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An activity theory study of data, knowledge, and power in the design of an international development NGO impact evaluation

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Abstract

International development is now a data-, information-, and knowledge-intensive industry, which some have characterised as "development 2.0." Power relations are rarely foregrounded in this landscape, even though they shape what data and knowledge is constructed or discarded. Impact evaluation is one example of this intensive work, yet evaluation models seldom make power relations explicit or actionable. Furthermore, implicit models of data and knowledge on which impact evaluation processes rely also neglect power and social practice. The resulting problem is that power remains silent in development impact evaluation practice. In response, this article articulates an alternative, using Cultural Historical Activity Theory (CHAT) to analyse impact evaluation activities conducted by a UK-based philanthropic donor and their grantee in India, a small non-government organisation (NGO) doing rural development work. The analysis uses CHAT to illustrate how impact data, knowledge, and power are simultaneously generated during professional evaluation activities. The study broadens our view of impact and offers two contributions. Firstly, for researchers in information and communications technology for development (ICT4D) and knowledge management for development (KM4D), it contributes the application of a perspective on social practice, CHAT, to development evaluation. A novel extension to CHAT, the concept of "temporal activity chains," is put forward to complement the established activity system frame. Secondly, the article demonstrates a practice-based view of development impact evaluation for researchers and practitioners who wish to acknowledge and respond to the generation of unequal power dynamics during evaluation processes.

KEYWORDS
cultural historical activity theory (CHAT), data, knowledge, power, international development, impact evaluation

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1 | INTRODUCTION

International development has become a data-, information-, and knowledge-intensive sector, as illustrated by calls for a new view of development based on the increasingly central role that digital technologies are playing. Heeks (2010) advocates a new "development 2.0" perspective and a new version of information and communications technology for development, or ICT4D 2.0 (Heeks, 2008: 26). Transitions towards e-development and consulting models also promise greater understanding of development through technologies and digital data (Brigham & Hayes, 2013: 112). In these views, modern technologies and knowledge management become instrumental for progressive outcomes. However, critical voices have warned against neglecting the unequal power relations produced during these shifts (Avgerou, 2002: 55; Hayes & Westrup, 2014: 20; Walsham, 2001: 56). This article describes how such data and knowledge-intensive practices can generate unequal power relations. The justification for the study is that during the shift to data- and knowledge-intensive development, a shift that has speeded up since the 1990s, development, ICT4D, and impact evaluation literatures have not sufficiently responded to the problems of unequal power dynamics inherent to data/knowledge intensity.[1] To illustrate this, the article uses the vehicle of development impact evaluation as one among many data- and knowledge-intensive processes in the development 2.0 landscape.

One may well ask why it is important to acknowledge power in the everyday practices of professional data and knowledge work in impact evaluation and development 2.0 more broadly. An important rationale is that such work is itself impactful, not purely representational nor immaterial. This work produces power relations beyond the oft-claimed instrumental purposes of decision support, efficiency, effectiveness, or innovation. In the 1980s, Markus (1983: 438) illustrated how information systems could produce organisational conflicts. Feldman and March (1981: 175) demonstrated how seeing information in terms of rational decision making ignored individual behaviours, symbolic uses of information, and organisational practices. In ICT4D, Walsham (2001: 57–58) highlighted the importance of studying power in practice, such as in how the "language of efficiency" can be used to gain power (Kling & Iacono, 1984: 1218). And more recently, Brigham and Hayes (2013: 27) described how a mix of technologies and conceptual models in e-development shape non-government organisations (NGOs). They argue that what appear to be professional values and efficiencies can function as Trojan horses for neoliberal exploitation. In short, ignoring power and practice impacts inclusion, effectiveness, efficiency, and equality. For these reasons, it is vital to address power and practice in understanding impact evaluation and development 2.0.

This study features an NGO case study critically focused on three research questions that allow us to unpack more intimately how power is generated during impact data/knowledge construction. The first question asks how development NGO impact data and knowledge are constructed in practice. Secondly, how are power relations generated during impact evaluation? And thirdly, how can views of power and practice be re-embedded into impact evaluation data and knowledge construction?

Through these questions and the use of Cultural Historical Activity Theory (CHAT), the article encourages ICT4D and knowledge management for development (KM4D) researchers, as well as evaluation professionals, to reflect on practice and power. This means considering how approaches focused on social practice, such as CHAT, which analyses social practices as situated activities, can provide alternatives to technical evaluation discourse or implicit models of data and knowledge. Practice-based alternatives sensitise us to more inclusive data and knowledge construction processes. As a contribution to CHAT and a complement to the established activity systems framework (Engeström, 1987), the article describes "temporal activity chains." These chains emphasise sequences of activities. The analysis reveals two contradictory forms of impact and illustrates how power relations are diffused along a temporal activity chain, where legitimate data/knowledge is elevated and surplus data/knowledge is submerged. Effectively, this is a data/knowledge supply chain.

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[1]The terms "data and knowledge" or "data/knowledge" are used to highlight digitization and expertise. They feature heavily in development debates and terminology, such as evidence, results, inputs, outputs, big data for development (BD4D), local knowledge, and knowledge for development (K4D).

To elucidate this argument, I start with a literature section that characterises the new development data/knowledge-intensive landscape and references a set of sector-specific demands for impact data and knowledge. The theory section describes how CHAT can provide an alternative to models of information and knowledge management such as the widespread, yet often implicit "Data-Information-Knowledge-Wisdom" model (DIKW) that underpins technical development impact evaluation processes. The methodology describes the CHAT framework, the temporal activity chains concept, and the research design. This design features a case study initiated when a contact of the author was invited by a UK-based philanthropic organisation (Imagine Foundation) and their NGO grantee (Rural India) to research and consult on improving the partners' 2013 to 2014 impact evaluation process. At their request, pseudonyms are used to protect the identity of both partners. The analysis applies the CHAT framework to the case, using activity systems, contradictions, and temporal activity chains. The discussion section outlines key questions and implications for researchers and practitioners who work in the development 2.0 landscape, and who wish to acknowledge practice and power within their work.

2 | LITERATURE: THE DATA/KNOWLEDGE-INTENSIVE LANDSCAPE

There are 2 parts to the literature. The first part describes the development 2.0 contemporary context, in which conceptual and digital work are emphasised, yet power and practices inherent to this work are insufficiently articulated. The second section signals examples of the diverse demands at work in the sector, which constrain impact evaluation processes and pressure funders, evaluators, and NGOs to keep producing products that represent robust, successful impact.

Firstly, what is the composition of the development 2.0 landscape, and how is unequal power endemic to it? The problem of data, knowledge, and power is one of representation and communication, and thus intricately related to the junctures between information systems, knowledge production, and practical, tangible data, or knowledge work. Development is a rich domain for studying power precisely because of its continuities with historical empire (Escobar, 1995; Kothari, 2005: 82) and its popular portrayal as a moral, ethical, charitable, and caring sector where tangible products and physical help for others in need are the key deliverables. However, development must also be understood as a highly data- and knowledge-intensive industry. Work on "ICT4D 2.0" (Heeks, 2008) and "development 2.0" (Heeks, 2010; Thompson, 2008) speaks to this new aid landscape. Development can no longer be understood as only about tangible care, charity, vaccines, and schools, but must also be about technologies, digital data, information systems, and communities of related specialists. In development 2.0, technical expertise, data management, and impact knowledge production must be mastered by aid agencies, funders, big and small NGOs, and individual evaluators, managers, and fieldworkers. What is new in development 2.0 is that significant data and knowledge are manifest in governing the care, charity, vaccines, and schools—and their impacts.

Critical voices in information systems (eg, Feldman & March, 1981; Orlikowski & Baroudi, 1991) and ICT4D (eg, Avgerou, 2002; Brigham & Hayes, 2013; Hayes & Westrup, 2012, 2014; Walsham, 2001) are vital for understanding the implications of development 2.0, not only the progressive opportunities but also the power relations inherent to data and knowledge. In understanding this landscape and the representational products that populate it, critical perspectives on power and politics are required. These are diverse and incorporate power in relation to evidence (Eyben, Guijt, Roche, & Shutt, 2015), evaluation (Norris, 2015; Picciotto, 2015), information behaviour (Feldman & March, 1981; Markus, 1983), and development itself (Escobar, 1995; Gardner & Lewis, 2015: 179). With the development 2.0 shift to more data and knowledge intensities, where "ideas," "theory," and "policy" are more significant than ever in poverty elimination (Mosse, 2007: 1), our approaches to ideas, policies, reports, and data must acknowledge their power dynamics.

