

The background features a dark, atmospheric photograph of a museum gallery. Several classical statues are visible, including a prominent one on the left and another on the right. The architecture includes arches and columns. Overlaid on this is a network of thin, light-colored lines connecting small, glowing yellow dots, creating a digital or data-like aesthetic.

Some Key Concepts in CIDOC CRM Classes and Relationships & Museums

Dominic Oldman

62nd CRM SIG - Oxford 2025

Background & Synergies Museums and CIDOC CRM

A Case

British Museum



The Law
New Art History
The Scientific
Research Dept.
The Organisational
Change.

CIDOC CRM Goal

“The primary role of the CIDOC CRM is to enable the exchange and integration of information from heterogeneous sources for the reconstruction and interpretation of the past at a *human scale*, based on all kinds of material evidence, including texts, audio-visual material and oral tradition. It starts from, but is not limited to, the needs of museum documentation and research based on museum holdings.”

Definition of the CIDOC Conceptual Reference Model (7.1.3)

Volume A:
Definition of the **CIDOC Conceptual
Reference Model**

Produced by the CIDOC CRM
Special Interest Group

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Museums



Museums are a fundamental part of arts and humanities research and education.



They provide tangible, experiential learning that connects individuals with history, culture, and creativity, bridging the gap between accumulated knowledge and lived experience.

The new CIDOC documentation definition

Museum documentation is the activity of recording and generating diverse knowledge and evidence, in analogue and digital formats, in order to preserve the history of society and nature as reflected by museum collections. It is a core strategic, operational, and transdisciplinary activity that enables the social role of museums as public memory institutions. As a dynamic information resource, it is central to the care of collections by:

- Reflecting and underpinning museum activities such as research, interpretation, audience engagement, conservation, curation, exhibition, education, administration and legal oversight, security, and collections management.
- Interconnecting and synthesizing information about physical, digital, and intangible collections around multidimensional aspects such as identity, materiality, preservation, aesthetics, conceptual associations, and social and historical contexts.
- Providing a living resource that evolves and responds to new knowledge that is supported by evidence, such as collection history and provenance.
- Acting as a conduit for promoting meaningful, ongoing collaboration among different communities to participate in the creation of diverse and inclusive knowledge.

Key Aspects for this Sector

1.



Relationships - the way we think and build knowledge about reality in modern scholarship.

2.



Knowledge - the CIDOC CRM provides the opportunity to represent real knowledge, not simply organise information (a mass of facts) – for example, explanation, interpretation and argument. Our thinking about the material world is part of reality.

3.



Historical contingency – the CIDOC CRM supports historical contingency. History is about understanding change and transformation over time. The CIDOC CRM is a historical ontology using phenomena (events) with material and immaterial things, employing the dynamic of relationships.

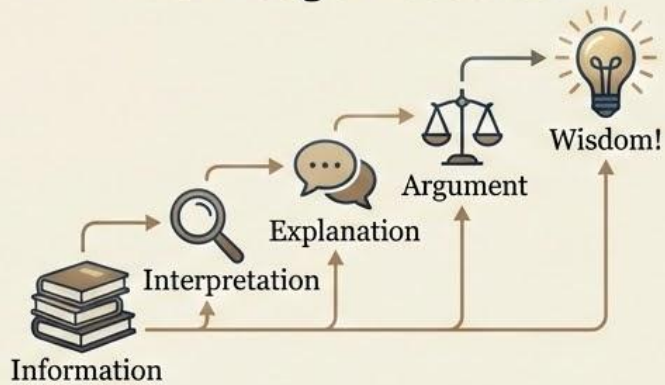
4.



Interoperability – by using the framework of relationships and entities which are empirically validated in a consistent framework, organisations and researchers can synthesise their work, even if the information and knowledge is heterogeneous.

Synergy with CIDOC CRM

Dynamic Information and Knowledge Resource.



- Not just Categorised information but actual Knowledge
- Interpretation
- Explanation
- Argument
- Wisdom!

Collaboration among different communities



- Meaningful Integration and synthesis = greater collaboration = greater insight.

