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Minding the gap: The importance of active facilitation in moving boundary objects from in-theory to in-use as a tool for knowledge mobilisation

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ABSTRACT

The Health Inequalities Assessment Toolkit (HIAT) was developed to support those involved in health research to integrate a focus on health inequalities. Our study focuses on bringing together the concepts of boundary objects (BO) and brokers-as-bricoleurs to explain the implementation of the HIAT within a research capacity building programme. Exploring the extent to which (i) the HIAT operated as a BO and (ii) the ideal conditions to nurture and enhance its effectiveness during knowledge mobilisation. We employed a qualitative approach to analyse: semi-structured focus groups and telephone interviews; secondary data from an evaluation of the wider research programme within which the capacity building was situated. Data was thematically analysed incorporating the properties of a BO: meaningfulness, convergence, resonance and authenticity. Four main themes identified: (1) Generating convergence through creating a focus (2) Reconciling differences to create a common language (3) Workshop facilitators: boundary brokers-as-bricoleurs, (4) Thoughts into action. The HIAT operated as a BO, enabling individuals across the different project teams to galvanise around the issue of health inequalities, explore collaboratively and incorporate equity within service evaluations. Highlighting the importance of involving brokers with an ability to improvise and mobilise around the HIAT, using their expertise to translate and interpret across boundaries and emphasise shared goals. Reflecting on this, a modified tool with additional resources beyond socio-economic causes has been launched as a forum to consider health inequalities from diverse perspectives for use beyond UK health and social care research.

1. Background

Health inequalities persist because of an inability or unwillingness to act on entrenched social injustices, due to ideology, lack of leadership, and societal indifference (WHO Commission on the Social Determinants of Health, 2008). There is extensive research evidence to show that social inequalities cause health inequalities, and that there is also a robust evidence base of policy actions that are likely to reduce health inequalities (Kelly-Irving et al., 2022). Smith and Anderson (2017) have shown that people with experience of living with socioeconomic disadvantage have a good understanding of these links, that structural factors represent

‘upstream’ determinants of health and ‘psychosocial’ factors are an important pathway to health outcomes. But, whilst the evidence-base has grown, so too have health inequalities, whether that be measured as relative health gradients or absolute health gradients (Kelly-Irving et al., 2022). Ambitions to reduce health inequalities are also set against an especially challenging backdrop of financial ‘perma-crisis’, where a decade of austerity and cuts to public services has been further exacerbated by the inequitable impacts of the ongoing Covid-19 pandemic (Marmot et al., 2020).

In making decisions about services and policy, health care organisations are ‘actively encouraged’ (Department of Health & Social Care,

Abbreviations: ARC NWC, Applied Research Collaboration North West Coast; BO, Boundary Object; CIGs, Collaboration Implementation Groups; CLAHRC NWC, Collaboration for Leadership in Applied Health Research and Care North West Coast; HIAT, Health Inequalities Assessment Tool; PPP, Partner Priority Programme.

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2021) to take account of the views and insights of patients and the public whilst still adhering to evidence from research, which generates a tension since these groups are likely to negotiate each bit of evidence in their own way (Gabbay et al., 2020). In applied health research that focuses in addressing health inequalities, having public involvement at an early stage of research ensures that the public perspective grounds the research with lived experiences. Producing research that is both high quality and relevant to the real lives of patients and the public (Green & Johns, 2019; Porroche et al., 2021). To support policy and practice initiatives, McMahon (2022) calls for resources that enable constructive dialogue about tackling the root causes of inequalities in health in a way that empowers and enables people to act, rather than serving to overwhelm. Evidence suggests that work to increase public awareness of health inequalities may unintentionally exacerbate experiences of stigma and shame (Smith & Anderson, 2017). Masuda (2014) describes a practice-based framework to strengthen the delivery of Equity-focused Knowledge Translation (EqKT), building collaborative knowledge relationships to promote health equity, asking individuals and groups to: situate themselves; identify their inclusionary practices; discern the extent of transparency; reflect on their approach to leadership; followed by reasoned action to envision change. This study explores the use of the Health Inequalities Assessment Tool (HIAT), which was designed to help individuals and projects consider health inequalities in an applied research setting. In this article, we explore the extent to which HIAT operates as a Boundary Object (BO) in-theory and in-practice, bringing people and ideas together for knowledge mobilisation.

