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The 4Rs: A collective reflexive methodology for realising critical self-transformation in ICT4D research practice

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Abstract

The “critical turn” in information and communication technologies for development (ICT4D) research emphasises a transformative and ethical research practice which can be addressed by developing the critical intent and agency of ICT4D researchers through reflexive practice. There exist, however, limited methodological insights into existing reflexive approaches and a limited understanding of how self-transformation and change can take place through more critically reflexive ICT4D research practice. To address these issues, this paper proposes a reflexive methodology for ICT4D research, labelled “the 4Rs”, which comprises four interrelated reflective and potentially self-transforming processes of Retrospection, Representation, Review and Reinterpretation. We present the explanations and justifications of the methodology in detail with illustrative examples. We also employ a metacognitive process to understand how self-transformation can be realised through the use of this methodology and demonstrate the applicability of the 4Rs for other ICT4D researchers. Our main contribution lies in illustrating how this collective and critical approach can be used to deepen the self-reflexivity of traditional individual confessional accounts. We also demonstrate how the approach can lead to new collective knowledge and contribute to achieving more critical agency.

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KEYWORDS

collective reflexivity, criticality, ICT4D, radical reflexivity, researcher intent

1 | INTRODUCTION

The “critical turn” in information and communication technologies for development (ICT4D) research (Bon & Akkermans, 2019; De´ et al., 2018; Krauss, 2022; Masiero, 2022) emphasises a transformative and ethical research practice. To recognise and address unintentional harm, researchers have drawn attention to power imbalances affecting the multi-stakeholder relationships involved in ICT4D projects, which influence the conduct, interpretation and application of research and thus, the production of knowledge (Bon et al., 2022; De´ et al., 2018; Schelenz & Pawelec, 2022). By “harm” we mean potentially disruptive or exploitative outcomes of research practices which may arise from imposing our own values and norms unthinkingly on participant communities in the progress of our research (Ansell et al., 2023). An example of this would be extractive research practices in which global South research participants and/or researchers become merely conduits for data extraction, while those from the global North benefit from the use or publication of that data (Bai, 2018; Hatakka & Strand, 2022).

In critical ICT4D research, reflexivity could address power asymmetry issues in knowledge production through, for example, involving research participants as co-developers of knowledge outputs (Bentley et al., 2019). Reflexivity in qualitative research is a process in which the researcher continuously reflects on how their own values, perceptions and actions influence their research setting and process (Fook, 1999; Hibbert, 2021). In IS research, it is recognised as an essential part of a critical research process (Cecez-Kecmanovic, 2011; Krauss, 2022; Myers & Klein, 2011), and may lead to uncovering contradictions, tensions, inconsistencies and biases that could unintentionally lead to “harm” in research contexts (Hibbert, 2021; Soedirgo & Glas, 2020; Sultana, 2007).

A reflective stance emphasises the role of the researcher, researcher positionality and issues of identity, which are also highlighted as key constituent elements of a critical research process in ICT4D research projects (Buskens, 2010; Krauss, 2012b; Light et al., 2010). A reflexive researcher could become more aware of their positionality and potential to cause harm in these contexts through their reflective practice (Krauss, 2012b). Reflexivity can thus contribute to the researcher’s development of criticality in the ICT4D field, that is, the ability to engage in research that has critical intent (Buskens, 2010; Roberts, 2015; Walsham, 2005a, 2005b). It could address potential misleading convictions of reaching equitable research outcomes with ICT4D solutions without comprehending their embeddedness in oppressive structures (Krauss, 2018; Krauss & Turpin, 2013). Both the researcher and research participants could fall prey to such false beliefs and perpetuate systemic injustice that ultimately may lead to the failure of the ICT4D project.

Even though a reflexive research practice may progress a transformative agenda of ethical ICT4D research, the “how” of “doing reflexivity” methodologically is seldom explicitly addressed (Krauss, 2012b, 2022). Indeed, incorporating reflexivity into research practice can be difficult since it can take many different forms (Finlay, 2002a). It can be employed to explore theoretical, methodological and/or personal issues in the research process and can occur at any point, such as at the proposal, execution or aftermath of the project (Hibbert, 2021; Subramani, 2019; Walsh, 2003). It can be: an intrinsic part of the methodological approach (Alvesson & Sköldbberg, 2017; de Vaujany, 2008); a way of framing the ‘self’ in the research process (Cunliffe, 2016; Hibbert, 2021); a way of acknowledging and exploring the relational nature of research (Cunliffe & Karunanayake, 2013; Duncan & Elias, 2021) or a combination of such approaches, perspectives and experiences, each with a potentially different objective or outcome. Due to the multiplicity of approaches, objectives, experiences and theoretical considerations involved in incorporating reflexivity into the research process, it has been likened to “negotiating a swamp” (Finlay, 2002a).

This paper proposes a critical reflexive methodology for ICT4D research, labelled “the 4Rs”, which comprises four interrelated reflective and potentially self-transforming processes of *Retrospection*, *Representation*, *Review* and *Reinterpretation*. We propose it as one way of “negotiating the swamp” of reflexive methodologies towards engaging in research with more critical intent (McGrath, 2005; Walsham, 2005a, 2005b). Our proposed methodology augments existing traditions in IS/ICT4D research that incorporate more subjective, confessional accounts into the research process (e.g., Krauss, 2018; Schultze, 2000). The paper is guided by the research question: “*What methodological approaches can ICT4D researchers use to become more critically reflexive and aware of processes of self-transformation through their research practice?*” We will demonstrate how we created a safe, shared space in which we could develop intersubjective, interpretive accounts of our experiences as ICT4D researchers (Jimenez et al., 2022) and challenged each other’s beliefs, assumptions and epistemological stances. In so doing, we enhanced our own criticality through self-transformation and created new collective knowledge.

The paper thus contributes methodologically to how we, as ICT4D researchers, espousing different fieldwork approaches, can negotiate collective interpretations of transformative and ethical research practice. The remaining sections of the paper are organised as follows. A *literature review* synthesises our understanding of reflexivity and achieving criticality in the research process and how these relate to ICT4D research. We then highlight existing research gaps. The section following presents a detailed description of the *4R’s methodology* complemented by a meta-reflection on our processes of self-transformation. These are supported by detailed evidence in the appendices. The *analysis* section draws out the lessons learned from the application of the methodology while the *discussion* section relates these towards addressing how we can become more critically reflexive ICT4D researchers. A section presenting guidelines on the *applicability* of the 4Rs and how we ourselves changed our research practice complements this discussion. We *conclude* finally with a summary of contributions to extant ICT4D research on reflexivity.

2 | LITERATURE REVIEW

In this section, we elaborate on the concept of reflexivity and explain why it is important to the researcher and their research practice, especially in the context of ICT4D research. We then present how reflexivity is being practiced in ICT4D research and how researchers engage critically with it. We then posit our own conceptualisation of how developing a critical perspective can be done through reflexive practice and relate this to ICT4D research practice.

2.1 | Reflexivity in research practice

Reflexivity, as a complex and multifaceted notion, presents challenges in understanding and applying it across different research fields. While this paper refrains from providing a universal definition of reflexivity, since it is contextual and shaped by the research in which it is embedded, we provide an overview of its different meanings in various research fields and examples of how it can impact the way research is done (see Table 1). Some key concepts emerge from these definitions, which we will clarify. First, there is a relationship between the terms *reflectivity* and *reflexivity*. The former is the process of reflecting upon underlying assumptions in a research context in order to institute change in one’s practice. It is seen as part of the process of achieving reflexivity, which is assumed to additionally encompass becoming conscious of the researcher’s active role in influencing the research process itself (Finlay, 2002b; Fook, 2009; Lazard & McAvoy, 2020). Reflectivity and reflexivity are thus assumed to be at different points on a continuum from the more instrumental, practical end to the more critical and self-conscious (Finlay, 2002b; Fook, 1999).

Second, previous research on reflexivity has resulted in numerous typologies and categorisations, some covering positivist, more objectivist views of “bracketing” the researcher from the research context to perspectives embracing

TABLE 1 Sample of referenced definitions of reflexivity in qualitative research.

Authors	Field	Definition	Purpose/impact on research practices
Wilkinson, 1988	Feminist studies	<i>“Personal” aspects of reflexivity refer to the researcher’s own identity: as an individual, a woman, and a feminist. For the individual, his or her research is often an expression of personal interests and values... Thus, the topics one chooses to study (and also the theories and methods one utilises-... “functional” aspects) (p. 494)</i>	<i>Becoming agents of change methodologically and disciplinarily, by becoming “aware of the factors that influence the legitimation of new forms of knowledge and methods of inquiry, [and]... deliberately seek to use these factors to our own advantage as we develop and implement strategies for change” (p. 498)</i>
Fook, 1999	Social work	<i>“It is an ability to locate yourself in the picture, to understand, and factor in, how what you see is influenced by your own way of seeing, and how your very presence and act of research influences the situation in which you are researching” (p. 12)</i>	<i>Reflexivity in research can “allow a facility to translate experiences from multiple perspectives, and allow more voices to be heard” and for novel research designs, for example, participatory research involving participants as researchers, research involving the “self as instrument”, for example, autoethnographies (p. 16)</i>
Schultze, 2000	Information systems	<i>“A confessional... or vulnerable... account of ethnographic research highlights the ethnographer’s experience of doing fieldwork by giving a self-reflexive and self-revealing account of the research process” (p. 8)</i>	<i>It presents the ethnographer’s role as a research instrument and exposes the ethnographer rendering his/her actions, failings, motivations, and assumptions open to public scrutiny and critique. (p. 8)</i>
Finlay, 2002b	Health research	<i>“Reflexivity can be defined as thoughtful, conscious self-awareness. Reflexive analysis in research encompasses continual evaluation of subjective responses, intersubjective dynamics, and the research process itself” (p. 532)</i>	<i>Reflexivity in research can be a “valuable tool” to increase integrity, examine the researcher’s impact on the research context, understand the interpersonal dynamics between researcher and researched, evaluate the research process. Finlay refers to this as “reflexive accounting” (p. 536)</i>
Guillemin & Gillam, 2004	Ethics in research	<i>“Reflexivity in research is thus a process of critical reflection both on the kind of knowledge produced from research and how that knowledge is generated” (p. 274)</i>	<i>Informing ethical research practice through being aware of “ethical dilemmas” and reducing the capability of “causing harm in various ways” (p. 275 & 276)</i>
Sultana, 2007	Critical geography	<i>“Reflexivity in research involves reflection on self, process, and representation, and critically examining power relations and politics in the research process, and researcher accountability in data collection and interpretation” (p. 376)</i>	<i>Reflexivity contributes to the understanding of researcher positionality, issues of hierarchy, power relations and ethical practice in international research. “Reflecting on my positionality vis-à-vis the way others constructed my identity helped in more fully engaging in reflexivity, that enabled engagement with the research process in a more meaningful way” (p. 382)</i>
Lazard & McAvoy, 2020	Psychology	<i>“Reflexivity is a form of critical thinking which aims to articulate the contexts that shape the processes of doing research and subsequently the knowledge produced” (p. 160)</i>	<i>Reflexivity can frame how subjectivity is implicated in knowledge production and how “affect, feeling and emotion... may provide a basis for insight on the research process” (p. 164)</i>
Darwin Holmes, 2020	Education	<i>“reflexivity is the concept that researchers should acknowledge and disclose their</i>	<i>“a reflexive approach should allow for a reduction of bias and partisanship”</i>

TABLE 1 (Continued)

Authors	Field	Definition	Purpose/impact on research practices
		<i>selves in their research, seeking to understand their part in it, or influence on it... Reflexivity informs positionality. It requires an explicit self-consciousness and self-assessment by the researcher about their views and positions and how these might, may, or have, directly or indirectly influenced the design, execution, and interpretation of the research data findings" (p. 2)</i>	<i>although not necessarily removing subjectivity (p. 4)</i>
Olmos-Vega et al., 2023	Health education	<i>"Reflexivity is a set of continuous, collaborative, and multifaceted practices through which researchers self-consciously critique, appraise, and evaluate how their subjectivity and context influence the research processes" (p. 242)</i>	<i>Used to "actively co-construct data and results"... "capitalising on the researcher's knowledge and identities", a key aspect of participatory research and understanding the social and political contexts of the research (p 0.243)</i>

subjectivity and emotional proximity (Finlay, 2002a; Hibbert, 2021; Lynch, 2000; Walsh, 2003). Of interest to this study are categorisations of reflexivity at the individual level, that is, self or personal reflexivity, which focuses on the self and is generally quite introspective/confessional (Finlay, 2002a; Fook, 1999; Hibbert, 2021; Schultze, 2000) and reflexivity at the interpersonal level, that is, relational, collective or collaborative reflexivity which tends to be inter-subjective involving co-construction of meaning between researchers and participants (Cunliffe, 2016; Finlay, 2002a; Hibbert, 2021). Where reflexivity involves challenging and changing epistemic positions, knowledge claims and how one constructs knowledge, this has been referred to as radical reflexivity, itself existing on a continuum of the researcher's ability to enact change (Duncan & Elias, 2021; Hibbert, 2021; Lynch, 2000).

Through reflexivity the researcher also critically analyses their role, positionality and identity in the research process (Muhammad et al., 2015; Soedirgo & Glas, 2020; Sultana, 2007). The researcher's role is the part that they play in the production of knowledge (Finlay, 2002b; Gilmore & Kenny, 2015; Lazard & McAvoy, 2020), especially if the practitioner is involved as a researcher (Bentley et al., 2019; Wilson et al., 2022). The researcher's role and identity are intrinsically linked, since one informs the other, for example, an "insider" who is close to and familiar with the research context may construct knowledge in a different way from those considered to be "outsiders"; a researcher may choose a particular identity that fits with the context in order to facilitate the knowledge production process (Barnard, 2019; Dwyer & Buckle, 2009; Shehata, 2014). Constructing a researcher identity in the field (e.g., Rowe, 2014) is also related to how one understands one's position with respect to others in the research context in relation to one's personal characteristics, such as gender, ethnicity, physical ability and so forth, which is key to the notion of positionality, or one's position within social and political structures in the research context (Darwin Holmes, 2020; Soedirgo & Glas, 2020; Sultana, 2007).

2.2 | Reflexivity in ICT4D research

Adopting a reflexive approach to research can help to progress the critical agenda in ICT4D for several compelling reasons. ICT4D interventions are increasingly driven by the goal of making a positive impact on society, addressing socio-economic disparities, and enhancing well-being (Lin et al., 2015; Masiero, 2022; Zheng et al., 2018). However, ethical challenges persist, such as fair compensation, user participation, and navigating intercultural differences during the design and implementation of ICT4D interventions (Heeks & Wall, 2018; Schelenz & Pawelec, 2022).

Researchers advocating for a more 'critical' perspective in ICT4D research and practice (Bon & Akkermans, 2019; De' et al., 2018) seek a fairer and more inclusive society which requires examining the social structures that underpin justice, rights, and ethics (Heeks & Wall, 2018; Masiero, 2023). To do this, ICT4D researchers, similar to those in other fields (see Table 1), can adopt more reflexive approaches which consider the ethical implications of their work and how to promote inclusivity and strive for meaningful social change through the use of ICTs (Zheng et al., 2018).

