InterPARES 2 Project

International Research on Permanent Authentic Records in Electronic Systems

Domain 2: The Concepts of Reliability, Accuracy, and Authenticity

Presentation to the Caribbean and Latin America InterPARES Dissemination Team

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Research goals of Domain 2

1. Explain the concepts of reliability, accuracy, and authenticity in each focus area –
   - the creative and performing arts
   - science
   - e-government

   – by examining the literature and

   by analyzing InterPARES case studies.

Research goals of Domain 2

2. Devise a theory of ideal record-making and record-keeping processes in the context of each activity.

3. Test the theory, for example:

- study record-making and record-keeping *in situ*;
- observe the effects of hardware and software evolution on records;
- establish a set of records on which to test guidelines for creation, maintenance and use.

Research goals of Domain 2

4. Develop high-level activity models that reflect commonalities and variations in record-making and keeping processes across disciplines.

5. Draft, test, and issue guidelines for records creators.

What will we produce?

1. Annotated bibliographies of the concepts of authenticity, accuracy and reliability in the arts, science, and e-government.
2. Scholarly papers that discuss the meanings of the authenticity, accuracy, and reliability in each activity, comparing and reconciling them;
3. Scholarly papers that present a theory of reliable record-making and record-keeping in each activity;
4. Guidelines for record creators, outlining methods for the reliable production and maintenance of records that can be authentically preserved.

How the work gets done

Research assistants and supervisors within each discipline.

Coordination at workshops: set deadlines, standards for bibliographic research.

Analysis of concepts collaboratively by team members, consulting with other focuses, domains, and cross-domains.

The Domain is represented at each case-study analysis and modeling session.

Sample results

General studies, including surveys or questionnaires that ask about authenticity

- composers
- photographers
- science data archives (in progress)
- government websites (in progress)

Sample results

Annotated bibliographies

Focus 1

- music
- theatre
- visual art
- photography
- sound preservation
- moving images
- architecture
- dance
- e-literature

Focus 2

- science
- geography

Sample results

Analysis of the meanings of “authenticity” in the arts

Different conceptions arise from the differences between the arts,

and even within each art, according to how the nature of the artwork is conceived.

How you preserve depends upon what you think you are preserving. (For example, preserving a recording is not necessarily preserving a musical work.)

Sample results

Generally, an interactive digital document is like music:

It is notated (represented in a “digital” symbol system for a performing means) to be presented on demand.

The user’s role in interactive systems is similar to situation with performer’s role: user as co-author.

To determine identity of the work and to develop appropriate notation, compare performances that the creator deems authentic.

Sample results (Focus 2)

What are conceptions of authenticity, reliability, and accuracy in science?

Scientists are concerned with identity of raw data: what phenomena they measure, and how, when, and where the measurements were obtained.

Data integrity means that the data have not been altered; provenance is crucial to integrity.

Results have integrity if all processes are documented, so it can be shown what products resulted from what processes.

Sample results (Focus 2)

What are conceptions of authenticity, reliability, and accuracy in science?

Reliable data are collected by a competent scientist using procedures and instruments that are reliable.

Reliability is a matter of degree. It involves completeness and repeatability. Reliability of procedure is more important than reliability of data. Procedures are reliable if they can be replicated.

The validity (truth) of results depends on reliability.

Sample results (Focus 2)

What are conceptions of authenticity, reliability, and accuracy in science?

Accuracy of data refers to their error and precision, that is, how closely they represent the true values (geographers' "ground truth") that were measured.

THUS

Replicating an experiment is like a performance.

Sample results (Focus 3)

E-government

Covered to some extent by InterPARES 1 research.

Concern for authenticity, but often confused with authentication.

Accuracy assumed, not often addressed.

Reliability often used to apply to delivery of services, not to the records themselves.

Appendix 1

Are there “authentic records” in the arts?

1. In diplomatic theory, a record stands for a fact or a functional ("enforceable") act arising in the course of a practical activity.

BUT

a. art does not stand for facts

b. art is not “practical”:

“literary compositions are those with no functional application…other than to be read”

Are there “authentic records” in the arts?

2. Duranti rules out diplomatic analysis to determine the authenticity and reliability of "documents expressing feelings and thought and created by individuals in their most private capacity, [because] the inner freedom of human beings is such that a strict observance of rules cannot be expected"

BUT

Art consists of such documents.

Nevertheless…

Artists do speak of authenticity and an associated concept, accuracy.

Let’s examine what they mean, “setting aside” archival notions for the moment.

Artworks are linked to acts

Levinson: "[A]uthenticity in all the arts involves a relation to a unique, historically positioned creative act…

“The authentic *Night Watch* is the one Rembrandt made on a definite occasion in 1642.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

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TIFF (Uncompressed) decompressor
are needed to see this picture.

“An authentic *Capriccio no. 43* is one pulled directly from a plate on which Goya toiled in 1779.

Correspondances

La Nature est un temple où de vivants piliers
Laissent parfois sortir de confuses paroles;
L'homme y passe à travers des forêts de symboles
Qui l'observent avec des regards familiers.

Comme de longs échos qui de loin se confondent
Dans une ténébreuse et profonde unité,
Vaste comme la nuit et comme la clarté,
Les parfums, les couleurs et les sons se répondent.

Il est des parfums frais comme des chairs d'enfants,
Doux comme les hautbois, verts comme les prairies,
— Et d'autres, corrompus, riches et triomphants,

Ayant l'expansion des choses infinies,
Comme l'ambre, le musc, le benjoin et l'encens,
Qui chantent les transports de l'esprit et des sens.