1.1. Boundary objects, from in-theory to in-practice

Boundary objects provide a shared syntax for individuals to represent their knowledge, enabling stakeholders to articulate and learn about their 'differences and dependencies across a given boundary' (Carlile, 2002). It is scale and scope which govern whether or not an item operates as a boundary object (i.e., that an object's capacity to span boundaries is contingent on the conditions of use and context of user (Star, 2010). Star (2010) describes boundary objects as 'the stuff of action' and 'something people act towards and with'. They can be tangible (e.g. a booklet or a toolkit) and/or intangible (e.g. a theory or an idea). Boundary objects enable "one group to speak to another" (Carlile, 2002), facilitating communication across boundaries, enabling a shared understanding of a problem between for example those involved in the delivery of health and social care services.

The helpfulness of a boundary object is determined by whether or not the embedded values and meanings coincide with those held by the intended users (Melville-Richards, 2016). As such, boundary objects can be vague or visionary, exerting either a negative or positive effect but also be static *boundary-objects-in-theory* or operational and *in-use*. For the Health Inequalities Assessment Tool HIAT to progress from a *boundary*

object-in-theory to a *boundary-object-in-use*, enhancing its appeal and uptake amongst users requires collective endeavour to instil a set of action-based properties that are defined by Melville-Richards et al. (2020) as:

- (i) Meaningful to stakeholders
- (ii) Convergent with stakeholder perspectives, reconciling viewpoints to enable different groups to work together towards a shared goal.
- (iii) Resonant with users, generating allegiance between different groups.
- (iv) Authentic, considered to be credible, highly contextualised, and collectively meaningful.

These properties have been theorised to interact as in Fig. 1.

This conceptualisation is underpinned by the consensus that boundary objects are shared items and ideas that play a role in collaboration by providing a reference point around which communication and cooperation can be coordinated (Star & Griesemer, 1989; Briers & Chua, 2001; Carlile, 2002; Levina & Vaast, 2005). Some examples of and uses are shown in Table 1.

Melville-Richards et al. (2020) showed that much knowledge mobilisation work is focused on standardised generic objects, for example evidence-based tools and best practice guidelines, that are perceived by stakeholders as rigid, lacking context or authenticity, which hampers uptake. Users are instrumental to the creation of boundary objects, and should be engaged in a process of co-production taking the under-utilised object and establishing a productive resource, i.e. through a process identified as *bricolage*. Thus, *bricolage* allows shared meanings to be established between stakeholders so that the objects created possess a deeper sense of shared ownership (Melville-Richards et al., 2020). *Bricoleurs*, those who engage in *bricolage*, are instrumental in the creation of things that exist outside and across boundaries through their knowledge and use of human, material, and symbolic resources (Duymedjian & Rüling, 2010). Effective boundary brokers who possess the ability to take that which is at hand and through experimentation and improvisation create boundary objects enriched by knowledge from practice have been identified as *bricoleurs* (Melville-Richards, 2016 and, 2020). Brokers as *bricoleurs* engage stakeholders in collective endeavour around *boundary objects-in-theory*, promoting visibility and increasing the likelihood that evolution into a *boundary object-in-use* will occur (Melville-Richards et al., 2020).

Maintaining the symbolic potency of a boundary object-in-use can be difficult as both stasis and over-adaptation could damage the intrinsic qualities which distinguish it from one in-theory only. A key challenge of maintaining the appeal and utility of a boundary object-in-use is ensuring the preservation of resonance with the groups using them despite exposure to persistent flux and change (Dowrick et al., 2020). Creating objects through an iterative cycle of coproduction facilitated by boundary

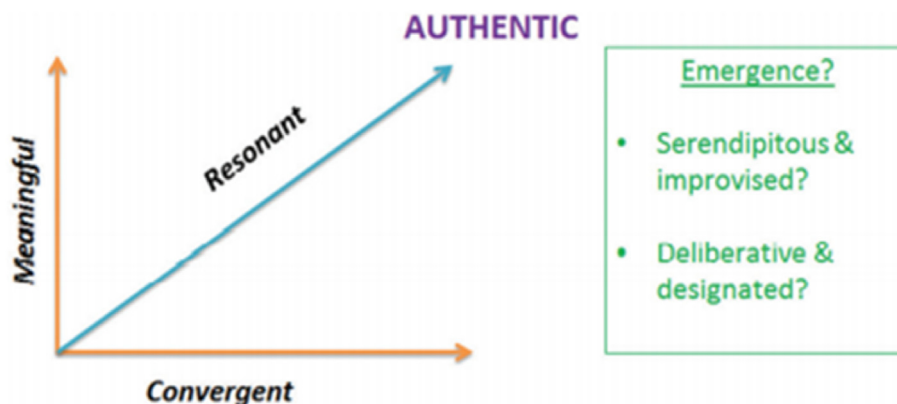


Fig. 1. Interplay of properties of a Boundary Object (Melville-Richards et al. (2020).

