Improving collaboration in construction: an opportunity for action research

IMPROVING COLLABORATION IN CONSTRUCTION: AN OPPORTUNITY FOR ACTION RESEARCH

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One perceived constraint to more effective collaborative working in UK construction is the current practice whereby individual team members each insure for their respective liabilities. It is argued that this promotes risk avoidance and other non-collaborative behaviour among them. An innovative form of insurance, called Integrated Project Insurance (IPI), promises to help alleviate these constraints by insuring the design and construction team as a whole. An Action Research (AR) project is currently being designed to support the development and implementation of key IPI features on a live construction project from 2013 to 2016, with a focus on improving collaborative working among team members. This paper provides a critical review of AR with a particular focus on its recent application in construction research. It seeks to build on previous studies by introducing the key features of a proposed AR approach in terms of their methodological basis, the roles of participants and the nature of AR 'interventions' occurring over time.

Keywords: action research, research methods, collaboration, project insurance.

INTRODUCTION

Improving collaborative working: an opportunity for Action Research

The UK Technology Strategy Board (TSB) is funding a practitioner-led research project adopting an Action Research approach - with the authors as academic research partners - aimed at improving collaborative working on a new construction project commencing in 2013 for the Defence Infrastructure Organisation (DIO). The project involves the introduction of a new form of insurance for all design and construction team members that, together with a range of other arrangements, are intended to improve the effectiveness of collaborative working among them.

The background to this initiative is a belief that current insurance arrangements within UK design and construction teams – whereby each member is individually liable for their own negligence and error, and insures accordingly – promotes risk avoidance behaviour among them. This is seen to be at odds with team working, problem sharing and the joint pursuit of project goals that are believed to be essential to effective collaborative working (Cabinet Office 2012, Specialist Engineering Contractors (SEC) 2011). A proposed solution is an alternative form of insurance,

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called integrated project insurance (IPI) providing single cover for the construction project team as a whole and covering all their liabilities.

By covering the project team as a whole, the central proposition is that IPI helps provide a context in which the potential of members to work better together may be unlocked and exploited. To do this, a range of further measures, including project team selection and facilitation processes, are to be introduced at different stages in the project to support IPI. The practitioner-led research team recognised early in the process that the active participation of the project team in the development and implementation of these measures could help improve their effectiveness. Providing clear opportunities for collective reflection, learning by experience and further action could help team members improve their collaborative practices on an ongoing basis, and made a powerful case for the use of an Action Research (AR) approach.

Aim, objectives and scope of the review

This paper provides a critical review of AR with a particular focus on its application in construction. It outlines the main elements of the approach proposed on this project, and the likely challenges to be addressed. It is intended to be the first in a series of papers on this theme that reflect on and contribute to the development and use of AR in construction research.

Details of our proposed AR approach are provided later in the paper. For now we assert our belief in the importance of participatory research with a focus on improving the practices of participants (McTaggart, 1995, Eden and Huxham, 1996). This helps put the following review in context which, following a brief historic overview, concentrates on:

- AR in education and healthcare (in recognition of the strong pedigree of AR in these areas, and the potential to learn from the approaches adopted);
- AR in organisational research;
- AR in construction; and
- Important distinctions between AR and consultancy, emphasising that our endeavour is one of social enquiry requiring critical reflection by participants.

With the focus on improving practices, wider discussions of AR in relation to issues of emancipation and community engagement, for example, are of necessity excluded.

ACTION RESEARCH: AN OVERVIEW

Action research – origins and key developments

Kurt Lewin is generally recognised as one of the originators of AR and defined it as a process of organisational change having ‘a spiral of steps, each of which is composed of a circle of planning, action, and fact-finding about the result of the action’ (Lewin 1946: 38). An alternative to the 'disinterested' social science models (Reason 2003), AR acknowledges the researcher as an active participant in the process rather than a passive observer. Its focus is on doing research with, for and by 'subjects' rather than on them, in order to produce practical, useful knowledge (Reason and Bradbury 2007). Its aim is to bring about change in specific contexts (Parkin 2009), and it has a dual goal of improvement and of generating knowledge (Eden and Huxham 1996).

AR has a very strong pedigree of social justice and community action, with the practitioner actively involved in the 'cause' for which the research is being conducted (Greenwood 2002, Reason 2003). More recently, AR has been used to effect

organisational change, with origins in work arising after WWII on productivity in the British coal mining industry and, subsequently, in other industries (Gustavsen, 2008).