Baudelaire, Les fleurs du mal IV

"So too, an authentic copy of *Correspondences*,

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

“or an authentic performance of the *Tragic* Overture,

Artworks are linked to acts

"…is one that is intentionally (and usually also causally) linked to particular creative activity of Baudelaire and Brahms in 1845 and 1881, respectively."

Artifacts (material objects)

- "authentic" carries a primary sense of *original*
- Goodman: "a work of art [is] *autographic* …if and only if even the most exact duplication of it does not thereby count as genuine"
- Levinson: "Genuineness is based on and reflects a direct causal relation to the artist”
- Dutton: “nominal authenticity”

Two-stage autographic arts: photography, printmaking

- Each print instances the work.
- Autographic because an exact copy of a print is not authentic.
- Authenticity conferred by certification (either of the print itself, or of an entire collection of prints), which testifies of the print’s link to the creator.
- (Slight nuance: Negative or print could be the original, depending on the photographer’s purpose.)

Digital photography complications

- Is the “original” the raw data file, analogous to a negative?
  - But in its physical form it can’t be directly viewed, so how is it a “photograph”?
  - And files are easily copied, possibly hiding provenance.
- Is the “original” a video display of the file (certified by the photographer?)
  - But then the work involves particular equipment as well as the raw file.
  - And how can a temporary display be “original”?

Can an artifact be authentic in the diplomatic sense?

- It does have an author and a distinctive appearance—intellectual elements placed in a particular physical arrangement.
- BUT the form of every autographic work is unique -- "the notion of essential structure is inapplicable to painting as it presently exists" (Levinson).
- Therefore it is not meaningful to attribute an artifact's authenticity to its instantiation of some essential structure, some "documentary form".

So for allographic artworks, authenticity is…

simply the nature of the *link between the artifact and its putative author(s).*

(examples)

- A declaration of authenticity establishes "when, where and by whom a picture was painted…[questions that] are in some cases settled by a complete and dependable record of the work since it left the artist's hands." (Goodman)
- In chemical-based photography “the claim of authenticity [is] based on identification of a photographer…, a time and place of exposure..., and a chain of transmission.” (Mitchell)

What if the link cannot be established?

Identification can be made by "expert…comparison with works already accepted and works already rejected as…by the same artist". (Goodman)

BUT

- Such attributions of authenticity are at best tentative
- Changes in attribution change our perception

Authenticity without a definite individual author

- A vase can be “authentic Ming” if provenance can be demonstrated.
- A collectivity or culture is the “author”.
- Authorship may not necessarily involve a physical act of the artist. If a painting was made in Warhol’s studio according to a process prescribed by Warhol, it is authentic. Here authorship is a formal role (as in diplomatic theory).

Another sense of authentic (original): unaltered

- In recording-studio practice a distinction is made between an "original master" and a "production master", which is an alteration of the original. (Borwick 1980).
- This connotation harmonizes nicely with the diplomatic conception of authenticity, which is threatened by any "manipulation" of the record.

Allographic arts

- Works are not tangible artifacts.
- A work may be multiply instanced.
- “Exact duplications” count as genuine.
- How is this possible? "[a] definitive identification of works fully freed from history of production, is achieved only when a notation is established." (Goodman 122).

Music

- Sound structures, that is, a temporal experience
- Often for a specific means of performance
- Often identified with a creator (composer)
- Various types: for live performance, for studio performance, “simulated performance”, not for performance (recorded playback only).
- Specified by SCORE or EXEMPLAR.

Authenticity of notated works

A musical work is authentically instanced whenever its notated sound events are played.

The score is not the work; the work exists as it is performed, realized, displayed,presented.

Performance authenticity defined

- "An ideally authentic performance is a performance that is *faithful* to what is determined in the musical notation according to the conventions appropriate to the interpretation of that notation."
- "an authentic performance is (at least) an *accurate* performance, [that is] a performance that reproduces all that is constitutive of the work's individuality." (Davies)

All musical works are not constituted equally

- “Thinly specified”, e.g. a lead sheet; generally all works for performance are underspecified. The performer is essential to realizing the work (and so is an author?)
- “Thickly specified”: at its extreme, a piece whose only authentic performance is the playback of a recording.

Performance authenticity is relative

- "an inauthentic performance is a performance that misrepresents the work of which it is a performance while remaining recognizable as a performance of the given work, despite its inaccuracies." (Davies)
- Authenticity in this view is a matter of degree: to the degree that a performance is faithful to score and convention, it is authentic.

Is the score an artwork?

- NO: it is merely a set of instructions for producing (performing) the artwork
- ANY accurate copy of a score, even a forgery (deceptively attributed to the composer), can be used to produce an authentic performance (that is, the authentic work)!

Conventions essential to the work

- Authenticity of performance requires also following the (often unrecorded) conventions associated with the making and interpretation of the score. Examples: Strauss waltzes; “swing”.
- Thus "the identity of a work… varies with the conventions under which the score is understood." (Grier).
- In order to preserve a work so that it can be performed authentically we must not only preserve its notational symbols (which could be done by preserving an authentic document), but also preserve these conventions by which the author intended the symbols to be interpreted.

Score reliability and performance authenticity

So if a score is complete if a performer following it produces what the composer judges to be an authentic performance.

Then authentic performance can guide the creation of reliable scores: Creators can decide how to notate a reliable score by comparing all performances they judge to be authentic. What such performances have in common completely specifies the work (under implied conventions).

Other “analog” allographic art similar to music

- Dance
- Theatre
- Film? (like music for playback?)

To some extent, they could be said to involve

- Notation that distinguishes instances of the work from non-instances.
- Conventions that govern the interpretation of the notation.