A less explicit part of development 2.0 is the growing technical subdisciplines and subspecialisms of data/knowledge work. Technical impact evaluation is one such expert discourse. This discourse foregrounds diverse definitions of impact and evaluation (eg, 3ie, 2012; OECD-DAC, 2002; Roche, 1999: 21; Stern et al., 2012: 5, 2015: 4),

specifications (eg, Groves, 2015; Roche, 1999: 61; UNDP, 2002: 55), methods, approaches, and subdomains.[2] Linear models, such as result-based management adopted by the UN in the 1990s (van den Berg, 2004: 67), position "raw" data as inputs and knowledge products as outputs serving managerial decision makers. The UNDP *Handbook on Monitoring and Evaluating for Results* (2002) explains the need for "evaluation evidence" and the need for knowledge on time, for the "right decision makers" (van den Berg, 2004: 77). Such technical discourse prescribes how evaluation data and knowledge should be made. It is one set of demands exerting an influence on impact data and knowledge construction in practice.

Another set of demands is for impacts to fit into the broader "parade" of aid knowledge fashions (Leal, 2007: 540), which has flourished since the end of the colonial era (Escobar, 1995: 23; Kothari, 2005). This parade features decade-long trends, from community development to poverty reduction, or good governance for example. Impact results must align with such trends. Additionally, evaluation must meet specific project and programme aims. Project data and knowledge are routinely benchmarked to global standards, such as the 17 Sustainable Development Goals (SDGs), their 169 subtargets (United Nations, 2016a, 2016b), and often to any of thousands of predefined data indicators (see World Bank, 2016a, 2016b). Further demands upon NGOs, evaluators, and donors include the need to implement new technologies, and the need to produce representations of impact for funding markets. Technological demands relate to the increasing importance and visibility of information systems in development (Avgerou, 2002; Walsham & Sahay, 2006: 7), software and the aid "dot.com bubble" (Kenny, 2014: 12), deploying e-development (Brigham & Hayes, 2013), ICT4D (Karanasios, 2014; Walsham, 2001), mobile for development (M4D), and big data for development (BD4D). Although, increases in state and multilateral funding since the 1990s are contested (Wallace, Bornstein, & Chapman, 2006: 49), observers suggest NGOs have become "too close" to funders (Banks, Hulme, & Edwards, 2015: 707; Hulme & Edwards, 1996). This means agencies and NGOs are under pressure to demonstrate impacts to survive.

These diverse sets of sector demands (from technical evaluation discourse, to aid fashions, increasing project management goal setting, growing use of technologies and digitisation, to the need for exchangeable impact products in NGO funding markets) all contribute to increasing development 2.0 data/knowledge intensity. However, they do not foreground or provide responses to the unequal power relations that are generated during such intensity.

3 | THEORY: FROM DIKW TO POWER AND PRACTICE

The literature section above suggests that development evaluation discourse has not focused on power, particularly in relation to development 2.0 or data/knowledge-intensive development. What is therefore required is a theoretical understanding of how data and knowledge are constructed and managed. However, commonly used models have not foregrounded power in information management or knowledge management.

One important model, the "Data, Information, Knowledge and Wisdom" hierarchy, also known as the DIKW pyramid,[3] has been widely adopted in recent decades. It has been characterised as a "convention" (Tuomi, 1999: 2) and a "canon of information science and knowledge management" (Fricke, 2009: 132). Lambe (2011: 187–189) considered it an entrenched framework in information systems and knowledge management. DIKW is the most prevalent approach to information presented in IS textbooks (Rowley, 2007: 168). Importantly, DIKW's emphasises linear input/output processes, in which raw data inputs, digital storage and information organisation, and knowledge end-product outputs are sequenced to serve decision makers. This DIKW architecture scaffolds the development evaluation discourse mentioned earlier, hence the need for alternatives.

[2]There are hundreds of qualitative and quantitative evaluation methods related to impacts. Variations span environmental impact assessment (EIA), social impact assessment (SIA), monitoring, evaluation, learning, accountability (M&E, MEL, MELA or MEAL), and others. Methods also diverge across subdomains eg, impact evaluation for gender, for disasters, or for ICT4D. See http://www.betterevaluation.org/.

[3]Works by Ackoff (1989) and Zeleny (1987) are often referenced for the early development of DIKW. Wisdom is the least prominently considered level in scholarly texts (Fricke, 2009: 3, Rowley, 2007: 170) and is therefore not outlined in this article.

In DIKW, data are foundational (see Figure 1), the "most fundamental elements of the digital age" (Walsham, 2001: 36). Data are discrete, objective, out there, empirical facts about the real world, or "raw assets" (Earl, 1994: 59). Data are organised into information, and information has meaning in messages, such as letters emails, or hand-written notes.

The next level up is knowledge, which is information that has been contextualised and made actionable for decision makers. Knowledge is held in brains, books, routines, and conversations. DIKW has become a pragmatic schema for people in organisations to understand how to make knowledge from data, or even to know "What to do on a Monday morning" according to Davenport and Prusak (1998: xi).

Criticisms of DIKW are available, but direct discussion of its contribution has been limited (Rowley, 2007: 164). Fricke (2009: 136) argued that the data bedrock was not secure and that DIKW encouraged mass data collection without purpose, but also argued that jettisoning DIKW would mean leaving a disciplinary vacuum because of its pervasiveness. In Lambe's (2011: 190–194) work on the history of knowledge management, he acknowledged DIKW's role in the growth of 1990s perspectives emerging out of technology, managerial, and consultancy agendas. These built on earlier computer and information science research that had fought hard to establish data as the most legitimate foundation for management decision making. This historical view supports the idea that, by the 1990s, knowledge management had become detached from its deeper roots in social theory, public policy, education, information studies, and economics.

Nevertheless, DIKW alternatives to date have not embedded power or practice into how data and knowledge are constructed. Fricke (2009: 138) accepted that representations "carve up reality," but did not address the implications of this. Snowden (2002: 4) argued that a first generation of knowledge management up to the mid-1990s focused on decision makers and computerisation, where "missionary" managers and consultants rode roughshod over "primitive cultures," resulting in "rape and pillage" rather than organisational enrichment and enlightenment. Despite alluding to leadership styles, Snowden (2002) did not explore unequal power dynamics as problematic in newer generations of knowledge management. Tuomi (1999: 110–111) referenced the importance of Polanyi's work (1967) on focal and peripheral knowledge, and Vygotsky's (1978) view of social relations as implicit in learning, but did not open the door on power or practice. And more recently, Williams (2014: 17–18) foregrounded practice as action (2014: 17–18), but not power. Therefore, the DIKW legacy still submerges power in practice.

As raw data capture remains the technical foundation for impact knowledge assets and flows in development 2.0, what is required is a way of reasserting the importance of power and practice. Blackler (1995: 1023–1025) critiqued five popular images of knowledge as assets held in the brain, the body, culture, routines, and media, respectively. Blackler saw knowledge as provisional, pragmatic, situated, contested, and mediated. This contrasted with knowledge as universal, expertly produced assets that could be apolitically managed and moved around, as in DIKW. Blackler advised that the five popular images aligned with "the needs of contemporary capitalism," globalisation, and technology-centric knowledge work (ibid: 1040-1042). Avgerou (2002: 77) further illustrated how politics and power were involved in the deployment of ICTs in global development. In her view, dominant market-based, technological, and managerial rationalities encounter or subjugate local knowledge, such as family-shared knowledge, traditions of
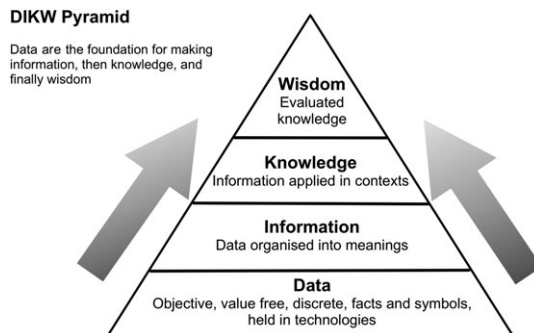

FIGURE 1 The DIKW pyramid (adapted from Rowley, 2007: 164)

conflict avoidance, communal or noneconomic-centred knowledge, affectual, traditional, or emotional knowledge (Avgerou, 2002: 77). Together, Blackler's concern with situated knowing and Avgerou's concern with global rationalities complement each other in understanding how one may theorise power, data, and knowledge relations in development encounters, where global discourses enter local activities.

In ICT4D, Brigham and Hayes (2013: 114) have argued that technologies and models are strategically mobilised in e-development evaluations, and that this mobilisation boosts donor power over NGOs. Hayes and Westrup (2014: 25) questioned the objective and apolitical status of consultancies in the development sector, which sought to "expand and stabilise" their influence. Accordingly, consultancies strategically promote perceptions of effectiveness, efficiency, and accountability and paint NGOs as the opposite—as unprofessional, ineffective, and lagging in IT capacity. These tactics, technologies, measures, and models are therefore not value-free, but part of strategies to secure contracts (Hayes & Westrup, 2014: 25–26). In these ways power relations are embedded in models and techniques used to construct data and knowledge in evaluation. Avoiding the silences of technical evaluation discourse and DIKW, and identifying power relations in models and technologies, is therefore necessary in promoting more sensitivity to power and practice.