A critical methodological approach can also transcend the dominant technological deterministic perspective in ICT4D research, which often overlooks socio-cultural contexts and everyday practices (Chipidza & Leidner, 2017; Unwin, 2017). By engaging in reflexivity, ICT4D researchers, similar to those in Table 1, can assess their biases, assumptions, and potential power dynamics in play, which may significantly influence research outcomes (Buskens, 2010; Tshuma & Krauss, 2017). Furthermore, in addition to empowering the researcher on a self-reflective basis, reflexivity sensitises the researcher to participants' mindsets, their daily activities and cultural practices concerning technology use, thus determining technology's influence in people's lives (Sam, 2021; Tacchi, 2001).

Though the "critical turn" in ICT4D research has been in existence for some time, it is difficult to situate reflexivity within the context of ICT4D research and practice (Gagliardone & Trincherro, 2014; Krauss, 2022; Tacchi, 2001). As with other fields, ICT4D research has faced criticism for its limited emphasis on making the researcher's reflexivity apparent and transparently addressing underlying epistemological assumptions (Heeks & Wall, 2018; Krauss, 2022; Masiero, 2022). Consequently, explicit examples of reflexivity within the ICT4D literature are scarce, making it challenging for researchers to comprehend how to effectively apply reflexivity in their work. Notable exceptions can be found in a few ICT4D studies that include reflexive elements (see Table 2).

With the exception of Krauss and colleagues (Krauss, 2012a, 2018, 2022; Tshuma & Krauss, 2017), reflexivity in the ICT4D literature reviewed is not the main subject of the research or the research act itself, hence there is a lack of insight into the reflexive methods used and little evidence of the transformative impact on the individual, the participants or the research process, although studies may hint at this (e.g., Buskens, 2010). These studies are insightful and original and provide the reader with an appreciation of how the reflexivity element could be incorporated methodologically. The adopted reflexivity approaches tend to be mainly individual researchers' introspective or confessional accounts (e.g., Buskens, 2010; Krauss, 2018). Where more than one researcher's reflexive process is documented, it is either as a compendium of their individual reflective accounts (e.g., Light et al., 2010) or of their reflective accounts in collaboration with research participants (e.g., Bentley et al., 2019). Approaches where researchers share their reflective/confessional accounts with each other in a collective way are less evident in the ICT4D literature.

There are few published examples of ICT4D researchers engaging each other in either intersubjective or collaborative/collective reflexivity through accessing their disparate or collaborative research experiences (in our review only Jimenez et al., 2022 does this). In the wider literature, such examples are also rare, even though it is acknowledged that self-reflexivity (and therefore change) can be deepened when researchers engage in discussing and debating their experiences in the field (Cunliffe, 2016; Hibbert et al., 2014). Such collective reflexivity is seen as contributory to the co-production of new knowledge, surfacing of unconscious thoughts and emotions, creating safe spaces for co-creating meaning and sharing experiences and encouraging more radical approaches to reflexivity, that is, questioning taken-for-granted knowledge claims and assumptions (Duncan & Elias, 2021; Gilmore & Kenny, 2015; Kohl & McCutcheon, 2015). Such views are also recognised by reflexive scholars who assert that reflexivity is more of a relational than an individual process and is not the sole responsibility of the individual researcher since research is inherently a social endeavour (Cunliffe, 2003, 2004; Hibbert, 2021; Muhammad et al., 2015). We aim to build on these existing reflexive methodological approaches by presenting through this paper a collective reflective approach to ICT4D research practice.

2.3 | Developing criticality through reflexivity in ICT4D research

Researchers advocating for more critical engagement in ICT4D that results in 'transformation and change' argue that research should be performed with critical intent (De' et al., 2018; Lin et al., 2015; Masiero, 2022;

TABLE 2 Summary of ICT4D studies featuring reflexive elements.

Author(s)	Method of reflexivity	Research approach	Focus of research	Operationalisation/use of reflexivity
Buskens, 2010	Individual Reflection	Storytelling	To critique the ICT4D knowledge construction process around women's agency in development projects	"...processes of making sense of what we witness and observe... and to respond to it from my own theoretical, methodological, and normative positions, as well as from the knowledge... of ICT4D research discourses" (p 20)
Light et al., 2010	Individual Reflections	Multiple field research techniques	To examine the ways in which a researcher's gender influences research outcomes and experiences in the field	"the tendency for people to reflect on, examine critically, and explore analytically the nature of the research process" (p. 2)
Krauss, 2012a	Critical self-reflexivity	Critical ethnography using empirical data	To provide a confessional account uncovering 'false consciousness' and bias in ICT4D research to enable more ethical and transformational outcomes in the research context	"self-revealing and self-reflexive account of the research process" (p. 52)
Tshuma & Krauss, 2017	Critical reflection	Conceptual positioning	To propose a critical examination of the integration of educational technology in African higher education settings to "uncover... the hegemonies and oppression inherent in technology integration and use" (p. 3)	"as the process of carefully considering our practices by examining our thoughts and feelings about them, others' experiences of these practices, and how they fit into the wider sphere of extant literature and context" (p. 3)
Krauss, 2018	Critical self-reflexivity	Confessional accounts with examples	To recount the researcher's emancipatory journey during a critical ethnography project—"... how I, as a primary research subject, evolved as critical researcher and in critical reflexivity" (p. 483)	"researchers explore their own ontological and epistemological assumptions and preferences that inform their research and influence their engagement with a study. By intentionally expressing, questioning, and reflecting upon their subjective experiences, beliefs, and values, critical researchers expose their ideological and political agendas" (p. 490)
Bentley et al., 2019	Inter-personal reflexivity	Participatory visual methods	To demonstrate the critical roles ICTs play in the participants' lived experience expressed as "situational awareness, reflexive ICT practice and power and control over ICT" (p. 477)	"involves examining one's role within the interaction between emancipatory objectives and situational awareness of ICT" (p. 489)
Krauss, 2022	Critical self-reflexivity	Critical ethnography using empirical data	To demonstrate how locally contextual project/policy implementation guidelines can be developed from reflexive methods used in the research project	"is about interpretation of interpretation...and the launching of critical self exploration of one's own interpretations of empirical

(Continues)

TABLE 2 (Continued)

Author(s)	Method of reflexivity	Research approach	Focus of research	Operationalisation/use of reflexivity
Jimenez et al., 2022	Collective reflexivity	Interpretive analysis with critical intent using autobiographical vignettes	To explore the researcher's role, identity and positionality as in-between "insider" and "outsider" researcher positions in ICT4D research projects	material (including its construction" (p. 143) "an ongoing process of questioning how a researcher's perception, values and position might influence the research process, the interpretation of findings and outcomes" (p. 27)

Poveda & Roberts, 2018). In mainstream IS research, reflexivity has traditionally played a role in critical IS studies (Cecez-Kecmanovic, 2011; Howcroft & Trauth, 2005; Myers & Klein, 2011), although interpretivist studies have long been the dominant paradigm for researching ICTs in their historical, socio-political and socio-economic contexts (Walsham, 2006). In becoming more critical, McGrath (2005) argues that the range of what can be considered critical IS research should include interpretive studies with "critical intent". Like Alvesson and Sköldbberg (2017), she provides a rationale for incorporating empirical insight with theory-based structuralist critique but stops short of prescribing any particular methodological approach. Rather, she challenges IS researchers to reflect upon their research practice to give insight into how criticality is achieved. Walsham (2005a, 2005b) provides examples of his own "journey" to criticality by using the metaphor "engagement" to exemplify long-term commitment, struggle against the status quo, and moral duty (towards change) and acknowledges that there is not always a clear-cut distinction in the methods he has employed in his research practice to become more critical. It is more about the "intent" or motivation and trying to influence others through his research. For McGrath and Walsham, therefore, criticality is linked to reflecting on becoming critical and manifesting a commitment towards ethical change in the research process.

Within the ICT4D literature, Buskens (2014a), cited in (Roberts, 2015), provides three categories of researchers' critical intent that are assumed to correspond broadly to Freire's (1970) levels of critical consciousness (Roberts, 2015). The notion of critical consciousness was introduced by Freire (1970) as increasing awareness of the structural societal challenges in which people are embedded, whether they benefit from or are disadvantaged by them. Buskens' (2014a) three categories provide a framework for understanding different levels of criticality that can be achieved within the ICT4D research community. The first category, *conformist*, refers to the researcher that has no intention of upsetting the status quo, but rather, seeks to increase efficiency within the current dominant development paradigm. *Reformist* researchers aim to address issues of inequality and marginalisation but without challenging the socio-political structures that maintain these injustices. Finally, *transformist* research is targeted at changing the underlying structural and historical roots of marginalisation or asymmetric power relations in the global South. Transformist research emphasises issues of gender, class, and race as well as any colonialist or imperialist legacies that may be present in the development discourse, that is, more structural societal issues (Roberts, 2015). These categories relate more to a continuum than a separation of concepts, and none of them are portrayed to be "better" than the other. The more critically reflexive researcher would tend to be on the transformist end of this continuum.

ICT4D research gives us only few insights into how the more transformational outcomes of reflexive practice can be achieved. Buskens (2010, 2014b) advocates exercising our agency as researchers to influence the way that knowledge is constructed in ICT4D research by unsettling powerful and established hegemonies. Krauss (2012a, 2012b, 2018, 2022) argues for emancipation of the self and research participants from false consciousness. Roberts (2015) and Poveda and Roberts (2018) propose critical agency (i.e., empowering research subjects with the knowledge and capability to realise transformist agendas). Beyond these examples, we have found little in ICT4D studies that accounts for how criticality may be realised in research practice.

In conclusion, the literature review highlights four key areas that warrant further attention: (1) limited examples of reflexivity in ICT4D research despite the role it can play in promoting a more critical research agenda; (2) limited methodological insight into existing reflexive approaches; (3) dominance of individual reflexive approaches even though collective reflexivity can deepen knowledge production processes; and (4) limited understanding of how self-transformation and change can take place through more critically reflexive ICT4D research practice. In the following section we propose a reflexive methodology that seeks to address these issues.

3 | THE 4Rs APPROACH: A REFLEXIVE METHODOLOGY

The 4Rs approach was a bespoke methodology developed by the authors to undertake a process of self-reflection on our collective experience of the positionality of “in-betweenness”, which provided data for research presented in a previous paper (Jimenez et al., 2022). The ‘data’ that resulted from applying this methodology were short autobiographical vignettes (Bagnoli, 2004) which can also be referred to as confessional accounts (Schultze, 2000). There is a long-standing tradition in the IS/ICT4D field of producing confessional accounts like this which then form part of the analysis of the case/situation comprising the object of the research (Alvarez, 2002; Bjørn-Andersen & Clemmensen, 2017; Krauss, 2018; Malaurent & Avison, 2017; Schultze, 2000). In such cases, the subjective experience of the researcher in the context of the research becomes part of the sense-making of the object of the research (Avison & Malaurent, 2014).

In this current paper, we present the processes that comprised this bespoke methodology and how the reflective confessional accounts were derived, shared, discussed and reframed. These processes were not discussed in the previous paper. In the sections that follow, we first explain how we constructed the 4Rs methodology and the stages and steps involved. In so doing, we also explain how previous research on reflexive methodologies influenced the reflective/reflexive aspects of the stages and steps that we developed to guide the research in the previous paper. We drew upon this work to inform our own processes, however, the sequence of steps we followed, the names we gave to the stages, and the choices we made, were all our own invention.

Through making the derivation of our confessional accounts transparent, we were also able to further reflect on how we were changing as researchers because of the 4Rs approach. In this current paper, therefore, we also present a meta-reflection on the 4Rs methodology to help us to understand how self-transformation was taking place through the collective sharing of our confessional accounts using the 4Rs methodology. This additional process represents an extension to the steps we took in the previous paper.

Recognising that our methodology incorporates self-referential and subjective elements, we conclude the methodology section with a comment on ways of assessing validity when using such data.

3.1 | Constructing the 4Rs methodology

In our previous paper, we derived the 4Rs methodology to examine how we, as global South-bred, global North-educated, ICT4D researchers, practising in the global South, undertook our research practice. We denoted this shared, collective researcher identity and positionality as “in-betweenness” (Kerstetter, 2012; Milligan, 2016). To collectively reflect on our practice, we enlisted methods that enabled us to retrospectively reflect on and discuss the separate ICT4D projects we had previously worked on, that had different objectives, outcomes and experiences (See Table A1, for a summary of the projects).

Due to this focus, we drew on inductive and collaborative research approaches used in existing work (Fook, 2011) which “enable participants to recognise values or beliefs that are fundamentally important to them..., to remake their understanding of their experience in a way that fits better with these fundamental ideas” (p. 56). For Fook (2011), reflexivity is a part of a relational, dialogical process. We, the researcher-participants, shared retrospective stories about our experiences and reflected on them with each other’s assistance, that is, a dialogue between the self

and others (Bagnoli, 2004). As a result, we each created three short vignettes of our experiences in the field (see Jimenez et al., 2022). The process began in January 2020 and lasted for 5 months, during which we conducted 14 meetings. Since it was a bespoke methodology, we then documented and formalised it into 4 stages, which we ourselves named: *Retrospection*, *Representation*, *Review* and *Reinterpretation*. We now propose the formalised processes as the 4Rs reflexive methodology. Although we present the 4Rs as a linear methodology, in practice it was more iterative, particularly between the *Review* and *Reinterpretation* stages. Additionally, the stages incorporated cycles of reading, writing and interpretation, which became more critically focused as we progressed. In the following, we present each of the stages of the 4Rs methodology focusing respectively on the *motivation*, the inspiration drawn from *established reflective and/or reflexive practices* and the *key steps* we took. The 4Rs stages, processes and steps are further summarised in Table 3.

3.1.1 | Stage 1: Retrospection

Motivation

To start the reflective process, we needed to create space for individual, focused reflection on our own past project experiences using an introspective reflection as explained below.

Reflective/reflexive aspects

Reflexivity when incorporated into research methodologies generally encompasses introspection or self-reflection at the individual level (Alvesson & Sköldbberg, 2017; Hibbert, 2021). In our case, the introspective process was part of a

TABLE 3 Stages, processes and steps taken in the 4Rs reflective methodology.

Stage	Process	Key steps
Retrospection	The process in which the researcher reflects retrospectively on their experience in a chosen research project and writes a personal account of the most significant aspects of this experience.	<ul style="list-style-type: none"> • Doing individual retrospective reflections • Writing personalised accounts of the reflections
Representation	The process by which researchers use their written personalised accounts as representations of their individual researcher experiences so as to discuss and deliberate on differences and commonalities with colleagues.	<ul style="list-style-type: none"> • Collectively reading each other's reflections • Seeking clarifications • Asking challenging questions • Identifying commonalities and differences
Review	The process by which a researcher reviews their initial personalised accounts through insights gained from discussions of their collective reflections and consults the literature to situate their thoughts and experiences in relation to relevant concepts.	<ul style="list-style-type: none"> • Individually reviewing own reflections • Revising reflections based on collective insights • Extending and editing reflections with conceptual inputs
Reinterpretation	The process by which the researcher reinterprets their initial personalised account as a more situated and critically reflective account of their researcher role in the project through further critical discussion and conceptualisation.	<ul style="list-style-type: none"> • Collectively reading each other's revised reflections • Engaging in further critical discussion • Considering learning outcomes from the process and takeaways for future research projects • Gaining more confidence in critically situating the reflection within a conceptual framework • Iterating through the Review and Reinterpretation stages.

past-oriented reflexive act, that is, “concerned with looking below the surface assumptions of past experience, to see how social and historical contexts have shaped us and our interpretations without any deliberate action on our part ...” (Hibbert, 2021, p. 4). When we performed this reflective activity, we were looking back retrospectively at projects with which we had been involved, but not actively engaged, at that point in time. Retrospective reflection has been used as part of reflective practice, for example, in education, for evaluating pedagogical approaches (Reardon & Snauwaert, 2015; Sablina et al., 2018) and classroom teaching (Brevig, 2006). It has been used in software development, as part of a project team's reflection on completed projects to document best practice and consolidate learning (Krogstie, 2009). In some instances, it is part of a process of developing collective or collaborative knowledge (Cress & Kimmerle, 2018). When done collaboratively, this process is also seen as creating “safe” spaces in which knowledge creation can take place (Brevig, 2006; Moon, 2004).

