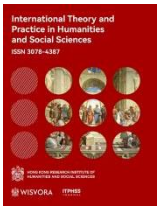
WISVORA

International Theory and Practice in Humanities and Social Sciences
2026 Volume3,Issue4 ISSN 3078-4387



From Prototype to Claim: A Short Traceability Protocol for Immersive Design Research

Xiangting Jiao[1]* Ahmad Rashidi bin Hasan[1]

[1]*Faculty of Creative Industries, City University Malaysia, Petaling Jaya, Selangor, Malaysia.*

Accepted

2026-07-15

Keywords

practice-based research; research through design; virtual reality; prototype; traceability; evidence; reflexivity

Corresponding Author

Xiangting Jiao

https://doi.org/10.70693/itphss.v3i4.660

Abstract

Practice-based immersive design research produces rich artefacts but often weakly traceable claims. Prototype operation, designer reflection, technical traces, participant accounts, and theoretical interpretation may be combined even though they support different inferences. This short article proposes the Prototype-to-Claim Traceability Protocol (PCTP), developed through methodological synthesis and demonstrated through an artefact-centred reconstruction of four immersive VR prototypes: *Resonance of Light*, *Breathing Space*, *Temporal Displacement*, and *Echoes of Self*. No participant quotations, outcomes, recordings, transcripts, or personal data are reported. The protocol separates five evidence classes and pairs them with descriptive, relational, explanatory, and transfer claims. Its six-stage workflow covers evidence planning, source identification, artefact versioning, source-near coding, claim–evidence mapping, and negative-case/verb auditing. The PCTP treats absent or retrospective records as limits rather than invitations to reconstruct evidence. It offers a compact method for retaining the epistemic value of making while increasing auditability, reflexivity, and ethical restraint.

1. Introduction

Creative technology research advances through making. A prototype is built, encountered, revised, and interpreted; materials reveal possibilities not available in advance. The epistemic role of practice is established across artistic research, practice-as-research, and research through design (Borgdorff, 2012; Candy & Edmonds, 2018; Frayling, 1993; Nelson, 2013; Zimmerman et al., 2007). However, because making generates several forms of evidence at once, an account may slide between what an artefact does, what a designer intended, what happened during an encounter, and what a theory appears to explain.

The problem is acute in immersive design. A VR prototype includes hardware, software version, tracking and mapping, audiovisual form, bodily activity, and spatial context. It may change between sessions. A parameter adjustment can alter both operation and interpretation. If

the build, source, and timing are not recorded, a final polished artefact may be treated incorrectly as the source of every observation.

Rigour should fit the purpose and internal logic of design inquiry (Fallman & Stolterman, 2010), while transparency, sincerity, and meaningful coherence remain relevant qualitative criteria (Tracy, 2010). Creative research does not need to imitate experimental science when its contribution is a situated artefact or transferable design proposition (Gaver, 2012). Recent practice studies likewise show how immersive storytelling and interactive design knowledge can emerge from sustained making (Polydorou, 2024; Wragg & Barnes, 2021). It nevertheless needs traceability: can a reader follow the route from a design operation to a source and from that source to a proportionate claim?

This article proposes the Prototype-to-Claim Traceability Protocol (PCTP). It asks: **How can immersive practice research preserve the generative value of making while making claims explicit, reviewable, and ethically bounded?** The protocol is illustrated through four prototypes from doctoral design practice. They function only as artefact-centred examples. Human-participant evidence is excluded because any such claim must remain linked to original, auditable records.

2. Prototypes and Evidential Ambiguity

A prototype is simultaneously a proposal, an experimental arrangement, a record of choices, and a prompt for experience. Its epistemic density creates ambiguity. In a breath-responsive chamber, code may show that a respiratory signal changes scale; a log may show that smoothing was adjusted; a designer note may record an intention to support attention; and a participant may describe calm. These sources are related but do not support the same claim. Code supports operation, a note supports intention, and a traceable account supports a situated interpretation. None alone demonstrates a general physiological effect.

Ambiguity is frequently concealed by verbs. Statements such as “the environment calms users” or “the avatar understands emotion” compress operation, experience, and explanation. A defensible account identifies which part is documented, which is inferred, and which alternatives remain possible.

Evolving artefacts also complicate provenance. A screenshot may come from one build and a technical trace from another. Negative cases can disappear when a polished version replaces an unstable build. Version control is therefore an epistemic record, not merely a software convenience. A minimum version entry connects a build identifier, date, hardware/software configuration, changed parameters, known defects, and the evidence generated under that version.