Many new artworks are allographic

- Minimal works “refabricated” for each new show, according to artists’ instructions
- Installation art, involving interaction and multi-sensoral experiences.
- Digital photographs?

Digital artworks are allographic

“When preserving and representing media-based works of art, we should give up the notion of a single, authentic object and view these works as sets of instructions rather than precious originals”. (Rinehart)

Intentional authenticity

- An artwork is authentic in this sense if it is *faithful* to the artist's *intentions*.
- Artists' certification of authenticity, mentioned in discussions of photography and the plastic arts, are one way that faithfulness can be determined (Warburton).
- Instructions/scores indicate intent.

“Personal” authenticity

- For very “thin” works in which the artist is the performer, this is how clearly a performance manifests the original and unique qualities of the artist herself. “An 'authentic' performer exhibits realism, lack of pretence, or the like" (Moore).
- the display of the artist is the artwork, unmediated by a document.

Verisimilitude

- An authentic work *represents its subject truly*
- Sound recording: “fidelity”; An "authentic recording" is one that is free of noises introduced by the recording/copying/playing processes
- Photography:

“having-been-there”.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

From the Editor: A Special Message

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

In the July 2004 issue of National Geographic, we published a story about elephant hunting in Tanzania by the Barabaig people. To our profound disappointment, we have learned that we were misled by the photographer and that three of the published photographs do not accurately depict the situation described in the accompanying text.

On pages 78-9 (photograph above), the picture caption reads that hunters are carrying "tusks taken from an elephant found dead in the bush." Soon after the article was published, several readers pointed out that there are faint but unmistakable numbers on the tusk on page 78—which we failed to notice before publishing the story. We now know that the tusks belong to the Tanzania Department of Wildlife. When we asked photographer Gilles Nicolet to explain, he admitted that he himself had supplied the tusks to the hunters after borrowing them from local wildlife authorities.

Legal implications

- The ability of an image or sound to stand as a "reliable" witness to truth is essential to the legal system. (Ritchin).
- "[T]he ‘truthfulness of facts’ in a photograph has always been presumed to reside in its verisimilitude" (Thompson)

SO: preservation strategies for evidentiary purposes may differ than those for artistic purposes.

Accuracy and verisimilitude

- The more fully the photograph accommodates the detail, tonal range, and perspective that a viewer would perceive in the real object—the more the image is seen as the real thing is seen—the more truthful it is. (Thompson).
- Accuracy in this context, then, signifies the quality of a work that facilitates the viewer seeing the photographed subject as if seeing the actual subject. It is the responsibility of the creator (Ritchin) -- like diplomatic reliability.

“Restoration” to achieve verisimilitude

"The quality of an e-document can be enhanced by algorithmic methods…shapes and forms can be made more distinct, shadows can be washed away. Restoration of e-documents must be considered as part of preservation." (Lindquist)

Similar in sound engineering:

"an ideal restoration would then reconstruct the original sound source exactly as received by the transducing equipment…” (Godsill and Rayner)

True representation is impossible

- All recording is from a point of view, so not “true”. Supposedly objective records are art.
- In realizing this, “the primary reference shifts from object to subject. Truth now refers not to accurate representation of the object seen but, rather, to accurate representation of the artist’s response to the object or view” (Thompson 28).
- SO “true” redefined as intentionally authentic!!

Summary

Art theory	Diplomatics
• visual art: the nature of the link between an object and its creator	• “authenticity”
• music: the faithfulness with which a performance realizes the score	• “accuracy”
• photography: verisimilitude	• “reliability”
• “personal authenticity”	• (Stelarc: “The body is the record”)

Appendix 2

To preserve any digital object one must:

1. keep it continually accessible in its intended form

and

2. keep it safe from tampering and unintended modifications

1. Identity

+

2. Integrity

= Authenticity

General challenges of preserving digital records

- Fragility of storage media
- Short life spans of software and hardware
- Ease of copying/repurposing obscures authorship
- Lack of standards for identity and integrity metadata
- Difficulty of controlling access to “originals”

Challenges of archiving digital works

- Contents are simply bits
- Perfect copies easily made
- Easy to alter & repurpose
- Obsolescent, proprietary software/hardware
- Lack of metadata standards
- Form not self evident
- Original context obscured
- Authorship effaced
- Hard to maintain and control access
- Description problematic

Crucial question: can they be preserved…

authentically?

What is electroacoustic music?

Music made with electronic sound-producing devices.

Historical sketch:

- Early 1900s: Theremin (1918); Ondes-Martenot (1928)
- 1950s: *musique concrète* and analog synthesis; Paris, Milan, Köln; Schaeffer, Berio, Stockhausen
- 1960s: computer music, digital hardware synthesis
- Representations developed: MIDI, C-Sound, Max, Finale
- Today: software synthesis and control; interactivity

Preservation problems special to electroacoustic music

- Widely varying types of electronic documents: digital, non-digital
- Special, in many cases unique, “instruments”
- Authors’ lack of expertise in preservation
- Authors’ lack of interest in preservation
- Questions about identity:

  What constitutes a musical work?

  Which digital objects are essential?

  Who are the real authors? (composer? performers? technicians?)

Theoretical studies

Stephen Davies, “Ontologies of Musical Works”

- Works not for performance:
  - ◊ stored as encoding
  - ◊ preservation reduced to preserving sound recording
- Works for performance: transmitted via instructions or exemplar
  - ◊ Works for studio performance/“virtual” performance
  - ◊ Works for live performance
  - ◊ Need to preserve instructions and interpretive conventions, including instruments.
- Works vary in how “thickly” they are specified.

