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International Society of the Learning Sciences

# Design-Based Approaches to Co-Analysis in Collaborative Research

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**Abstract:** Research-practice partnerships (RPPs) and design-based implementation research (DBIR) emphasize co-design with stakeholders, yet approaches for collaborative data analysis remain underdeveloped. This paper examines how design approaches can scaffold qualitative and quantitative inquiry for diverse partners in co-analysis processes. We present two working examples: the TRACE Project, which developed a community-driven taxonomy of arts program outcomes through collaborative classification with 26 community arts organizations, and the Whole Child Analytics Project (WCAP), which employed AI-assisted reflection tools to measure college and career readiness competencies through teacher and student co-design in a large, urban school district. Through these cases, we illustrate methods for creating spaces that afford meaningful engagement from all partners while honoring multiple perspectives, voices, and worldviews in the analysis process.

## Introduction

Methodologies like research-practice partnerships (RPPs) and design-based implementation research (DBIR) have gained prominence in the learning sciences for their emphasis on co-design with stakeholders. These approaches are built on principles of trusting relationships, long-term collaboration, and mutualism, where researchers and practitioners contribute their unique expertise toward shared goals (Coburn & Penuel, 2016; Fishman et al., 2013; Fishman & Penuel, 2018; Penuel et al., 2011). Effective partnerships require transparency, shared decision-making, and respect for each partner's roles and expertise. Sustained engagement over time allows partners to co-develop goals, adapt to changing needs, and build cumulative knowledge that short-term projects cannot achieve.

While co-design processes have been well-documented in the literature (e.g., Goldman et al., 2022; Philip et al., 2022; Lee et al., 2024), approaches for co-analysis—collaboratively interpreting data and generating meaning—remain underdeveloped. This gap is particularly significant given the commitment of RPPs and DBIR to honoring multiple perspectives, valuing the presence of diverse materials and meanings, and engaging in shared processes of inquiry, dialogue, and reflection (Ahn et al., 2024). The question emerges: How do we use design in the analysis process to scaffold inquiry for all partners? Furthermore, how do we create spaces that afford meaningful engagement from all stakeholders in making sense of data? This paper addresses these questions by examining moments of design throughout the research process and presenting two working examples that illustrate different approaches to co-analysis.

## Theoretical framework

Our work is situated within sociocultural theories of learning that emphasize the importance of context, community, and collaborative meaning-making (Esmonde & Booker, 2017). Traditional approaches to measurement and assessment in educational settings have often been top-down and theory-driven, particularly in school-based contexts guided by cognitive theory. In contrast, our approach draws on connected learning (Ito et al., 2013) and sociocultural perspectives that foreground ground-up, community-based practices, particularly in out-of-school settings (Simonsen & Robertson, 2013).

Co-analysis represents a shift from extractive research models toward participatory approaches that position community members, practitioners, and youth as knowledge producers rather than merely data sources. This orientation aligns with critical perspectives on research that challenge traditional hierarchies of expertise and seek to democratize knowledge production. By engaging in co-analysis, we acknowledge that interpretations of data are enriched by multiple standpoints and that the meaning-making process itself can be a site of learning and capacity building for all involved.

Design approaches provide methodological scaffolding for co-analysis by creating structured opportunities for collaborative interpretation (DiSalvo et al., 2017). These approaches can include activities such as creative future scenario development, taxonomy building, and iterative feedback processes that make space for diverse voices while maintaining analytical rigor (Campos, 2024; Farrell et al., 2022). The challenge lies in balancing accessibility for all participants with the technical demands of systematic analysis.

# Methods

## Context and participants

This paper draws on two research-practice partnerships that employed distinct design approaches for co-analysis. The first example comes from the TRACE Project, a multi-phase investigation of the long-term impacts of community arts programs on youth identity and life trajectories. The project involved partnerships with 26 community arts organizations across the United States, United Kingdom, and Australia. Data collection included 257 surveys and 102 life history interviews with program alumni, resulting in over 129,000 statements, including 7,133 “outcome statements” about the program’s impact coded for analysis.

The second example comes from the WCAP Project, where researchers partnered with leaders and teachers in a large, urban school district. The partnership focused on developing and measuring the "5Cs" framework of college, career, and life readiness: Compassion, Critical Thinking, Creativity, Collaboration, and Communication. This partnership evolved from the district's 2014 decision to move away from test scores as primary drivers, culminating in a 2022 initiative to develop AI-assisted tools for measuring the 5Cs through student reflections. The work involved over 100 teachers, administrators, and education specialists across 16 schools, along with researchers and technology developers.

## Co-analysis approaches

### The TRACE Project: Community co-classification of outcomes

The TRACE Project employed a multi-stage co-analysis process centered on developing a comprehensive taxonomy of community arts program outcomes. The process began with researchers conducting interviews that invited participants to critically reflect on their arts experiences in relation to their overall life trajectories. Researchers then programmatically cleaned, segmented, and randomized blocks of the corpus to support coding at the level of individual utterances, attending to rhetorical patterns speakers used when describing the benefits of their arts participation (Corrigan et al., 2024).