These two forms of AR are often contrasted as Southern vs. Northern: "the Southern tradition is committed to community transformation through empowering disenfranchised groups; the Northern tradition is concerned with reforming organisations through problem solving" (Brown 1993: 249). With its focus on group problem-solving for a practical outcome, within a commercially-driven organisational context, this research project is firmly aligned with the Northern tradition.

Key forms and principles

Whilst the context and use of AR varies, there are generally agreed to be a number of key features which distinguish AR from other social science research methodologies (Heller 2004, Eden and Huxham, 1996; (Elden & Chisholm, 1993); Kemmis and McTaggart 1990):

- Addressing a 'real life' problem, often of shared concern;
- Participant (rather than researcher) led and performed collaboratively, with collective judgement on the outcome;
- Practical problem solving and knowledge expansion through interpretation and intervention;
- Paying attention to ethical and power considerations;
- A focus on how learning and change processes become self-generating and self-maintaining;
- Often longitudinal and involving more than one discipline.

While it is often argued that AR be defined in broad terms, reflecting its flexible, pragmatic, collective nature (Greenwood and Levin 2007), over the years there have been many attempts to categorise AR, with Jönsson (1991) claiming, "there probably are as many definitions of action research as there are authors on the subject". In order to focus our activity, we have selected the related definitions of Participant - where diagnosing and action planning are carried out in collaboration between researcher and client system (Chein et al. 1948), and Practical - involving active participation and cooperation with practitioners (Zuber-Skerritt 1996). The Participant/Practical form identifies the embedded nature of the researchers, and aligns most closely with the activity on this research project. Having participants embedded in the research team has been argued to enhance scientific validity (Whyte 1989), and the importance of participation from members of the organisation has been commonly accepted in recent AR theory (Pålshaugen, 2006).

Building on Lewin's model, the AR process continues to be seen as a cycle or spiral comprising a continuous, iterative sequence of activities (Baskerville 1999) involving: diagnosis; action-planning; action-taking and observing; reflecting; and further re-diagnosis and planning leading to subsequent cycles of AR.

Baskerville (1999) argues for a specific learning stage once the research cycle is complete. This can take the form of 'single' or 'double loop' learning (Argyris and Schön 1978) – the latter with an explicit acknowledgement of context (Greenwood and Levin, 2007) – where knowledge of unsuccessful intervention/failed change leading to a further cycle of diagnosis, planning and so on.

Although criticisms in relation to its replicability, reliability, generalisability and objectivity continue to be levelled at AR (Hales and Chakravorty 2006, Stokes and Dainty 2011), AR has been recognised as helping to overcome the gap between theory

and practice and improving the relevance and impact of academic research through its proactive nature (Azhar et al. 2010; Reason and Bradbury, 2007; McKay and Marshall, 2001). By explicitly rejecting notions of objectivity, the AR researcher is clearly acknowledged as a key participant and to many this lends strength to research aiming for relevance and utility, overcoming researchers' "self-imposed distance from the world of action" (Dash 1999: 479). Validity is provided by the joint interpretation of the results by all of the participants, not just the researcher (Heller 2004). A detailed contextual narrative of the work allows readers to underwrite the accounts by bringing to bear their own knowledge of the situation and context (Koshy et al. 2010).

ACTION RESEARCH IN CONSTRUCTION

Overview and focus of AR in construction

There has been a growing interest in AR in construction since around the late 1990s. Early contributions include Seymour et al. (1997), for example, who reflected on the methodological challenges of AR in terms of their own role as participant researchers in a local government organisation. Hauck and Chen (1998) proposed AR as a research strategy for graduate students in construction management to enable them to tackle 'real' problems. In one of the earlier applications of AR in construction, Cushman (2001), who studied information systems in construction project teams, noted the (then) novelty of AR in construction, especially within the wider UK government-sponsored industrial R&D programme of which his project was a part.

In the decade or so since Cushman, construction researchers have continued to use AR in work with a a strong focus on information systems and knowledge management. For example, Davey and London (2005) used AR in an ethnographic study of the development of company systems for knowledge sharing. Rezgui (2007) studied the development and implementation of IT systems to support collaborative working among construction team members. Graham et al. (2008) focused on the development of knowledge sharing within a contracting organisation; Azhar (2007) and Azhar et al. (2010), used the approach to examine improvements in construction data systems.