Key steps

The retrospection process involved two steps: undertaking the retrospective reflections individually and then documenting them as personalised accounts of our experiences in the field. The retrospection step initiated our individual meaning-making reflective processes (Hibbert, 2021; Moon, 2004).

3.1.2 | Stage 2: Representation

Motivation

Having established our own perspectives on our individual experiences in the field, we needed to create a shared understanding of these experiences, necessitating a collaborative reflective approach as outlined below.

Reflective/reflexive aspects

In this stage, the individual personalised retrospective accounts that we wrote in the *Retrospection* stage became written representations of our reflective process. Reflective writing helps make tacit knowledge (i.e., our individual meaning-making) explicit so as to enable shared learning from reflective practice (Goodyear & Steeples, 1998; Moon, 2004). We thus represented our thoughts and feelings in a material form, externalising our internalised experiences and making them visible to each other for discussion and debate, a process similar to Zavos and Biglia's (2009) account of producing collective knowledge from their fieldwork experiences. In so doing, we followed Moon's (2004) guidance on reflective learning: “...learning from the representation of learning... as if it is a two-stage process of representing initial learning (e.g., in writing) and then (later) learning from the representation (learning from the written material). The process is often likely to be integrated so that adjustments to the ongoing representation process can be made by learning from what has already been represented” (p. 81). This stage added a relational and dialogical element to our reflective process, which served to introduce a critical reflective perspective (Fook, 2009). The relational element refers to our interdependence with others in social processes (e.g., research practices) and an acknowledgement of the influence others have on our thoughts and feelings in these contexts (Cunliffe, 2016; Hibbert, 2021). The dialogic element refers to our ability to express through discourse with ourselves and/or others, thoughts and feelings related to our practice and surface cognitive and emotional issues of which we were not consciously aware (Brown & Sawyer, 2016; Fook, 2011; Mann & Walsh, 2017). Both elements introduce intersubjectivity into our reflective process (Cunliffe, 2016), the basis of collective reflexivity (Archer, 2013; Duncan & Elias, 2021; Kariippanon et al., 2020). These elements also increase our ability to engage in more critical forms of reflection (Cunliffe, 2016; Fook, 2011; Hibbert, 2021).

Key steps

This process involved four steps: collectively reading each other's written reflective representations, clarifying what our representations meant, asking each other challenging questions about our perceptions in our reflections and

identifying any commonalities and differences between our individualised accounts. Similarities can be found between our process and the work of Duncan and Elias (2021), Fook (2011) and Gilmore and Kenny (2015).

3.1.3 | Stage 3: Review

Motivation

At this stage we consolidated the learning we gained from stage 2, *Representation*, and deepened our emerging collective knowledge. We also developed a theoretical understanding of our emergent concepts and connected practice to theory.

Reflective aspects

Reflective practitioners in education acknowledge the need to connect personal theories derived from reflecting on practice with knowledge already available in published work, so-called *public theories* (Griffiths & Tann, 1992; Tilson et al., 2017). Making this connection is seen as becoming more critically conscious of their practice and “prepared to place their practice and theories in a critical framework of understanding” (Tilson et al., 2017, p. 454). It helps to deepen criticality through considering not just our own actions but how they fit within the broader social, historical and cultural context in which we are positioned (Fook, 2009; Fook & Gardner, 2007; Thompson & Pascal, 2012). For us the Review stage involved first, consulting theoretical concepts in the literature and comparing those inductively with our developing collective knowledge, similar to Griffiths and Tann’s (1992) last three levels of reflection, namely the *Review*, *Research* and *Rethorising and Reformulating* levels. Their *Review* level focuses more on “reflection-on-action”, that is, post hoc reflection, while the latter two levels involve seeking validation and corroboration for the reflective researcher’s developing theory. According to Griffiths and Tann (1992), “The last (two) levels, in particular, lend themselves to engaging with public theory... through the wider support of courses and networks... which form a public arena for discourse, debate and dissemination” (p. 79). The second aspect of increasing our capacity for critical reflection involved making emotional connections with our practice and each other. Emotions are seen to be important in deepening critical engagement and sensemaking in the reflective process (Duncan & Elias, 2021; Fook, 2009; Gilmore & Kenny, 2015; Hibbert et al., 2014). Fook (2009), for example, establishes a link between emotional connections with the research context made by researchers during critical reflection and the process of learning. Additionally, Duncan and Elias (2021) align the psychoanalytic processes of transference and countertransference (unconscious emotional responses) with radical and collective reflexive methods.

Key steps

This stage comprised three steps: individually reviewing our own reflections, revising our reflections based on the collective insights gained from our dialogic process and extending and editing our reflections with conceptual inputs from the literature. These steps are in line with similar approaches to critical reflection (e.g., Fook, 2011; Gilmore & Kenny, 2015; Tilson et al., 2017).

3.1.4 | Stage 4: Reinterpretation

Motivation

We needed to collectively debate and discuss our revised individual retrospective accounts to understand the nuances, convergences and divergences of our emerging collective knowledge.

Reflective aspects

The *Reinterpretation* stage mirrors *Representation* in that it is another, but more informed, enlightened process of challenging each other's assumptions, beliefs and values that have surfaced through the previous stages of the 4Rs approach. The *Review* process gave us a shared language of theoretical concepts with which to further interpret our researcher positionalities and identities and to co-construct a collective understanding of the in-betweenness phenomenon we shared. According to Hibbert (2021), interpretation is seen as a key part of two levels of reflexive practice, namely, rational and relational. Rational reflexivity is similar to self-reflexivity and “*tend[s] to be concerned with... opening up our patterns of interpretation to critical examination... enhanced awareness of what is going on in the process of interpretation helps us to break open apperception, by allowing us to show how we contextualise our interpretations (showing where they come from) so that we can give an account of the patterns behind our conceptualisations (the ways in which we choose to describe our interpretation of experience)*” (p.6). Relational reflexivity, similar to collective reflexivity, “*involves a letting go (at least for a time) of one's own interpretive authority, in order to receive new insights from the other, which needs to be followed by resolution through dialogue until the partners in the exchange believe they have established a shared interpretive horizon*” (Hibbert, 2021, pp. 6–7). Our *Reinterpretation* stage accomplishes both aspects above, producing a narrative that is the result of an iterative self-reflective and dialogical process, similar to that used by Bagnoli (2004) to research identity formation. The intersubjective, discursive part of this stage also reflects elements of radical reflexivity since it results in a transformative kind of reflective process (Fook, 2009), where our assumptions, beliefs and values are subject to each other's scrutiny and questioning (Cunliffe, 2016; Duncan & Elias, 2021; Gilmore & Kenny, 2015) and where we try to incorporate our new insights into an improved research practice. Hibbert (2021) refers to this as “*future-oriented reflexivity..., focussed on how we actively change and develop, in response to the ways that we interpret our experience of the world from moment to moment*” (p. 3).

Key steps

This stage comprised four steps: collectively reading each other's revised reflections; engaging in further critical discussion about these new interpretations of our retrospective accounts; considering learning outcomes and takeaways for future research projects; and further critically situating the reflections within a shared conceptual framework. These steps provide further alignment with critical reflective processes in the literature, especially those related to radical reflexivity (Cunliffe, 2003; Duncan & Elias, 2021; Gilmore & Kenny, 2015).

3.2 | Meta-reflection on the 4Rs methodology

To understand our self-transformation through the 4Rs methodology, we employed a metacognitive process, that is, reflections on our own reflective processes, which we termed “meta-reflection”. Metacognition is often used in reflective practice to engage in deep learning (Fischer et al., 2018; McAlpine et al., 1999; Moon, 2004). This process entailed scrutinising the evolution of the autobiographical vignettes produced using the 4Rs approach in the previous paper, similar to Moon's (2004) analysis of the iterative processes of reflective writing (pp. 164–183). We focused on: examining the evolution of the vignettes to understand how, over time, our collective reflective discussions shaped these vignettes, and reflecting on the extent to which we were challenging our original assumptions, world-views and values. The entire meta-reflective process took place during 11 meetings held between November 2021 and February 2022. The meta-reflection began by sharing with each other three progressive iterations of our own individual vignettes that we had created in the previous paper. The examples below in Figures 1–3 illustrate excerpts from three progressive iterations of one vignette, each one demonstrating deeper, convergent understanding of one author's experience of “in-betweenness” as influenced by discussions with the other authors.

We reflectively reviewed each of our three iterations and drew out prevalent themes that were prominent across them, producing *vignette analyses*. These themes were the same reflexivity concepts we were discussing and debating during the 4Rs process as illustrated in the Email Excerpts in Appendix D and included our positionality, our

researcher identity and role, and other aspects that we believed were being shaped through the vignette iterations. These were, of course, related to our efforts to collectively understand our experience of “in-betweenness” while writing the previous paper. In the metacognitive process of discussing similarities and differences across our three individual vignette iterations, these identified themes appeared to evolve over time. Thus, we used the vignette analyses to trace the evolution of these themes. Figure 4, for example, which is an excerpt of Researcher B's vignette analysis, illustrates how the theme of positionality evolved from reviewing the example iterations of Figures 1–3. This detailed vignette analysis can be found in Appendix B.

At the end of this process, we developed *reflective summaries* (see Figures C1–C3), based on our vignette analyses, which highlighted our own personal self-transformations throughout the course of these iterations. The reflective summaries focused on what we considered were the main aspects of self-transformation and change taking place over the vignette analyses. These reflective summaries then became the basis for further challenging each other. We also discussed future actions to ensure that our reflections subsequently resulted in relevant changes that might hold us accountable for our research practice. This process was documented through comments made by the authors and attached to the texts of the reflective summaries (as per the excerpt in Figure 5 below). Supporting evidence of the commentaries is also provided by email extracts of collaborative discussions we held during the 4Rs process (see Appendix D).

Figure 6 illustrates the timelines and processes associated with both the construction of, and meta-reflection on, the 4Rs methodology as described above. In the following section we explore the learning gained through the application of the 4Rs methodology.

3.3 | Addressing the use of self-referential data

Through presenting the 4Rs methodology we attempt to make visible the process through which we co-developed collective knowledge in our previous paper. Our work contributes to a long-standing tradition of introspective confessional accounts being used as data in IS/ICT4D research (Alvarez, 2002; Bjørn-Andersen & Clemmensen, 2017; Krauss, 2018; Malaurent & Avison, 2017; Schultze, 2000). These reflective approaches are sometimes critiqued as being too focused on the self (Finlay, 2002a) and too agnostic about what constitutes valid knowledge

It is difficult to articulate clearly my positionality in this project, although I think positionality has everything to do with how I became involved in the project in the first place and how I have perceived the evolution of the ongoing dynamics of the project. I began interacting with the actors in this project owing to my roles on two EU-sponsored projects at my previous university. I was an investigator on these projects, however, due to my being an Information Systems researcher, I was pushed more towards the XXXX project, which had a strong “advocacy” focus and the development of a wide-ranging survey as its main means of gathering information. Hence, the research tradition in which I was trained helped shaped my role in these projects and, to a great extent, my interactions with the participants. My Computer Science colleagues on the project deemed that my competence must have lain in what they considered the “soft” skills part of the project, i.e., anything that was not related to hard-core computer programming or engineering. This “softer” part of the XXXX project involved a needs assessment survey of all of the Higher Learning Institutions (HLIs) under the remit of YYYY, one of the main actors on this project. Since I was an IS scholar, it was thought that I would understand intrinsically this process and liaise well with all the people-based aspects of the project. I was also expected to enable the publication of the articles from this needs assessment in IS journals.

FIGURE 1 Excerpt of researcher B's vignette—first iteration (free-flowing text expressed in a confessional style).

1. **positionality:** whether that is your gender, age, 'class', religion, etc...in what way do you think these aspects influence your research experience (for better or for worse)

It is difficult to articulate clearly my positionality in this project, although I think positionality has everything to do with how I became involved in the project in the first place and how I have perceived the evolution of the ongoing dynamics of the project. I view positionality as being a blend of researcher identity, personality and socio-cultural attributes that combine to create perceptual spaces that we as researchers occupy over the course of a project. In these reflections, I find myself moving between these perceptual spaces, which influence my experience of the project and its outcomes. In-between-ness seems to stem from never really occupying a particular positionality completely. Disciplinary issues related to my researcher identity played an influential part in my initial participation and choices made in the project. This is dealt with below under the discipline section. Very often in the reflections below I draw attention to tensions and contradictions within the positions I occupy in these perceptual spaces. It may be an inherent instability of in-between-ness to be in constant flux.

FIGURE 2 Excerpt of researcher B's vignette—second iteration (structured around an emerging co-constructed understanding of positionality).

Reflection 2: conducting research on a Pan-African project

Positionality

I believe that in this research process, I gained legitimacy due to in-between aspects of my positionality. My authority/validity, as perceived by the research participants in the project, stemmed from my association with institutions and places in the global North. This allowed me access to the research participants in the first place. For example, being previously part of an EU project, granted me legitimacy amongst the research participants due to association. Once they also knew my institutional affiliation, they sought to build linkages with me by drawing upon their own ties to various institutions in the UK including mine. This seemed to be important to them, i.e., to make that link, to position themselves as being legitimate representatives of their profession through their association with institutions in the West. I, therefore, became a “leader” of the first phase of this project merely by initiating a conversation on a new mailing list that incorporated the research participants. In my position as a senior lecturer, I was seen as some sort of expert to whom they should now listen.

FIGURE 3 Excerpt of researcher B's vignette—third iteration (reflecting a more confident assertion of what positionality meant to the researcher).