4 | METHODOLOGICAL FRAMEWORK AND RESEARCH DESIGN

4.1 | CHAT as a methodological frame

The study adopts CHAT (Blackler, 1995; Engeström, 1987, 2009) as a framework to respond to the research questions stated in the introduction. CHAT is also an approach to social practice (Miettinen, Samra-Fredericks, & Yanow, 2009; Nicolini, 2012). Development is "deeply intertwined with issues of power, politics, donor dependencies, institutional arrangements, and inequities of all sorts" (Walsham & Sahay, 2006: 19), and CHAT offers resources for researching such socio-political contexts (Karanasios, 2014: 2).

Researchers in knowledge management (Blackler, 2011; Blackler & Regan, 2009), organisation studies (Canary & McPhee, 2009: 181–182; Engeström, 2006: 1791; Engeström, 2009: 203), and IS/ICT4D (Karanasios, 2014: 9; Karanasios & Allen, 2013; Korpela et al., 2004: 453) have supported CHAT research on issues of politics, power or emancipation. CHAT can be used to interact with participants and support critical reflection.[4] It has been described as "more operational" than actor networks, and more "theoretically founded" than ethnomethodology or participatory design (Korpela et al., 2004: 455), and thus is suited to critical studies of practice. It is often used in "change labs" where participants are brought together to exchange views and search for collaborative solutions (Virkkunen & Newnham, 2013). CHAT can also be used in ethnographic research (Kontinen, 2007: 25–26), and emancipatory initiatives (Karanasios, 2014: 9).

Finally, CHAT is useful for framing the generation of contextual data, for example, from meetings and discussions, and for analysing data in terms of activity systems and contradictions. For these reasons, CHAT offers a productive vocabulary for a critical case study of evaluation data and knowledge construction.

4.1.1 | CHAT concepts, activity systems, and contradictions

CHAT emerged from Russian social-psychology in the 1920s, in work by Vygotsky (1978), Leontyev (1978), and others. It is used to describe relationships between "subjects" (people, groups), "tools" (concepts, technologies), and "objects" as purposeful group activities (Blackler & Regan, 2009; Engeström, 1987; Kuutti, 1996). Initially, Vygotsky (1978) was interested in individual cognitive development, for example, how people used tools to complete tasks or objects of work (see Figure 2, box 1). Engeström outlined the activity system model in 1987 (Figure 2, box 2), and both Engeström and Blackler articulated how networks of activities influenced each other through the 1990s (Figure 2, box 3).

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[4]For more on the relationship between CHAT, action research, and participation, see Virkkunen and Newnham (2013), particularly chapter 1.
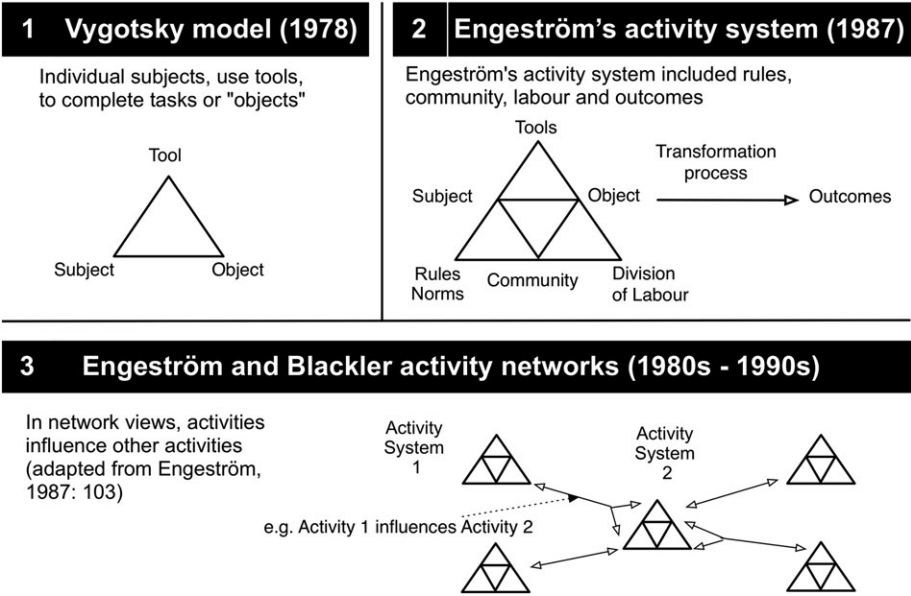
FIGURE 2 Activities seen through individual, systems, and network perspectives

How activity systems are framed, whether drilling into individual behaviour (eg, an individual's writing activities) or zooming out to group activities (eg, group writing coordination), is flexible and depends on the research focus (Allen, Karanasios, & Slavova, 2011: 781–2; Karanasios & Allen, 2013: 296).

In CHAT, practice is understood as situated activities, analysed as activity systems and networks of systems. Activities are produced when subjects (individuals, groups, organisations) perform work, using tools (conceptual, physical, technological), following rules or regulations, adopting roles or divisions of labour, within communities. Subjects perform activities to achieve "objects." An object in CHAT can be shared across people and groups or contested. Kuutti (1996: 37) argues that "problems, ruptures, break downs, and clashes" can become manifest for CHAT researchers, and Engeström (1987: 98) describes four kinds of systemic contradictions that can be used to understand these problems, conflicts, or clashes.

Contradictions are a key analytical device in CHAT. Primary contradictions occur within an activity element (eg, a single tool or rule does not function). Secondary contradictions occur between elements (eg, a rule clashes with a technology). Tertiary contradictions occur between older and newer versions of activities. Quaternary contradictions occur between adjacent activities in networks (Engeström, 1987: 103–104). As such, contradictions offer one way of understanding systemic power relations in the CHAT framework, as they can be analysed when opposing objects of activity come into conflict.

4.1.2 | Temporal activity chains

Looking at activities in temporal sequences is rooted in Vygotsky's view of psychological development as itself a process that occurs over time. Temporal activity chains are an extension to support the activity systems analysis of temporal processes. They are an explicit and novel framing device to understand impact evaluations as activities distributed over time.[5] Development, for Vygotsky, contrasts with the "accepted scientific paradigm" in which a scientific method is understood as a tool to yield representational results (Holzman, 2006: 112). Vygotsky saw scientific

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[5]Many CHAT concepts, such as the "levels" of operations, actions, and activities, relate to temporal activity chains. However, these are left to future work as the focus here is to illustrate globally diffused power dynamics. Karanasios (2014: 6) describes the levels in a simple "house building" example.

work not as separate methods and results, or isolated inputs and outputs, but as broader development and change over time in unfolding practice, which becomes "simultaneously prerequisite and product, the tool and the result" (Holzman, 2006; Vygotsky, 1978: 65). To understand evaluations in practice then (not as inputs/outputs nor methods/results), one can draw on Vygotsky and CHAT, to constitute evaluations as developing activity chains. In evaluation processes, one activity generates knowledge or data, and this is subsequently used, changed, or mediated in follow-on activities in the evaluation lifecycle. The outcomes of data or knowledge are products from one activity that feed or mediate another activity. In this sense, "a product designed and fabricated becomes a tool for use in another activity" (Miettinen, Paavola, & Pohjola, 2012: 11).

Mediations are part of CHAT's methodological framework where outcomes produced in one place and time become used and changed in another. Activities are always developing (Vygotsky, 1978) and knowledge is always "in motion" (Leontyev, 2009: 25). But what happens with power in practice, especially when conflicts and contradictions are silent or normalised in data and knowledge? Blackler (2011: 730–731) has written about "unobtrusive power" in knowledge work (2011: 731–732), where contradictions remain silent and participants are unable to make conflicts audible, especially in situations with broad or complex power differentials. In ICT4D, Kenny (2014: 18) has discussed how NGO employees masked power dynamics, seeing bad practice in other people's roles but not in their own. Engeström (2008: 22–47) showed how conflicts and disturbances were masked in a TV bowling show production. Because of diverse objects of work, the production crew, managers, and marketers were unable to communicate and surface conflicts for effective responses.

What is important is what gets cut out of data and knowledge as it moves and what is left in? What is rendered focal or periphery, tacit, or explicit (eg, Polanyi, 1967) when capturing data or building knowledge? CHAT registers such editing as incremental mediations and transformations across sequential chains of activities. Paying critical attention to what is cut, subjugated (Avgerou, 2002: 77) or "submerged," and what is added, rationalised, or "elevated" along a temporal activity chain enables us to locate unequal power dynamics.

4.2 | Research design and NGO case

The framework thus informed by CHAT was used for the research design and study implementation, focusing on micro-level practices during an NGO and funder annual evaluation design process. CHAT informs both the data collection and data analysis. As we have seen, Blackler (2011: 730–731) identified relations between power and knowledge as part of everyday, mundane, or unobtrusive knowledge work, and as such there was no overt research requirement to identify open conflicts, breakdowns, failures (Kuutti, 1999: 37), or "critical events" such as disasters (Long, 2004: 60–61). In contrast, the study focused on normal, professional evaluation activities.