“identity, materiality, preservation, aesthetics, conceptual associations, and social and historical contexts.
The integration of Different integrated Vantage Points”

Mellon & Museums

An Objective

“...impose no strict requirements on data models and permit models to be revised and even replaced with minimal effort, a set of features well-suited to the open-ended nature of scholarly research.”

Technology

Use RDF for flexibility (Tim Berners Lee)

Strategy

“...not to produce ‘homogenization of processes or outcomes’, but rather to ‘offer the opportunity to experiment with methodologies and to test models of collaboration’.....to think about common problems and drive the whole field further intellectually.

CRM SIG

Ontological Commitment

“The focus of the development of the conceptual model was on the ontological commitment, i.e. the empirical confirmation from experts and documentation examples that the concepts in the ontology are the relevant ones that experts actually share. Further, the functional adequacy of the ontology was validated and is continued to be validated carefully against characteristic *sets of questions or queries from domain experts.*”

Doerr, Ore, Stead (2007)

- **Recurring Problem**
- **It requires work**

The Basics of Classes and Relationships

It must have an empirical grounding. This means that it must be;

1. Grounded in **the real world (Detectable)**
2. Represent **phenomena that genuinely exist (Empirically Dense)**,
3. Contribute **useful and reusable meaning (Semantically Dense)**.



The Gravity of Truth: Empirical Reality vs. Subjective Opinion in CIDOC CRM

The CIDOC Conceptual Reference Model (CRM) uses a bottom-up induction methodology, prioritizing a unique material reality and verifiable ground truths to ensure that cultural heritage data remains scientifically valid and interoperable.

SEMANTIC DENSITY

Every property must contribute distinct, reusable information that enables useful historical inferences.

DETECTABILITY

Classes must be observable by different observers and represent recurring structures of reality.

Crashing Down Under Material Evidence

The model prioritizes physical traces, records, and measurements over theoretical speculation.

Mental States

A mental state is only relevant if it leaves an empirical footprint or documented activity.

SEMANTIC DENSITY

A mental state is only relevant if it leaves an empirical footprint or documented activity.

HISTORICAL FACT

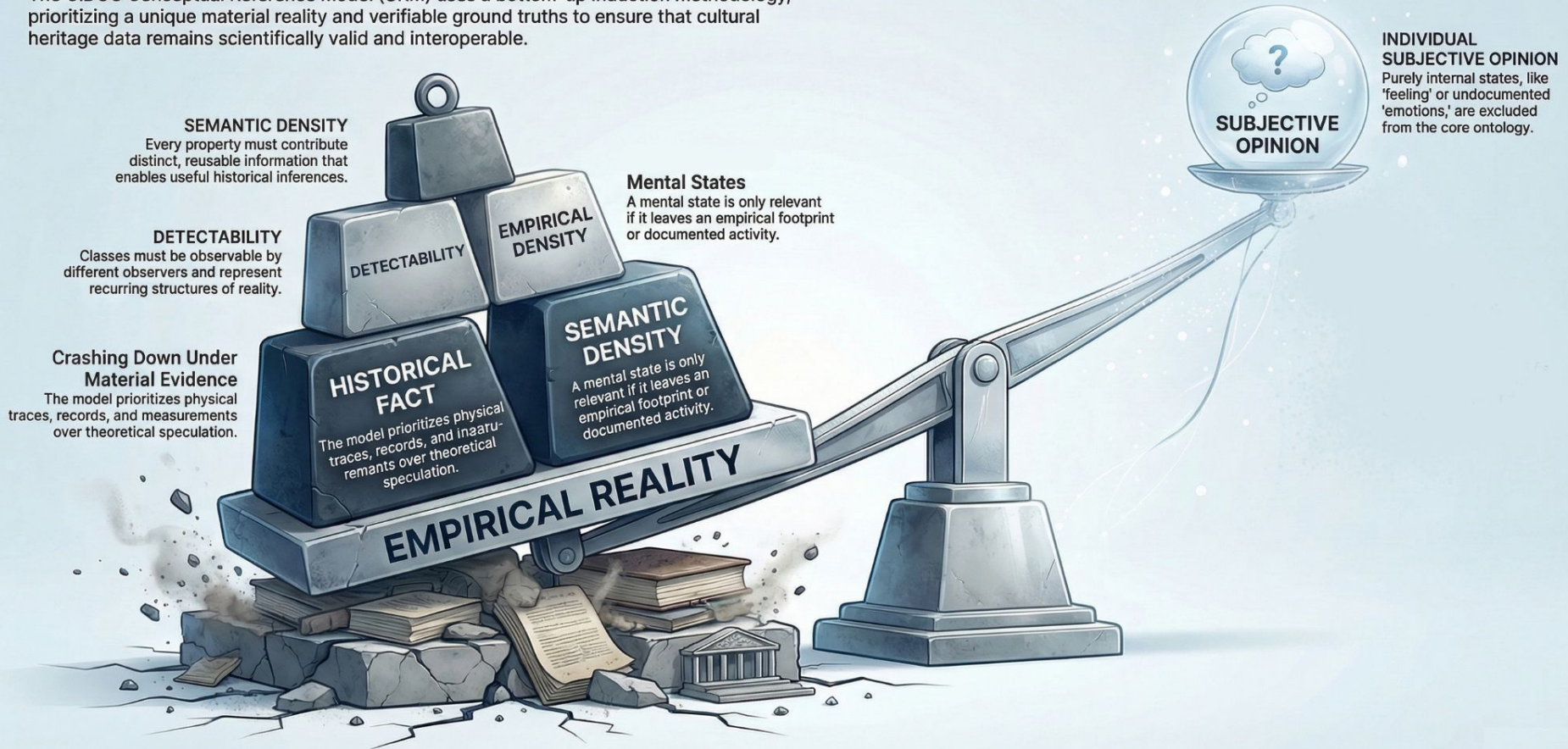
The model prioritizes physical traces, records, and inarguable remnants over theoretical speculation.