The co-classification process unfolded over several months. In December 2023, the research team created an initial seed taxonomy for feedback. From January to February 2024, arts organizations and researchers collaboratively refined it through iterative discussions. By May, this work produced a draft taxonomy, which was then used from June to August to sort outcome statements with community partners. Regular meetings supported shared inquiry and reflection, while activities such as *The Thing from the Future* encouraged creative envisioning of the future of arts learning and program design. Together, these co-design and co-analysis efforts scaffolded shared evaluation practices and fostered mutual learning among researchers and practitioners.

### WCAP: Teacher co-design of AI-assisted assessment tools

The WCAP partnership employed a different co-analysis approach focused on developing and refining AI-assisted tools for analyzing student reflections on their 5Cs development. The partnership centered on student voice and funds of knowledge, asking how AI could reveal the 5Cs that students already communicate in their own understanding of their work.

The co-analysis process we illuminate here, occurs throughout various phases of the partnership and DBIR work that occurred between 2022-2025. For example, we engage in dedicated phases of participatory design, focus groups and qualitative, exploratory research to unearth key system needs for the school district, build conjectures that become the focus of designing new innovations, and co-create research questions that drive the joint analysis work. We will highlight how each of these activities in the RPP, frame opportunities for co-analysis between the district and our research team. A critical component of the co-analysis approach involved co-designing AI-tools with over 60 high school students, consistent engagement with district leadership and over 30 instructional coaches in the district, and conducting focus groups with over 100 teachers, administrators, and education specialists in our joint research.

# Findings

## Outcomes from the TRACE Project co-analysis

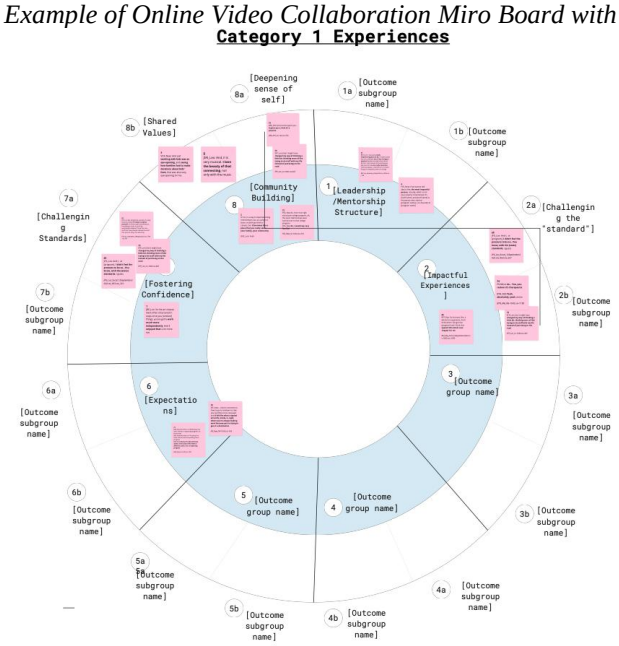
The collaborative co-analysis process produced a comprehensive taxonomy that organized community arts program outcomes into thematic clusters (Corrigan et al., 2024; Dahn et al, 2024). Using collaborative tools such as Miro boards (Figure 1), participants reviewed, grouped, and named 210 outcome statements drawn from interview data. Through iterative coding and refinement, the groups identified approximately 112 top-level and

94 subcategories of outcomes. The resulting taxonomy reflected the lived realities of community arts education and supports both local and cross-program interpretation.

**Figure 1.**

*Example of Online Video Collaboration Miro Board with Community Arts Partners*




The iterated community-driven taxonomy included 94.25 percent coding reliability, indicating strong consensus across coders and community partners. Beyond its technical validity, the co-analytic process surfaced a substantially broader range of outcomes than approaches constrained by predetermined categories. As a shared interpretive framework, the taxonomy enabled both theory-building and equitable comparison across arts education contexts. More broadly, these findings illustrate how design-based co-analysis can function as an epistemic infrastructure, one that aligns community knowledge, research inquiry, and practice-based evaluation to advance learning in the arts.

## Outcomes from the WCAP co-analysis processes

Participatory design plays an ongoing and vital role in our co-analysis processes. Early in the RPP process, we engaged in deep conversations to understand the district partners' history (Gutiérrez & Jurow, 2016), and understood that the district had been striving toward moving their teachers and instructional system to focus on developing students' 5Cs versus a sole focus on standardized test score performance. Our co-analysis process involved developing conjectures about where obstacles existed in their instructional system (Cobb et al., 2020), and led to a focus on developing AI tools that collect student reflections about their work, and detect the 5Cs that were present in their experiences.