AR has also been used in other areas where issues of stakeholder participation and collaboration take centre stage, including:

- Collaborative working (including partnering) - e.g. Alexander et al. (2003) ;
- Value management - e.g. Perera et al. (2011);
- Stakeholder engagement, particularly at community level - e.g. Gansmo (2012)
- Organisational change, including the development and implementation of new systems and processes - e.g. Miller and Dorée (2008) - and skills development and training - e.g. Chan and Moehler (2007), Cano-Lopez et al. (2008);
- Project development, including the development and implementation of systems and processes - e.g. Al-Balushi et al. (2004), Zimina et al. (2012) - and building design processes - e.g. Johnston and Miles-Shenton (2009)
- Innovation - e.g. Sexton and Lu (2009)
- Building operation - e.g. Beadle et al. (2008)

Important issues and themes

In looking critically at the use of AR in construction research, four key themes emerge as potentially important to our enquiry: the formality of the AR approach adopted;

methodological issues; the definition and treatment of researcher and participant roles; and the nature and management of AR 'interventions'.

First, the literature portrays something of a spectrum of approaches to AR adoption in construction: between, at one end, an explicit application of an established AR 'model' within a formal research design (examples include Al-Balushi et al. (2004), Graham et al (2008), Sexton and Lu (2009) and Azhar et al. (2010)); and, at the other, a rather more implicit adoption of the approach in a less specific manner (e.g. Miller and Dorée (2008), Chan and Moehler (2007)). Those applying AR more formally tend to rely on established four- or five-step AR models taken from the more general social science research methods literature that each has a similar 'diagnose-plan-act-observe-reflect' cycle. Models include those by Denscombe (2003), Susman (1983), and Kemmis and McTaggart (1990). No new models of AR for construction have yet emerged. Further, there is as yet very little in the way of results or guidance available on the appropriateness of different AR models in different construction contexts.

Second, and perhaps more fundamentally, there are differences in the literature in the degree to which construction researchers consider theoretical and methodological implications of the AR approach in the construction context. While most afford these issues little or no consideration at all, among the small number who do, many seem mainly concerned with critiques of the participatory approach - and the potential for loss of objectivity and rigour from involving researchers in the problem/solution axis (e.g. Seymour et al. 1997; Stokes and Dainty, 2011). This connects to an important ongoing debate on 'co-production' research (also referred to as Mode 2 knowledge production in the language of Gibbons et al. (1994)) that views research as a transdisciplinary, collaborative endeavour aimed at resolving complex problems in their social setting. Sexton and Lu (2009), for example, argue that AR provides a useful approach for Mode 2, especially in the generation of 'actionable knowledge' (pp 686-8) which practitioners can use to change practice. Conversely, Stokes and Dainty (2011) argue that fundamental challenges to Mode 2 in the management and organisation studies literatures have been largely ignored in construction. While a detailed discussion of the debate - and particularly its research policy dimension - is beyond the scope of this paper, it raises important issues for the use of AR. Two unresolved questions in particular are discussed further below. One concerns roles in AR, and specifically the role of collaborators as 'co-producers', with all that might entail for the nature and status of research in AR. Another related question, returned to under Outline Proposals below, is about distinctions between research and action.

Third, the roles of various participants in construction AR remain generally unexplored. Construction project organisations are complex entities involving clients, end-users, consultants, contractors and third-party stakeholders (not to mention researchers!) - in contrast to the simpler researcher/client relationship portrayed in much of the traditional AR literature (e.g. Schein 1995). Such complexity is not unique to construction, of course, but it might be expected that action researchers would be concerned strongly about role allocation on AR - who, for example, is responsible for action, observation, reflection and so on. Graham, et al. (2008) are among the few who provide detail on role allocation in construction AR, allocating a role of 'facilitator' (and 'moderator') to the academic researcher, with non-academic 'practitioners' undertaking primary research duties such as interviewing. While this follows (Denscombe 2003) who views the practitioner in AR as the dominant partner, its implications are not fully explored. In particular, it is not clear how challenges to

objectivity and reliability that invariably arise with participant research are addressed, especially where the more typical roles of participant and researcher appear reversed.

Fourth, the critical AR concept of 'intervention' is not always clearly delineated in construction AR. It is not always entirely clear what 'interventions' (actions) are being introduced, observed, reflected upon and used as a basis for a further cycle of AR. Further, how these interventions might change and evolve over time, and what this means for the AR process is generally not considered. While Cano-Lopez et al (2008), for example, outline a three-year AR model involving successive cycles of interventions in the development of a training programme, these appear more in the nature of planned implementation than as an outcome of successive rounds of AR.

AR and consultancy - are they the same?