Theoretical studies

Meanings of “authenticity”

1. In sound preservation literature:

- Unaltered from the original recording (Lazar)
- Fidelity: free of noises introduced by recording, copying, or playback.
- Approaching the acoustic experience of the original sound (Copeland, Fox), that is, “verisimilitude”.

2. In performance-practice literature:

- “An ideally authentic performance is a performance that is faithful to what is determined in the musical notation according to the conventions appropriate to the interpretation of that notation.” (Davies)

3. In diplomatic theory:

- An *authentic record* is a document, created or received in the course of an activity, that is what it purports to be, and that stands for the action that it documents.
- Every record derives its identity partly from its documentary, juridical, and provenancial contexts. (Duranti)

Survey of creators' practices

Of 161 responding composers:

- 43 percent produce interactive electroacoustic music of some kind
- 47 percent have lost files they considered valuable through hardware or software obsolescence
- There is an even split about whether a score-less musical work is best represented by the pre-existing digital documents that define and delimit its possibilities, or by an audio (or video) record of what actually happens.
- Most of the software they use (76 percent) is commercial, off-the-shelf product.

Other general studies: MUSTICA

A collaboration of InterPARES with French agencies that commission and produce electroacoustic compositions:

Groupe de Recherches Musicales (GRM) of L'Institut National de l'Audiovisuel (INA) and

Institut de Recherche et Coordination Acoustique/Musique (IRCAM)

Goal: to create a typology of the records generated by the composition and performance of interactive computer music

- interviews with composers and technicians
- prototyping of a database repository

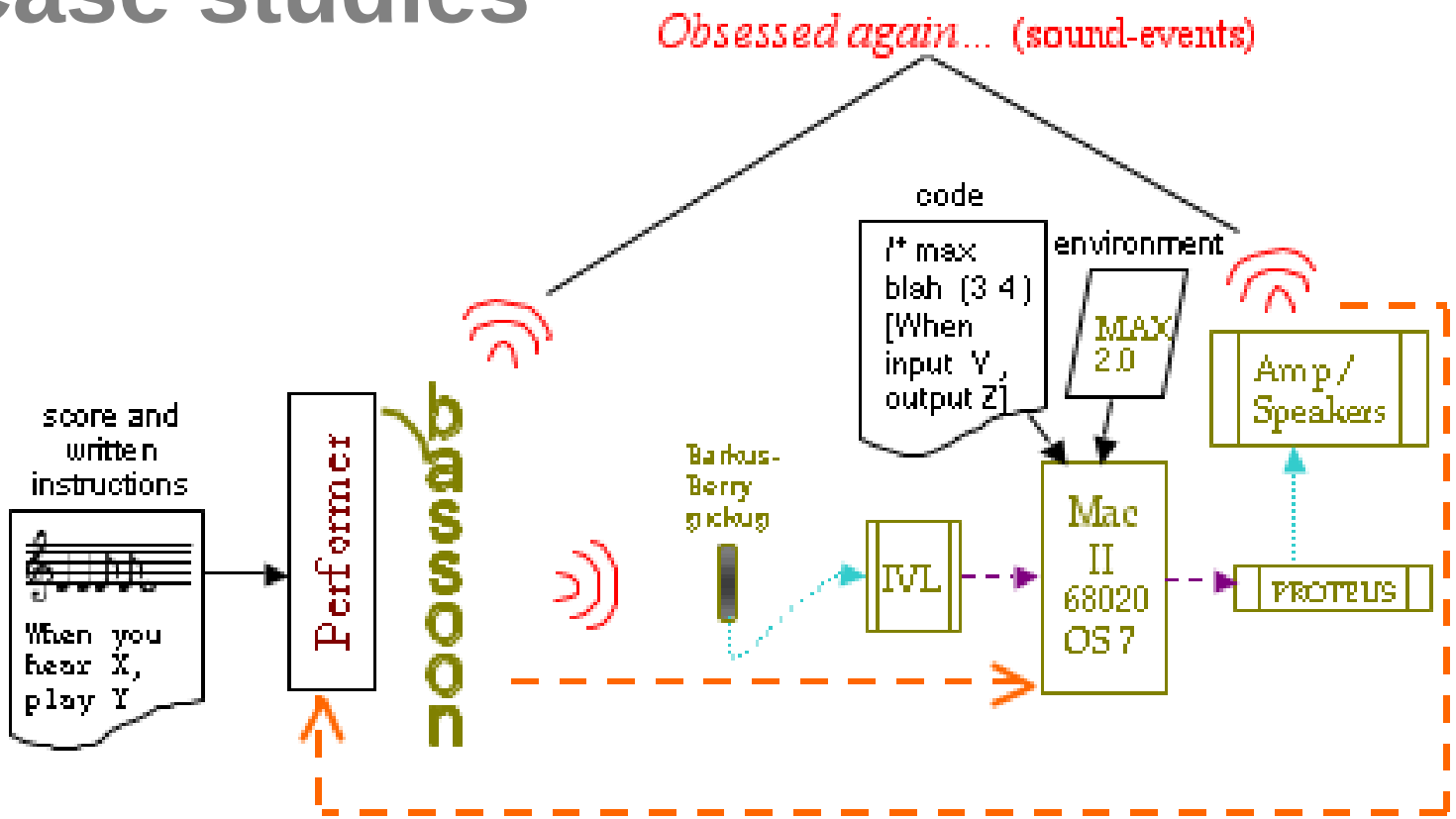
Case studies

Obsessed again... for bassoon and interactive electronics, by Keith Hamel (Canada).

Commissioned and first performed in early 1990s.