In terms of case selection, this case is one of several cases constituting a broader research project looking at development sector impact evaluation practice and power. Criteria for all cases in the broader study were that participant NGOs were actively performing impact evaluation work and were willing to interact with a researcher. The appropriacy of the case in this particular investigation into data, knowledge, and power was based on three additional rationale. Firstly, working with Rural India (the NGO and grant recipient) and the Imagine Foundation (UK-based philanthropy and Rural India's funding partner) presented a unique opportunity to interact directly with senior management at both NGO and donor organisations. Secondly, as a consequence, this case illustrated the breadth of activities in an annual cycle of impact evaluation, from design, through implementation, management overview, and funding activities. And thirdly, Rural India and Imagine were expert data managers and evaluators, already well-versed in performing evaluations. This case therefore illustrated how power and practice were incrementally silenced during impact evaluation in the data/knowledge-intensive development 2.0 landscape.

4.2.1 | Data generation

Data generation focused on how Rural India and Imagine designed their 2013 to 2014 evaluation. Research data were generated between August 2013 and April 2014 and included group conference calls, phone calls, co-production of

evaluation tools (eg, a new survey, qualitative interview tools and a feedback mechanism for improving mobile ICT use), evaluation reports, statistical spreadsheets, website copy, researcher notes, and email exchanges. The conference calls with the managers of Rural India and the Imagine Foundation were crucial, as they provided insights on the strategies, and overall use of evaluation tools such as spreadsheets and mobile ICTs. Group conference calls were recorded and transcribed. The senior management participants were Vijay, Imagine CEO ("V", in Figure 3 below), Leonard (L) the Imagine Project Manager, and Chandan (Ch) the Rural India NGO Director. The author (P) and author's contact (N) are also listed.

Discussions concerned what had been done in previous evaluation cycles and what was going to be done in the upcoming cycle. The author's input included asking questions about evaluation workflow, use of tools and technologies, methods, timelines, and how data would be used, as well as proposing new approaches to qualitative evaluation, such as interviews and focus groups. Generating this kind of information about the overview of the evaluation process would not have been possible without direct interaction with the managers at Rural India and Imagine.

4.2.2 | Data analysis and limitations

Analysis used the CHAT framework (eg, Engeström, 1987; Karanasios, 2014): firstly, identifying evaluation activities (who did what, with what technologies etc); secondly, describing data and knowledge products as outcomes from one activity and how they were mediated in follow-on activities; and finally, how aspects of data and knowledge were submerged or elevated. Figure 4 shows the analysis steps from the research questions through CHAT's concepts to indicative examples of data.

DATA TYPE	PARTICIPANTS	DATA DESCRIPTION
Phone call 1 (45 mins)	L, V, N	Researcher field notes
Group call 1 (60 mins)	L, N, P	Audio, transcript and field notes
Group call 2 (90 mins)	V, L, N	Audio, transcript and field notes
Group call 3 (90 mins)	L, N, P	Audio, transcript and field notes
Group call 4 (120 mins)	L, N, P	Audio, transcript and field notes
Group call 5 (120 mins)	L, Ch, N, P	Audio, transcript and field notes
Group call 6 (90 mins)	L, Ch, N, P	Audio, transcript and field notes
Phone call 2 (20 mins)	L, P	Researcher field notes
Spreadsheet 1	NGO staff	Mustard production costs
Spreadsheet 2	NGO staff	Mustard control/value
Spreadsheet 3	NGO staff	Animal husbandry data
Spreadsheet 4	NGO staff	Cotton crop data
Spreadsheet 5	NGO staff	Deep ploughing data
Spreadsheet 6	NGO staff	Vegetable crop data
Spreadsheet 7	NGO staff	Data on 1,638 farmers
Spreadsheet 8	NGO staff	Data on 150 farmer groups
Spreadsheet 9	NGO staff	3 year measurement matrix
Spreadsheet 10	NGO staff	Data on 1,411 farmers
Document 1: Case studies	NGO staff	4 beneficiary stories
Document 2: Questionnaire	NGO staff	Draft of discrete questions
Document 3: Indicators	NGO staff	Draft of indicators
Document 4: 2013 Report	NGO staff	35 page project report
Survey tool	Ch, L, P	3 versions of survey/questions
Interview plan tool	CH, L, P	3 versions of qualitative questions
ICT feedback tool	CH, L, P	3 versions of ICT feedback survey
Imagine Website	Imagine Staff	Homepage, project pages etc
Email messages	L, Ch, P	August 2013 to April 2014, 100+ emails

FIGURE 3 Research participants and data generated

Data analysis from research questions through CHAT analysis to illustrative data examples

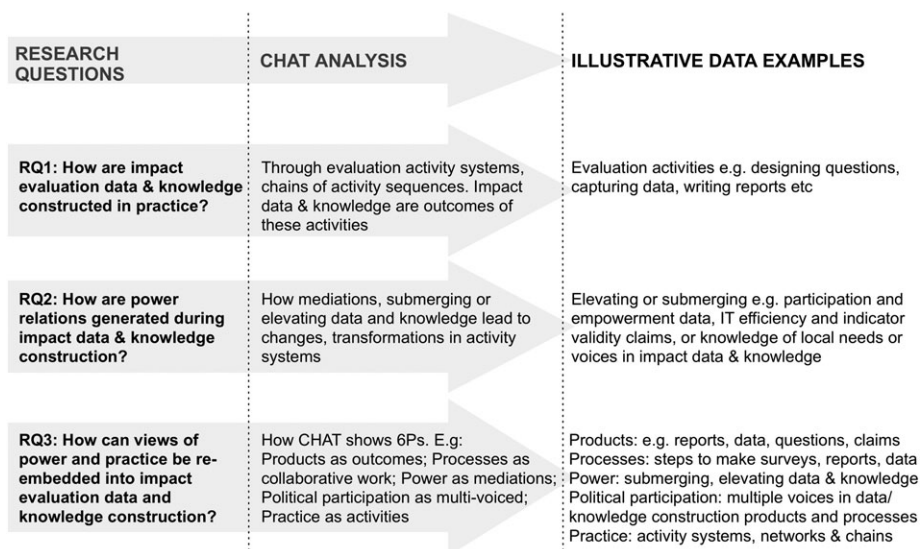| RESEARCH QUESTIONS	CHAT ANALYSIS	ILLUSTRATIVE DATA EXAMPLES
RQ1: How are impact evaluation data & knowledge constructed in practice?	Through evaluation activity systems, chains of activity sequences. Impact data & knowledge are outcomes of these activities	Evaluation activities e.g. designing questions, capturing data, writing reports etc
RQ2: How are power relations generated during impact data & knowledge construction?	How mediations, submerging or elevating data and knowledge lead to changes, transformations in activity systems	Elevating or submerging e.g. participation and empowerment data, IT efficiency and indicator validity claims, or knowledge of local needs or voices in impact data & knowledge
RQ3: How can views of power and practice be re-embedded into impact evaluation data and knowledge construction?	How CHAT shows 6Ps. E.g: Products as outcomes; Processes as collaborative work; Power as mediations; Political participation as multi-voiced; Practice as activities	Products: e.g. reports, data, questions, claims Processes: steps to make surveys, reports, data Power: submerging, elevating data & knowledge Political participation: multiple voices in data/ knowledge construction products and processes Practice: activity systems, networks & chains

FIGURE 4 Analysis process, with research questions, CHAT concepts, and data examples

In terms of limitations, the methodological framework, case design, data generation, and analysis all emphasised the activities of the NGO and philanthropy managers in designing their evaluation. It did not emphasise aid-beneficiary or policy-maker interactions. This is in line with the research aim of understanding how NGOs make impact data and knowledge. Furthermore, Rural India was a small NGO with fewer than 40 staff and the evaluation was performed in-house, not by external consultants. Both in-house and consultant-based impact evaluations are common in the sector. From the partners' perspectives, the author acted as a researcher interested in evaluation, as a source of expertise, and as a collaborator invited in by the partners to support improvements.

5 | RURAL INDIA AND IMAGINE CASE FINDINGS AND EVALUATION ACTIVITIES

This section firstly profiles the work and contexts of Imagine, the philanthropy, and Rural India, the NGO. Secondly, the findings from the case, namely, quotations, remarks, processes, arguments, claims, and sample screenshots taken from evaluation data spreadsheets are presented. This evidence is used to identify the different activities that constituted the evaluation cycle. To make the range of activities involved in the evaluation cycle clear, the findings draw mainly on the managing of the cycle, illustrated in the rich interactions with Imagine's Project Manager Leonard, and Rural India's Director Chandan. Three periods with different related sets of activities became evident:

1. assembling an evaluation machine (early in the cycle)
2. capturing, storing and filtering data (mid cycle activities)
3. processing and packaging, bundling and pitching (late cycle activities)

The main purpose here is to describe the partners, the findings, and the evaluation cycle activities. Section 6 will analyse the activity systems, contradictions, and temporal chains, revealing the data, knowledge, and power dynamics.

5.1 | Donor, NGO, and case context

The Imagine Foundation was started by "Vijay," an Indian national who owns a capital investment fund. Imagine, the philanthropic arm of the fund, finances NGO projects across India and develops software for the aid sector. Software currently under development includes a live crowd-funding platform and an evaluation management information system (MIS). Grants cumulatively ran into tens of millions of dollars in years before the study.