Without generally accepted and well understood AR models, a clear underlying methodology, clarity about participant roles and about how interventions are defined and managed in AR, it becomes difficult to distinguish the approach from more general problem-solving consultancy. This, of course, is not a problem exclusive to construction research. Building on Eden and Huxham's contention that "action research demands an explicit concern for theory" (1996: 79), McKay and Marshall (2001) propose a dual cycle process that explicitly acknowledges the distinct but complementary interests of problem-solving and research, with the two inter-related cycles focused on the aims of problem solving/improvement, and the generation of new knowledge respectively. Whilst consultancy can be viewed as a problem-solving interest, an action researcher must explicitly adopt and acknowledge the research interest in order to remain distinct from, and indeed to move beyond consultancy.

This dual focus is further supported by Blichfeldt's (2006) argument that action researchers should consider the action and research cycles in AR as distinct, and distinguish themselves from the heavily action-oriented behaviour of consultants and "practical problem-solvers" (2006: 5). We expect to explore this approach further in the construction context to develop a deeper understand of the dual cycle process.

OUTLINE PROPOSALS AND CONCLUSIONS

Key features of our approach

Our approach to AR on the construction project has the following key features:

- It is motivated by improvement through research-driven understanding and learning; it is cognisant of the problem solving and research 'cycles' and is distinct from more general consultancy approaches.
- It takes a participant/practical form of AR (after Chein et al. 1948; McTaggart, 1995; and Zuber-Skerritt 1996) involving diagnosis and action planning as a joint endeavour between participants and researchers, and aligned more with the 'Northern' tradition of change through problem-solving (Brown 1993)
- This integrated co-production of knowledge within a real world setting aligns the research firmly within that of Mode 2. The provision of a 'new' context for collaboration will support 'double-loop' learning (Argyris and Schön 1978).
- It adopts a five step diagnose-plan-act-observe-reflect process in the manner of e.g. Al-Balushi et al. 2004 and Azhar et al. 2010. It acknowledges the complexities arising from multiple and phased 'interventions' over time (see further under Interventions below)

- It highlights the distinctive roles of researchers, participants (practitioners and 'clients' of different forms) and also recognises the shifting boundaries between them, not least in terms of how each participates in key stages of AR 'cycles' (see further under Participant Roles below)
- As well as a commitment to the project participants, it makes a commitment to the research community regarding the production of scientific knowledge (including further development of the AR methodology). In that sense it lies in the interpretive research tradition and seeks validation partly through participants' own accounts of the problem area and context (Koshy et al. 2010)

Interventions

The use of IPI on the construction project for DIO will be supported by a range of measures intended to improve collaborative working. These are the 'interventions' that are the main focus of this action research, and include:

- Processes and criteria for team selection that emphasise a willingness to adopt collaborative working under IPI arrangements;
- A target cost approach adopted by the project team as a whole, including pain/gain share provisions (e.g. as described in Zimina et al. 2012) ;
- Insurance cover for project cost overrun above a guaranteed maximum price (GMP) up to an agreed limit;
- A facilitated approach to design and construction to encourage the joint development and testing of solutions to the client's requirements;
- Active input from an independent research and facilitation team, focused on supporting the design and construction team in 'learning by doing'.

The AR action-reflection-action dynamic will alter the context for, and the nature of these and subsequent interventions. Interventions will be developed in collaboration between researchers and the project team, and will draw on participants' experience, ideas of 'best practice' in key areas, and on underlying theories relating to elements of collaborative working. Participants will thus be engaged in a progressive and dynamic AR endeavour focused on the cumulative effects of multiple interventions.

Participant roles

It is recognised that the participants' roles throughout the process will be fluid - at different stages they will represent the researcher, the client, and the practitioner. The adoption of the AR approach allows for this by acknowledging all participants as "co-researchers". Inherent within all roles will be the need to reflect on the process and the observations of others, and to consider opportunities for improvement and for taking further action. The full research implications of this deep level of participant engagement have yet to be examined, though we recognise that they add to the complexity of tracking successful interventions in terms of outcomes.

Conclusion

While this four-year project offers the opportunity for academic and practitioner learning on a number of levels - and not least the prospect of improving collaborative working in construction - we have concentrated in this paper primarily on the methodological challenges and potential. Many further questions arise of course, and we see this paper as the first in a series designed ultimately to contribute to the further development and application of AR in construction. Indeed, it is tempting to wonder whether slow progress in the development of construction AR to date may be due to a lack of an underlying AR 'mechanism' of reflection and learning in the application of

the approach. By providing explicitly for observation, reflection and learning in the methods used as well as in the more practitioner/client-oriented interventions, we hope our approach will ultimately help construction researchers - and of course we include ourselves in this - improve their understanding and use of AR.

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