- It is a typical interactive electroacoustic work for performance
- It presents typical issues of obsolescence

Case studies



MIDI signals
Analog-electrical audio signals
Instructions
Interactive signals
Descriptor Composer-specified instrumentation

Case studies

Obsessed again... for bassoon and interactive electronics, by Keith Hamel (Canada)

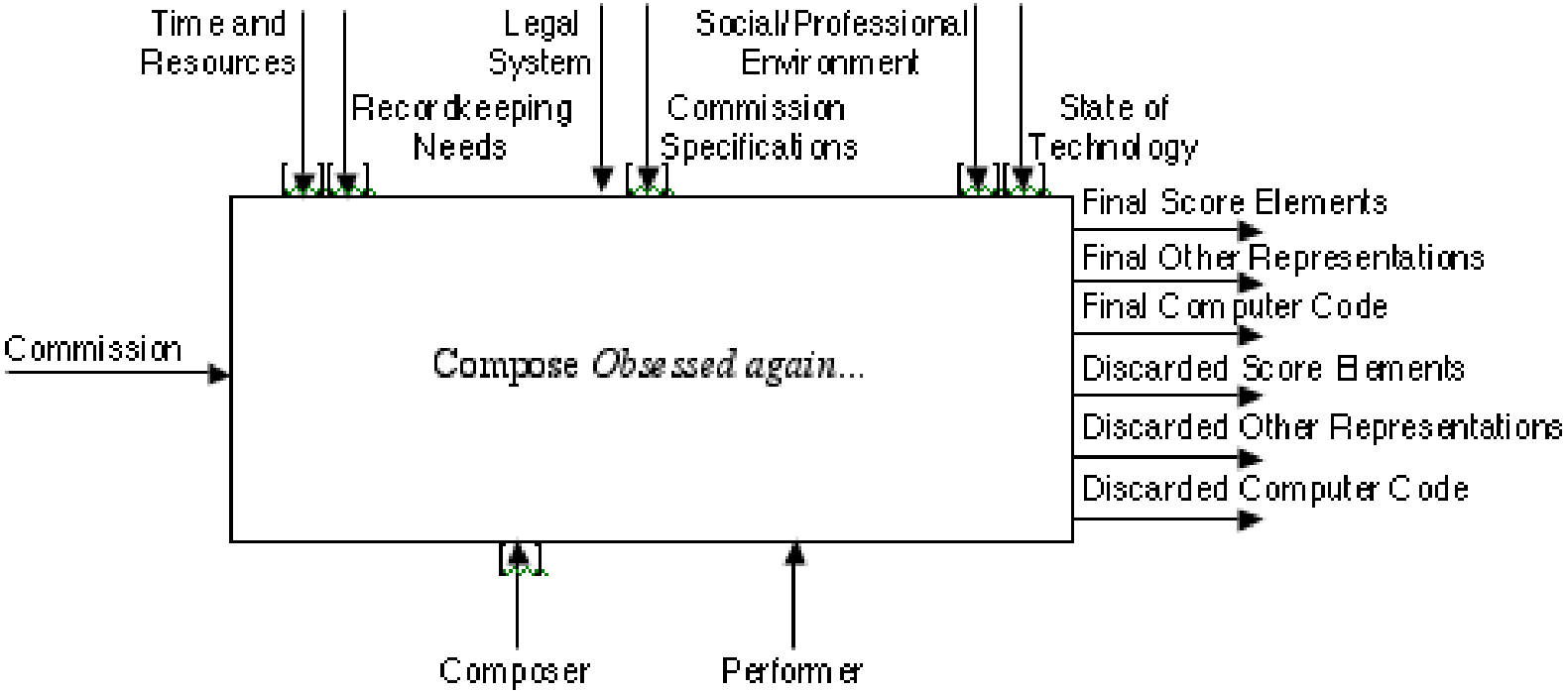
Examples of interactions (audio examples*)

1. Computer sounds triggered by bassoon pitch.
2. Computer matches and sustains bassoon pitches.
3. Repeated bassoon pitches trigger different computer events.
4. As above, but bassoonist also follows computer's beat.