(Lynch, 2000). These arguments are part of an ongoing scholarly debate embedded in conflicting philosophical positions between different research paradigms about separating the subject and object of research (Cunliffe, 2011). In this debate the subject of the research usually refers to the researcher themselves, while the object of the research is the phenomenon that is being researched. In the Social Sciences, it is often acknowledged that there is little separation between the subject and object of research; both are considered to be inextricably linked in the research process (Greene, 2014). Similarly, reflexivity does not require a separation of the object of the research from the subject of the research; it is intrinsically subjective (Hamati-Ataya, 2014). The debate around separation of subject and object of research is related to the question of what constitutes valid knowledge from research output (Knafo, 2016; Ngwenyama, 2019). Those who believe in an objective reality, would argue that in order to produce valid knowledge,

Recurring themes	Iteration 1	Iteration 2	Iteration 3
<i>Positionality</i> : "the perceived stance or position of the researcher in relation to the socio-cultural dynamics of the research context, especially in relation to power relations, privilege etc."	Although I claim that my reflection is all about positionality, there is little in-depth exploration of it in this reflection and not much evidence of critical self-reflection at this point. At the end of the reflection, I make a note about it but it is clear I have not yet fully connected with my positionality in this project and the role it played in establishing my researcher identity and impact on the project's outcome.	Positionality is explicitly defined from my perspective and key observations about it are made evident,	A deeper understanding of positionality is demonstrated and the role it plays in the research project, e.g., it is explicitly linked to access to the research participants

FIGURE 4 Excerpt of Researcher B's vignette analysis (detailed version in Appendix B).

200-300 words of summary of changes in radical self-reflexivity

When it comes to me, the first vignette demonstrates no signs of critically considering myself and my contribution to the project. The second vignette, on the other hand, demonstrates significantly more evidence of this, including a greater recognition of my own privilege and positionality. It appears that, based on our initial reflections, we were challenging each other to be more conscious of the fact that things didn't just happen to us; we were also responsible for what happened. This is also acknowledged in the third vignette, indicating that I have

Commented [1]: I also have noticed the same in my reflections, that I see little evidence of self-reflection in the first iteration of the vignette
 Commented [2]: Are you sure? For me I still saw a little bit of reflection from you although at a very vague level but as you move to the second piece, I see more critical self reflection as you further reflected and discussed your positionality and privilege of conducting research in Peru.

FIGURE 5 An excerpt of Researcher C's reflexive summary (detailed versions can be found in Appendix C).

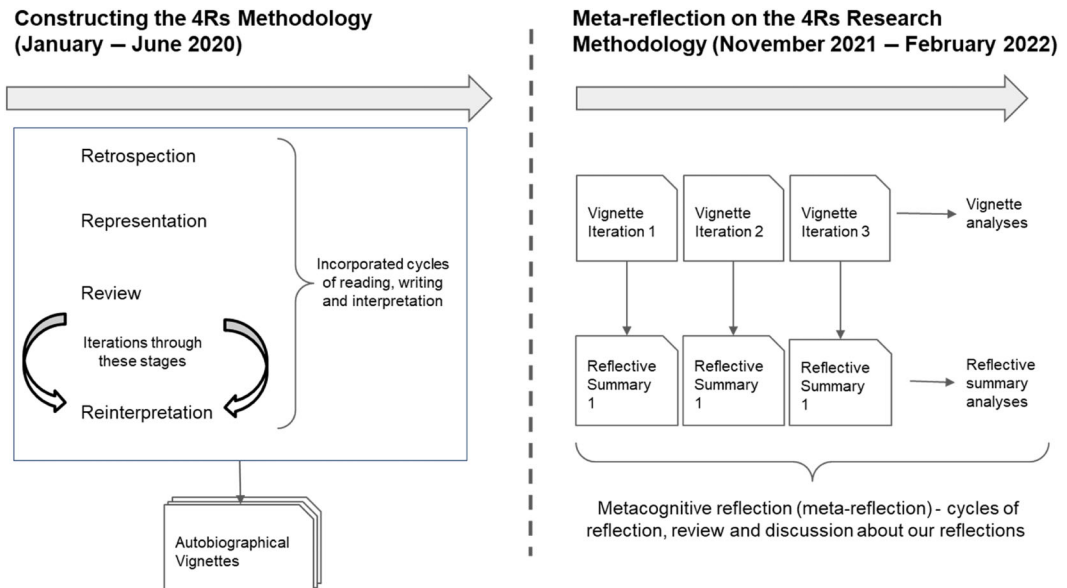


FIGURE 6 The 4Rs Methodology construction and meta-reflection—timelines and processes.

the subject and object of research need to be separable. Those who believe that reality is somehow socially constructed and relational, do not see the necessity of the separation of subject and object. This is true of reflexivity as well. There is a reason why the subjective analyses presented in this paper can still be considered valid knowledge in

terms of the research output. And this is related to an acknowledgement that this kind of approach produces a different form of knowledge to what has been considered acceptable in scientific endeavours. What is produced as part of the reflexive act can be considered valid knowledge (Alvesson & Sköldböck, 2017; Cunliffe, 2011; Greene, 2014). Recognition of this form of knowledge is part of a more inclusive and pluralistic movement in the Social Sciences to recognise different knowledges and to accord them equal value. Such approaches are evident in feminist and decolonial studies, for example (Kohl & McCutcheon, 2015; Krauss, 2012b; Wilkinson, 1988) and are becoming more recognised in IS research (Avison et al., 2017; Avison & Malaurent, 2014; Richardson, 2009).

4 | ANALYSIS: LEARNING GAINED THROUGH THE 4Rs APPROACH

Through the reflective summary and vignette analyses, we drew out themes around how we were constructing knowledge about occupying an in-between positionality in the ICT4D research process (see Jimenez et al., 2022 for the unpacking of this notion). The reflective summary analyses resulted in three derived themes: “co-constructing meaning”, “questioning epistemic ‘truths’” and “self-transformation and change”. The themes from the vignette analyses reflected the reflexive concepts that we were discussing through the 4Rs approach in the previous paper (Jimenez et al., 2022). We found interrelationships between the two sets of themes. For example, we associated the theme “co-constructing meaning” from the reflective summary analyses with the reflexive concepts of *positionality*, *phenomenon of in-betweenness* and *researcher identity* from the vignette analyses. This is because these reflexive concepts became a main focus of our sense-making during the 4Rs. In the following sections, these themes and linkages are explained in further detail.

4.1 | Co-constructing meaning

The 4Rs approach helped to establish preliminary impressions of key issues arising from our past research projects and their relationship to key concepts such as researcher role, identity and positionality. Some examples from the vignette summaries follow:

Researcher A focused on issues of positionality and identity related to culture, ethnicity and religion:

“Mainly, understanding the importance of my identity in the research process with IDPs in Nigeria was very dominant in the first reflection of my vignette” (Figure C1).

Researcher B associated positionality with membership of an epistemic community:

“In the first reflection, I was very much concerned with epistemic differences between myself and project team members” (Figure C2).

Researcher C found that she failed to understand her role in the research process at first:

“When it comes to me, the first vignette demonstrates no signs of critically considering myself and my contribution to the project” (Figure C3).

The process of challenging and questioning each other led to a negotiation of shared meaning. We were engaging in a shared rather than individual meaning-making process. Our reflections took on an intersubjective perspective. A few examples demonstrate this:

We collectively became aware of varying degrees of change in our perceptions, stances and understandings of “in-betweenness” in our research process. We co-constructed meaning around these changing perceptions.

Researcher A, for example, was able to understand how connecting to the research participants also enabled him to construct his researcher identity in that research setting.

“They were not welcoming in the first instance as they thought I was just a Western researcher trying to exploit them and hence couldn't trust me... but due to my identity as a Nigerian, a Muslim and also from the same tribe as the IDPs, they became welcoming, happy and friendly to me” (Vignette 1 Analysis, Table B1).

Researcher B began to realise that the experience of in-betweenness consists of shifts in different positionalities:

“I explore more the ‘contradictions and tensions’ that I experience as a result of being in-between, but the concept is still under development in this reflection, for example: ‘In-betweenness seems to stem from never really occupying a particular positionality completely... It may be an inherent instability of in-betweenness to be in constant flux’” (Vignette 2 Analysis, Table B2).

Similarly, Researcher C became aware of her changing association with different sets of research participants and how this influenced the research process:

“My in-betweenness involves me occupying a privileged position due to my Western educated position, which opens the possibility for indigenous people to want to welcome me into their context and meet them. This in itself can be quite problematic, as it could also reflect an element of power and privilege that I experience (for instance, would I be able to get the access if I was a scholar from Peru?)” (Vignette 3 Analysis, Table B3).

These individual meaning-making processes revealed nuances about our intersubjective understanding of researcher identity and positionality and eventually also contributed to a collective understanding of what it meant to be in-between. This is explicitly acknowledged, for example, in Email Excerpts 2 and 4 (Figures D2 and D4) where we discuss learning what “in-betweenness may mean”.

4.2 | Questioning epistemic ‘truths’

During the 4Rs, we became more aware of our situatedness within the research process and the surfacing of our unconscious thoughts and feelings, leading to a better understanding of how our research was positioned within existing power relations. We were becoming more critically engaged, moving from interpretive analyses of our practice to more critical and self-aware perspectives. An example follows:

We began to explore, through literature and our own experiences, the culturally situated understandings of technology in these research settings. For instance, we debated how we might frame our reflections on participants' relationships with technology in our respective field experiences, (Email Excerpts 1 and 5, Figure D1 and Figure D5), for example, or as a representation of their own value systems (Email Excerpt 3, Figure D3).

Researcher B began to link the role of technology in the project not only to differences between epistemic communities but also to power differentials and to place these understandings within the context of power dynamics that were evident in the project. She saw a techno-rational discourse emerging but within a power structure where NGOs set the tone for how ICT4D projects unfolded:

“I personally did not feel I was part of the “proper” networks to draw upon other more powerful resources and mobilise the funding effort. I was, myself, occupying a grey area of in-betweenness, having the privilege that comes with association but lacking the power of truly belonging to these privileged networks” (Vignette 2 Analysis, Table B2).

Researcher C also revealed an alternative discourse to that of techno-rationality, which was espoused by the research participants. This “hidden alternative” surfaced after successive iterations of the reflective process:

“Although my first two vignettes did not make mention of how to think differently about technology, there was some reflection around the underlying logics and assumptions technology has. Vignette 2 has some reflections around different epistemic stances which inform the role of technology and innovation. The third vignette adds ‘I think there is something here around technology being something that can be adopted by our research participants, but attention needs to be paid to how they use them, what matters to them rather than what I (or the project) thinks the technology can do’” (Vignette 3 Reflective summary, Figure C3).

4.3 | Self-transformation and change

Through iteratively applying the 4Rs, we successively refined our reflective vignettes and engaged in further debate and discussion. Similar approaches are documented in (Fook, 2011; Gilmore & Kenny, 2015; Moon, 2004). Through this process we began to experience self-transformation and change, which was evidenced, for example, in the reflective summaries, by different terms, for example, “awareness”, “consciousness” or “self-revelations”. In all three cases, we recognise that the dialogical process of questioning and challenging each other, undertaken in the 4Rs approach, seemed to underpin this increasing sense of awareness emerging from the vignette analyses. We summarise these transformative experiences here:

Researcher A's self-transformation revolves around his increasing sense of layers of identity that interlink with and influence the response from the participant community. Ethically, he becomes aware of how his in-between identity could frame him as an extractive researcher and influence the sense of distrust held by the participants towards foreign researchers:

“In sum, my critical reflection allowed me to understand how the different elements associated with me beyond [being] an academic influenced my research process and radical reflexivity allowed me to reflect beyond not just my identity alone but also the relationship between my identities and other key elements such as privileges, trust and others that were critical in the research process” (Vignette 1 Reflective summary, Figure C1).

Researcher B's self-transformation could be seen in a gradual move away from reflecting on how others in the project may have been positioning her to an understanding of her own agency, that is, how her own positionality was reflected in the actions she took in the project. These transformative aspects also helped her to construct a more grounded view of her researcher identity, moving away from external aspects such as epistemic differences with other colleagues to internal aspects such as positional characteristics—for example, ethnicity and privilege:

“I began to construct a different understanding of positionality, which was more about belonging and my presence in structures of power and influence. In my initial reflections, I clearly associated my identity as a researcher with my academic field, not noticing characteristics such as ethnicity and gender, as playing a role” (Vignette 2 Reflective summary, Figure C2).

TABLE 4 Summary of themes and associated concepts from the meta-reflection of the 4Rs.

Themes from the reflective summary analyses (Appendix C)	Associated themes from the vignette analyses (Appendix B)
<p><i>Co-constructing meaning</i>: negotiating collective understandings of positionality and researcher identity; recognising the evolution of the meaning of these concepts.</p>	<p><i>Positionality</i>: “the perceived stance or position of the researcher in relation to the socio-cultural dynamics of the research context, especially in relation to power relations, privilege etc.”</p> <p><i>Phenomenon of in-betweenness</i>: “concept of being neither an insider nor an outsider regarding researcher identity and positionality in relation to the research context and participants”</p> <p><i>Researcher Identity</i>: “a complex combination of our personal characteristics, positionality, association with particular epistemic communities and our perception of our relation towards research participants”</p>
<p><i>Questioning epistemic “truths”</i>: membership in epistemic communities; constitution of researcher identity; questioning what is legitimate knowledge; exploring knowledge-related dimensions of in-betweenness; challenging perceptions of what technology should be or do; linkages to power and privilege.</p>	<p><i>Periphery and centre</i>: “the extent to which people are viewed as being at the centre of a community of practice or as operating at its margin or periphery, similar to the concept of legitimate peripheral participation LPP in the Communities of Practice literature”</p> <p><i>Epistemic differences</i>: “the extent to which different research traditions are seen to inhere to different fields of study, which influence ways of conceptualising legitimate knowledge and the way in which it is constructed”</p> <p><i>Techno-rationality</i>: “the extent to which decisions to implement technological solutions were driven by rational decision-making based on a Western/Eurocentric view of rationality”</p>
<p><i>Self-transformation and change</i>: uncovering layers of, and creating, researcher identity; becoming aware of perceptions of attitudes and trust; emerging sense of what one can do, not just one’s reflections; sense of belonging; progressive/deepening understanding of positionality; linkages to, and taking responsibility for, power and privilege.</p>	<p><i>Agency</i>: “this relates to aspects of reflection that suggest a lesson learned, something I wish to do in the future which has been identified as part of this reflection”</p> <p><i>Belonging</i>: “articulating different aspects of belonging to various communities, for example, ethnic communities or epistemic communities”</p> <p><i>Power and Privilege</i>: “associated with positionality, meaning a sense of having authority over others and being able to influence the social relations within the research project or the outcomes and additionally a sense of special entitlement or favoured treatment due to one’s positionality”</p> <p><i>Attitude and Trust</i>: “perceptions of how others in the research context relate to the researcher as evidenced by behaviour, attitudes, expressions or not of trust or acceptance”</p>

The self-transformation leads to a revelation of her sense of belonging but not belonging, which proves powerful in articulating the in-between experience. This was also pivotal in her articulation of an ethical stance on whether she was the “right” person to be doing this research (Vignette 2 Reflective summary, Figure C2).

Researcher C’s sense of self transformation occurred through a shift from feeling uncomfortable about privilege, to acknowledging it and taking responsibility for being privileged. This led to the researcher taking an ethical stance on how this responsibility should be enacted.

“It appears that, based on our initial reflections, we were challenging each other to be more conscious of the fact that things didn't just happen to us; we were also responsible for what happened. This is also acknowledged in the third vignette, indicating that I have progressed beyond simply acknowledging that we have privilege to recognising that we can use this privilege for something greater” (Vignette 3 Reflective summary, Figure C3).

Table 4 summarises the themes from both analyses and the linkages between them.