Table 1
Examples of boundary objects.

Author & Year	Boundary object	Function
Henderson (1991)	CAD (computer assisted design)	Drawings and sketches in AEC provide necessary plasticity to act as 'social glue' between teams, facilitating distributed cognition whilst providing conscription devices. This inherent flexibility is lost when CAD adopted.
Fujimara, 1992	Genes, cancer, cancer-genes in proto-oncogene theory	Multiple boundary objects existing within the 'grey box' of standardised packages
Bowker and Star (1999)	International Classification of Diseases (ICD), nursing Intervention Classification (NIC)	Exploration of classification in which, illnesses diseases, and other categories society create have implications as boundary objects
Winget (2007)	Sheet music	Sheet music operates as boundary objects around which musician playing different instruments or parts can cooperate. Intrinsic flexibility maintained via musicians' annotative notes on musical scores
Phelps & Reddy, 2009	Architectural blueprints, plans, drawings	Provide a focus around which architectural engineering and construction (AEC) teams can collaborate, maintaining focus and clarity of information over long and complex projects
Allen, 2009; 2014	Integrated care pathways	ICPs are a clinical and governance tool enrolling medics, nurses, and others onto the quality improvement agenda. proposed that ICPs can become negative boundary objects in the eyes of some users, according to the value and meanings ascribed.
Barrett and Oborn (2010)	Software and project management tools	Software packages and project management tools as boundary objects which can both enhance collaboration or induce conflict in different settings.
Fox (2011)	Surgical tools and aseptic process	Considers the adoption of aseptic practices in surgery including sterile gowns and instruments.
Dowrick et al., 2020	IRIS domestic violence training	Domestic abuse referral pathway identified as boundary-object-in-use around which GPs, patients and Advocate Educators can interact.

brokers as bricoleurs can help to ensure objects can be updated as contextual stakeholder knowledge, values and needs change (Melville-Richards, 2016; Melville-Richards et al., 2020).

2. The Health Inequalities Assessment Toolkit

The NIHR Collaboration for Leadership in Applied Health Research and Care North West Coast (CLAHRC-NWC) was a collaborative partnership between regional universities, and health and social care organisations (including NHS and local government) which focused on improving patient outcomes through the conduct and application of applied health research. Recognising that inequalities in health between the north and south of England and within regions between more and less affluent groups persist (Marmot, 2020), CLAHRC-NWC additionally committed to focus its research portfolio on maximising the relevance of findings for frontline practice and policy to reduce these inequalities

(Porroche and Popay 2021). Embedding equity and health inequalities isn't always top of the academic agenda when creating and delivering research, with few studies reporting differential impacts of interventions across population groups for example (McMahon & Maden, 2018). Thus, as part of the CLAHRC -NWC partnership programme, as there was no suitable tool for researchers to use in this regard, we co-developed one. The Health Inequalities Assessment Toolkit (HIAT) is an open-access, online resource (www.HIAT.org.uk), developed to provide a focus, structure, and process for stakeholders with diverse experiences and specialisms to explore their research practices regarding reducing health inequalities, embedding equity principles and public involvement (Porroche-Escudero et al., 2021; Porroche-Escudero & Popay, 2021). Members of the public, staff from universities, the NHS and local authorities working alongside specialists with international experience of health inequalities contributed to the development of the tool and piloted draft versions. The intention was to enable a shift in attitudes and practice to embed equity in research with a core focus on health inequalities and public involvement.

