H U D — UNIVERSIDAD DEL NORTE

RETOOL INTERVENTION FINAL REPORT

The ReTool Intervention is an action-research initiative of the HUD [Future of Humanitarian Design] project that **redesigns the management and transfer of medical technologies in Colombia to ensure local autonomy and sustainability**. Through a systemic diagnosis and five participatory design workshops with key stakeholders, structural failures were identified and technological solutions (HUD Nexus and Bitácora) were co-created, along with their respective roadmaps, to ensure the continuity of care within the territory.

Meet the Project Members from Universidad del Norte


Edgard Rincón
Project Director
M.I.D., Product Designer


Ana Liliana Ríos
Collaborating Expert
M.S. in Family Studies, Medical specialist.


Angie Reyes
Project Assistant
Industrial Designer


Widman Valbuena
Collaborating Consultant
PhD in Design and Creation.

OKA Consultores
Collaborating Consultant
Research, Co-creatrion and more Consulting

This project can be seen from three main points: **Desk Research** | **Workshop Development** | **Technology Roadmapping**

1 Analysis of Policy and Regulatory Frameworks

- ***Scope:***
  - Decree 0919/2004 (Parent)
  - Decree 697/2021
  - Resolution 0184/2024.
- ***Objective:*** Define governance and traceability (INVIMA/APC) for medical technology transfer.

2 Systematic Literature Review

35 Bibliographic references + **03** Other documents + **05** Colombian regulations

3 Categorical Framework

Hybrid deductive/ inductive model + **11** Analytical categories = **Core Pillars**
Operational challenges
Stakeholders' dialogue
Beneficiary demographics
Post-donation support

4 Qualitative Data Processing

Primary Data: 10 semi-structured interviews with high-level leaders (IOM, PAHO, UNICEF), local authorities, and Wayúu community representatives.

x **Software:** ATLAS.ti (v.25).

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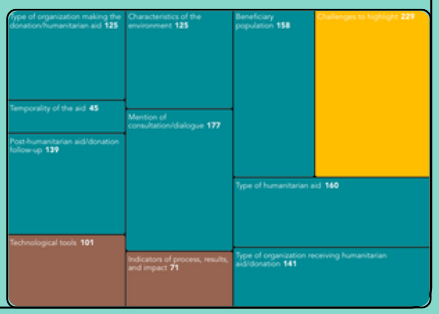
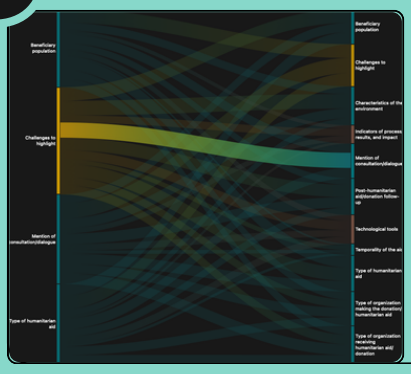


Grounding of the categories in discursive configuration and hierarchy.

5 Analytic Metrics

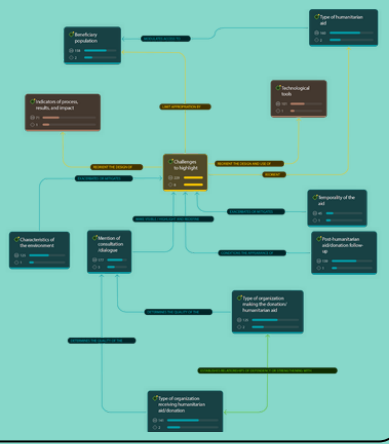
Citation density and relational co-occurrence leads. → Identifying structural asymmetries through variable cross-referencing. ↓



Top 3 Identified Co-occurrences:

1. Key Challenges ↔ Mention of consultation/dialogue (104)
2. Key Challenges ↔ Environmental characteristics (99)
3. Key Challenges ↔ Beneficiary population (94)

6 Axial Synthesis and Semantic Network



Integration of findings into a relational system (HUD Semantic Network).

Conclusions

- ***Critical Sustainability:*** Episodic aid (<6 months) lacks long-term maintenance planning for local systems, particularly in rural zones.
- ***Intercultural Approach:*** Success depends on prior dialogue, mediation by local leaders (e.g., Wayúu), and cultural adaptation of donations.
- ***Technological Gap:*** Despite the potential of AI and telemedicine, there is a critical lack of data integration between international NGOs and local systems.
- ***Institutional Disarticulation:*** Aligning global agendas (IOM/PAHO) with territorial health requirements remains a fundamental structural barrier.