5 | DISCUSSION

Existing ICT4D reflexive approaches to research are dominated by confessional approaches, that is, individual reflexive accounts (e.g., Krauss, 2012a; Krauss, 2012b; Light et al., 2010), however, the analysis of the 4Rs approach has demonstrated how it is possible to achieve deeper self-awareness through a more collective reflective process. We explain below how the collective and radical elements of the reflective process we constructed have converged to offer new ways of producing knowledge and a path towards more critical self-awareness in our research practice.

5.1 | Enhancing ICT4D reflexive research approaches through collective reflexivity

All three researchers recognise the influence of the others challenging their worldviews during the 4Rs process that is, all researchers commenting on, questioning and discussing similarities and differences in reflections in a dialogue with each other. The constant questioning through these dialogues allowed us to interrogate more deeply the meaning of our individual experiences when compared to the others. We saw this as a process of collective reflexivity since it allowed us to connect to our own constructions of researcher identity, positionality and privilege within our research processes through a language and terminology that we co-constructed. We came to understand our experiences in relation to each other's and to our contexts. This resonates with other researchers' experiences of collective and relational reflexive methodologies in disclosing identity work within the research process (Barnard, 2019; Callagher et al., 2021; Moore & Koning, 2016) and enhancing connectedness to research environments to understand better the research practice and thus the production of knowledge (Cunliffe, 2016; Hibbert et al., 2014).

Our reflective process also resonates with Cunliffe's (2016) notions of intersubjectivity as inherent to critical reflection. That is, the reflective process is not so much about our self-awareness but increasingly about becoming aware of the relational aspects of reflexivity, about our relationship with ourselves, with others and with our contexts as “deeply embedded, embodied, and mutual relationship[s]” (p. 743). Her work increasingly gives credence to these intersubjective aspects (Cunliffe, 2003, 2004, 2016; Cunliffe & Karunanayake, 2013), as does much of the more recent work on reflexivity (Duncan & Elias, 2021; Hibbert, 2021). There is also congruence with Gilbert and Sliep's (2009) relational, dynamic and iterative aspects of reflexivity, which they argue that, in practice, allow for the construction of meaning through social interactions, and must include a “concern for moral agency and involves a negotiation of accountability and responsibility for action” (p.469). Our intersubjective dialogue was necessary to determine which aspects of our reflections were relevant to each other, as well as the differences and similarities we perceived in relation to our positionalities. Our paper adds to this discourse through highlighting the collective meaning-making made possible through our own intersubjective reflective process which included dialogue and the reciprocal interpretation of our narratives in textual formats. Intersubjectively, we connected with each other in attempting to understand the contours of “in-betweenness” in the research process, similar to those attempting to understand through reflexive practice the in-between spaces which researchers occupy (Cunliffe & Karunanayake, 2013; Gilmore & Kenny, 2015).

5.2 | Self-transformation and change through a more critically reflexive ICT4D research practice

In all three cases, we identified an aspect of our individual research practice that we are now questioning, through critical self-reflection (Krauss, 2012b, 2022), which we previously took for granted. The 4Rs enabled us to think critically about what we assumed was important in ICT4D research, particularly the role of technology and what it should achieve in context. We explicitly explored our own values and assumptions, what we thought mattered, and what we could reflect on more deeply during this process (Duncan & Elias, 2021). We also began to develop a shared understanding of how to think about our own assumptions, beliefs, and practices (Krauss, 2018), which is also consistent with Gilbert and Sliep's (2009) process of determining moral agency.

These revelations point to radical reflexive elements as espoused by early proponents of radical reflexivity, like (Cunliffe, 2003, 2004) and (Pollner, 1991) such as questioning methodological and philosophical 'certainty' (e.g., Lynch's (2000) standpoint reflexivity) and critically examining assumptions, values, and beliefs. Like Lynch (2000), our reflexive process demonstrates our commitment to scrutinising how the results of our research process are constructed, that is, not taking them for granted. We thus contribute to the development of methods to engage with radical reflexivity (Duncan & Elias, 2021).

We conclude by providing insight into how our own "self-transformation and change" through critical reflexivity evolved. First, we realised that when we began our own reflexive process, our ontological and epistemological positions were broadly situated within the social scientific interpretive tradition, but with "critical intent" (McGrath, 2005; Walsham, 2005b). That is, we engaged in the 4Rs process primarily as interpretive researchers but with some critical perspectives in mind, such as our recognition of unequal power relations between researchers from the global North and global South (Jimenez et al., 2022). Our processes of intersubjective understanding involved collective reflections, which we now realise were a vehicle for not only collective meaning-making, but also critical self-awareness. By interrogating positionality and researcher identity to understand our subjective and situated experiences of in-betweenness, we were also by default engaging in critical self-reflection. This enabled us to connect our in-betweenness experiences to existing critical discourses.

In this paper, our meta-reflection of the 4Rs process demonstrates, however, that the more we iterated through our reflective process, the more the process itself moved us beyond critical self-reflection to more critical engagement akin to a form of critical self-transformation, that is, closer to the concept of critical agency (Poveda & Roberts, 2018). We conceive this movement as occurring along a continuum, within which various forms of research within the interpretive and critical traditions of ICT4D research exist. As illustrated in Figure 7, the continuum places at one end interpretive traditions of research in ICT4D broadly aligned with Buskens' (2014a) and Roberts' (2015) notions of "conformist" research. At the other end of the continuum are critical research approaches that would align with these authors' notions of "transformist" research. In the middle would sit "reformist" research, which we define broadly as interpretive approaches with "critical intent" as explained in the literature review.

At the start of the 4Rs process, our position on this continuum was somewhat to the left of centre as demonstrated in Figure 7. We found, however, that the 4Rs process moved us along this continuum towards the right of centre (see Figure 7). The *Retrospection* stage of the 4Rs allowed us to engage with self-reflection, which was informed by some awareness of critical perspectives on ICT4D research. The *Representation* stage which incorporated intersubjective elements marked the beginning of the collective reflective process, which increasingly led to more self-awareness and critical self-reflection. That placed us more in the centre of the continuum. The *Review* stage worked iteratively with the *Reinterpretation* stage where more concepts from critical theory were brought to bear on our thinking. At this stage, we see elements of radical reflexivity emerging, causing us to question our epistemological and ethical stances. The self-transformation that ensues is centred on ourselves as researchers; we exhibit a form of critical agency insofar as we could alter our ways of thinking and being in the world and our understandings of how we were contributing to the process of knowledge production in these projects. We were deeply influenced by the 4Rs approach and transformed/enlightened by it, reflecting retrospectively, but with the potential to transform future research practice through

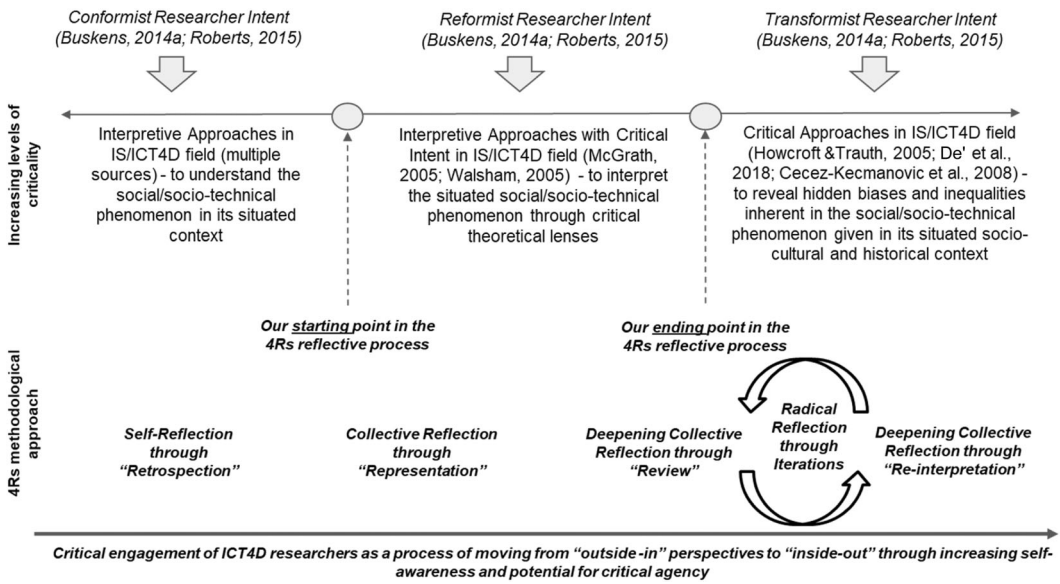


FIGURE 7 A continuum of researcher intent in the interpretive and critical traditions of ICT4D research with the 4Rs process superimposed.

increased moral agency (Gilbert & Sliep, 2009). This outcome aligns with future-oriented reflexivity in which “changes in the researcher’s ways of being and doing are the most important outcomes and sources of insight” (Hibbert, 2021, p. 3).

6 | APPLICABILITY OF THE 4RS METHODOLOGY TO ICT4D RESEARCH PRACTICE

In this section, we develop guidelines based on our own experiences to orient ICT4D researchers towards potential applications of the 4Rs methodology to their own research practice. We note that each research project is different, hence the guidelines are meant to suggest but not to prescribe ways of incorporating the 4Rs perspective into one’s own research process.

6.1 | Guidelines for applying the 4Rs approach

Table 5 presents a set of guidelines related to the stages of the 4Rs methodology, which we believe can help other researchers to gain similar insights to ours. We refer to experiences from our use of the methodology when writing the in-betweenness paper and its influences on our subsequent projects.

6.1.1 | Guideline 1: Maximising reflection

It is important to recognise that implementing the 4Rs requires a significant investment of time. In our case, applying the 4Rs took 12 months, but other researchers might take less or more time. Therefore, it is crucial to allocate a sufficient amount of time to actively participate in it. This allocation is crucial not only for efficient implementation but also for avoiding the drawbacks linked to excessive navel-gazing, as emphasised in the research on critical self-

TABLE 5 Guidelines for applying the 4Rs methodology in ICT4D research projects.

Guideline	Description	Examples from our own practice
#1 Maximising reflection	Dedicate ample time to implement the 4Rs. This involves incorporating as much time as it takes for personal reflection interspersed with group discussions.	We took a total of 12 months and took 2–3 weeks between each step to allow for reflection time.
#2 Creating a “safe space”	Provide a psychologically secure and reliable environment, where participants trust each other and do not feel judged.	We had previously built a relationship of trust. During the 4Rs, we actively listened to each other and did not hold or express judgement on each other. Moreover, there was no hierarchy between us and no-one dominated the discussions.
#3 Develop an iterative process	Consider the 4Rs not as a linear methodological approach; you can iterate between steps and move back and forth. Be flexible around this and make decisions as a group based on what you consider helps you identify needed changes.	We conducted various iterations of both our individual reflections as well as our engagement with literature/theory.
#4 Crystallise your commitment to change	Conclude the 4Rs by committing to change in research processes.	We wrote final ‘commitments’ to change; where we made explicit how we will approach the research process from now on. These included changes in relation to both our research practice as well as making explicit our own interpretation of our research contexts.

reflexivity (Sultana, 2007). In our case, we noticed how different iterations of our reflections changed from focusing on ourselves to broader areas and issues. This would have been quite challenging if we only had an initial reflective stage. Moreover, the fact that we did retrospective reflections also helped maximise reflection. Providing time for ideas to develop and giving the subconscious mind room to contemplate promotes enhanced comprehension and more sophisticated reactions. Hence, it is crucial to prioritise enough time for this process.

6.1.2 | Guideline 2: Creating a “safe space”

In order for the 4Rs to be effective, it is necessary to provide a psychologically secure and reliable environment. In our particular situation, this approach proved to be effective due to our limited number and existing familiarity with one another. Nevertheless, we advise researchers who intend to adopt the 4Rs to first develop a relationship based on trust before engaging in the 4Rs. In our case, the three of us knew each other for a couple of years and we had engaged in various social events and had lengthy discussions about our personal experiences. During our discussions, we noticed that we shared a similar ethos around conducting research as well as our individual experiences in academia. This should serve as the foundation for establishing an environment in which individuals feel at ease in expressing their opinions. Furthermore, we suggest initiating a preliminary discussion to establish that this approach is intended for the purpose of exchanging ideas, opinions, and experiences in a non-judgmental environment. Open communication should be encouraged, allowing individuals to express vulnerability and be treated with respect. For us, we aimed to encourage open communication by actively listening, allowing people to express themselves as long as was needed and thanking them for sharing their experiences. What also helped is that we did not have one person dominating the conversation and instead, we felt we could share on an equal basis.

TABLE 6 Changes to subsequent projects and commentaries on our own self-transformation and change influenced by the 4Rs approach.

Researcher	New project/ activity /task	A key learning from the 4Rs	How the learning was applied	Researcher's commentary on Self-Transformation & Change
A	Investigating the impact of virtual reality (VR) on the wellbeing of elderly people in Nigeria (2022)	The recognition that cultivating personal relationships with the participants to facilitate open discussions and gather insights necessitated an understanding of the participants' cultural and religious identity, aligning with the researcher's, thereby fostering a perception of shared identity and trust.	<ul style="list-style-type: none"> • A preliminary phase spanning two months was devoted to establishing rapport and trust with the elderly participants under care. • Participants were empowered to autonomously select the type of virtual reality experiences they wished to undergo, with the researcher's role being to facilitate the provision of their chosen experiences. • By fostering an environment of mutual understanding and respect, the researcher was able to amplify the voices and experiences of the participants, thereby contributing to a more equitable and holistic understanding of their needs and aspirations 	<i>"In my new project, I understood my identity and positionality within the VR research context was far more nuanced and dynamic. During my engagement with [participants] I was aware of how my own identity intersected with theirs, shaping my perspectives, biases, and interpretations of the research outcomes [...] To address these barriers, I collaborated with local community leaders to ensure equitable access to [technology] and to amplify the voices of the [research participants]."</i>
B	Impact evaluation of a longitudinal Pan-African Action Research Project on Open Science (2024)	The value and the power of taking a relational approach to learning underpins the thinking in the design of this work. The researcher also learnt that knowledge is not discipline-bound, that it can take many forms and can be constructed in many ways, and is especially powerful when done in a	<ul style="list-style-type: none"> • Engage project stakeholders in a series of narrative retrospective-style reflective interviews to understand their learning from the project. • Conduct knowledge exchange sessions with the stakeholders to both feedback their learning experiences 	<i>"Engagement with the 4Rs has also heightened my concerns about ethical research practice, authenticity of research outcomes, ownership of research outputs by participants, hence another aspect of my ongoing work with the project partner in this research will be the development of an ethical process relevant</i>

(Continues)

TABLE 6 (Continued)

Researcher	New project/ activity /task	A key learning from the 4Rs	How the learning was applied	Researcher's commentary on Self-Transformation & Change
		relational way with participants of the project.	and to co-develop with them tangible processes for improving the way the action research project is undertaken.	<i>to the needs of the participants who engage in the project's activities. Power, privilege and positionality will always be present in my engagement with this project, but I believe that I have found ways to negotiate more collectively beneficial outcomes through my own learnings from the 4Rs."</i>
C	Follow-on impact work to arrange public policy dialogues with policymakers from the Ministry of Environment, Ministry of Culture, and other ministries, as well as indigenous organisations (2020)	Reaching an understanding that it is not about whether the researcher has the skills or not (although this is important) to achieve a positive impact in society, but it is more about whether the decisions are made about what is the most ethical and responsible approach to benefit the participants.	<ul style="list-style-type: none"> • The topics of discussion were decided by Indigenous organisations and the researchers' role was to facilitate the discussion rather than lead it. • Indigenous people described as the original innovators and how their lived experiences have had positive impacts on biodiversity in Peru. • Most of the funding went to cover indigenous participants' expenses and equipment. • Making a commitment to follow up on what was discussed, and continuing to follow up with policymakers. 	<i>"The 4Rs approach made me realise how closely participatory methodologies connect with my own views on knowledge production and ethics.[...] Based on my reflection, I concluded that my next project needed to be focused on what they [participants] wanted. The topics of discussion were decided by [participants] and our role as researchers was to facilitate the discussion rather than lead it"</i>

6.1.3 | Guideline 3: Develop an iterative process

In order to harness the full potential of the 4Rs framework, it is imperative to adopt an iterative approach. It is important to note that the 4Rs is not a linear method but rather a cyclical process that allows for continuous refinement and improvement.