Divided into four sections, the HIAT is a coproduced, research-derived, 'actionable tool' (Cooke et al., 2017) that guides its users to: clarify the health inequality dimension of the problem to be addressed; design the work to address the problem; evaluate the work as it is implemented; monitor and plan for wider impacts on health inequalities (Porroche-Escudero & Popay, 2021). CLAHRC-NWC used HIAT as a vehicle to support its strategic aim of embedding a health equity focus across all levels of the partnership, promoting a shared understanding and language, which has traditionally hampered efforts to address the issues (Masuda et al., 2014; McMahon, 2022). As such, the HIAT appears to fit well with the concept of a boundary object, a toolkit that facilitates the creation, transmission, and adoption of new information about health inequalities across multiple and diverse stakeholders. Evaluating the extent to which HIAT enhanced the equity focus of the work of the partnership, Porroche-Escudero and Popay (2021) found widespread support for the mandatory HIAT assessments and one-to-one training, with respondents remarking that HIAT contributed to a shift in thinking about health equity from 'someone else's' to 'everybody's business'. However, tensions were apparent and the diversity of professional disciplines and organisational cultures in the partnership led to different and at times conflicting perspectives on research and health inequalities and a reluctance to invest time to retrofit the HIAT approach was seen as too 'restrictive', 'bureaucratic' or 'unnecessary' (Porroche et al., 2021; Khan et al., 2021). Thus, the HIAT, as a Boundary Object with practical utility was theorised to combine a top-down requirement across the CLAHRC to undertake a HIAT, to enable a bottom-up approach for embedding health inequalities and public involvement. It was intended to enable a shared understanding and deeper dive into the causes of health inequalities that could be modified as a result of the research, mobilising and sharing knowledge and experiences from different experiences and paradigms.

2.1. Implementing a health inequalities assessment toolkit in an applied research collaboration

Within the CLAHRC-NWC, a programme of research was coproduced with NHS and local authority partners focused on a key shared strategic priority of reducing health inequalities, improving population health and wellbeing and reducing emergency hospital admissions (CLAHRC NWC Partner Priority Programme 2017–2018). A research capacity building programme was developed to share information and experience on evaluating the new services being offered to reduce emergency hospital admissions (Saini et al., 2021). Using evaluation of a service change or innovation as the vehicle, collaborative co-learning between a group of NHS, Local Authorities, and University staff and relevant members of the public (referred to in CLAHRC-NWC as Public Advisors) brought different types of knowledge and expertise to the table to work together as a peer group (Knight & Pye, 2005). This approach used Collaborative

Implementation Groups (CIGs), based on participatory action-based inquiry methods as an innovative way of improving practice and developing new knowledge (Saini et al., 2021). Through this cooperative and collaborative process, NHS, Local Authorities, public members, and university partners (the latter acting additionally as Collaborative Implementation Groups CIG facilitators) support each other in the development of project evaluations, supporting local decision-making in health services improvement.

The HIAT was embedded in all workshop activities through training, case studies, activities and completion of a HIAT report (example report at ForEquity.uk 2022). As a tool, the HIAT was employed in the programme to enable participants to think about the potential impact of their actions not only in terms of benefits (in reducing health inequalities) but also the potential risks - that policy and system changes may further widen health inequalities (Porroche-Escudero & Popay, 2021). CIG facilitators helped teams with practical examples of how to apply the HIAT, including the approaches that could be used, data that could be collected and methods of analysis.

2.2. Aim of this article

Our study focuses on bringing together the concepts of boundary objects and boundary brokers-as-bricoleurs (Melville-Richards et al., 2020) to explain the implementation of the HIAT within a research capacity building programme and how this was facilitated. Our analysis explores the extent to which (i) the HIAT operated as a boundary object and (ii) the ideal conditions to nurture and enhance its effectiveness during knowledge mobilisation.

3. Method

3.1. Design

We employed a mixed qualitative study design to explore participants' experiences of using the HIAT in co-production of knowledge to support local decision-making in health services improvement. The use of qualitative methods enables different perspectives to be explored helping to create an enhanced understanding of the context that shapes the participants' experiences (Carter, et al., 2014).

The study used both primary and secondary sources of data: primary data included ten semi-structured focus groups and eight telephone follow up interviews with participants of the research capacity building programme; secondary data from an evaluation of the wider CLAHRC NWC within which the research capacity building programme was situated (Porroche-Escudero et al., 2021; Ward et al., 2020).

The topic guides for all focus groups and interviews were co-produced with public advisors and included a set of open-ended questions that explored participants' perceptions of the HIAT, its impact on their work, individual decision-making and any learning and outcomes that arose from their involvement in the programme. Interviews included open-ended questions that explored participants' interpretations about health inequalities and their use of the HIAT (Saini et al.; Porroche-Escudero et al., 2021; Ward et al., 2020).

Focus groups lasted around an hour whilst telephone interviews ranged from 20 to 30 min. Secondary data interviews were approximately 60 min long. Focus groups, interviews and telephone interviews were audio recorded and transcribed.

3.2. Participants and recruitment

We used purposeful sampling to recruit members of teams that had been part of the research capacity building programme, including those involved in its design and facilitation. Two cohorts undertook the programme, the first during November 2016 to October 2017 and the second from July 2017 to June 2018. Focus groups took place following the completion of each of the two rounds of the programme. A total of 42

team members took part in focus groups and eight participated in telephone interviews. Secondary data analysis included 58 one-to-one interviews.