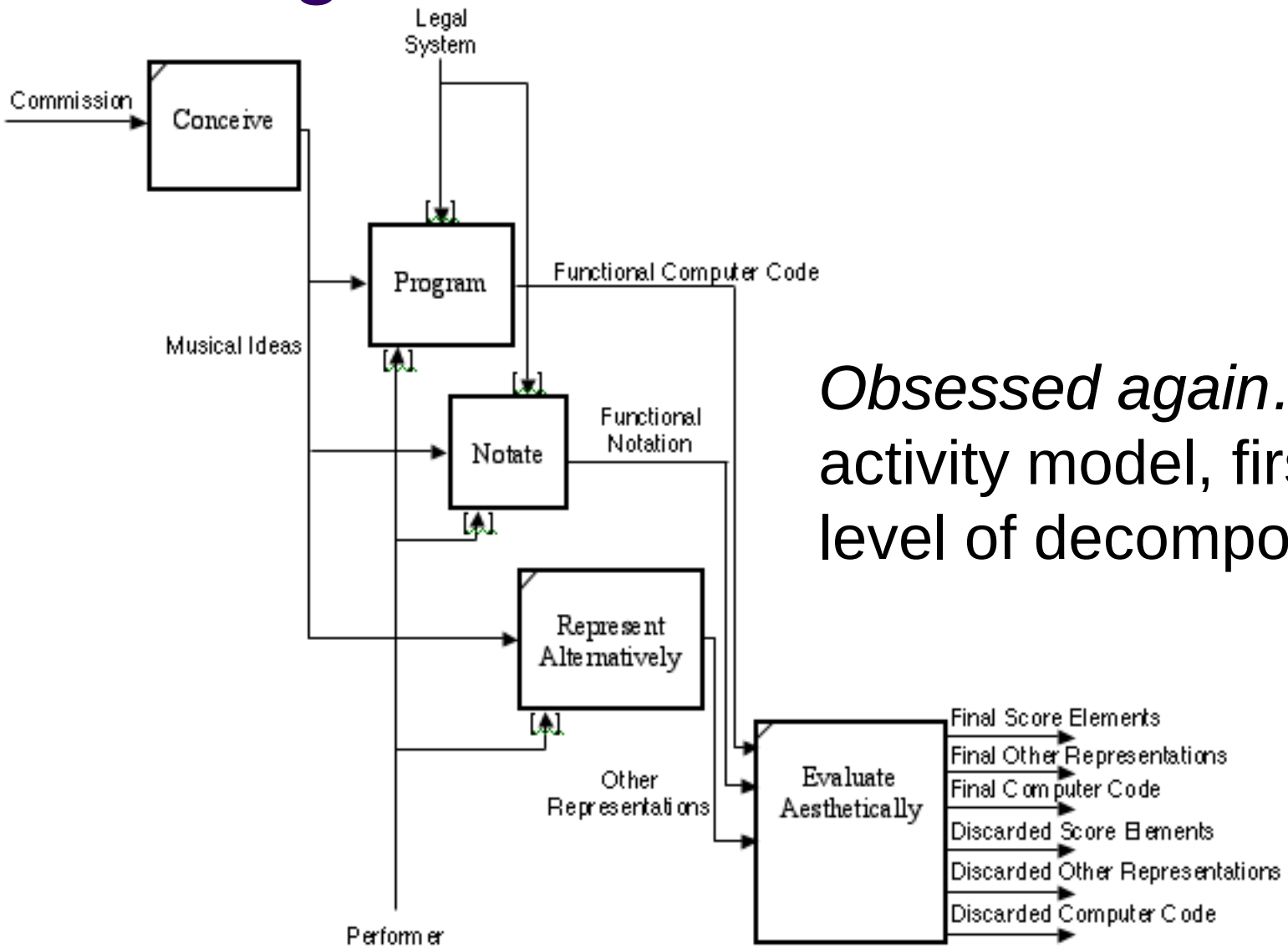
(*Recording reproduced by permission of the composer, Keith Hamel, and the performer, Jesse Read)