Rural India is a small NGO working on agriculture and livelihoods projects with female farmer groups in central India. Their aims are to encourage self-sufficiency through improved farming practices and to reduce rural poverty. To achieve these aims, Rural India runs empowerment and livelihood programmes in numerous villages. Project beneficiaries are poor female farmers, who enrol onto Rural India's projects voluntarily.

Rural India's livelihood projects run over multiple years. Imagine's 2013 annual report describes how in a typical project year one activities include community mobilisation, formation of Women's Livelihood Groups, capacity building through training, and agricultural demonstration plots. Villagers are supported to grow crops including mustard, wheat, or cotton, raise livestock, keep livestock vaccinated, and reduce livestock diseases. In year two, livelihood centres are established that provide "one stop solutions to all problems related to agriculture and animal husbandry." The centres offer support for farmers on crop choices, cultivation methods, marketing, access to government and financial support, branding, and packaging. Rural India reaches over 10 000 beneficiaries through their projects.

5.2 | Early-cycle activities: assembling an evaluation machine

Many activities were required before data could be captured. In the first phone call with Imagine's CEO, Vijay, he explained that his motivation for evaluating Rural India was part of "accounting for the impact of $10 million in annual funding." He stressed the need to "measure the effectiveness of services in the financial sector, and in development." He further described how he used business techniques and technologies from his other ventures to measure Rural India's impacts. These included surveys, discrete response multiple choice questions, professional spreadsheet software (eg, Microsoft Excel), mobile tablet computers and desktop computers, a third-party Android marketing application customised for evaluation surveys by the Imagine software team in the United Kingdom, and an online accessible database application for uploading/storing survey data. The discrete question formats included short numerical questions, and "Yes/No" questions on farming and livelihoods topics. Examples were in the form of "Having vegetable cultivation? Y/N," "Having own water well? Y/N," and "Having own toilet? Y/N."

Vijay appointed Leonard as a "Head of Projects" for Imagine, which involved managing evaluation processes from the United Kingdom. Rural India's Director, Chandan, arranged the evaluation activities in India, managed NGO staff, recruited village volunteers, trained volunteers to conduct surveys in farmer households, and coordinated the input or upload of data to a central database. In a conference call, Chandan indicated numerous activities:

> The collection of the data is the first thing to be doing, then ... then analyse, then write good documents, for the research etc. (Chandan)

> We try to collect information there on the ground, from different stakeholders, the local government, the community, people, data from all the households. And we train the volunteers in the ways and means of how to conduct a household survey. If you see the survey and the excel sheets, you'll see there are so many parameters, they collect that and put it up in the website spreadsheet. (Chandan)

To produce evaluation data and knowledge many activities were therefore required before any data could be captured. Each involved different choices, people, tools, and shared goals—or what is viewed as group objects of work in

CHAT—as well as numerous outcomes that, when assembled together, constituted the mechanisms needed to per-form impact data capture. Identifiable activities were

1. establishing and communicating the need(s) to know impact

2. sourcing evaluation methods, tools and technologies (conceptual/technological)

3. establishing authority lines and roles

4. managing NGO staff

5. recruiting village volunteers

6. training village volunteers to run household surveys

7. designing survey questions

8. customising the Android survey app, scripting app questions

5.3 | Midcycle activities: capturing, storing, and filtering data

Rural India's role was prominent in the capture and collection of evaluation data. Office staff and village volunteers would take the Android mobile tablet and survey app software into villages and visit door-to-door doing survey inter-views. In recent years, they had begun to upload collected data to a web-hosted database, which was, according to Leonard and Chandan, more efficient than the old method of returning to the office and manually inputting data to a database on a desktop machine. Leonard saw technologies such as mobile tablets, spreadsheets, and the Android app as instrumental in facilitating the efficient transport of data from Rural India to Imagine United Kingdom:

> The first thing is how the technology can help. We want to … y'know so that it gives valuable information faster, to add value and so we can understand what's really happening. Obviously the technology is a tool for capturing better and faster and analysing the data … that is the key. (Leonard)

However, in contrast to Leonard's focus on value-free efficiency, the mundane capture of survey data from households constituted a professional filtering process too. Capturing data converted farmer opportunities to talk about projects into a syntax and aggregated semantics of scores of question columns (eg, on demographics, income, loans, crop types, land, and fertilisers), and thousands of farmer identity rows.

Definitive responses from individuals populated cells. Some data were rounded off, some not (see Figure 5 use of 999.6, but not 1000), some data rendered focal (stored) and some peripheral (discarded). This editing and bifurcation was justified by the professional need to render impact legible and useful in follow-on activities. The organisation of data into spreadsheets, cells, rows, and columns was a mundane part of professional and efficient evaluating. How-ever, filtering meant data could not be understood as "raw."

A wealth of extra data, beyond that held in cells and rows, was present during household interviews, but rendered undesirable or illegible. This included farmer needs, understandings, definitions, lengthy oral responses, multiple respondent opinions, and broader dialogue. These did not fit into digital cells. For example, Chandan stated that farmers had doubts about questions and definitions of terms, like "savings," "incomes," or "expenditure":

> We know the family size, landholdings but not exact figures for savings and expenditure … because they are not very exact, they don't record their expenditure as they sell their produce, they get the money and they finish the money in a day. They don't know how they have spent it. (Chandan)

Survey encounters also involved multiple respondents, many responses and "clamour":

> … population density is high and there are a lot of disturbances, so when I am asking you a question there will be a few others, their neighbours all clamouring there, answering questions and disturbing and all that. (Chandan)

Stored survey data as filtered rather than "raw"

Survey data as professionally filtered into rows, cells and columns, rather than "captured" or "raw"

Row data
Rows used to represent individual farmers and attach specific data to each farmer.

◇	A	B	C	D	E	AD	AE	AF	AG	AH	AI	AJ		Per Capita Income
	Serial No	Group Id	Group Name	Name of the Women	Husband Name	Subscribed to any subsidy presently (Yes-1 & No-0)	Kind of subsidy	Children attending regular school (Yes-1 & No-0)	Access to health facility inculding family (Yes-1 & No-0)	Loan Sanctioned (Yes-1 & No-0)	Loan Amount (If Yes)	Per Capita Income		
7														3,300
1406	###	##	lyot	irmal	Satvi	0	0	1	1	0	0	7,000		27,500
														9,600
														17,833
														16,000
														41,500
														16,500
														34,500
														9,000
														2,250

Cell data
Cells used to isolate data from rows or columns; not always rounded-off, suggesting expert judgements being made

999.6
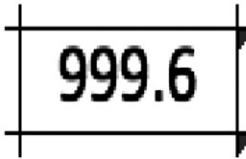
Column data
Created to foreground questions and multiple specific responses; edits out contexts, people and alternative responses

FIGURE 5 Farmer data stored in spreadsheet cells, rows, and columns

As part of the engagement, the author proposed a set of 25 qualitative interviews with female farmers, using open-ended questions to understand this contextual data or the "clamour" more closely. But Chandan and Leonard expressed reservations about qualitative evaluation. They argued against it for six reasons: mobile devices could not record audio, software needed adapting, transcription from farmer dialects was arduous, fieldworkers did not have capacity for open response interviews, and field bosses did not want volunteers wasting more time in households. The partners were also not sure how to analyse qualitative data:

> OK, ... so the analysing of the qualitative, is somewhat different from the quantitative. So, you know, erm ... yeah ... we have ... people for that. Not a problem. ... <PAUSE> ... 'P' [author] can also be of help ... I guess? (Leonard)

Chandan described how Rural India used to record interviews, but stopped because farmers were "inarticulate."

> What voice recording doesn't give us, we tried that, but one of the challenges we faced was that some people are not articulate enough to say what they wanted to say, so we lost a lot of data. (Chandan)

In these ways, data capturing activities filtered data into two types: firstly, efficient and legible data, and secondly, illegible or inarticulate data. These capture activities precluded famers' broader contexts of poverty, farmers' understanding of survey terms (eg, expenditure, savings), or why the NGO perceived farmers as inarticulate. Activities in this part of the evaluation cycle included

1. capturing data from households using mobile tablets and surveys
2. uploading data into an online data store, or manually inputting data back at office
3. filtering household data into survey app cells: legible, clear, definitive responses
4. filtering household data out: doubts, inarticulate, clamour, disturbances
5. storing data for access/analysis, as cells, rows, columns in spreadsheets
6. transmitting meaningful data to the funder in the United Kingdom, Imagine

5.4 | Late-cycle activities: processing and packaging, bundling and pitching

Finally, further activities processed and packaged the data into knowledge, for exchange and for "sales pitches." Whereas filtering involved editing and cutting data out, these activities involved adding to data or bundling in other value-adding knowledge. Two examples are discussed below: firstly "pitching" and secondly "bundling expertise."