Six months after the completion of the first round of the programme, where they were still engaged with the programme facilitators and some were in the process of publishing findings from their evaluation completed on the programme. Project interns were contacted by their academic project facilitator to conduct a follow up interview.

Involving the project facilitator in the data collection helped to enhance overall understanding of programme participants' experiences. Insider researchers such as programme facilitators, that supported individual project teams, had a greater understanding of the project, the problems and challenges they faced (Saidin & Yaacob, 2016). All participants were provided with the study information sheet and consent forms via email and before the focus groups and interviews was conducted.

Quotes are coded as followed; PPP1/2 referring to Partner Priority Programme PPP cohort; F1/2- facilitators (academics) focus group, PL1 – PPP project leads (academics) focus group, Intern1/2 – PPP interns (NHS or Local Authority professionals) focus groups, R&D- PPP Research and development focus group, PA1/2 – Public adviser focus group, follow up (number) – project follow up interviews and CLAHRC int (No.)– CLAHRC staff interviews.

3.3. Data analysis

All qualitative data were analysed using a thematic approach (Braun & Clarke, 2006; 2019), incorporating Melville et al.'s (2020) key characteristics of a boundary object (meaningfulness, convergence, resonance, and authenticity) to start with a scaffold of key codes informing thinking about potential themes. Our constant comparative approach (Braun & Clarke, 2006, 2019) enabled a wider categorisation of codes and theme development beyond the Melville et al. scaffold. We incorporated a theoretical perspective triangulation, whereby a team of five researchers (SH, MG, AR, JC and MG) were involved in the interpretation of the raw data; helping to provide multiple perspectives to create a deeper and wider understanding of the data and enhanced research validity and credibility (Carter et al., 2014; Olsen, 2004).

All researchers involved read and made notes of emerging patterns in the data within each transcript and reflected on potential codes. Transcripts were imported into NVivo (Nvivo11) for ease of coding. Codes were then combined, and potential themes explored.

3.4. Patient and public involvement

The research question was developed collaboratively with researchers, CLAHRC NWC member organisation (NHS and Local Authorities) partners and Public Advisors. The Public Advisors were involved in a series of meetings to agree the focus for this research and to plan the analysis. SS is a co-author of this paper and has contributed to interpretation of findings and drafting of the paper.

3.5. Ethical consideration

Ethical approval for NIHR CLAHRC NWC Partners Priority Programme evaluation was obtained from the University of Liverpool Committee on Research Ethics (Ref:2236) and Lancaster University Committee on Research Ethics for research on the CLAHRC-NWC evaluation (FHMREC17023) providing this study secondary data.

3.6. Findings

This study identified four main themes: (1) Generating convergence through creating a focus (2) Reconciling differences to create a common language (3) Workshop facilitators: boundary brokers-as-bricoleurs, (4) Thoughts into action. Qualitative quotations are used to illustrate themes identified.

Theme 1. Generating convergence through creating focus

Deliberative thinking about health inequalities - whilst the phrase 'reducing health inequalities' was a common aspiration within health service organisations, the way in which they were conceptualised, looked at or considered was diverse. Several of the participants reported that health inequalities were inferred in organisational documents rather than clearly stated; others reported that within their organisations there was a lack of focus on actively addressing health inequalities:

'[the research capacity building programme] had really strong health inequalities focus that was really helpful because that was something we were lacking' (PPP1-PL1)

'and it's getting them to think about looking at things [health inequalities] a bit differently' (PPP1-R&D)

The HIAT was integrated within the research capacity building workshops, so as to enhance programme participants' awareness of health inequalities and stimulate new ways of working to embed equity into their evaluations. During the workshops, training on how to use and apply the tool within their proposed evaluations, debate amongst the project team and also reflecting on feedback provided from workshop facilitators enabled participants' thinking to converge and recognise the potential impact of their services on health inequalities both positively and negatively. Participants reported how this process had enhanced their thinking about health inequalities and enabled them to apply its common principles whilst also personalising them to their own initiatives.

