point Likert expert critique instrument was applied, comprising questions organised around five aspects: (1) clarity of cultural duality, (2) degree of visual contrast, (3) character differentiation, (4) coherence between character and UI design, and (5) cultural authenticity of formal decisions.

The blind identification test was conducted with 30 participants (multimedia engineering students, ages 18–24). All thirty (100 %) correctly attributed each character. Most-cited cues: colour palette (warm vs. cold), surface texture (rough/matte vs. smooth/reflective), and silhouette geometry (fluid vs. angular); outline and posture reinforced the reading. The expert Likert instrument yielded: cultural duality clarity $M=4.4$, visual contrast $M=4.5$, character differentiation $M=4.4$, UI coherence $M=4.7$, cultural authenticity $M=4.3$. Cognitive friction from interface switching rated $M=1.6$ in frustration, confirming it was experienced as meaningful rather than obstructive.

Limitations: The sample ($n=30$) is professionally homogeneous; results remain exploratory pending a broader and more diverse sample. Robust evaluation of whether visual style communicates cultural worldviews beyond group membership requires instruments developed in collaboration with Muisca communities [Tuck e Yang 2012].

6. Discussion and Conclusions

The blind identification result demonstrates that when design parameters derive from primary historical sources rather than cultural conventions, the resulting visual language is both perceptually immediate and culturally specific. Participants read specific formal properties — warm matte ochre and fluid silhouette vs. cold reflective silver and angular planes — as distinct worlds rather than recognising generic indigenous/European markers. This is the experience *Siecha* aims to produce: two characters whose formal incompatibility is visible before any narrative context is given.

The framework's contribution is its traceability: from primary source to formal principle to design parameter to validated artefact. This is the difference between a design justified by documented cultural practice and one relying on inherited conventions that perpetuate colonial misrepresentations [Tuck e Yang 2012, Balela e Mundy 2015]. The four-phase structure constitutes a replicable methodology for game art direction grounded in cultural heritage research.

One tension merits acknowledgment: the organic/natural (Muisca) vs. geometric/technological (Spanish colonial) binary has a documented history in postcolonial theory as a framing that can naturalise the power asymmetry it depicts [Tuck e Yang 2012]. The design inhabits this structure deliberately, because the historical encounter was asymmetric — and because *Siecha* uses that asymmetry to humanise both sides rather than to celebrate the colonial project. Alejandro is designed not as a conqueror-villain but as an ordinary person compelled by institutional structures he did not fully choose; the game's visual and mechanical language ensures that neither

protagonist is reduced to a symbol of their culture's power or absence of it. The broader question of how narrative agency positions the player's ethical judgement will be addressed in future work on interactive narrative design.

The validation results confirm a direct answer to the design challenge posed in the introduction: visual style alone, without text or dialogue, is sufficient to communicate cultural identity. The 100 % attribution rate across all participants demonstrates that the five contrastive parameters — silhouette, texture, palette, outline, and posture — operate as a legible cultural sign system independent of narrative context. Furthermore, the expert evaluation confirms that this legibility does not come at the cost of cultural specificity: scores above $M = 4.3$ across all Likert dimensions indicate that the framework produces differentiation that is both perceptually immediate and historically grounded.

Three directions structure the future agenda: (1) technical implementation in Unity (NPR shaders, 6–12 months) to test whether concept-art parameters translate to real-time rendering; (2) expanded evaluation ($n \geq 50$, 12–18 months) measuring perception of cultural values beyond group attribution, with culturally diverse participants; (3) collaborative process with Muisca communities to validate symbolic representation and establish ethical co-design protocols.

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