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## **Action Research in the Design of New Media and ICT Systems**

Greg Hearn and Marcus Foth

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### **Notes on contributors**

Greg Hearn, PhD, is Professor of Media and Communication and the Research Development Coordinator of the Creative Industries Research and Applications Centre (CIRAC) at Queensland University of Technology (QUT), Brisbane, Australia. He has been a Visiting Fellow at Brunel University, UK, and Cornell University, New York, and has been involved in high-level consultancy and applied research with organisations such as the Broadband Services Expert Group, British Airways and many Australian government agencies, focusing on adaptation to new media technologies. Greg has also been chief investigator of several national competitive research grants and author or co-author of many publications including the recent book: Rooney, D., Hearn, G., Mandeville, T., & Joseph, R. (2003). *Public Policy In Knowledge-based Economies*. London: Edward Elgar.

Marcus Foth is a PhD candidate in the Creative Industries Research and Applications Centre (CIRAC) at Queensland University of Technology (QUT), Brisbane, Australia. He holds a Bachelor of Multimedia from Griffith University, a Bachelor of Information Technology (Media) from Furtwangen University, Germany, and a Master of Arts (Digital Media) from QUT. His PhD project "Towards a design methodology for online community networks to grow sustainable neighbourhoods" is being supervised by Prof. Greg Hearn (CIRAC) and Prof. Jeff Jones (Australasian Cooperative Research Centre for Interaction Design, ACID). Marcus is also a sessional tutor, lecturer and research associate in the Creative Industries Faculty, and web designer of several commercial and community web sites. His online resume and portfolio is available at [www.vrolik.de](http://www.vrolik.de)

## Introduction

The guiding principles of action research are straightforward, though at times misunderstood, especially by disciplines which traditionally follow quantitative research methods and adhere to a positivistic Weltanschauung. We argue that action research deserves a firm place within the family of methodologies relevant to media and communication research, though it has rarely been deployed in these fields. Hence we shall briefly outline the principles underpinning the application of action research, its mandate given a critique of the established epistemology in media and communication studies, and its particular relevance to the emerging field of new media and communication technology research and development. Practical examples will illustrate our observations. Finally, we conclude by acknowledging some constraints on the practice of action research as well as sketching an outlook for future methodological developments of action research.

## What is action research?

The imperative of an action research project is not only to *understand* the problem, but also to provoke *change* (Dick, 2002; Reason & Bradbury, 2001; Smith, Willms, & Johnson, 1997). Hence, quality assurance of an action research project is not only established by conceptual advances, but also by practical results and achievements in the field that actually solve the problem at hand. Researchers immerse themselves with the subjects under investigation in order to connect with them and encourage them to directly participate in the project as co-investigators.

Action research is operationalised by constant cycles of planning, acting, observing and reflecting. Findings and theory building which the researcher drives are balanced by the phase of planned action which benefits the participants by giving them a solution to their problem or at least by making a step towards a solution. This democratic approach (cf. Reason, 1998) which regards subjects and researchers as equally valuable, is especially suitable in new media and communication studies, where innovation and change are continual, and where processes and outcomes are usually not predictable and often involve fuzzy and emotional human parameters. The field of new media is highly technical and the process of design of software and media systems naturally embodies many action research principles.

Moreover, the field of new media must be analysed at individual, institutional and cultural levels. Multiple research approaches must therefore be used to make sense of the questions that arise. In this regard, action research can also be thought of as a meta-process for managing inquiry and action on any issue. Thus, whilst action research mostly uses qualitative companion methods, it may also incorporate any primary method at all. Action research can also be thought of as a research *culture* (Tacchi, Slater, & Hearn, 2003) which engages all project stakeholders in constantly oscillating between knowledge generation and critical-informed reflection, in a helix

directed at reaching a stage of improvement from which the process can start all over again – but this time towards an even higher level of understanding and achievement.

The features of action research that recommend it as a vehicle for inquiry into new media – namely, its grounding in actual processes of change, the primacy it gives to respondent phenomenology, and its flexible, open and eclectic conceptualising processes – all grow to some extent out of a critique of more dominant modes of inquiry in media and communication research.

## **Critique of the established epistemology in media and communication studies**

Theoretically, communication and media studies have always been fragmented (Ellis, 1995; Gerbner, 1983), with functionalist, interpretivist and critical traditions vying with each (Hearn, 1999; Hearn & Stevenson, 1998). Ironically it is a feature which these three traditions share which is the point of departure for media action research – namely a split between the theoriser and those theorised about – the observer and the observed (Guba & Lincoln, 1994).