EMPIRICAL REALITY

SUBJECTIVE OPINION

INDIVIDUAL SUBJECTIVE OPINION

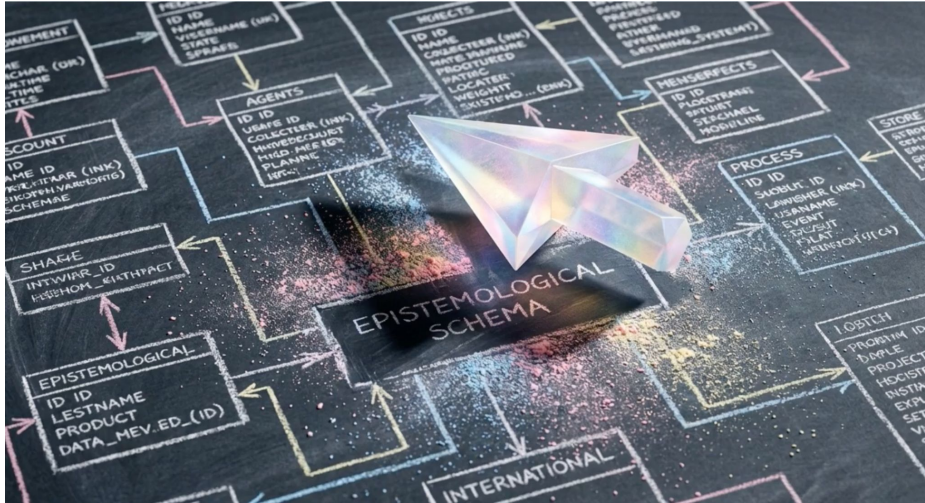
Purely internal states, like 'feeling' or undocumented 'emotions,' are excluded from the core ontology.



Verifiability

In the case of the CIDOC CRM ontological commitment is based on the existence of kinds of things (processes) and their properties or relationships. Their empirical existence must be verified by multiple independent observers who agree on a definition - not the possibility or likelihood of their being. For example, in the main, phenomena like clouds, weather, geological masses and collective phenomena are considered empirically indeterminate. Martin Doerr

Epistemological Models



- Models based on subjective beliefs
- No ontological reference to the real world
- Not interpretable by computers.
- Metaphysical abstractions
- Similar databases attempting to address the exact same subject matter will often use completely different field names, implicit meaning, and structures.
- Fragmentation and Incompatibility
- Inability to Handle Richness - Factoid reference systems.
- Closed World Assumption

Origins of CIDOC CRM: The Direction of Travel

TRADITIONAL INFORMATION SCIENCE STANDARDS



CONFLICT

Rigid, idealized frameworks clashing with the messy, dynamic reality of data usage, organizational culture, and technological evolution.