'How it's [HIAT] applied helped as well, that sort of confirms what you are thinking about and consolidates your learning. I think that the whole process of a look at the HIAT tool apply it to a project, help them [research capacity building programme participants] with the project and then get some feedback from (Facilitator09) and then go around that again, that iterative process with (Facilitator09) feedback I think has been a really important learning opportunity' (PPP1-F1)

'Then the clinician will call them back and ask them the reasons why, is there anything else that we can do for you, home visit? what is the barrier that's they're not coming for? what is the reasoning behind the barrier ... tackling elements of health inequalities' (Follow up 3)

There appeared to be little evidence of active thinking about health inequalities having progressed in terms of socio-economic factors and how these might be measured, and evidence used to influence service development in practice. Participants indicated that the programme by focusing on health inequalities and using the HIAT was enabling new ways of thinking amongst partners. The HIAT through focused questioning about health inequalities, allowed participants to question commonly accepted routine practices within their initiatives.

'I suppose it's getting people to think about inequality of provision of service and getting them to reflect on it themselves ... It's getting them [research capacity building programme participants] to think about looking at things a bit differently rather than just accepting that they said it was going to do this and it's doing this'. (PPP1-R&D)

Going beyond awareness to action, one participant highlighted how the programme:

'acted to change how participants thought about working - supporting them to envisage how they might work collaboratively in seeking to address health inequalities' (PPP1-F1).

However, some participants highlight how this was difficult initially and keeping the focus on health inequalities within their organisations objectives was challenging within the time frame of the evaluation. It was reported that reducing or addressing health inequalities and having a measure to reflect this is long term and it can be a 'big ask'.

'In terms of meeting the objectives like we are going to address or reduce health inequalities, again even this within itself is like a massive statement because you know measuring health inequalities or reducing health inequalities can be a long timer' (PPP1-R&D)

Theme 2. Reconciling differences to create a common language

The Collaboration Implementation Groups CIG approach brought together different project teams, with the HIAT being seen as fostering the conditions for language to converge and for the groups to connect, cross boundaries and discuss health inequalities. Participants highlighted how the four clarifying questions presented by the HIAT enabled conversations between teams at a 'practical level' allowing sharing of their initial plans about how they might identify and tackle health inequalities. This sharing of information and experiences was important for learning, enabling participants to see different perspectives and discuss the practicalities and challenges of tackling health inequalities.

'I think HIAT has facilitated the conversation as well because it's given us an object to talk around'. (CLAHRC-Int2)

'It really facilitated a big discussion around health inequalities and how members of the multidisciplinary team are thinking about it and then applying it to their practice now' (PPP2-PL2)

'The importance of trying to improve health inequalities but actually I suppose as a group of projects we've all had the same kind of focus and that's been good. It's been very good to listen to other people's projects and think about links to other people's projects'. (CLAHRC-Int3)

Participants not only engaged in conversation at the initial stages of planning their evaluation but these debates continued throughout the evaluation process, with feedback to teams and further reflection on how they might tackle health inequalities.

'awareness of health inequalities and I think that's a skill that they've [research capacity building participants] actually managed to learn throughout, attending the workshop, being parts of the Collaborative Implementation Groups CIGS, networking, collaborating with others' (PPP2-F2)

The workshop facilitators highlighted how documenting these conversations facilitated practical plans to address health inequalities and that using the HIAT to inform the assessment measures within their evaluation was key in enabling participants to communicate a clear and common focus on tackling health inequalities both within their own organisations and with other colleagues.

'They've [the programme participants] learnt from those conversations, they've informed us about what they are doing but they've picked up new ideas about how they might approach it slightly differently. They've tried to put those into practice and fed back to us on how that is working and some of them have gone quite a long way to adapt their current practices'. (PPP1-F1)

Finally, some participants report that it is important to continue conversation about health inequalities, highlighting that it is not an easy concept to grasp and requires continuous reviewing.

'I actually understand it now 12 months on, so the content of information is very important to be squashed. It's a very vast topic and it is difficult to understand. Health inequalities is one of those, I think you should attend a workshop every six months to 12 months, it should be constantly reviewed' (PPP2-PA2)

Theme 3. Workshop facilitators: boundary brokers-as-bricoleurs

It was apparent that whilst the Health Inequalities Assessment Tool HIAT appeared to be functioning as a boundary object, it was not doing so in isolation and that under the influence of workshop facilitators who supported participants in employing the HIAT in their evaluations,

critical thinking about health inequalities was fostered. Workshop facilitators were central to the effective introduction of the HIAT and in applying the tool to real life scenarios. Participants highlighted how workshop facilitators enabled the HIAT to be used - making it more grounded and practical for members to use in their day-to-day practice. As such, facilitators could be said to be acting as boundary brokers, with participants reporting that it would have been difficult for them to understand or apply the HIAT without their support and guidance.