For example, it is the functional/ empirical school's pursuit of generalisable predictive scientific formulae which requires disengagement between the observer and the observed, in particular the observer's disengagement from action. As such it treats social phenomena as concrete, materialistic entities – types of social facts. As a result this approach is beset by problems which help distance theory from action: the stripping of context from actions, dissociation of meaning from purpose, inapplicability of general data to individual cases, and exclusion of the discovery dimension in inquiry. The meaning of communication from the actor's point of view is obscured as a new "scientific discourse" is developed to more effectively explain what is happening.

Interpretivists, whilst acknowledging social context and stressing the importance of local meaning-making, are ultimately no less guilty than functionalists of putting words into the mouths of others. Indeed perhaps their basis for doing so is even more suspect than that of the functionalists, because their right to "tell the story" as they see it ultimately cannot be disputed. Moreover, the pursuit of grand theoretical schemes is also no less pronounced than amongst the functionalists (Schoening & Anderson, 1995). Interpretivists are motivated by theory building as much as functionalists, and their claim to know the mind of the observed, is equally spurious, since it, too, is based on the attributions of the observer. It is the construction of a story from the point of view of an observer, living in a different phenomenal world to the observed.

The critical stance also embodies an inability to understand from the point of view of the observed or theorised about, even as it has adopted poststructuralist and postmodernist views. Embedded within criticism is a claim to know what is better, more just or more humane and a belief that these claims must be defended rather than interrogated. In this sense critique is anti-reflective. In other

words, the fixed macro positions which critical theorists take towards the social world interfere with their ability to embrace the local problematique, in fresh and open-minded ways. Ironically therefore, the critical position leads to the same kind of problem – disengagement from phenomena – that they find the functionalists guilty of in their objective stance (Burrell & Morgan, 1979).

In a basic sense it can be seen therefore, that the three research traditions share the same epistemological stance, namely that of the observer – an objective observer, a sense-making observer and a critical observer, respectively. While each of these may at times be a valid perspective in its own right, each misses an essential point, namely that communication and mediated communication inherently involves an interactive process. As a result, the observer stance leads to a disjunction between theory and action. A disjunction between theory and action renders each tradition more intent on theory building and less open to seeing the ultimate poverty of its approach. Theories built are theories defended.

An engagement with action challenges prior theory, exposing its limited dimensionality and the necessity for further development. The field of action therefore inculcates perceptual openness rather than defence and thus increases the chances for dialogue across paradigms.

In recent years a number of researchers from different traditions have begun to move toward this position. Mirroring this epistemological shift, which Mumby (1997) describes as “optimistically post-modern”, researchers from the post-structuralist/ critical, post-positivist and critical/ interpretive traditions have been progressively adopting inquiry approaches which accentuate local dialogical knowledge, reject strictly objective characterisations of human communication activities, and share a concern to enact their theory. As we suggested initially, this turn in research philosophy is particularly relevant to the field of new media.

## **Rationale of action research in ICT and new media applications**

Information and Communication Technology (ICT) and new media applications have not only a very young history but usually a very short lifespan, too. The executive protagonists of this new era are programmers and designers, their products – software applications, internet web sites, multimedia presentations and animations – are digital, weightless and intangible, which makes them universal and more and more pervasive and ubiquitous. Although ICT and new media products only come to life when both the code and the design aspects work together seamlessly to create a functional and useful unit, the programmers and designers themselves come from quite different backgrounds and do not understand each other by default, when they think, communicate and act in their respective professional spheres. For example, programmers are part of a mathematical and computer science tradition, whereas designers come from an arts and aesthetics background.

It is still quite rare that the position of a programmer and a designer is filled by one employee who has the educational and practical background of and understands the interface and thus the transcendence of working comfortably in both disciplines, especially when each discipline itself is still progressing and evolving rapidly to reach out to new frontiers while unifying the understanding and knowledge of the existing territory (e.g., Shedroff, 1999).

Furthermore, ICT and new media professionals have to deal with another important variable when developing products and applications: the client. ICT and new media applications require a high level of expertise in order to be developed, customised, deployed and maintained. The conventional relationship between a client facing an ICT problem and a developer willing to provide an appropriate ICT solution is usually constrained by a lack of understanding on both sides, because both parties plan, act and reflect within a different knowledge space: the client within a problem-specific knowledge space of their business or community, and the developer within a solution-specific knowledge space of their particular area of expertise. Additional limitations on time and budget frequently result in two key issues: First, the developer's solution does not meet all needs the client is aware of, and second, the developer's portfolio of solutions could have addressed other needs the client is not currently aware of.