CIDOC CRM & APPROPRIATE TECHNOLOGY

HIGHLY FLEXIBLE

Easily swap parts
or scale without
dismantling system

Deals with
heterogeneity

Prioritise actual
end-user needs;
intuitive feel

Supports different
perspectives



Why not have a concept for 'Project'

Why?

- The CRM avoids "administrative" or "social" labels that mean different things to different people.
- Instead, it breaks a "Project" down into its **observable physical and temporal components**.
- **The Plan** (The Conceptual Aspect) - **E29 Design or Procedure**
- **The Execution** - **E7 Activity**
- **The Social Agreement** (The Administrative Aspect) - **E30 Legal Documents**

Social Concepts



E31 Documentation Example

This class comprises identifiable immaterial items that make **propositions about reality**, often called non-fiction. These propositions may be expressed in text, graphics, images, audiograms, videograms or by other similar means.

Typical examples are scientific records and studies, observational data, realistic portraits, depictions of landscapes or buildings, log books of ships and many others. **Documentation databases are regarded as instances of E31 Document**. This class should not be confused with the concept “document” in Information Technology which denotes any kind of digital object (of “file”) and is compatible with E73 Information Object.

In general, it is the **implicit or explicitly expressed intention in the creation of the item that justifies the classification** as an instance of E31 Document, which distinguishes it from other kinds, such as fiction or software, and **not its claimed truthfulness with respect to reality**. Deviations with respect to reality are typically unintended errors or poorly supported assumptions, but also different cases of bias discussed in the scientific discourse. It is the task of scientists and scholars to assess truthfulness of instances of E31 Document.

Only if the overall seriousness of an information object appears not to be given, such as the article by Leo Taxil 1890 about the Freemasonry, the documentalist should decide not to classify an item as instance of E31 Document. Also, historical novels, such as “Sinuhe the Egyptian” by Mia Waltari, 1945, which may incorporate or is inspired by facts are not considered an instance of document because they are primarily fiction. Fiction consists of narrative mainly based on imaginary events, people, places, etc.

[Leo Taxil wrote in 1890 a farce about the freemasons **not intended to be taken seriously**, but getting "viral" as being real despite of his confirmation that it was a hoax. It is the origin of conspiracy theories about the . <https://en.wikipedia.org/wiki/>

Martin Doerr

E31 Documentation Example

1. Documentation is a common concept in this sector
2. Museum's have departments called "Documentation" which document the collections.
3. Museum's have roles called Head of Documentation or Documentation Officers.
4. We ourselves belong to CIDOC - the Documentation wing of ICOM.
5. Documentation has a long history, whether ancient, colonial, bureaucratic or progressive but all with common intention.

Detectable - ✓

Empirically Dense - ✓

- We Observe the act
- The Observable reality of intention regardless of truth.
- Historical Evidence - not verifiable and not falsifiable
- The Observable Reality of Intention

Semantically Dense - ✓

- meaningfully useful to the model.
- Unlocks meaningful distinctions, relationships, and inferences
- Is not made redundant by other classes - Information Object is not a substitute.