"Health team and a couple of the registrars looked at the website and couldn't really see how to apply it [HIAT]. So I think why it's [HIAT] worked so much better in the [research capacity building programme] is because genuinely they've [workshop Facilitators] had you waving your arms about it [HIAT] at the beginning of firing them up on it and they've had the practical project to think it through on. I think it's much more of a challenge for people to look at it [HIAT] and see it [HIAT], it [HIAT] is a resource that they would use just in their general practice. Because I think it [HIAT] might need a bit more active facilitation or kind of capacity building to do it or whatever". (CLAHRC-Int4)

"we were lucky in that our first facilitator had really strong health inequalities focus that was really helpful because that was something we were lacking" (PPP1-PL1)

This 'active facilitation' prompted more in-depth consideration and discussion within and across teams, thus encouraging a process of continuous reflection on traditional practices and bringing in new perspectives.

"I think the facilitators within the PPP have [embedded health inequalities], because as I said they've had the practical example, they've kind of seen how to help people to think it through and its helped them to think it through as well" (CLAHRC-Int4)

Theme 4. Thoughts into action

Doing things differently - Participants reported that being part of the capacity building programme had enabled them to identify where health inequalities existed including ones not acknowledged previously, and that this new knowledge was supporting future development and planning of services to address these.

"Well from an inequalities point of view just actually looking at our service from this evaluation PPP point of view allowed us to see where some of the inequalities that we didn't understand or didn't necessarily expect. And that's led to the development of the drop in and the out of hours services that we're hoping to develop" (Follow up 4)

The programme was important in facilitating the practical use of the HIAT by persuading participants to not only propose a plan for how they will tackle health inequalities in their services provision but also to put actions in place that would enable them to work practically toward this. Participants reported that through the process of thinking about health inequalities, the HIAT had enabled them to explore different approaches to how they could measure and describe these.

"I remember there was two sections that came back [HIAT report] which helped us, it helped to show you're on the right path but it also added those probing questions to say, lets expand your thought process here" (PPP2-PA2)

They might have looked at gender and they may well have looked at ethnicity but they weren't looking at other factors, they weren't looking at postcode factors, they weren't necessarily looking at disability; there were so many other things that they did not consider when they collected their data." (PPP1- F1)

For some project teams, using the HIAT had not only influenced their current project evaluation, it was also starting to influence wider organisational change.

"One project that I was working with designed their data capture questionnaires that go right across their organisation not just for the evaluation but for the way that they record and track their service users. The disaggregated data because they weren't collecting it in that way before. So that's quite a big service change for them to make. So they've been willing to take on board some of the ideas and suggestions and put them into practice". (PPP1 - F1)

Participants also reported how the programme had advanced their thinking from seeing the HIAT as a purely conceptual framework, to a tool that supported a cycle 'from theory into action'. For the majority of participants this was an important stage of their learning as they implemented their actions and measured health inequalities within their own settings, learning from the experiences of other projects.

"HIAT is a very conceptual framework...and it's not until you actually work with those projects and look at what they are doing on the ground, how are you capturing this data, what are you doing with that data ... they have that lightbulb moment ... created all these conceptual frameworks and tools that we needed to get us to this point, but now we've started to use them on the ground, that's where we've really hit the big learning curve" (PPP1- R&D)

"I suppose one of the reasons for offering the physical health screens in the first place is to hope to address those health inequalities. We've had to adapt to how we offer those services" (Follow Up 1)

Finally, participants reported organisational challenges that continue to create difficulties and potentially limiting capacity to focus on health inequalities during and following the completion of project evaluation. These challenges reported included limited time capacity in doing service evaluation with a health equity focus, appropriate collection of disaggregation data, and limited resources (such as resource to enable appropriate public involvement).

"I know for us here that wasn't easy for some teams because there was pressure from senior management to do this and they are like we can't do all of this. They eventually negotiated their way into doing what they should be, like you know keeping it focused but that was a challenge for them and that was that was easy for them to manage" (PPP1 -R&D)

4. Discussion

Our analysis used the concepts of boundary objects, brokers and bricolage to illustrate how the Health Inequities Assessment Tool HIAT was implemented within a research capacity building programme. We consider how the concept helps to explain why HIAT became an effective device and how it might inform the future development and implementation of the HIAT more generally.