We suggest that those interested in applying the 4R's conduct at least three iterations of personal reflections, interspersed with meetings for discussion and debate. Moreover, we also encourage iteration in engagement with theory by revisiting theoretical frameworks and perspectives and incorporating new insights and perspectives gained from the iterations of reflections. In our case, for example, one of our initial reflections involved reviewing literature on techno-rationality, to understand the extent to which we adopted this perspective in our own research projects. Finally, remain open to revisiting previous stages of the 4Rs process if needed, recognising that insights may emerge later in the reflective journey. In our case, for example, we noticed that some of the initial reflections left us with more questions than answers and so we kept on deciding we needed to continue unpacking our reflections.

6.1.4 | Guideline 4: Crystallise your commitment to change

The final stage of the 4Rs should conclude by committing to change in research processes. It should be focused on answering the question: "How can we commit to changing our research process going forward?" This would involve making a dedicated commitment to altering research practices based on reflections conducted throughout the 4Rs process. We recommend that there is a final discussion around the implementation of future actions aimed at ensuring that reflections translate into tangible changes, thereby holding researchers accountable for their research practices. We demonstrate in Table 6 the changes we made in our approaches to subsequent projects and/or follow-on activities/tasks that were influenced by the 4Rs approach. We also comment on the personal self-transformation that motivated those changes. This demonstrates not only our commitment to change but how our own internal self-transformation has started to affect the way we think about our research process.

7 | CONCLUSIONS

This paper has addressed the question of "*What methodological approaches can ICT4D researchers use to become more critically reflexive and aware of processes of self-transformation through their research practice?*" It has done so through addressing four main issues around reflexivity in ICT4D research highlighted in the literature review. The first issue we identified was a relative lack of examples of how reflexivity can be practiced in ICT4D research. Our contribution to this was to extend the range of reflexive methodologies available to ICT4D researchers by proposing a *unique collective critically reflexive methodology that can be applied retrospectively* and which is suitable for creating a safe space for discussion and debate amongst ICT4D researchers working on separate projects.

We identified the challenge of limited insight into the methodologies of existing ICT4D reflexive approaches. To address this we have made the contribution of an *explicit robustly constructed methodology for which we have supplied practical applicable guidelines*. We also highlighted individual introspective ICT4D reflexive approaches (or confessional accounts) as the dominant paradigm in this area. For this, we have demonstrated how our proposed methodology *can deepen self-reflexivity and lead to new knowledge production* mainly because it allows for intersubjectivity and a relational approach to the reflexive process. In our case this approach enabled us to co-create new knowledge around what it meant to be "in-between" from a researcher positionality and identity perspective.

The final issue we discovered was a limited understanding of how self-transformation and change can take place through a critically reflexive approach to ICT4D research practice. Our contribution to this was to review the methodology through a metacognitive process in which *we documented the learning gained and our own self-transformative process*. We have provided evidence of how this process works and the artefacts we produced from it. These details can be used by other ICT4D researchers in constructing their own meta-reflective process of learning gained from a similar reflexive approach. Furthermore, *we demonstrated how our collective reflexivity approach with elements of radical reflexivity led to achieving criticality*. In our case we became more engaged researchers, researchers espousing a more critical intent towards our research. For us this was a process of transformation and change of the self, moving

from a predominantly interpretive epistemological stance to one with more critical intent closer to critical agency. We have also provided applicable guidelines on how the 4Rs methodology can be applied in practice and how these aspects of greater critical intent have influenced our subsequent research projects.

In future research, we would like to explore how emotions may play a role in this process of collective sense-making and self-transformation through the 4Rs. In the metacognitive reflection, we were only able to demonstrate to a small extent how emotions played a role in our awareness-raising. A key research objective of future research would be to understand how the surfacing of these emotions contributes to deepening the critical reflexive aspects of our process.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

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APPENDIX A: SUMMARY OF RESEARCHERS' PAST RESEARCH PROJECTS

TABLE A1 Research settings for the 3 ICT4D projects used in the 4Rs methodology.

Subject of the research	Research participants	Research context(s)	Research processes
Usage of mobile phones to improve social inclusion of internally displaced persons (IDPs)	Internally displaced persons	IDP camps in Northern Nigeria	Interviews with conflict-induced internally displaced persons
Information management capabilities of African Higher Education librarians in the context of digital transformation	African HEI librarians	Pan-African HE context—Anglophone, Francophone and Arab	Surveys and focus groups; workshop discussions on survey results. Tools—questionnaire developed in conjunction with the participants; focus group questions developed out of discussions at the workshops.
How innovation discourse, policy and practice are informed by values of collectivity and sustainability	Indigenous communities working on biocultural innovations and academic experts	Peru	Participatory action research: Indigenous walking methods, discussions with indigenous leaders. Method tools: research diary

APPENDIX B: TABLES PRESENTING THE THREE INDIVIDUAL DETAILED ANALYSES PER RESEARCHER OF THREE PROGRESSIVE ITERATIONS OF THEIR REFLECTIVE VIGNETTES

TABLE B1 Researcher A's individual vignette analysis.

Recurring themes	Iteration 1	Iteration 2	Iteration 3
<i>Researcher identity:</i> “a complex combination of our personal characteristics, positionality, association with particular epistemic communities and our perception of our relation towards research participants”	Evident I had to convince them that I was Nigerian and indeed, I did care about their plight and the reason for conducting this study.	Evident Considering I was a Muslim, their attitude towards me changed and since then they were very open to me.	Evident However, growing up in Jos, Plateau State, a city that has been engulfed by ethno-religious crisis, I shared my stories with the IDP as being part of them and also once a victim of conflict who was trying to find a solution on how digital technology could improve their lives. However, drawing upon my ethnicity, religion and previous experience of living and working in war prone areas in Nigeria, I was able to position myself not only as a researcher but also a member of communities that have been affected by war.
<i>Positionality:</i> “the perceived stance or position of the researcher in relation to the socio-cultural dynamics of the research context, especially in relation to power relations, privilege etc.”	Evident On arrival to the camp, I was welcomed very well and the reason for this was due to them having an impression that I might be coming with some goodies (Money and relief materials) like any other actor (Donor agencies and NGO) that comes from the Western part to visit them in the camp. Unfortunately, I was only coming in to gather data from them.	Evident They were not happy with this and their reception towards me change. However, I was showed around the camp, the office camp which contained several old papers and register of the IDPs in the camp including their mosque, and their little tents where they were living. One of the leaders mentioned that they have had some few researchers come from abroad to gather research data but they left without giving them anything but made promises that the research findings will be beneficial to them and up until date, there has been little or no progress in the camp. Hence they prefer to listen	Evident My position as an academic researcher coming from the UK was at first misunderstood by Internally Displaced People (IDP) in Nigeria as trying to access them either for my own personal gains or someone coming with some huge donations to them. IDP gave me examples of how researchers have collected data from them and published the wrong stories about them.

(Continues)

TABLE B1 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
		and talk to NGOs than researchers.	
<i>Attitude and trust:</i> “perceptions of how others in the research context relate to the researcher as evidenced by behaviour, attitudes, expressions or not of trust or acceptance”	Evident They were not welcoming in the first instance as they thought I was just a western researcher trying to exploit them and hence couldn't trust me.	Evident Same as reflection 1, but due to my identity as a Nigerian, a Muslim and also from the same tribe as the IDPs, they became welcoming, happy and friendly to me and were able to share as much information as possible.	Evident Same as reflection 2
<i>Power and privilege:</i> “associated with positionality, meaning a sense of having authority over others and being able to influence the social relations within the research project or the outcomes and additionally a sense of special entitlement or favoured treatment due to one's positionality”	Not evident	Evident Eventually I made contact with a very small NGO owned by a friend's sister who had in the past worked with female IDPs and they she was able to connect me with one of the leaders of the IDP camp in Abuja.	Evident In trying to access IDP, I tried to leverage on my parents' network. I was directed to a country manager of a global NGO who connected me with several profit-based NGOs in the North-eastern region of Nigeria who were working with IDP. However, all were reluctant to participate in the study due to the lack of financial gains to it. Alternatively, I used my influence on Twitter to connect with an NGO who aided my access to the IDP. I have a large followership due to the perception people have of me as a young Nigerian boy that has worked so hard to attain a PhD at the age of 24. With my access to a large network and many Nigeria twitter influential individual, I tweeted asking for any NGO who were working with IDP. One of the small NGO reached out to me and connected me with one of the leaders of an IDP camp that was less than 10 min drive from the location I reside, an upper-class neighbourhood.

TABLE B1 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
<i>In-betweenness</i> : “concept of being neither an insider nor an outsider regarding researcher identity and positionality in relation to the research context and participants”	Evident I work abroad, but I am Nigerian and a Muslim.	Evident Same a reflection 1 but also I come from the same tribe as the IDP. Putting an image of a research from abroad but also going into the shoes of the participants as one of them	Evident Same as reflection 2

TABLE B2 Researcher B's individual vignette analysis.

Recurring themes	Iteration 1	Iteration 2	Iteration 3
<i>Techno-rationality</i> : “the extent to which decisions to implement technological solutions were driven by rational decision-making based on a Western/Eurocentric view of rationality”	Occupied a good portion of the reflection as evidenced by these excerpts: “EIFL came on board officially and so did COAR, a Canadian-based NGO with a remit to revolutionise open access repository (OAR) development worldwide. Since WACREN was interested in supporting research infrastructure within these HLIs, OARs became a natural focus for exploring a digital intervention whose development depended on the HLI librarian” “Once they were involved, the dynamic that developed was one that saw the research aspect, which I represented, subordinated to the wider objectives of developing a pan-African techno-rational solution.” “The approach of the bigger players was to impose OAR models and standards that they believed would help in the physical development of workable OAR solutions.”	There was less focus on techno-rational perspectives in this reflection and where it was present, its emphasis was different; it was more about demonstrating contradictions and tensions within the project's dynamics that I was experiencing, rather than demonstrating epistemic differences: “This part of the reflection is about the dominant narrative of techno-rationality, which permeates many ICT4D projects and initiatives was being promoted by the partners within the research who held positions of legitimacy due to their association with foreign NGOs. In a sense, they were true representatives of the global North, whereas I was an interloper (another contradiction of my in-betweenness).”	Reflections on techno-rational perspectives regress to the background as does the prominence I gave originally to other actors in the project.
<i>Epistemic differences</i> : “the extent to which different research traditions are seen to inhere to different fields of study, which influence ways of conceptualising	Occupied a significant portion of the reflection as evidenced by these excerpts: “Hence, the research tradition in which I was trained helped shaped my	Though still dominant, this theme moves from a focus on epistemic differences between scholarly communities for example, CS & IS to how these epistemic differences were	Same as Reflection 2, with some emphasis now also on how these differences were related to experiences of in-betweenness

(Continues)

TABLE B2 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
legitimate knowledge and the way in which it is constructed”	<p>role in these projects and, to a great extent, my interactions with the participants. My Computer Science colleagues on the project deemed that my competence must have lain in what they considered the “soft” skills part of the project, that is, anything that was not related to hard-core computer programming or engineering.”</p> <p>“I also did not understand from my perspective as an IS scholar what research questions were being investigated. In effect, it seemed that there were none, thus, what research paper could ensue from such a project?”</p> <p>“From an epistemic perspective, these reflections of mine were related to clashes between dominant epistemologies of IS and CS scholars at this institution and within this project. My research tradition, in which I was trained, had strong roots in the social sciences where research is usually guided by a research question. In the CS tradition, outcomes drive the research, outcomes that develop new artefacts, hence the project is a key vehicle for their communities.”</p>	<p>influential in constructing my researcher identity: “Hence, the research tradition in which I was trained helped shaped my role in this project and, to a great extent, my interactions with the participants.”</p> <p>“First, there were contradictions related to researcher identity due to conflicts in research traditions and second, there were disciplinary differences which induced an ‘imposter syndrome’-type uncertainty into my developing research identity on this project.”</p>	
<i>Periphery and centre</i> : “the extent to which people are viewed as being at the centre of a community of practice or as operating at its margin or periphery, similar to the concept of legitimate peripheral participation LPP in the Communities of Practice literature”	<p>This emerges as a part of the reflection and appears to result from a wider focus in this reflection on other project actors rather than on myself—the reasons for the feeling of being on the periphery are not explored in the reflection, rather comments are made about it, more implicitly than</p>	<p>A different emphasis becomes clearer in this reflection, and it is more about identity and belonging: “I now question my right to be doing this research in the first place due to my in-betweenness. I am not African, and I do not truly understand the African culture, yet I was involved</p>	<p>Same as Reflection 2, for example: “They respected me for not “othering” them and worked well with me. For example, I became a guest speaker at locally hosted advocacy and awareness workshops. I, therefore felt some kinship and camaraderie with the research participants. I felt</p>

TABLE B2 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
	<p>explicitly. A few quotes illustrate: “From my viewpoint, EIFL and COAR, established international NGOs in their respective communities with influence in many quarters, were bigger players than myself. I was, by association and due to my previous EU-project-based experience, an influential actor, but I believed myself outpaced by these bigger players. Once they were involved, the dynamic that developed was one that saw the research aspect, which I represented, subordinated to the wider objectives of developing a pan-African techno-rational solution.” “I see myself in this research as a periphery actor, not as an immersed participant in this field. But that is not the whole story; I was peripheral in one sense but quite central in another. I need to flesh this out more clearly.”</p>	<p>in a pan-African project, which at points I felt was following a techno-rational logic, which as an IS researcher I knew was not the right direction for it. I also felt fragmented with respect to my researcher identity. I constantly questioned if I was the right person to be doing this job—did I fit?”</p>	<p>this more acutely when my apparent lack of belonging in the global North context led to failed grant proposals in the UK. It was though I was occupying two different worlds.”</p>
<p><i>Positionality:</i> “the perceived stance or position of the researcher in relation to the socio-cultural dynamics of the research context, especially in relation to power relations, privilege etc.”</p>	<p>Although I claim that my reflection is all about positionality, there is little in-depth exploration of it in this reflection and not much evidence of critical self-reflection at this point. At the end of the reflection, I make a note about it, but it is clear I have not yet fully connected with my positionality in this project and the role it played in establishing my researcher identity and impact on the project's outcome. A few illustrative quotes about this: At the beginning of the reflection: “It is difficult to articulate clearly my positionality in</p>	<p>Positionality is explicitly defined from my perspective and key observations about it are made evident, for example: “I view positionality as being a blend of researcher identity, personality and socio-cultural attributes that combine to create perceptual spaces that we as researchers occupy over the course of a project. In these reflections, I find myself moving between these perceptual spaces, which influence my experience of the project and its outcomes...Very often in the reflections below I draw attention to tensions and contradictions</p>	<p>A deeper understanding of positionality is demonstrated and the role it plays in the research project, for example, it is explicitly linked to access to the research participants in this quote: “I believe that in this research process, I gained legitimacy due to in-between aspects of my positionality. My authority/validity, as perceived by the research participants in the project, stemmed from my association with institutions and places in the global North. This allowed me access to the research participants in the first place.”</p>