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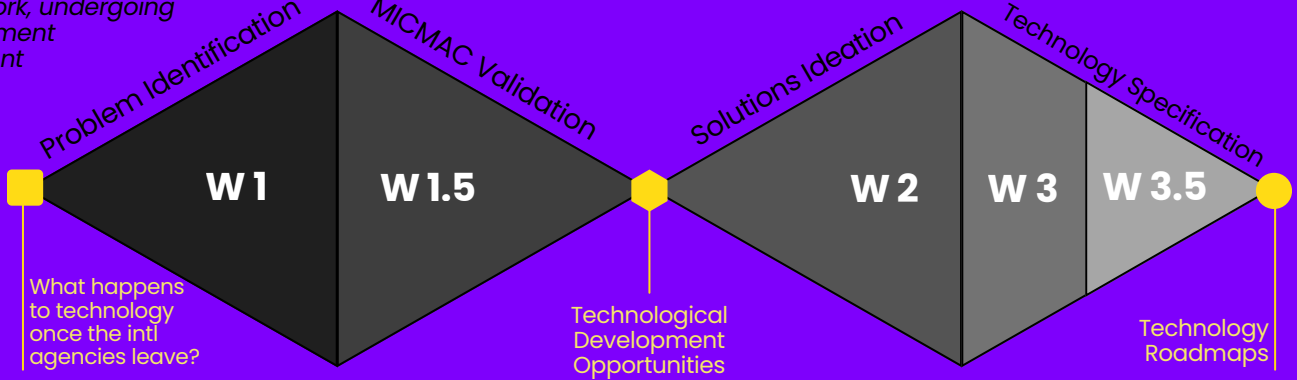
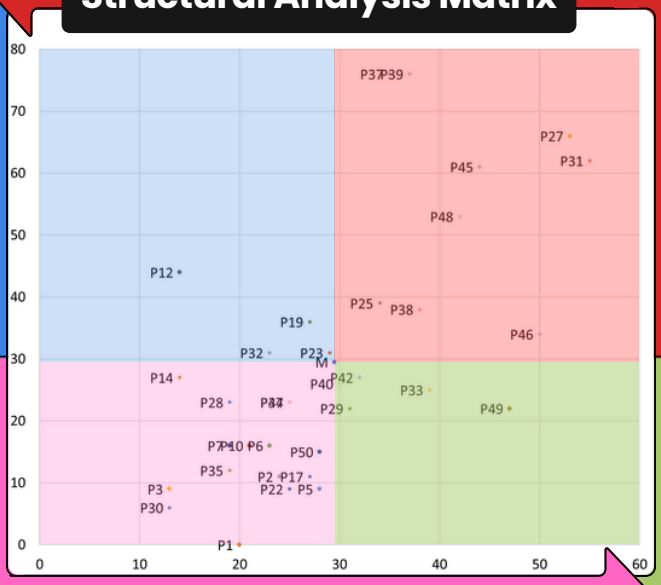
Desk Research | **Workshop Development** | Technology Roadmapping

The methodology employed an adaptive framework, undergoing continuous refinement based on emergent field insights.



This methodology was key in the strategic mapping of...

Structural Analysis Matrix



Power Zone
+Influence -Dependence

Problems found here reflect that:

- Rigid administrative schedules systematically conflict with the continuous 24/7 exigencies of humanitarian crises.
- International compliance standards remain fundamentally disconnected from the operational capacities of local municipal entities.
- The absence of formal decommissioning protocols leads to systemic asset stagnation and the accumulation of technological waste.
- International donation streams consistently overlook the granular technical specifications required for last-mile operationality.

Conflict Zone
+Influence +Dependence

Problems found here reflect that:

- Coordination gaps foster redundant protocols and systemic entropy loops through feedback-driven instability.
- Inflexible digital architectures fundamentally conflict with the volatile and fluid nature of humanitarian demand.
- Administrative and fiscal compliance is systematically prioritized over substantive clinical outcomes and public value.
- The absence of territorial ownership triggers systemic collapse upon international withdrawal or technical failure.
- Specialized service delivery is frequently paralyzed by dependency on convoluted and rigid administrative chains.