The co-design process also involved teachers and students in developing reflection prompts and assessment criteria embedded within the district's learning management system. District-wide performance task assessments incorporated reflections focused on 5Cs development, measurement, and calibration. The AI analysis provided personalized feedback on the 5Cs, strengthening the district's commitment to data-driven decision making aligned with their values.

A critical component of the co-analysis approach involved conducting focus groups with over 100 teachers, administrators, and education specialists across 16 schools. Focus groups revealed important insights about implementing AI-assisted assessment tools in authentic educational contexts. Teachers expressed concerns about the trustworthiness of data and AI, raising questions about how algorithmic analysis might capture or miss nuances in student work. These concerns highlighted the importance of maintaining human judgment in the assessment process while leveraging AI for efficiency and pattern recognition across large datasets.

Perspectives on student equity emerged as a central theme, with educators questioning how AI tools might differentially serve students from diverse backgrounds. Teachers emphasized the importance of ensuring that the 5Cs framework and its measurement tools were culturally responsive and did not inadvertently privilege

particular forms of expression or ways of knowing. This finding underscored the need for ongoing critical examination of equity implications in co-designed assessment systems.

Addressing student motivation surfaced as both a challenge and an opportunity. Teachers noted that reflection processes could be meaningful vehicles for student learning when students understood their purpose and saw connections to their own goals. However, they also identified barriers related to student buy-in and the risk of reflections becoming perfunctory exercises. These insights informed iterative improvements to the reflection prompts and feedback mechanisms.

Despite challenges, educators expressed strong hopes for the 5C initiative as a vehicle for more holistic student assessment and development. The sustained nature of the partnership—extending beyond typical grant-funded project timelines—enabled continuous refinement based on teacher and student feedback. The work was embedded into the district's professional learning calendar, performance task assessments, and college and career fair lessons, demonstrating institutional commitment to the co-designed approach.

## Discussion

These two working examples illuminate key principles for co-analysis in research-practice partnerships. First, they highlight the value of creating multiple entry points for stakeholder engagement throughout analysis. In the TRACE Project, iterative taxonomy development invited arts leaders to shape the categories through which outcomes were understood. In the WCAP partnership, teachers participated through co-design and focus group protocols that informed the RPP's research direction, systems-change goals, and AI technology design. Both projects positioned practitioners as contributors to interpretation rather than consumers of research findings.

Second, the examples show how design activities can scaffold co-analysis by making abstract analytical processes more concrete and accessible. Creative strategies such as *The Thing from the Future* in TRACE and conjecture mapping or direct technology design in WCAP provided structures for collaborative meaning-making that honored diverse expertise. These scaffolds were vital for bridging epistemological differences between researchers focused on systematic coding and practitioners focused on program improvement and student learning.

Third, both cases highlight the temporal dimensions of co-analysis. Meaningful collaboration requires sustained engagement that extends beyond single workshops or feedback sessions. The TRACE Project's six-month taxonomy process and WCAP's multi-year evolution show how trust builds over time and how iterative cycles of design, implementation, and reflection deepen shared understanding. This temporal commitment challenges traditional research timelines but produces more robust, contextually grounded findings.

Fourth, the examples surface tensions inherent in co-analysis. In TRACE, balancing the breadth of community-identified outcomes with the need for analytical coherence required ongoing negotiation. In WCAP, concerns about AI trustworthiness and equity exposed differing views on technology's role in assessment. Rather than resolving such tensions, productive co-analysis sustains dialogue that acknowledges complexity and multiple viewpoints.

Additionally, both examples demonstrate the importance of attending to power dynamics in co-analysis. While collaborative approaches aim to democratize knowledge production, researchers still often control aspects of data collection, analytical tools, and publication processes. The TRACE Project addressed this partly through community co-classification that shaped the fundamental categories of analysis. The WCAP work incorporated teacher perspectives on AI implementation but researchers maintained primary control over algorithmic development. Future work should continue examining how power operates in co-analysis partnerships and developing practices that more fully distribute analytical authority.

## Conclusion

Several directions for future research emerge from this work. First, additional investigation is needed to understand how different co-analysis approaches shape research outcomes and partnership dynamics. Comparative studies could reveal which designs work best across contexts and data types. Methodological development should also focus on adaptable frameworks that partnerships with varied resources can use, and on addressing power dynamics to more equitably distribute analytical authority.

These examples also raise questions about how co-analysis can inform measurement and policy. In community arts, the taxonomy developed through co-classification could support shared metrics while honoring diverse community values. In education, the 5Cs framework and AI-assisted tools offer alternatives to standardized testing that center student voice and holistic development—yet scaling these approaches requires preserving their participatory spirit. Ultimately, co-analysis is both a methodological innovation and an ethical commitment to more democratic knowledge production, advancing research-practice partnerships that better serve learners, educators, and communities.

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