3. Evidence Classes and Claim Levels

The PCTP separates five evidence classes. Class A, **artefact operation**, includes builds, code, diagrams, mappings, and parameters. Class B, **design process**, includes dated journals, commits, sketches, calibration records, and rejected alternatives. Class C, **technical trace**, includes logs, timestamps, tracking confidence, sensor streams, and screen capture from a specific run. Class D, **situated encounter**, includes consented observation, traceable participant accounts, questionnaires, or measures linked to a session and version. Class E, **interpretation**, includes coding, thematic relations, theoretical mapping, and design propositions.

Claim level	Required basis	Suitable example	Unsupported escalation
Descriptive	Class A or B plus version	"Motion was replayed after an adjustable delay."	"Delay caused reflection."
Relational	Two linked sources, such as A+C	"A one-second buffer produced visible separation between current and returned motion."	"One second is universally optimal."
Explanatory	Convergent evidence plus Class E and alternatives	"Perceptible separation supported an interpretation of mediated time in this case."	General causal or clinical effect
Transfer	Cross-case/theoretical support and boundaries	"Visible temporal difference may support reflective attention when correspondence remains legible."	Universal design rule

The distinction is not a hierarchy in which every paper must reach transfer. A precise descriptive claim may be the appropriate contribution. Causal, therapeutic, population, and long-term claims remain outside the protocol unless supported by a research design able to establish them.

4. Six-Stage Protocol

Stage 1—Plan the evidence. Bound an inspectable design relation and state which evidence classes will be collected. If human participants are involved, document prior ethics approval or exemption, recruitment, consent, withdrawal, privacy, retention, and deletion according to the responsible institution. Approval information must be copied from the original record, not reconstructed.

Stage 2—Identify sources. Assign each source a stable identifier containing project, prototype, version, class, date, and sequence, for example EAF-TD-v03-C-20250317-02. Human records add a non-identifying session code; the identity crosswalk is stored separately.

Stage 3—Freeze the artefact. Archive the build, source commit/export, device configuration, software versions, parameters, known failures, and third-party asset licences. The final build must not overwrite the version that generated relevant evidence.

Stage 4—Code before theory. Begin with source-near codes such as "delayed return," "visual persistence," or "sensor smoothing," then map them to mediation, embodiment, presence, or reflection. Reflexive thematic analysis is interpretive; transparency is achieved by showing the analytic path rather than claiming mechanical objectivity (Braun & Clarke, 2006, 2021; Finlay, 2002).

Stage 5—Build a claim–evidence matrix. For each principal statement, record claim level, source IDs, prototype version, analytic step, alternative explanation, missing evidence, and proposed verb. An unsupported claim is narrowed, reframed as intention, or removed.

Stage 6—Audit negative cases and verbs. Retain mappings that were not noticed, delays associated with discomfort, sensor instability, and effects that dominated bodily attention. Negative cases refine a contribution rather than interrupt a success narrative. Calibrate the final verbs: "implements," "records," "was associated with," "was interpreted as," and "demonstrates" carry different burdens.

5. Artefact-Centred Demonstration

Resonance of Light mapped head-rotation velocity to chromatic transition, luminous particles, and audiovisual rhythm. Class A material can support the claim that movement modulated non-representational form. The statement "abstract light produced bodily resonance" would require version-linked encounter evidence. Without it, a proportionate proposition is that movement can become a compositional variable through rhythmic mapping.

Breathing Space mapped a processed respiratory signal to chamber scale, light, and sound. Class A–C records can support claims about sensor mapping, smoothing, and output. They cannot establish reduced anxiety or improved respiration. The transferable design issue is the balance between legibility and mechanical predictability: excessive sensitivity creates fluctuation; excessive smoothing conceals reciprocity.

Temporal Displacement returned semi-transparent motion traces after adjustable delay. Build comparisons can show when a trace becomes visibly separable, while logs confirm timing. A statement that one delay is "optimal" requires an explicit criterion and comparison. A bounded proposition is that latency can become aesthetic material, while increasing temporal difference risks weakening agency, comfort, and intelligibility.

Echoes of Self returned tracked movement through an abstract luminous avatar and transformed sound. The traceability task is to distinguish sensed variables from inferred states. If voice amplitude or classifier output changes colour, the system maps a signal; it does not "understand emotion." A defensible proposition is that partial correspondence can stage recognition and estrangement without photorealism. Claims about self-awareness or empathy require separately defined and traceable evidence.