The overall aim of the evaluation process was to produce impact knowledge products that could be exchanged for something in return, such as investment or reputation. Chandan described this as a "pitch" based on "solid evidence."

> We have taken the district as a model district. We want to showcase this, that the work has changed the district vis-à-vis the other neighbouring districts. We need to present it to prospective funders, at fundraising events, so this is a kind of pitch that we are trying to do on the basis of solid evidence on the ground. (Chandan)

Farmer data here were instrumental in creating a pitch to use at "fundraising events," to convince investors and partners to fund projects. In fact, in Figure 6, an excerpt from a group conference call shows how pitching was a crucial part of the cycle.

Phrases related to marketing in the dialogue in Figure 6 include "leveraging," "expect 10× or 15× at the other end," the "marketing story," "our pitch," and a "strong pitch". Other marketing phrases were used at different times, including "put together data in a nice document," to "go fundraising," to "showcase impacts," to "leverage resources," and the "need to ask others to pitch in, but for others to pitch in we need a strong marketing story."

Such pitching and leveraging require adding expert knowledge to evaluation data, to form stronger claims regarding impact and partner capacity. Leonard and Chandan demonstrated various forms of expertise, related to scientific knowledge, evaluations, information technology, fundraising, and technical aid discourse. The use of scientific discourse is evident in the term a "model district" mentioned above, or references such as "solid evidence on the ground," the "hydro-electric" engineering metaphor, or the production of cell data and spreadsheets. In these ways, expertise was added or "bundled" onto data captured.

Chandan (Rural India Director): So the contribution of this app is not only for a mechanical way of getting the data stored, but also to understand why this is being done. So I would say in response to your point, I would say that we'll be confident of the capacity building of the volunteers, but this would not be as much as we would like for the researchers for example.

P (Researcher): This is a really good conversation. Let me just rephrase what we are doing again. If I am understanding you correctly, we would use the app here in the first kind of cluster or function, about collecting data in the field. And the second would be to support NGO offices in submitting their own interpretations of that data to a single repository for yourself, and for the London offices of Imagine to work with that data. So there are two inputs. One, from the beneficiaries of projects, through their volunteers or data collectors, and two, a mediating role for NGO management and office workers to apply their interpretation about what's happening, what this data shows us, like in reports.

Chandan: Yes, and a third one, I would also like to mention and bounce this off you, is why we are doing this, is we see a roadmap, as I told you, leveraging of resources is very close to our philosophy. And we understand that if you put an x in, we expect about 10x or 15x at the other end. I also use, I often use the analogy of hydro-electrics, so if you put x pressure at one end, the other end should give you about 10x or 15, or some multiple of x pressure at the other end. So what it means for what we are talking now is that if we use this properly we will be able to have all the answers required. So, so say for example grants for a typical program like this, needs probably $100 and we have $10, and we ask others to pitch in, but for others to pitch in we need a strong marketing story. And how do we talk to them, what is our pitch? To have a very strong pitch, we need to have our analysis complete.

FIGURE 6   Transcript excerpt showing how "pitching" fits into wider evaluation

Leonard stressed Imagine's information technology expertise (and technology strategy) in talking about how the impact evaluation helped in creating categories of aid effectiveness. These categories contributed to the design of an evaluation MIS. It had a "roadmap," evaluation "templates," and "poverty alleviation verticals" (Leonard). "Verticals" is a commercial term for product or service markets. It shows how commercial terms are added onto raw farmer data to construct impact knowledge.

Finally, Chandan downplayed the expertise of other NGOs in comparison with Rural India's. "Other NGOs are well meaning, but they don't know what they are doing," he suggested. Other NGOs were "inarticulate" because they were incapable of good data management. The partners' own development sector expertise was demonstrated, for example, through Leonard's use of technical terms eg, "poverty alleviation," Chandan's talk of "integrated development," and terms in reports, and on Imagine's website, including "fostering innovation," performing "integrated development," "scaling up," and "providing enablers" for NGOs.

To summarise, there were numerous activities involved in processing or packaging data into development impact narratives, incorporating pitching impact or bundling expertise in with the legitimate data captured earlier. Through the evaluation cycle, data incrementally became processed, packaged, and made into strategic knowledge. Activities included

1. processing data into robust knowledge, eg, adding scientific terms to impact data
2. packaging knowledge for exchange, eg, sales pitches or narratives for fundraising
3. producing reports for funders or marketing copy, eg, at events, on websites
4. downplaying other NGO evaluating as not effective, not data intensive, inarticulate
5. using data for other strategies, eg, an evaluation MIS, verticals

6 | CHAT ANALYSIS

6.1 | Activity systems and two contradictory impacts

Research Question 1 asked the following: how is development NGO impact data and knowledge constructed in practice? In response, firstly, the concerns of impact evaluation data and knowledge construction in practice appear wider than those of technical evaluation or DIKW decision support. Practice involves more than methods and results or inputs and outputs for decision makers. In the case, data were not all that were used to make knowledge: sector demands played framing roles and expert knowledge was packaged into impact narratives.

At Rural India, impact construction required motivation (sector demands, Vijay's need to account for money spent), methods (surveys, collection of discrete data, eg, Yes/No questions), tools (spreadsheets, survey software, tablets, desktop PCs), training and hiring of staff and volunteers, collaboration between Imagine and Rural India, and authority lines. These were not incidentals, or contingencies of an evaluation model, but constituted the practices and power inherent to the evaluation cycle. A first response from a CHAT perspective then is that these constitute and make manifest the evaluation.

A second CHAT response is that there are not one, but two forms of impact involved, and these conflict, generating systemic contradictions (see Figure 7). The first kind of impact was impact as representations, or "knowledge products" (Mosse, 2004: 77), produced for circulation in aid chains, markets, and bureaucracies. In development 2.0, such digitised impact representations are mobile, rationalised global representations (Avgerou, 2002: 77). Mobile impact is strategically remediated for exchange or revenue (Hayes & Westrup, 2014: 28). In contrast, the second kind of impact is in farmer livelihoods. It is more "humble," less certain, less documented, less data-centric, and less robust than the first type. Humble impact is personal, experienced, locally circulated, often uncertain, partial, and situated (Blackler, 1995).

Activity System for Imagine and Rural India Evaluation Machine

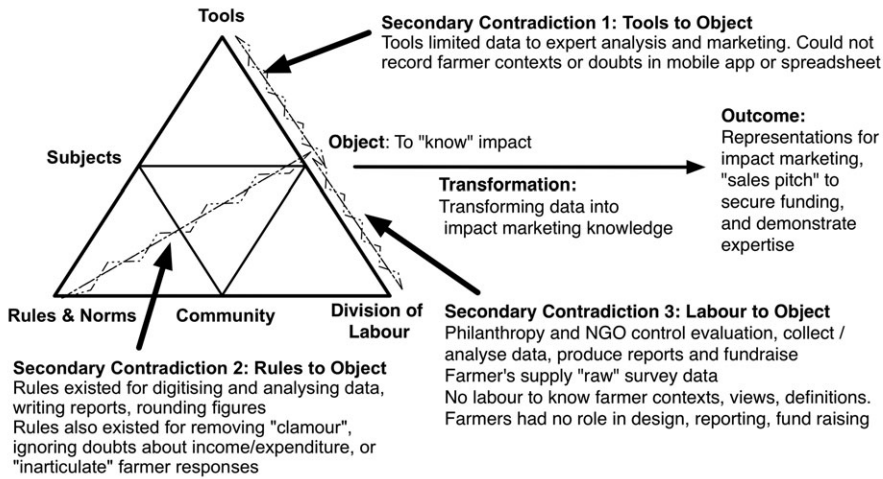**Primary Contradiction**: Knowing impact marketing contradicts knowing humble/local impact

Tools

Secondary Contradiction 1: Tools to Object
Tools limited data to expert analysis and marketing. Could not record farmer contexts or doubts in mobile app or spreadsheet

Subjects

Object: To "know" impact

Outcome:
Representations for impact marketing, "sales pitch" to secure funding, and demonstrate expertise

Transformation:
Transforming data into impact marketing knowledge

Rules & Norms   **Community**   **Division of Labour**

Secondary Contradiction 3: Labour to Object
Philanthropy and NGO control evaluation, collect / analyse data, produce reports and fundraise
Farmer's supply "raw" survey data
No labour to know farmer contexts, views, definitions.
Farmers had no role in design, reporting, fund raising

Secondary Contradiction 2: Rules to Object
Rules existed for digitising and analysing data, writing reports, rounding figures
Rules also existed for removing "clamour", ignoring doubts about income/expenditure, or "inarticulate" farmer responses

FIGURE 7   Activity system and contradictions in the Rural India evaluation process

Figure 7 shows the activity system and contradictions between impact knowledge products and humble impact. It shows how tools, rules, and divisions of labour incrementally limited the object of knowing impact, ie, expert analysis and marketing to satisfy sector demands. The activity system bifurcates impact data/knowledge, rendering humble impact (clamour, doubt, farmer views, etc) as illegible to the impact machine.