There is a need for resources that enable productive exchange of ideas about tackling health inequalities in such a way that is respectful of individuals knowledge and circumstances, and empowers and enables people to act (McMahon, 2022; Smith & Anderson, 2017). As a toolkit that aims to facilitate the creation, transmission, and adoption of new information about health inequalities, the HIAT was seen to operate as a boundary object enabling individuals from diverse backgrounds and with different specialisms to become galvanised around the issue and work together to explore and incorporate an equity lens within their healthcare service evaluations.

The HIAT was co-designed specifically to support those frontline stakeholders involved in designing health research and implementing projects or programmes to build capacity in integrating health equity into their work (Porroche-Escudero & Popay, 2021). Although individuals and project teams had their own aims, motivations, and interpretation of health inequalities, our findings indicated that the adoption of the HIAT enabled the surfacing and sharing of ideas, whilst acknowledging those differences. This is reflective of Star's (2010) description of the

interpretive flexibility of a boundary object, where the difference depends on the use and interpretation of the object. In enabling ideas to emerge and be discussed, the HIAT allows different types of evidence to be negotiated and framed (Gabbay et al., 2020), laying the building blocks of collaborative knowledge mobilisation to promote health equity as described by Masuda (2014). As a boundary object, HIAT helped to extend and enhance understanding and ideas about health inequalities that translated across culturally defined boundaries (Fox, 2011).

Boundary brokers enable connections, sharing and translating knowledge between and across stakeholder groups. The workshop facilitators functioned as both boundary brokers and bricoleurs, bringing together the different understandings of health inequalities held by the programme participants and maintaining effective processes to enable targeted knowledge mobilisation, key steps in bridging the gap between knowing and doing (Melville-Richards, 2020; Appleby et al., 2021). Keszei (2018) highlights that it is the boundary brokers' willingness to share their knowledge that contributes to innovation success. In our study, we saw that whilst the formal training as part of the workshop programme focused participants' attention on the HIAT the workshop facilitators maintained collective discussions and collaborative activity of knowledge mobilisation. This resonates with Melville-Richards et al. (2020) who highlight how bricolage plays a crucial role in the progression of a boundary object-in-theory to a boundary object-in-use. For the HIAT to advance from a boundary object-in-theory (i.e. on a website) to a boundary object in use (i.e. informing an evaluation) it was necessary to facilitate open conversations between knowledge users and producers (partners, academics, and citizens) around the concept of health inequalities. Acknowledging the different perspectives of participants enabled the facilitators to use the HIAT as a reconciliatory device to stimulate a convergence of stakeholder views and highlight overlapping priorities. This enhanced the overall authenticity of the HIAT for all and represented a key step in knowledge mobilisation.

Our findings add evidence to the existence of a shared feature amongst effective boundary brokers described by Melville-Richards (2016) as boundary object competency i.e., the ability to identify, improvise, and tactically mobilise boundary objects, using their ability to translate and interpret across boundaries to highlight shared goals.

5. Conclusions and recommendations

There is a need for effective resources to support teams to focus their research on maximising the relevance of findings for frontline practice and policy to tackling the root causes of health inequalities. Our study illustrates how the HIAT, as a boundary object, stimulates project stakeholders with different backgrounds, experiences and specialisms, to work collaboratively and address the impacts on health inequalities of implementing local services. We integrated HIAT into the research capacity building workshops and used Collaborative Implementation Groups (based on participatory action-based inquiry methods) to support a group of NHS, Local Authorities and Public Advisors evaluate their healthcare services. Our evidence suggests that it was important to involve facilitators or brokers with an ability to improvise and mobilise around the HIAT 'questions', using their expertise in translating and interpreting across boundaries to emphasise shared goals. Reflecting on this and other evaluations of the HIAT, a modified tool with enhanced web-based resources and additional categories beyond socio-economic causes of inequalities, has been co-developed (ForEquity.uk). This is free to use and has been designed as a forum for a more inclusive audience to consider health inequalities and equity from diverse settings and cultures for use beyond UK health and social care research. As such it has the potential to serve as a web-based boundary object to facilitate exploration of these wicked problems.

Author contributions

The study was conceived by RY, SH, PS, LH, JC, KB, MGo and MGA.

Qualitative analysis and interpretation of the data was undertaken by SH, LM, AR, JC and MGo and reviewed by all authors. SH and LM contributed to drafting the manuscript. All authors revised the paper and approved the final version of the manuscript.

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Consent for publication

Not applicable.

Availability of data and materials

Qualitative data extracts are presented in the article to support the findings. The original transcripts are not available to the public as they may contain information that could compromise the confidentiality and anonymity of the participants.

Declaration of competing interest

The Authors declare no conflict of interest. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.

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