Thus, the two apparent communication conflicts are internally between different professional groups of developers, and externally between the developer and the client. Only if an awareness of these conflicts is raised and the conflicts are successfully addressed by strategic methodological decisions, will it be possible to develop and deploy a solution to the client's problem. Yet, this is anything but trivial.

For example, a particular business interested in advancing and streamlining their sales operations and acquiring more customers through online channels might be offered an inexpensive "brochure ware" website from a contractor not familiar with database programming, whereas another supplier might offer a dynamic website that fully integrates with the business' existing IT infrastructure<sup>1</sup>. The question is, how can we expect to find a solution to a problem if we do not know what we are looking for. Polanyi offers a simple but far-reaching way out of this classic contradiction by stating that "we can know things, and important things, that we cannot tell" (Polanyi, 1983: 22), something he terms *tacit knowledge*.

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<sup>1</sup> This is an example of a common problem in ICT and new media development – and even in media and communication research – that goes back to the issue Plato (1956) illustrated in "Meno". Plato presents a dialogue between Socrates and a slave boy who gives right answers to a geometrical problem although he knows no geometry. In our example, Socrates is the new media developer trying to discover which applications would be best suited to meet the business' needs, although the business itself is not familiar with the inner workings of new media applications.

So, for an ICT or new media developer it is essential to tap into a client's tacit knowledge, because it will help to surface the inner processes of the client's business operations – information which is significant for the successful development of any potential solution. The discovery of this meta problem, which has to be looked at before any exploration for the client's actual problem can begin, enables the search for and endeavours to span connections between the problem-specific knowledge space of the client with the solution-specific knowledge space of the developer – between explicit and tacit strata on each side.

The distinction between tacit and codified knowledge is important in action research. Most research methods only acknowledge codified knowledge, privileging the development of theory, via formal definitions, arguments or other publicly verifiable knowledge forms. Action research however trades in both codified and tacit knowledge. Tacit knowledge is embedded in the actions and phenomenology of participants. This is an important source of the construction of knowledge about the local life-space as well as the implementation of changes in that life-space. As well, action research produces codified knowledge that can be related to the theory produced by other research methods<sup>2</sup>.

The interplay of codified and tacit knowledge towards an action solution is fostered by setting up a culture of action research. With its focus on participative development, soft or agile methods, qualitative analysis, adaptive procedures, reflective practice, and informed action, many ICT and new media professionals and businesses start to adopt de facto principles of action research in their strategy and operations in order to translate these ideas and concepts into a design and development process that yields a sustainable and user-friendly new media product.

This has been accompanied by a shift in the traditional social research disciplines as outlined above, but also in technical and practice-oriented disciplines such as software engineering and systems design (cf. Arnold, 2002). In fact, the well-established product life cycle models (e.g. ISO 12207) do already resemble the act-reflect cycle of action research in that they both propose alternating phases of planning (initiation, specifications, design), action (production, delivery and implementation), and reflection (review and evaluation) (Impart Corporation, 1998). The development of updates and service releases to software products and websites correspond with the stage of informed reflection and change at the end of each action research cycle. Nevertheless, the fast spreading shift towards action research is more groundbreaking than the mere adoption of a life cycle process which limits itself in most cases to a top-down view of the technology itself and the correction of its flaws and faults instead of a holistic and user-inclusive bottom-up perspective.

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<sup>2</sup> Action research exists in a meta-theoretical space that has seen for example, Marxist (Kemmis & McTaggart, 1988), feminist (Naples & Clark, 1996), and liberal (Argyris, 1982) forms emerge

The pioneers in the technical/ practical realm advancing into previously alien social research territory acknowledge and appreciate the significant roles the client and the future users of a product play in its development. They are reflective practitioners advocating action research through participative development and soft systems methodology (Checkland & Holwell, 1998; Checkland & Scholes, 1999), scenarios and use cases (Adolph & Bramble, 2003), agile methods (Cockburn, 2002; Fowler, 2003; Highsmith, 2002), interaction design (Cooper, 1999; Cooper & Reimann, 2003; Preece, Rogers, & Sharp, 2002), and design studio methodologies (Wells & Horan, 2001).