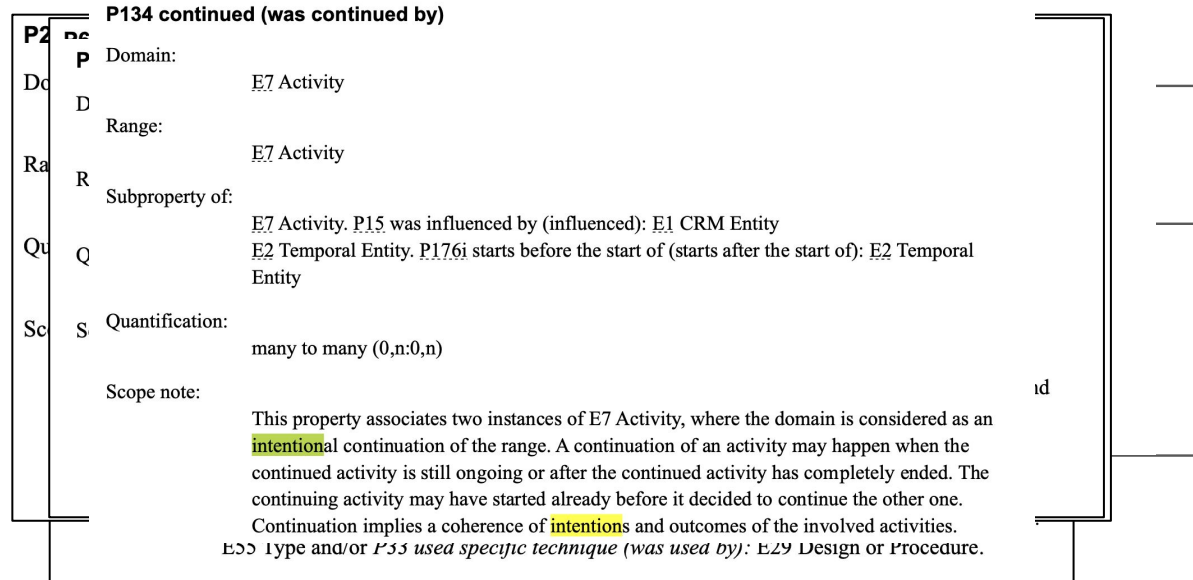
Example's

1. Leo Taxil documentation of freemasons - he never intended it to be documentation
2. Indigenous Communities in Peru (16th / 17th century Peru)
 - a. Notaries in Peru - Noble Classes
 - b. Translated by Anthropologists - and treated as representative.
 - c. Imposition of Spanish Documentation Templates
 - d. Analytical Databases were created using categories from these translations.
 - e. The Notaries conformed to the documentary plantation of the Spanish
 - f. Historical Distortion.