(Continues)

TABLE B2 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
	<p>this project, although I think positionality has everything to do with how I became involved in the project in the first place and how I have perceived the evolution of the ongoing dynamics of the project.”</p> <p>In the middle:</p> <p>“Other positionalities were surfacing at this point that affected my involvement in the project.”</p> <p>“In terms of my positionality, I was again seen as an expert in an area that only tangentially ‘fit’.”</p> <p>“The bigger players had their own positionality in this project as external experts bringing internationally sanctioned knowledge to bear on this problem.”</p> <p>At the end:</p> <p>“In the reflections given above, I conclude that my movement between different positionalities both professional, personal and institutional played a part in the way the project played out.”</p> <p>The exact nature of these positionalities is not explored, but rather the reader is left to guess what I mean by this term.</p>	<p>within the positions I occupy in these perceptual spaces. It may be an inherent instability of in-betweenness to be in constant flux.”</p>	
<p><i>Researcher Identity:</i> “a complex combination of our personal characteristics, positionality, association with particular epistemic communities and our perception of our relation towards research participants”</p>	<p>Researcher identity for me in this reflection is bound up with my perceived inclusion in a particular epistemic community: “Translating this into the field of library and information sciences would be difficult for me, thus I experienced again some new epistemic challenges to my identity as a researcher.”</p> <p>There is little evidence of exploration of this identity, however, beyond my</p>	<p>In this reflection I make a more explicit articulation of the role identity plays in the research project; a better articulation of the experiential aspects, for example, ‘fracturing of identity’ ‘never occupying fully a position’ I identify better what are the dimensions of researcher identity, for example, ethnicity and its effects on how I saw my role in the project, for example:</p>	<p>Same as Reflection 3 and more performative aspects of identity were explored, for example:</p> <p>“This led to a sense of fracturing of my researcher identity, not really occupying fully a position, but having to perform as an actor from that position.”</p>

TABLE B2 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
	<p>reflections about being associated with a particular field of study.</p>	<p>“Researcher identity is a strong theme in these reflections and another aspect is my ethnicity, of mixed-race Caribbean heritage, very familiar with colonial societies, having some knowledge of African heritage, but from a very distorted Eurocentric perspective. I could identify easily with my African counterparts and colleagues in this project; I never felt myself superior to them, even though my position as a scholar in a global North institution may have given me the privilege of believing this.”</p>	
<p><i>Phenomenon of in-betweenness: “concept of being neither an insider nor an outsider regarding researcher identity and positionality in relation to the research context and participants”</i></p>	<p>In-betweenness is hardly explored in this reflection, except as an afterthought in the final part of the reflection: “In-betweenness seems to stem from never really occupying a particular positionality completely.” “I could relate to the need to negotiate whether directly or indirectly insider/outsider positions and also to having to perform identity, especially related to my professional identity as an “expert” researcher.” I acknowledge a relationship between researcher identity, positionality and the experience of in-betweenness but this is not fully explored.</p>	<p>I explore more the “contradictions and tensions” that I experience as a result of being in-between, but the concept is still under development in this reflection, for example: “Two issues related to my positionality and the inherent contradictions of in-betweenness were revealed in my reflections. First, there were contradictions related to my researcher identity due to conflicts I was experiencing with the underlying research traditions in this project. Second, there were disciplinary differences which induced an ‘imposter syndrome’-type uncertainty into my developing researcher identity on this project.” “In-betweenness seems to stem from never really occupying a particular positionality completely... It may be an inherent instability of in-betweenness to be in constant flux.”</p>	<p>In this reflection, I am more clearly linking the exploration of researcher identity to the experience of in-betweenness and exploring more aspects of in-betweenness that I see emerging from my different experiences on the project: “I experienced some new epistemic challenges to my identity as a researcher. I felt in-between the traditions of these fields: between IS and CS, between IS and LIS. I also personally struggled to make sense of how I could frame any of the project activities as legitimate research in my field.” “This again reinforced an in-between researcher identity. I was learning from the research participants and from this situation, yet, at the same time I had to project an image of knowing what I was about and being a ‘leader’.” “I was once again occupying an in-between position: both on the “inside” through my</p>

(Continues)

TABLE B2 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
<p><i>Power and Privilege:</i> “associated with positionality, meaning a sense of having authority over others and being able to influence the social relations within the research project or the outcomes and additionally a sense of special entitlement or favoured treatment due to one’s positionality”</p>	<p>I hardly explore these topics in this reflection, and then very tangentially, for example, issue of ‘power’ is mentioned in relation to my perceived lack of it and privilege only marginally through my acknowledgement of my association with Western institutions, which appeared to influence my acceptance by the participant community: “My position, however, as an influencer in the grander funding landscape, was not that significant. I put this down to (a) not being a professor and (b) not being truly expert in this fledgling area I was entering into, thus not having the proper networks into which I could insert myself and draw upon other more powerful resources to mobilise the funding effort.” “...when they knew I was from Sheffield University’s Information School, sought to build linkages with me by drawing upon their own ties to various institutions in the UK including Sheffield University. This seemed to be important to this group, that is, to make that link, to position themselves as being legitimate representatives of their profession through their association with institutions in the West.”</p>	<p>“In a sense, they were true representatives of the global North, whereas I was an interloper (another contradiction of my in-betweenness).”</p> <p>There is still a tangential reference to these themes, although they are drawn out more explicitly: “I never felt myself superior to them, even though my position as a scholar in a global North institution may have given me the privilege of believing this.”</p>	<p>perceived alignment with the “bigger” players and on the “outside” through my own misalignment with their project ethos.”</p> <p>A more explicit understanding of my association with power and privilege and how this influenced my actions in the research project, for example: “Thus, I personally did not feel I was part of the “proper” networks to draw upon other more powerful resources and mobilise the funding effort. I was, myself, occupying a grey area of in-betweenness, having the privilege that comes with association but lacking the power of truly belonging to these privileged networks.”</p>
<p><i>Belonging:</i> “articulating different aspects of belonging to various</p>	<p>Reflections on belonging were evident only in my sense of an absence of</p>	<p>I make some vague referential statements that could be interpreted as</p>	<p>A sense of belonging is first explicitly mentioned in this reflection:</p>

TABLE B2 (Continued)

Recurring themes	Iteration 1	Iteration 2	Iteration 3
<p>communities, for example, ethnic communities or epistemic communities”</p>	<p>belonging, for example, I focused outwardly on the other actors in the project and my difference/distance from them, for example, epistemic differences: “Once they were involved, the dynamic that developed was one that saw the research aspect, which I represented, subordinated to the wider objectives of developing a pan-African techno-rational solution.”</p>	<p>related to belonging but not really made explicit: “...another aspect is my ethnicity, of mixed-race Caribbean heritage, very familiar with colonial societies, having some knowledge of African heritage, but from a very distorted Eurocentric perspective. I could identify easily with my African counterparts and colleagues in this project”</p>	<p>“I required more than just affiliation with these powerful networks to achieve the level of belonging that I believed I needed.”</p>
<p><i>Emotive elements:</i> “words, phrases, parts of speech where emotions are being mentioned or expressed”</p>	<p>There is very little evidence of emotive words in this first reflection.</p>	<p>There are a few more words related to feeling, but otherwise there is very little evidence of emotive words in the second reflection</p>	<p>“Feeling” words were more prevalent and emotive words that expressed these feelings, for example “Uncomfortable”, “discomfort”: “Thus, constantly being associated with an LIS identity as an expert was uncomfortable to me. In this project, this discomfort was even more poignant, since I really did not have much expertise in the LIS knowledge base and even worse, how this plays out in the global South.” “Those actions were motivated by the in-betweenness I felt as an outsider when associated with the EU/NGO community but as an insider trying to better align and work with the participant community.”</p>

TABLE B3 Researcher C's individual vignette analysis.

Dominant themes	Iteration 1	Iteration 2	Iteration 3
<i>Techno-rationality:</i> “the extent to which decisions to implement technological solutions were driven rational decision-making based on a Western view of rationality”	Not evident	Not evident	Evident in the following sentence: It could be argued that the label ‘innovation’ or ‘technology’ could be perceived as external tools or resources and could potentially be perceived as external impositions; the indigenous people in the park talked about these with confidence. So, they somehow embraced the notions of innovation and technology, but they explained to me what these two look like from their perspective. I think there is something here around technology being something that can be adopted by our research participants, but attention needs to be paid to how they use them, what matters to them rather than what I (or the project) thinks the technology can do.
<i>Epistemic differences:</i> “the extent to which different research traditions are seen to inhere to different fields of study, which influence ways of conceptualising knowledge and its construction”	Different epistemic differences are mentioned, in relation to how I move between them. Becoming aware of hegemonic knowledge production. In particular between modernisation towards decolonial thinking “It seemed to me that it made more sense to understand the historical contingencies that led to uneven conditions in different countries, such a colonialism and imperialism.”	Similar to reflection 1, except this time I include a personal experience that helps the reader understand my ontology/ epistemology “During my bachelor's degree on communication for development, I was educated to believe that Peru, a developing country, was in serious need of becoming developed adopting measures found countries in the global North. We learned about other examples and lifestyles where poverty was not at your doorstep. Therefore, I was trained to believe in the importance of promoting a development discourse and developed a saviour complex. I believed this very powerful idea and looked at living somewhere in the global North, where I could continue with my education and see what being developed looks like.”	Similar to both reflections, except the idea of epistemology not only being different, but also oppressive: “The discipline, that once opened doors of knowledge, started to be perceived by me as oppressive, teaching me a Western way of looking at the world, translated into a Universal language.”

TABLE B3 (Continued)

Dominant themes	Iteration 1	Iteration 2	Iteration 3
<p><i>Periphery and centre:</i> “the extent to which people are viewed as being at the centre of a community of practice or as operating at its margin or periphery”</p>			
<p><i>Positionality:</i> “the perceived stance or position of the researcher in relation to the socio-cultural dynamics of the research context, especially in relation to power relations, privilege etc.”</p>	<p>Here, my positionality is described but only in relation to how it was perceived by participants. There was little reflection around how my positionality was not only the reason why I experienced ‘mistreatment’ but also how it led to privilege.</p>	<p>There is also explanation of my positionality, but there seems to be more questioning or reflecting on whether this led to how I was perceived and treated. For instance, “The in-betweenness for me is in relation to the epistemic worlds I see myself adopting and the embodiment (how I am perceived) that also shapes the world around me. Having started my education in Peru, where I was taught a form of modernistic development discourse, to adopting a more critical view of this, I found myself returning to my country to challenge the assumption that West is best.” “My in-betweenness involves me occupying a privileged position due to my Western educated position, which opens the possibility for indigenous people to want to welcome me into their context and meet them. This in itself can be quite problematic, as it could also reflect an element of power and privilege that I experience (for instance, would I be able to get the access if I was a scholar from Peru?). It could also lead to some potential blind spots, where I may not be aware of how my actions and words could inevitably lead to some form of oppression or injustice. Constant self-reflection is the tool I use to navigate this.” Positionality/epistemological stance More critical awareness</p>	<p>There is more reflection around how my positionality is full of privilege “There is an element of privilege (power) that I held in working with indigenous communities.” “My in-betweenness involves me occupying a privileged position due to my Western educated position, which opens the possibility for indigenous people to want to welcome me into their context and meet them. This in itself can be quite problematic, as it could also reflect an element of power and privilege that I experience (for instance, would I be able to get the access if I was a scholar from Peru?). It could also lead to some potential blind spots, where I may not be aware of how my actions and words could inevitably lead to some form of oppression or injustice. Constant self-reflection is the tool I use to navigate this.” More critical awareness</p>

(Continues)

TABLE B3 (Continued)

Dominant themes	Iteration 1	Iteration 2	Iteration 3
<i>Phenomenon of in-betweenness:</i> “concept of being neither an insider nor an outsider regarding researcher identity and positionality in relation to the research context and participants”	Very little evidence of this in the first reflection	Some mention of in-betweenness but in relation to how I was perceived by other participants. In this case by indigenous communities and Peruvian academics. For example: “In our conversations they talked about the lack of recognition at the national level. Identifying as a Peruvian living abroad enabled me to get access to them and have honest conversations about how they felt in Peruvian society. I also felt more comfortable in this space, and my intention was to listen and learn from them.”	Very much evident in this one. “My in-betweenness involves me occupying a privileged position due to my Western educated position, which opens the possibility for indigenous people to want to welcome me into their context and meet them. This in itself can be quite problematic, as it could also reflect an element of power and privilege that I experience (for instance, would I be able to get the access if I was a scholar from Peru?). It could also lead to some potential blind spots, where I may not be aware of how my actions and words could inevitably lead to some form of oppression or injustice. Constant self-reflection is the tool I use to navigate this. At the same time, it is exactly that ‘Western’ educated position (aka outsider) that meant that local academics found me problematic.”
<i>Power and Privilege:</i> “associated with positionality, meaning a sense of having authority over others and being able to influence the social relations within the research project or the outcomes and additionally a sense of special entitlement or favoured treatment due to one's positionality”	Very little evidence of this...	There is much more on this, in particular I share my story to explain why/how I was perceived by others. I reflect on how ‘my western side’ gave me access to indigenous communities. I then reflect on how my age and the fact I studied abroad make things difficult with Peruvian academics. I don't seem to acknowledge this latter experience is also full of privilege though.	In my case positionality and privilege seem strongly associated. I would mention what I explained in the row above.
<i>Emotive elements:</i> “words, phrases, parts of speech where emotions are being mentioned or expressed”	No evidence of this	Some evidence of this. For instance: “Both these very different experiences make me question both my positionality but also how I experience both epistemic worlds. In the indigenous led initiative, I was invited to visit them and learn from their	Much more evidence of this “These perceptions influenced in me a sense of imposter syndrome which meant that my conversations with the academics were perhaps a bit shy, where I found myself having to perform like an

TABLE B3 (Continued)

Dominant themes	Iteration 1	Iteration 2	Iteration 3
		<p>practices, and I felt comfortable in adopting the role of a learner”</p> <p>“Another senior academic spend a significant amount of time telling me it was unethical that I had asked for a consent form where her name could be anonymous. She explained that if I did that, I would be taking her ideas and making them my own, and that this was problematic. During the interview I felt like I was being told off and ‘lectured’.”</p> <p>“Identifying as a Peruvian living abroad enabled me to get access to them and have honest conversations about how they felt in Peruvian society. I also felt more comfortable in this space, and my intention was to listen and learn from them.”</p>	<p>‘academic’ to feel that my questions were legitimate”</p> <p>“In contrast, my experience with the Peruvian academics was one of subordination. I felt that they were not comfortable with my presence and what I was proposing. It was my age and gender which I felt were the most prominent aspects that negatively affected this relationship”</p> <p>“Since I identified myself as a Peruvian living abroad, it enabled me to get access to them and have honest conversations about how they felt in Peruvian society in which they also felt alienated. I also felt more comfortable in this space, and my intention was to listen and learn from them.”</p> <p>“This is a side of me I tend to want to ignore, as it reminds me of a privilege, I’m not entirely comfortable with. But nonetheless it does reflect a part of my in-betweenness that is worth considering”</p>
<p>Agency: “this relates to aspects of reflection that suggest a lesson learned, something I wish to do in the future which has been identified as part of this reflection.”</p>	<p>No evidence of this.</p>	<p>“Moving forward, rather than trying to ignore the privilege I hold given the western education I have received (and the position I currently hold) I would like to explore instead what responsibility I have to use this privilege for something that I can consider better or more just.”</p>	<p>“Moving forward, rather than trying to ignore the privilege I hold given the Western education I have received (and the position I currently hold) I would like to explore instead my responsibility to use this privilege for something that I can consider better or more just. It could be argued that the label ‘innovation’ or ‘technology’ could be perceived as external tools or resources and could potentially be perceived as external impositions; the indigenous people in the park talked about these with confidence. So, they somehow embraced the notions of innovation and technology, but they explained to me what these two look like from their perspective. I think there is</p>

(Continues)

TABLE B3 (Continued)

Dominant themes	Iteration 1	Iteration 2	Iteration 3
			something here around technology being something that can be adopted by our research participants, but attention needs to be paid to how they use them, what matters to them rather than what I (or the project) thinks the technology can do.”