Modeling

Activity model (BPWIN) of composing *Obsessed again…*, top level



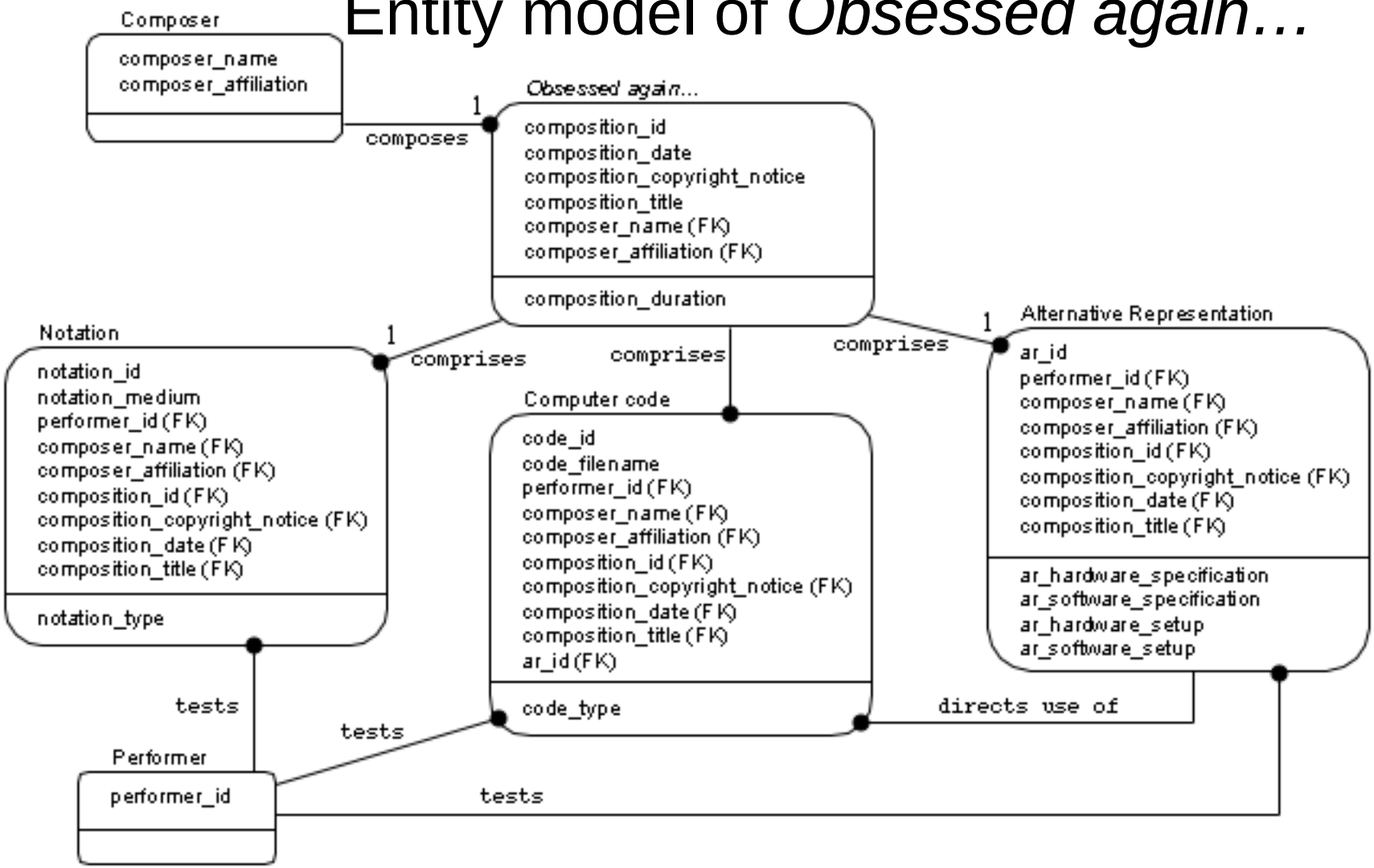
Modeling



Obsessed again…
activity model, first level of decomposition

Modeling

Entity model of *Obsessed again…*



Modeling

What the modeling so far shows:

- As now specified, the identity of *Obsessed again…* is tightly bound to idiosyncratic, obsolete hardware technologies;
- Work-characteristic interactivity is specified only implicitly;

But the composer says he conceives of the work essentially in a technologically independent way,

So to preserve the work, it must be renotated accordingly (and with the metadata shown in the entity model).

Coming soon:

- Case study continues as composer attempts migration.
- This model feeds into general model, along with models of other cases.

Case study 2

Waking Dream, for two dancers and audiovisual electronics, by Sidney Fels, Baerbel Neubauer, and Sachiyo Takahashi*.

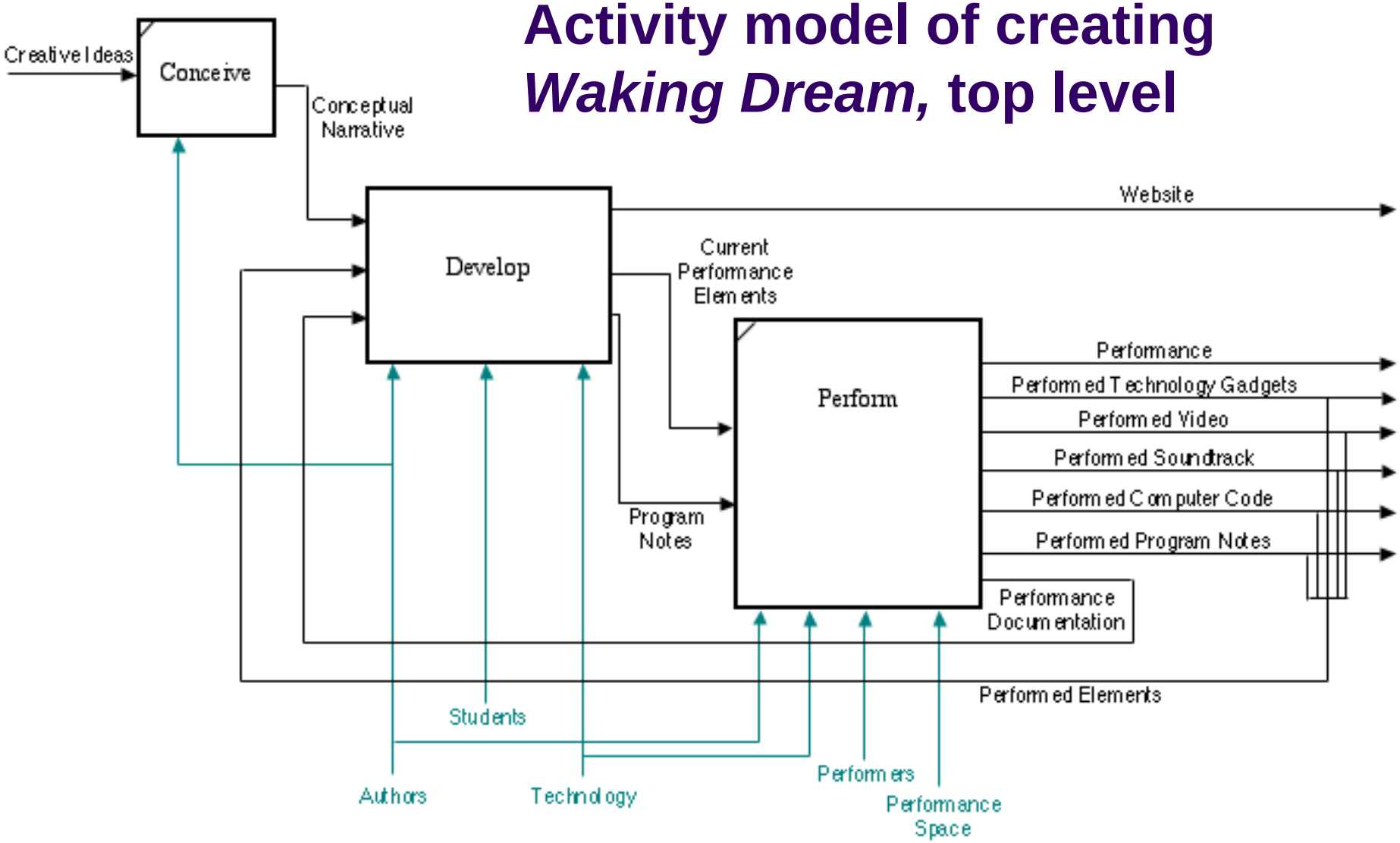
What is essential to the identity of the work?