It is still an E31 Documentation - but the context is important

3. Colonial Gazette's until 1940s

CIDOC CRM and Intention



Practice

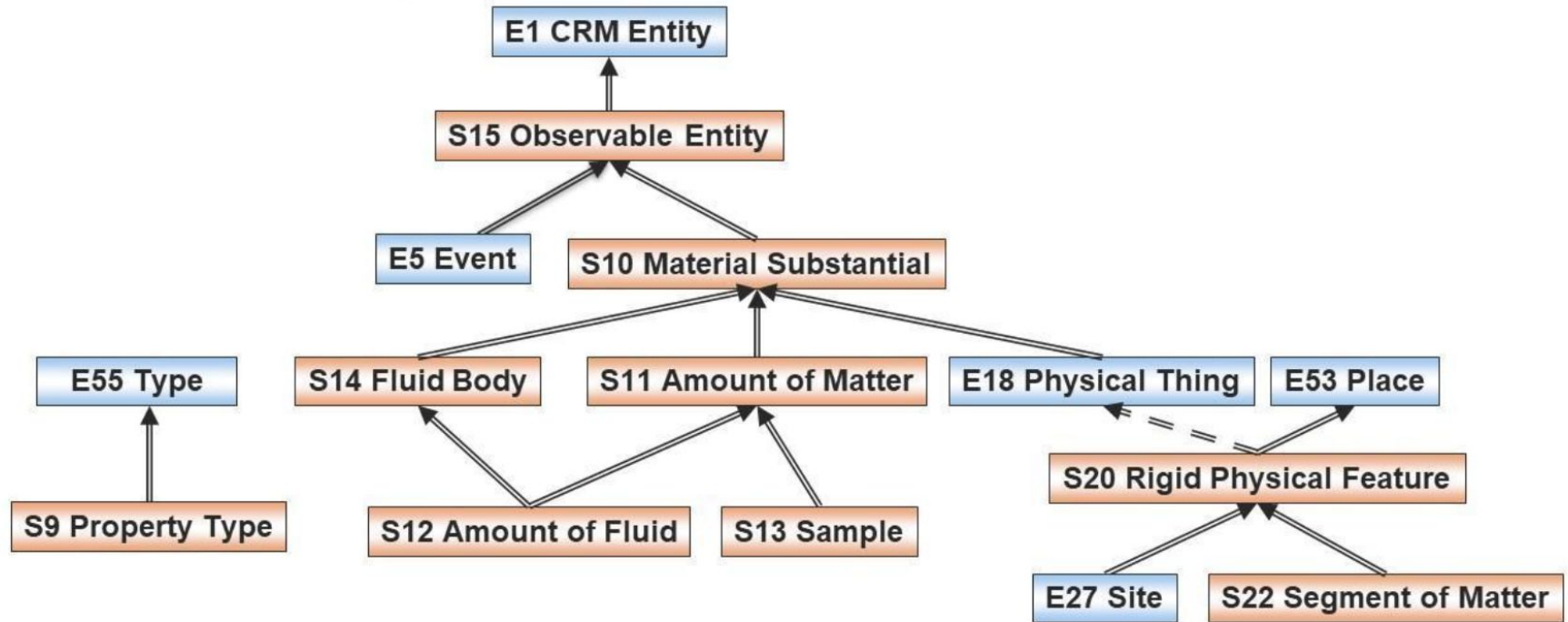
Problem

- **CIDOC CRM** requires a **fundamental paradigm shift** away from the data management practices that have dominated the heritage sector for decades.
- The difficulty rarely lies in the concepts themselves, but rather in overcoming
 - ⚙️ entrenched habits
 - 🕒 practical shortcuts
 - 💻 the limitations of software
 - 📖 historical reductionism

“Of course a sample is a Physical Thing, the CIDOC CRM must be wrong”

(Reliance of Labels)

Friction with domain experts - opaagness



Design Issues

Shopping List Design

The List of things rather than systems of relationships

Lists of Things

You immediately work against the ontology leading to structural and intellectual flaws. It produces an ahistorical and fragmented approach.

Systems of Relationships

The CIDOC CRM is about relationships and is event based. Approaching it this way creates a better conversation which encourages a historical and transdisciplinary approach

Design Impact

The design process becomes a task in trying to think about as many fields as possible and not about important processes, activities and questions.

Always start with an event/activity

Closed world versus Open World

The "Unknown" vs. The "Unstated"

Closed World

Relational databases hate empty spaces (called "Nulls"). If you don't know an artist's name, the system often forces you to type "Unknown." This is problematic because "Unknown" isn't a person—it's an artificial filler.

Open World

Knowledge Graphs use an "open world" approach. If you don't know a piece of information, you simply don't create that link yet. The system doesn't break; it just understands that the story is still being written. It is honest.

Design Impact

Understanding an An "Open World" approach means that thinking is directed towards a dynamic environment and no a static one which is what people have been used to.

Designing to a static model creates a different mindset.

I

Ahistorical Modeling versus Historical Modeling

Ahistorical Modeling (The "Static" Object)

In a traditional database, we treat the painting as a static item. When a scientist takes a sample, they are simply linking "Data Point A" to "Object B."

- **The Process:** You fill out a form for a "Sample." The form has a field for Source Object (the painting) and Admin Metadata (who took the sample, when, and how).
- **The Result:** The painting is just a "thing" on a shelf. The sample is just "admin work." There is no deeper context about where the painting came from or why the sample matters to its history.

Design Impact

ahistorical modeling is great for keeping track of data and workflow tasks, but it treats the object as if it has no past.

Approaches

SeaLit (Research Project)

“Historians in SeaLiT investigate the maritime labour market, the evolving relations among ship-owners, captain, crew, and local societies, and the development of new business strategies, trade routes, and navigation patterns, during the transitional period from sail to steam.”:

Compare

The National Archives Collection Care System (Operation - Practitioner-Researcher)

“The Collection Care team investigate the interaction of different teams involved in both routine and exceptional conservation processes and treatment developments. This means understanding the historical evolution of those treatments and their integration with historical context which informs those processes”:

Design Questions



What fields should we have in the database?



Do we all have to have the same fields?



What do we deal with 'unknowns', like an unknown person?



How do we deal with uncertainty?