Autonomy Zone
-Influence -Dependence

Problems found here reflect that:

- Material aid frequently diverges from the specific technical and operational requirements of the field.
- Global standards fundamentally conflict with local cultural and territorial referents.
- Humanitarian operations remain critically vulnerable to external digital dependencies and connectivity gaps.
- Communication efficacy is hindered by inadequate digital channels and the omission of inclusive languages.
- External social dynamics and systemic insecurity consistently disrupt the continuity of humanitarian aid.

Outcome Zone
-Influence +Dependence

Problems found here reflect that:

- Solution designs exhibit a critical disconnect from the material and housing realities of local beneficiaries.
- High technological complexity acts as an exclusionary barrier for grassroots and refugee-led organizations.
- Vital assistive technologies for persons with disabilities remain systematically marginalized within standard aid frameworks.
- Bidirectional communication breakdowns increase community vulnerability to public health
- misinformation narratives.

The information was turned into ***Generalized Statements***

Technological mediation in the humanitarian system operates under a paradox of operational rigidity: standardized digital protocols—designed to streamline aid—ultimately stifle local response capacity.

Within the nexus between international humanitarian organizations and local stakeholders, management systems exhibit a systemic inability to align donor requirements with local operational realities.

The operational landscape is perceived as a 'minefield of microfrictions' and 'orphan technologies': tools that reach the territory but rapidly fail due to the absence of integrated local or cultural support systems.

Within the relationship between international humanitarian organizations and local stakeholders, current management systems exclude local beneficiary conditions from solution design, thereby limiting the impact of humanitarian assistance.

Which then turned into ***Technological Development Opportunities***

Design a technological framework that synthesizes historical evidence with projective design to facilitate a precise mapping of needs between aid recipients and humanitarian providers.

Design a technological solution for the collection of lived experiences—utilizing video and written formats—by local health organizations to facilitate a comprehensive socio-cultural and contextual analysis of the affected territory. This framework ensures that during the coordination of assistance, precise requirements are communicated to establish optimal delivery pathways, logistical zoning, storage capacity planning, and specialized training protocols, such as food handling

The Technological Development Opportunities led us to the maturing of two solutions

HUD Nexus

A resilient **digital and hardware command center** designed to bridge the gap between international aid mandates and local territorial realities.

Standard tools map streets; **HUD Nexus maps trust.**

Speculative Mock-ups created using Gemini 3's Nano Banana 2

To transform humanitarian management from a reactive "firefighting" dynamic into a proactive, localized, and data-driven system.

Predictive Risk Foresight
Utilizes Machine Learning [ML] to transition from reactive aid to proactive alerts for logistical and epidemiological risks.

Social Capillarity Mapping
Visualizes informal trust networks to bypass bureaucracies and route aid through validated community leaders.

Tactical Connectivity
IP67-rated hardware and LoRaWAN radio networks ensuring operational continuity within severe climatic environments.

Offline-First Resilience
Employs Progressive Web Apps [PWA] and low-bandwidth protocols for offline data capture with automated synchronization.

The system **neutralizes "digital silence"** within the connectivity paradox where standard aid technologies typically fail due to a lack of internet infrastructure.

Critical **territorial data loss is mitigated** by preventing institutional amnesia during local governmental transitions or International Non-Governmental Organization [INGO] withdrawals.

Top-Down Solution

HUD Bitácora

A **technical research repository** engineered to distill complex territorial data into Generalized Statements that bridge the gap between historical evidence and projective design.

To transform humanitarian management from a reactive "firefighting" dynamic into a proactive, localized, and data-driven system.

BITÁCORA
Bi-directional Intelligence, Territory Analysis & Operational Resource Atlas

Lived Experience Capture
Utilizes video and written formats to collect lived experiences from local health organizations for deep socio-cultural analysis.

Contextual Validation
Establishes delivery pathways and logistical zoning based on the material and housing realities of beneficiaries.

Specialized Training
Develops protocols for food handling and asset management that are aligned with local operational capacities.

Speculative Mock-ups created using Gemini 3's Nano Banana 2

Bottom-Up Solution

In Conclusion,

Episodic humanitarian aid frequently collapses because it prioritizes short-term "firefighting" over cultural adaptation and integrated data sharing between global NGOs and local systems. **The ReTool Intervention breaks this cycle by replacing reactive relief with a proactive, localized architecture**. By utilizing HUD Nexus and HUD Bitácora to map trust and preserve lived experiences, the project ensures that medical technology transfers are not just temporary fixes, but sustainable, autonomous assets tailored to the specific needs of the community.

Read the extended Final Report HERE