In addition, a limited number of new media studies have been conducted which are explicitly informed by action research, including anticipatory studies of the incorporation of 'intelligence' into the telephone network (Hearn et al., 1993; Lennie, Hearn, Stevenson, Inayatullah, & Mandeville, 1996); design and evaluation of internet services for Australians in remote locations (Lennie, Simpson, & Hearn, 2003); evaluation of community websites in rural Australia (Lennie & Hearn, 2003; Lennie, Simpson, & Hearn, 2002); design and evaluation of community media projects in South Asia (Tacchi et al., 2003); research and design of residential community networks (Foth, 2003, 2004); and research to animate youth through music, creativity and ICT (Hartley, Hearn, Tacchi, & Foth, 2003).

Typically, the action research process is engaged either to design or to evaluate some aspect of a new technology. The approach focuses on actual practices of use and interaction with new media technologies in the wider context of people's lives – what has been termed 'communicative ecologies' (Tacchi et al., 2003). Placing users and producers at the centre of the research process is important if useful analytical and action frameworks are to be developed. This necessitates the complete range of social relationships and processes within which a project is doing its work. It includes the immediate circle of participants, how they are organised, and how the project fits into their everyday lives. It also involves the wider social context of the project – e.g., social divisions within the community, language issues, community economic, social and cultural resources, power and institutions in the community – and social structures and processes beyond the locality – e.g., infrastructure, government policies, economic developments.

Action research means that the research process is tightly connected to the technology design or evaluation in three main ways:

1. **Active participation:** the people who should benefit from the research participate in defining the aims and direction of the research and in interpreting and drawing conclusions from it.
2. **Action-based methods:** the activities and experiences of participants generate knowledge alongside, or in combination with, more formal methods.

3. **Generating action:** research is directly aimed at generating things like medium and long-term plans, including business plans; ideas for new initiatives; solving problems; targeting sectors of the user constituency; finding new resources or partners. Action-generating research can be a combination of general, wide-ranging, background research and very specific focused research.

Knowledge produced via these processes range from tacit, tactical knowledge of most relevance to local participants through to more general codified knowledge relevant to the researcher and other communities. Emerging from the growing though still fairly disparate body of work applying action research to ICT and new media are two themes that represent important methodological and practical contributions of action research to the field of media and communication. They are: User-centred design of ICT and new media, and producing actionable knowledge through learning. These are now discussed in turn.

## **User-centred design of ICT and new media**

We introduced action research not only as a research methodology, but also as an overarching research culture or paradigm that can work with almost any primary methods, depending on the situation and context of the research problem. Here we want to sketch out a possible methodological foundation for initiating user-focused development.

The everyday business of ICT and new media programmers and designers involves working with a set of practical methods, hardware and software devices, templates, guides, and skills, the variation and combination of which lead to the conception and implementation of a product. The challenge the industry faces on a day to day basis is not the operation of these tools itself, but their purposeful application towards creating a product that meets the client's needs and solves the client's problems, or the problems of the client's audience. Hence, the daily quest of an ICT or new media business is for a process that helps identify the client's requirements swiftly and thoroughly.

Within the paradigm of an action research culture, traditional ethnography lends itself effectively to the initial phases of a project where the goal is to establish an awareness for and knowledge of the existing communicative ecology of users by identifying stakeholders, mapping relationships and contextualising information needs. Qualitative methods tend to be best for generating theory and quantitative methods tend to be best for testing theory (Howard, 2002: 569). In this sense, the qualitative nature of ethnography proves to be very appropriate for generating a rich understanding of the client's requirements which is necessary to advance the project to successful completion.