- Narrative sketch
- Technological gadgets (obsolete!)
- Its performance (dance, music, video feedback, touch)
- Web site

(*Video reproduced by permission of the authors)

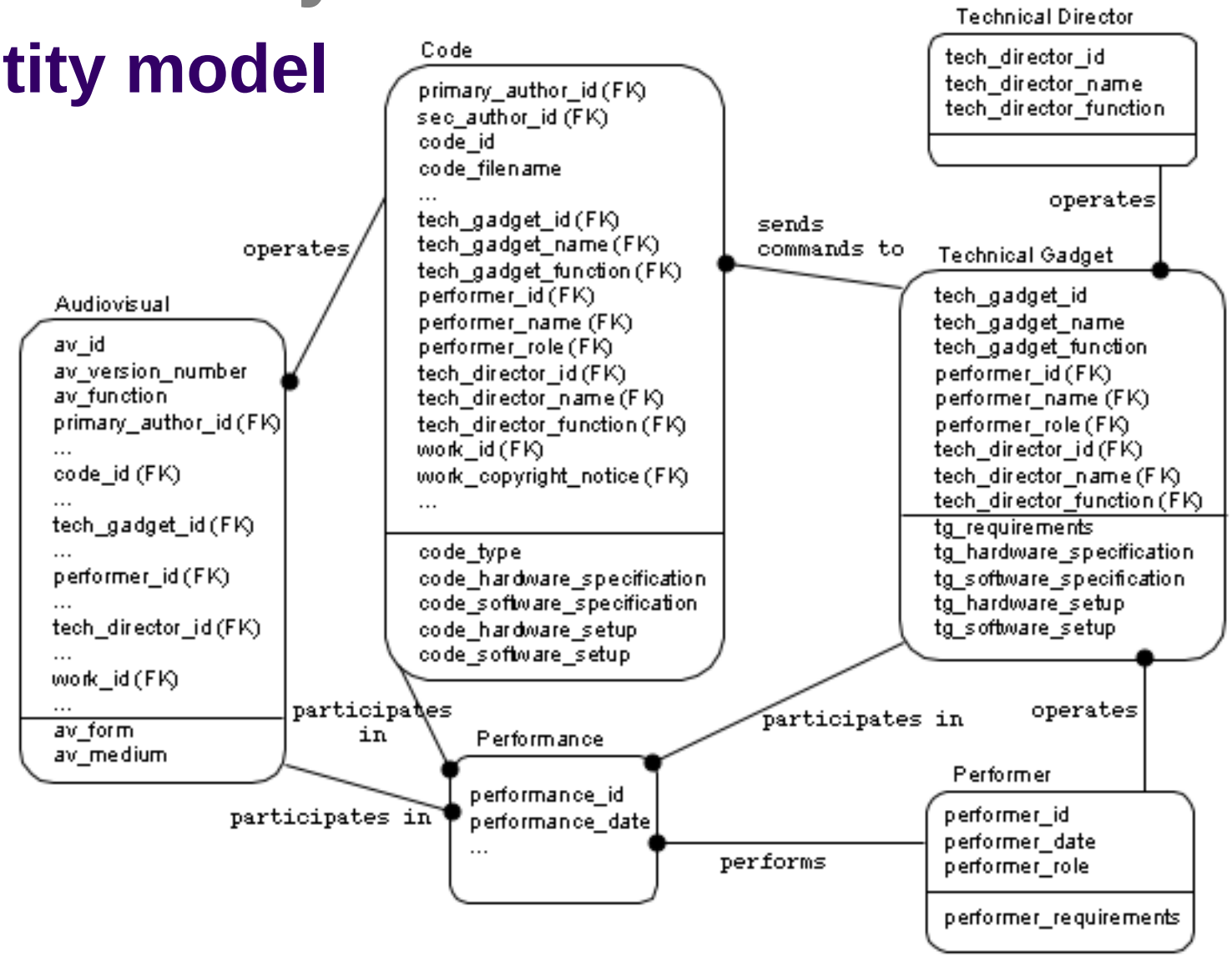
Case study 2

Activity model of creating *Waking Dream*, top level



Case study 2

Entity model



Modeling

What the modeling so far shows:

- As now specified, the identities of *Obsessed again…* and *Waking Dream* are tightly bound to idiosyncratic, obsolete hardware technologies;
- Work-characteristic interactivity is specified only implicitly;

But the authors claims they conceive of the works essentially in a technologically independent way,

So to be preserved, the works must be renotated accordingly (and with the metadata shown in the entity model).

Coming soon:

- Case study continues as authors attempt migration.
- This model feeds into general model, along with models of other cases.

Some recurring themes

- Preserving digital works for performance means, at least, preserving the ability to perform them. Recordings may be necessary but they are rarely sufficient.
- There are many varied records associated with a work, including drafts, correspondence, and contracts, that form a context for the work's identity. Preserving a work requires maintaining the relations among these records.
- Modeling the entities and activities of creation helps determine the interdependencies of authors, performers, and technology that identify the work.
- Some of the content essential to the identity of these works may derive originally from properties of unpreservable electronic devices. By comparing authentic performances, one may be able to determine what is essential to the work's identity, and so what should be preserved.

Some recurring themes

- Creators, while they are still living, are the best arbiters of the authenticity of performances. So creators should describe works in technologically independent (and authentically preservable) ways that will allow authentic performance in the future.
- To preserve a work authentically, its metadata should provide information about identity and integrity.
- Because the procedure of systematically migrating pieces onto new technological platforms to keep the pieces playable is labor-intensive, it may be that institutions are best equipped to carry out preservation functions.
- Learning how to preserve interactive electroacoustic music may teach us how to preserve other interactive experiences, such as citizens‘ online transactions with government.