These two impacts formed a primary contradiction based on the exchange value of representational impact to meet sector demands and secure funds or legitimacy. This contradicted the use value of humble impact in farmers' daily lives. Secondary contradictions between activity elements illustrated these contradictions (Figure 7). Tools (eg, data cells, survey methods), rules and norms (data management, removing clamour), and divisions of labour (NGO and philanthropy evaluation control, farmer "raw" data supply alone) all contradicted the object of knowing farmer impacts, limiting knowing to the first form of impact, that of impact for marketing outcomes. Farmer voices, contexts, uncertainties, and participation were filtered out of the activity system outcomes. Humble impact was submerged or "masked" (Engeström, 2008: 36–42).

The contradictions were not a problem for the Rural India or Imagine management, because marketing impact had become an expert-normalised process, a problem of professional efficiencies, technical methods, and results. In response to Research Question 1, therefore, the CHAT analysis suggests the impact evaluation machine was assembled to harvest data and construct knowledge products for managing and marketing activities, not for understanding humble impact in farmer lifeworlds.

6.2 | Temporal activity chains, submerging and elevating

Research Question 2 asked the following: how are power relations generated in practice during impact evaluation? In response, a view of the temporal sequence of activities illustrates a relatively stable chain, wherein impact data and knowledge products are edited and mediated, and power relations are generated. For example, the findings showed that managing NGO staff requires specific early-cycle training activities, divisions of labour and rules, which are different to later activities, such as data capture, storage, or analysis. The temporal view also highlights points of agency where submerging and elevating occur. These points are opportunities for change, contestation and learning, albeit

with the proviso that systemic change is not guaranteed because agency, and thus power, is diffused along the whole chain (Figure 8).

CHAT has traditionally modelled bounded schools or workplaces, but Engeström (2009: 9–10) questions how activity systems model larger formations in society, because today these places "are bombarded by interventions from all kinds of outside agents (e.g., consultants, administrators, customers, competitors, partners, politicians)." NGO evaluation data/knowledge work is subject to such influences. Engeström puts forward runaway objects, knotworking, trails, mycorrhizae, and wildfire activities as new concepts for understanding the diversity of large-scale social activities today. The notion of temporally configured activity chains (Figure 9) follows these concepts for understanding diffused phenomena and fits descriptions of the "aid chain," where aid data and reports flow between international stakeholders (Wallace et al., 2006: 13, 166). The Rural India activity chain incorporated the early-cycle need-to-know impact and the later exchange of impact representations in funding markets. From impact demands to impact supplies, data and knowledge travel through and mediate activities, revealing a deeper, more fluid, and power-laden production process:

> Forms, records, genres of email and other forms of documentation travel across activity systems and make trails that change the landscape. This is directly relevant for our attempts to understand current historical transformations in the organisation of human activities. (Engeström, 2009: 8–9)

Furthermore, understanding impact supply and demand means recognising how evaluation mechanisms that precede data capture invalidate the "raw data" claims of DIKW (eg, Earl, 1994) and the idea that impact data is based only on technical methods. At Rural India, diverse sector demands led to a data/knowledge supply chain stretched out over time and space, in which impact data/knowledge flowed and changed (Figure 8).

The temporal chain provides a tool for understanding power relations beyond technical impact evaluation or DIKW models of knowledge construction, beyond the linear rooting of knowledge, to raw data facilitated by modern ICTs. At Rural India, bundled knowledge was not data driven. Technologies bifurcated impact as well as speeding data transfer up. Rural India "absorbed" (Karanasios & Allen, 2013: 300) the object of activity (marketing impact products), technologies, and techniques of Imagine. They benefited through funding, learning to be expert evaluators, and gaining legitimacy as a capable deliverer of impact. Together, the activities had coalesced into a stable supply chain
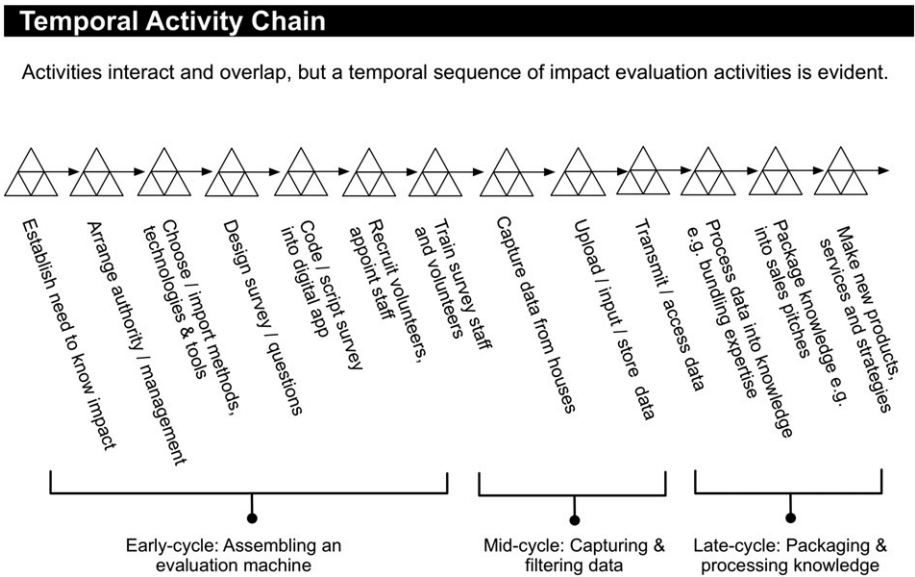

Temporal Activity Chain

Activities interact and overlap, but a temporal sequence of impact evaluation activities is evident.

Establish need to know impact

Arrange authority / management

Choose / import methods, technologies & tools

Design survey / questions

Code / script survey into digital app

Recruit volunteers, appoint staff

Train survey staff and volunteers

Capture data from houses

Upload / input / store data

Transmit / access data

Process data into knowledge e.g. bundling expertise

Package knowledge into sales pitches

Make new products, services and strategies e.g.

Early-cycle: Assembling an evaluation machine

Mid-cycle: Capturing & filtering data

Late-cycle: Packaging & processing knowledge

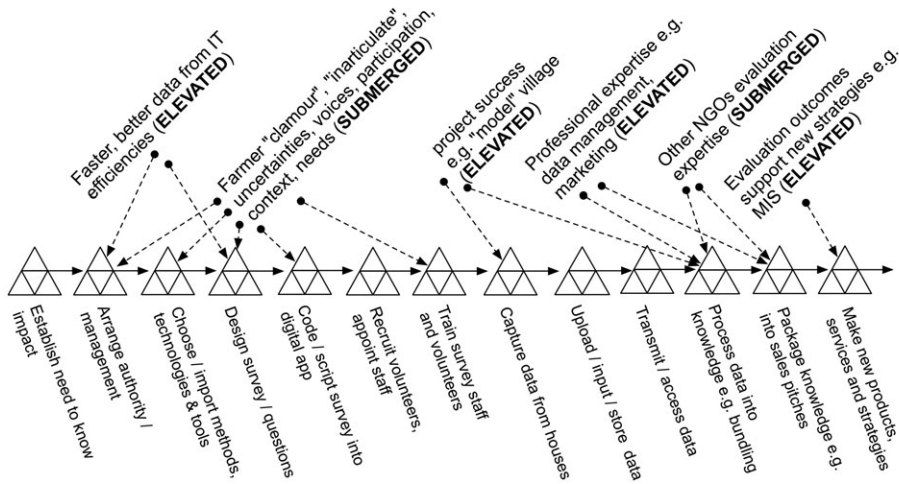**FIGURE 8** Evaluation activities illustrated in a temporal sequence or chain

FIGURE 9 Submerging and elevating along the temporal activity chain

where representations of impact were "redesigned to meet the demands" (Miettinen et al., 2012: 11) of the sector. Demands included selling impact, illustrating capacity, securing funding, meeting targets, and using modern ICTs.

Chandan's descriptions of farmer clamour and farmers' inability to articulate responses were normalised in relation to his own expertise. Farmer contexts, participation, and voice were submerged. Data management, marketing, and evaluation forms of expertise were elevated. Leonard's need for fast data was a question of efficiency for him, not a lack of participation by others. Some knowledge was elevated, legitimated as part of exchangeable rationalised discourses or claims to expertise and efficiency (Hayes & Westrup, 2014), and these elevations supported impact marketing. Other knowledge was submerged, or subjugated in this process (Avgerou, 2002: 77), such as farmer needs, doubts about income and expenditure, group responses to survey questions, or aspects of farmer lifeworlds that were illegible to evaluators. By elevating expertise, certainty, and success, other data and knowledge were submerged in the temporal activity chain.

The problem of submerging and elevating mediations, and their effects on power and participation, means Blackler's (2011: 733) call for CHAT researchers to problematise structures beyond local interventions and confront clients with such problems is critically important. Submerging and elevating occurred through diffuse mechanisms, where managers call voices inarticulate, where data cells eject peripheral context, and where executives insist impacts must be measured using business tools.