APPENDIX C: FIGURES PRESENTING THE THREE COMMENTED OVERARCHING REFLECTIVE SUMMARIES SUMMARISING THE LEARNING FROM THE DETAILED INDIVIDUAL VIGNETTE ANALYSES

Reflective summary of Researcher A's vignette analysis.

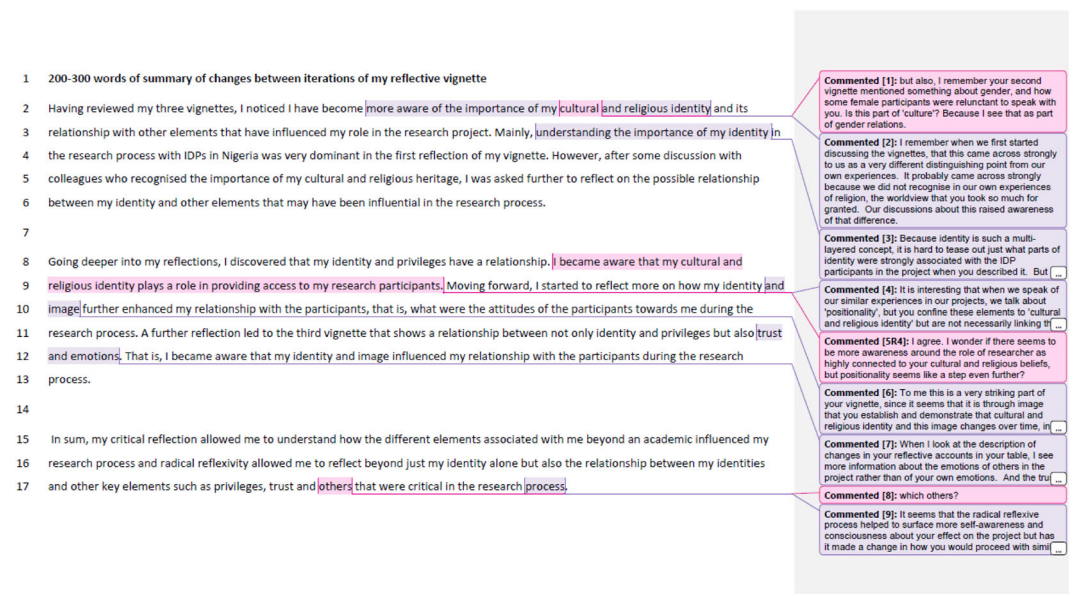


FIGURE C1 Reflective summary with comments, Researcher A.

Reflective summary of Researcher B's vignette analysis.

1 **200 - 300-word analysis of the transformations that took place from Reflection1 through to Reflection 3:**

2 In reviewing the three stages of the development of my reflections on my experience of in-betweenness in ICT4D research, I notice that, over

3 time, I develop an increasing awareness of myself and my role in this project. I believe that this process demonstrates that my reflections lead

4 eventually to a sort of consciousness and self-transformation. By consciousness, I refer to that state of critical self-awareness that allows a

5 researcher to understand more deeply how they may implicitly influence the research process and its outcomes and how such influence is

6 beneath the surface, i.e., not intentional, and not readily observable until a reflective process, such as the one I engaged with, is undertaken.

7 Such consciousness allows me to become more aware of my own positionality and how it resonates with, and may sustain, structural and

8 systemic biases that I may not be initially aware of. By self-transformation, I refer to changes in my understanding of the less instrumental

9 aspects of the research process, such as concerns around different interpretations of ethical behaviour, such as an appreciation of the social

10 and cultural contexts in which my research is immersed. I notice that in my reflections, at first I focused mainly on other project partners and

11 on the roles I believed that they felt I was meant to play. This external focus gradually shifted towards a more critical self-reflection, focusing

12 on my own thoughts and eventually feelings. At the start of the reflective process, I was emphasising the cognitive aspects of my experiences

13 more than the affective ones. The more I began to express these more affective aspects of my experiences, the more insight I gained into my

14 uncertainty and discomfort thus leading to an "unsettling" of my worldviews. This is clearly observed in the latter reflections when I begin to

15 speak of whether I had the right to carry out this research, given my positionality.

16

17 My reflections also demonstrate a movement away from an implicit understanding of positionality to a more explicit one. In the first

18 reflection, I was very much concerned with epistemic differences between myself and project team members, for example, but in later

19 revisions of the reflection, after consultation and co-constructing the meaning of these reflections with my colleagues, I began to construct a

20 different understanding of positionality, which was more about belonging and my presence in structures of power and influence. In my initial

21 reflections, I clearly associated my identity as a researcher with my academic field, not noticing characteristics such as ethnicity and gender, as

22 playing a role, I was struggling with epistemic differences and how to assert my position within the project. I acknowledge tensions and

23 clashes of worldviews but do not explore them in-depth. In earlier reflections, it appears as if I am aware of collisions and tensions occurring,

24 but I do not yet have the language to describe or conceptualise these experiences. Our collective, radical approach to these reflections

25 allowed us to find co-constructed names and labels for our understanding of the in-between experience, similar to that of other researchers

26 using such methods. Some of the tensions that thus begin to surface are those regarding legitimacy and lack of influence/power. I also begin

27 to recognise performative elements that I did not see at first and then the feelings associated with these. I experienced a conceptual shift in

28 my understanding of what positionality and researcher identity meant in practice and how my unique experience of in-betweenness was being

29 realised. By the third stage of the reflection, I started to connect with my emotions and understand how these emotions were influencing my

30 behaviour in the project. Our own tailored, collective, radical approach to reflexivity resulted in a common language to describe our

31 experiences (as 'reflexive spaces'), surfacing of deeper transformational shifts in ourselves (consciousness) and self-revelations "hidden

32 beneath the surface".

Commented [1]: definitely, the same applies to my vignettes. The first one had very little 'self-awareness'

Commented [2]: By this, do you mean ways in which your own positionality may actually reinforce structural and systemic biases? because this strongly resonates with how I felt at the end of our reflection process

Commented [3]: Indeed this was very dominant in your first reflection where you focused very much on the roles of the project partners in the research project and their top-down approach. However, it was good to see your self-reflection moving beyond that external focus to an internal focus in terms of reflexivity and how it has helped and led to a sort of consciousness and awareness.

Commented [4]: I wonder if this relates to emotions? asking oneself whether they have the right to carry a research must ignite strong emotions. I can definitely relate to feeling a sense of insecurity, perhaps even shame at how I didn't notice my own privilege before this reflection.

Commented [5]: It would have been beneficial if you went into more detail in your discussion on ethnicity and gender. Even though you did not emphasise so much on it, I believe the discussions we had made us touch very much on it as our genders did make an influence on our research process i.e. positionality and identity.

Commented [6]: I'm not sure I am able to pinpoint which emotions these are? as this in relation to the tension between being considered a 'leader' and feeling impostor syndrome?

Commented [7]: While reading this, I was trying to really see the self-transformation bit however having looking at your table, I was able see a transition in your three reflections in the various labels and the similarities of these labels with the rest of us. Indeed, this is the radical reflexivity we have been discussing about and yes it has really helped us reflect on our experience in the research field

FIGURE C2 Reflective summary with comments, Researcher B.

Reflective summary of Researcher C's vignette analysis.

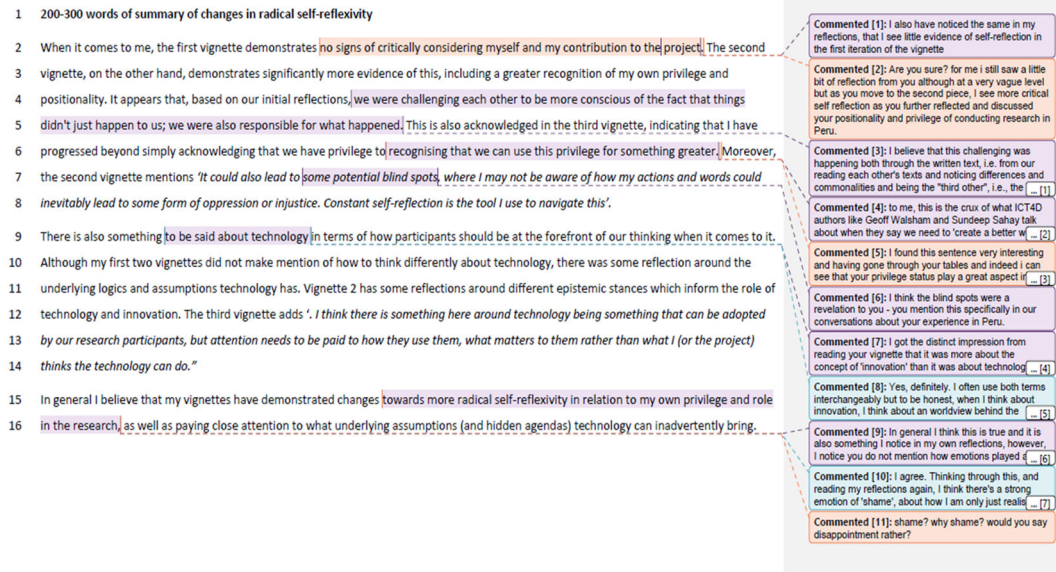


FIGURE C3 Reflective summary with comments, Researcher C.

APPENDIX D: FIGURES PRESENTING EMAIL EXCERPTS DEMONSTRATING CONSENSUS-BUILDING AND COLLABORATION DURING THE 4RS PROCESS

Email Excerpt 1

Hi both,

here is the structure I propose for the reflections:

In relation to 'in-betweenness'

1. **positionality:** whether that is your gender, age, 'class', religion, etc...in what way do you think these aspects influence your research experience (for better or for worse)
2. **privilege:** in relation to research participants and colleagues in projects/academics. What aspects do you consider speak of your privilege (or lack thereof) that you think influence your research experience (for better or for worse)

In relation to 'digital'

3. **discipline:** to what extent do you think your 'discipline' influenced your research experience.
4. **ethics:** what are the ethical aspects that you perceive emerged from your research and your chosen methodology. How do you think this could have been differently (say if you did not have the 'inbetweenness').
5. **something about the technology:** here I suggest we try to think a bit more... As we haven't yet touched upon this as much, let us write what we think is relevant on this.

Let me know if you are ok with this.

Best

FIGURE D1 Email excerpt about structuring reflections in the "in-betweenness" paper.

Email Excerpt 2

Dear Both

From our extended abstract:

Based on these cases, we argue that self reflection, even when done retrospectively and outside of an ethnographically-informed tradition, brings new insights into our roles as ICT4D researchers, and it influences how we conduct research in a sensitive and ethical manner. Moreover, we also shed light on the particular role that "in-between" ICT4D researchers and their positionality may have on the process and outcome of their projects and how they may be uniquely positioned to understand the power asymmetries involved in the implementation of these projects. More insightful reflections such as these help to improve our practice and address the critiques of techno-rationality and eurocentrism in ICT4D research.

Are we able to meet the highlighted parts of this excerpt with the structure below? In our reflections so far, I believe we have not reflected on anything to do with technology. This is what is lacking, I think. And in order to address the critiques of techno-rationality, we need to do that. This would also distinguish us from development studies scholars reflecting on their practice.

FIGURE D2 Email excerpt discussing reflections on role of in-between researchers.

Email Excerpt 3

Hi both,

Hope you're enjoying your Sunday. I've spent some time working on my revised reflection, which you can find attached. It has been a very useful exercise, I think! You will see that what I've done is moved the paragraphs that were already there and in each section I've added a paragraph that describes what I would focus on. This is so you can see the process, because at the moment the document is going to read a bit unclear and messy. I think this is normal and expected at this stage.

What I've learned is that there are a few descriptive aspects which I can do without, and I can include other aspects which I didn't do before. Somewhere, maybe in the introduction or methodology, we could have a short description of our projects, so that our reflections focus more on the criteria we have come up with.

With regards to the technology, what I found interesting is that the indigenous people I met were very comfortable talking about their technologies, showing me how they use them and how their underlying values inform their usage. I think this was interesting because it means that although technology could be argued to be externally designed and produced, these research participants were able to adopt them to their own needs and to use them based on their own values. This was something that I think needs more reflection, but it's a start!

Just thought I'd share this in case you need inspiration for yours.

FIGURE D3 Email excerpt about refining reflections after collective discussion during 4Rs process.

Email Excerpt 4

Hi Both

I have also now completed my revised reflection for tomorrow's meeting.

I keep learning more and more from this exercise. I have now identified what I believe my positionality is in this project and I have also identified what in-between-ness may mean for me.

It may have ethical dimensions which I have not fully explored.

FIGURE D4 Email excerpt demonstrating how we were learning more from the 4Rs process as we refined our reflections.

Email Excerpt 5

Dear Both

Here is my updated reflection for today.

I have also created a new folder in our shared drive and put some articles there which speak to the issue of techno-rationality in IS and ICT4D studies called 'IS Lit on Techno-rationality'.

The consensus of these papers is that ICT4D projects tend to follow this techno-rational logic which is essentially based on Western-influenced thoughts on how society and economics should work. Technology provides 'efficiency' gains which feed into this dominant view and therefore supports this logic. The techno-rational approach supports neoliberal thinking. It is another way of Western ideas and thoughts dominating those of the global South.

Regarding positionality, inbetweenness and space, I'm thinking we may need to look at the concept of liminality.

We'll talk later.

FIGURE D5 Email excerpt demonstrating iterations between the re-interpretation and review stages of the 4Rs process.