Across the cases, the PCTP separates what the artefact demonstrably does from what a person may experience and what a researcher infers. This preserves the creative ambition of rhythm, reciprocity, delay, and mirroring while making the limits of evidence visible.

6. Ethics, Absence, and Minimum Archive

Traceability is inseparable from ethics. Human material requires prior institutional review where applicable, voluntary informed consent, power-sensitive recruitment, privacy protection, and documented retention. Anonymisation requires stable anonymous identifiers and a separately secured identity crosswalk. Quotations must be checked against original recordings or transcripts. Images and screenshots need authorship, licence, and consent checks.

Retrospective reconstruction has a narrow status. A dated memo may record what a researcher currently remembers and why a file is absent. It is Class B evidence of present recollection, not a replacement for a lost transcript, consent form, or approval letter. Committee names, reference numbers, dates, quotations, and demographics must not be invented to complete a manuscript.

A minimum archive contains: (1) a project manifest stating the question, roles, ethics/data status, and retention; (2) a version register; (3) an asset-rights ledger; (4) an evidence index; (5) an analysis trail including negative cases; and (6) the claim–evidence matrix. The platform can be a spreadsheet, research notebook, or controlled repository. Stable identifiers, backups, access control, and a retention plan matter more than technical complexity.

7. Discussion and Conclusion

The PCTP does not make practice research scientific by adding administration. It protects

what is distinctive about design inquiry. An artefact can remain open and poetic while its research account becomes precise about provenance and inference. The protocol also changes practice: a version freeze encourages conscious iteration, a negative-case field preserves breakdown, and a verb audit reveals when theoretical desire has exceeded the material.

The protocol was demonstrated through one connected family of prototypes and should be tested in collaborative installations, mixed reality, biosensing, and machine-learning projects. Its evidence classes can overlap; a screen recording may be both artefact documentation and technical trace. Researchers should state the source's primary role rather than force exclusive categories.

In conclusion, immersive practice research needs a clear route from making to saying. The PCTP provides that route by separating evidence classes, calibrating claim levels, and treating missing evidence as a boundary. A prototype can still support valuable knowledge about mapping, form, iteration, and trade-offs without unsupported psychological or causal claims.

Declarations

The four prototypes originated in the first author's doctoral research at City University Malaysia. This article reports no participant quotations, outcomes, recordings, transcripts, or personal data. Funding: [confirm]. Conflict of interest: [confirm]. Author contributions: Jiao Xiangting—conceptualisation, methodology, design practice, writing; Ahmad Rashidi bin Hasan—supervision, validation, review. [Both authors to confirm.]

References

Borgdorff, H. (2012). *The conflict of the faculties: Perspectives on artistic research and academia*. Leiden University Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology, 18*(3), 328–352. https://doi.org/10.1080/14780887.2020.1769238

Candy, L., & Edmonds, E. (2018). Practice-based research in the creative arts: Foundations and futures from the front line. *Leonardo, 51*(1), 63–69. https://doi.org/10.1162/LEON_a_01471

Fallman, D., & Stolterman, E. (2010). Establishing criteria of rigour and relevance in interaction design research. *Digital Creativity, 21*(4), 265–272. https://doi.org/10.1080/14626268.2010.548869

Finlay, L. (2002). Negotiating the swamp: The opportunity and challenge of reflexivity in research practice. *Qualitative Research, 2*(2), 209–230. https://doi.org/10.1177/146879410200200205

Frayling, C. (1993). *Research in art and design* (Royal College of Art Research Papers, Vol. 1, No. 1). Royal College of Art.

Gaver, W. (2012). What should we expect from research through design? In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 937–946). Association for Computing Machinery. https://doi.org/10.1145/2207676.2208538

Nelson, R. (2013). *Practice as research in the arts: Principles, protocols, pedagogies, resistances*. Palgrave Macmillan.

Polydorou, D. (2024). Immersive storytelling experiences: A design methodology. *Digital Creativity, 35*(4), 301–320. https://doi.org/10.1080/14626268.2024.2389886

Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837–851. https://doi.org/10.1177/1077800410383121

Wragg, N., & Barnes, C. (2021). Advancing interactivity: Graphic designers' practice-based contribution to developing the Web. *Digital Creativity, 32*(2), 143–164. https://doi.org/10.1080/14626268.2021.1898987

Zimmerman, J., Forlizzi, J., & Evenson, S. (2007). Research through design as a method for interaction design research in HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 493–502). Association for Computing Machinery. https://doi.org/10.1145/1240624.1240704