6.3 | Re-embedding power and practice in evaluation

Research Question 3 asked the following: how can views of power and practice be embedded into impact evaluation data and knowledge construction? Firstly, this means asking if CHAT surfaced evidence of power and practice in the case, and secondly, if participants reflected and acted upon power inequalities. The answers are firstly yes and secondly no.

Firstly, CHAT did articulate power and practice. In CHAT, methods, data, information, knowledge, evidence, and results have more diverse genesis than in technical evaluation or DIKW. Therefore, the CHAT analysis speaks to concerns about the politics of evaluation (Norris, 2015: 136; Picciotto, 2015: 152–153), evidence (Eyben et al., 2015) and knowledge production (Gardner & Lewis, 2015: 179). The two impacts and systemic contradictions are part and parcel

of a data/knowledge-intensive development 2.0 in which NGOs compete for funding and are under pressure to submerge or elevate different data/knowledge. In the case, CHAT articulated these demands and the supply chain as activity systems and temporal activity chains. This contrasts with technical impact evaluation as inputs and outputs, and DIKW-related models of decision support.

Secondly, however, it was difficult for Rural India or Imagine to reflect or act on the power relations generated by their evaluation machine. They were reluctant to adjust their process to incorporate interviews or farmer contexts. In this sense two of the aims of the research were unsuccessful: to encourage more multivoiced evaluation using qualitative interviews and to encourage reflection on evaluation power dynamics. The NGO Director lamented lost data and inarticulate farmers when using qualitative interviews in the past, and he cited numerous reasons for not revisiting qualitative ways of understanding farmer contexts. The philanthropic foundation's Head of Projects was unsure about resources for qualitative interviews or analysis.

On reflection, the CHAT analysis suggests farmer voices and more contextual narratives conflicted with the partners' need to show success, expertise, and relative certainty. More contextual evaluation would have led to questions about the lack of farmer participation and limited data validity, thus damaging impact marketing narratives. Given the two-impact contradiction, and the triple needs to digitise, transport, and pitch impact for funding markets, it was not surprising that the partners avoided richer contexts and issues of power. In summary, CHAT supported a greater sensitivity to power and practice, but Imagine and Rural India found elevating these sensitivities challenging.

7 | DISCUSSION AND IMPLICATIONS

The case analysis raises two points for debate relevant to ICT4D and KM4D researchers and development evaluation practitioners.

The first point concerns whether the CHAT analysis of temporally diffused power dynamics in funder-NGO partnerships is unique, or if it resonates with broader development 2.0 relations. For example, does ICT2.0 deliver progress that is increasingly responsive to poor people's demands, as Heeks (2008: 33) argues? And are data-intensive technologies "on balance" both relevant and beneficial to developing nations (Walsham & Sahay, 2006: 7)? Answering such questions implicates development 2.0 relations between kinds of organisations (eg, investors, governments, IT vendors, and consultancies), and kinds of processes (eg, planning, e-development, data analysis, and technology-centric innovations such as recent interest in blockchain for development[6]). From the Rural India case, the problem that stands out is if and how these other data/knowledge relations also generate unequal power dynamics? More work around development 2.0 is required to resolve this debate. It will need to draw on broad forms of analysis (Brigham & Hayes, 2013: 127), illuminate the diversity of development 2.0 organisations and processes, and re-embed relations of data, knowledge, and power. CHAT offers conceptual tools for understanding these relations, via activity systems, contradictions, and temporal chains.

The second point of debate raised by the case is how approaches to social practice and power might be made pragmatic, palatable, and useful for adoption and adaptation by development organisations. In the Rural India case, the partners were open to advice to improve their annual evaluations. CHAT delivered an analysis of activity systems and temporal chains that illustrated distributed data, knowledge, and power dynamics. However, the partners found it difficult to revisit qualitative evaluation, and they did not articulate problems regarding unequal power relations in their professional work of assembling the evaluation machine, bifurcating data, and packaging or pitching impact knowledge.

If sector demands, technical evaluation discourse, and the DIKW legacy combine to normalise and therefore silence power and practice, then how can more sensitive approaches be re-embedded into impact evaluation and development 2.0 more broadly? From development, Gardner and Lewis (2015: 180–181) implore anthropologists and aid agencies to collectively engage and critique. Guijt (2015: 207) asks practitioners to acknowledge the messy

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[6]See Hernandez (2017) for a recent discussion of blockchain.

politics of their work or find "space and time for more appropriate protocols and methods." Nicolini (2012: 240–241), in reviewing practice theories, concludes that testing practice-based toolkits in fieldwork is required. Engeström, Virkkunen, Helle, Pihlaja, and Poikela (1996) and others (eg, Virkkunen & Newnham, 2013: 24–25) facilitate CHAT change laboratories, bringing stakeholders together to explore potential changes. However, in global development, stakeholders are geographically dispersed across data/knowledge supply chains. Participatory forms of ICT4D, knowledge management, and evaluation emphasise local communities and local knowledges as a response. But being sensitive to data, knowledge, and power means acknowledging wider activity chains across development 2.0. As such, the case has no clear answers but suggests multisite responses distributed across aid chains may better amplify the problem of power inequalities than single-site interventions.

The study also has important implications for development 2.0, ICT4D and KM4D researchers, and development evaluation professionals. Firstly, impact data and knowledge construction involve temporal sequenced activities that generate power relations in practice. Many IS and KM models do not track power or practice, but approaches to social practice can and do.

Therefore, if researchers or practitioners wish to promote more democratic forms of impact evaluation, rather than autocratic or bureaucratic ones (MacDonald, 1993; Norris, 2015), researchers cannot ignore power in data/knowledge work, managerial controls (eg, Bernardi & De Chiara, 2011: 37–38), or local knowledge generation (Walsham & Sahay, 2006: 11; Thompson, 2002). Evaluation may be "captured" by vested interests, bureaucratic, or neoliberal market forces (Picciotto, 2015: 152), especially where mundane power dynamics operate expertly and silently. Blackler (2011: 732–733) advised CHAT researchers to take heed of Hardy and Clegg's (1996) observation that power is best theorised as "the medium of collective action." As such, practitioners and researchers can benefit from Blackler's (2011: 733) advice on how they influence clients or research participants. The implications of the current study add to Blackler's advice, focusing attention upon

1. mundane, diffused power relations in data/knowledge activity chains

2. submerging of doubt, uncertainty, or participation, potentially viewed as old, unclear, out-of-scope, unmarketable, inarticulate, illegible, or peripheral

3. elevating of success, expertise, technical methods, and scientific rigour, considered as professional, certain, modern, unproblematic, and virtuous

4. how knowledge and "raw data" always have etymologies and provenance through which their demand, supply, and power dynamics can be articulated and critiqued

8 | CONCLUDING REMARKS

To conclude, the article has argued that development impact evaluation discourse and DIKW-derived models of data and knowledge construction have inadequately addressed power relations and social practice. In response, an alternative frame on power and practice has been advocated and demonstrated through CHAT. The study applied CHAT to a collaboration with two development partners, a UK philanthropic foundation and their grantee, a small NGO in India. The critical case described the design of an impact evaluation process to illustrate how power inequalities were generated during professional evaluation data/knowledge construction. Power dynamics in the study were silent rather than overt, manifested in normalised submerging and elevating activities and diffused across the evaluation process. These dynamics can be surfaced and articulated as temporal activity chains in CHAT, a novel concept to compliment CHAT's activity system model. The activities also constitute a data/knowledge supply chain.

The analysis illustrated how demands upon the partners produced two kinds of impact: firstly, representational impact products to market in the development sector, and secondly, humble impacts, as part of participant

experiences and lifeworlds. Studying power dynamics requires both diagnosis and engagement, issues advocated by scholars in relation to ICT4D (Karanasios, 2014: 8; Walsham & Sahay, 2006: 19), information systems (Orlikowski & Baroudi, 1991: 21), and development studies (Escobar, 2008: 202–203; Gardner & Lewis, 2015: 179). CHAT successfully articulated issues of power and practice as inherent features of impact data/knowledge supply and demand.

Three caveats are important to note. Firstly, the case focused on senior management at the NGO and philanthropy. Direct research with beneficiaries, volunteers, and investors would support a more expansive account of activity chains. Secondly, the study does not deny that evaluation can support livelihood improvements. In contrast, the aim has been to elevate the negative effects of impact construction to challenge pervasive models and methods that fail to address power and practice. These are exemplified by technical evaluation discourse and DIKW's legacy. It would be ironic and ethically problematic if marginalised groups could only be served by data and knowledge that necessarily submerged and misrepresented their lifeworlds, whilst simultaneously elevating evaluator expertise and aid sector demands. Thirdly, Rural India and Imagine had stable funding and evaluation relationships. Not all NGOs and funders share such close relations.

Finally, further research with donors, NGOs, and other organisations is required to explore how practice-based approaches may be made more palatable for adoption and adaptation in data/knowledge-intensive development 2.0 work. Future CHAT research may also consider how temporal activity chains can support the need for new CHAT analytics in understanding and responding to globally complex activities (Engeström, 2009: 28).

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