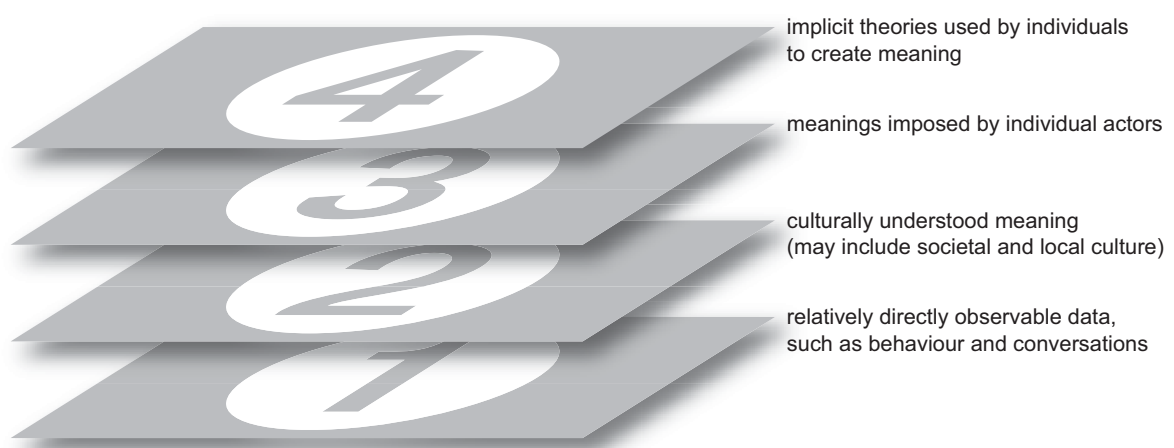
Utilising an ethnographic action research approach (Tacchi et al., 2003) which emphasises user participation, the developer benefits from being able to capture a maximum of explicit and tacit knowledge sources providing information and insight which are a strategic advantage in building a

better product. In return, the initial ethnographic immersion in the users' world also makes the product introduction at the end of the development phase a smooth and less daunting moment, for the support from the users through intrinsic motivation and sound knowledge of the project's objectives ensures a simplified process of product acceptance and implementation.

This philosophy can be taken further via a consideration of the idea of design process. Design process is a term that crosses both system development and action research fields, particularly through the work of Schön (1995) and Argyris & Schön (1978; 1996). For these theorists, both technical system design and social system design is a function of the phenomenology (manifested in various levels of cognitions) of those who would use the system. Orlikowski & Gash (1994) also argue that differences in 'technological frames' (that is, the way people talk about and understand the technology) may be an important source of conflict between, for example, technologists and managers. Different technical 'facts' can be interpreted in very different ways.

Take, for example, observations of the number of times an intranet site is visited. Such data would seem to be invaluable to systems designers. However, such behavioural indicators may have a number of interpretations. A systems designer might think that lower usage indicates lower need. On the other hand it may be that the more expert the user the less often and more efficiently they access the system. The quality of their interaction with the system may be much higher than a prolific user who is less effective. Clearly, behaviour in its own right acquires interpretation to make sense of and use the system in a meaningful way. The simple dilemma that underlies many ICT design processes is who should provide the interpretation of the facts at issue.

Argyris (1982) and Argyris & Schön (1978; 1996) provide a specific model developed further here, in Figure 1, which provides a map of the levels of meaning which design and implementation of communication/ information systems might invoke.



**Figure 1: Levels of meaning in a design process**

Each level of meaning has its own specific set of entities and internal principles of syntax and semantic, yet the marginal conditions of one level of meaning is determined by the principles of its next higher level. Polanyi (1983) terms these the principle of dual control and the principle of marginality. Each level of meaning can only be understood in terms of its own principles. The complete meaning cannot be grasped and understood by looking individually and independently at any of the lower levels. This is when misunderstandings and misinterpretations happen and the true meaning of communication is camouflaged (Allen, 1996). The holistic perspective is lost by focusing one's perception on details such as words, intonations and personal interpretations.

The following example illustrates the levels of meaning: A potential user tells a systems designer that the web interface s/he has designed is unacceptable. The actual words and nonverbals observed constitute level one data. Any member of the user community would understand that the general meaning of the conversation was that the interface was unacceptable. This general meaning, which would be accessible to anyone who shared the language and culture the conversation took place in, constitutes level two data. In addition, individuals are likely to impose a third specific layer of meaning. For example, the user might say he was honest and forthright; the systems manager might call the same actions blunt and insensitive. This is level three data in Argyris' model. But why should the same physical and cultural data (levels one and two) result in idiosyncratic meanings at level three? Clearly the answer must lay in the different mindsets of the actors at that point in time. Argyris argues that human actors have 'theories' of their interpersonal world, (of which they are largely unaware), that govern the creation of meaning (and therefore resultant behaviour). For example, the client may have a theory like "the only way I can force the systems manager to change the design is to get upset about it".

Design of information and communication systems necessarily invoke change in social systems and they require inquiry into all four levels of meaning. Furthermore, each level of meaning poses its own problems of capture and analysis as well as providing a unique perspective on the overall problem. For example, at level one, analysis of communication frequency and length of communication episodes requires sophisticated monitoring and statistical analysis, and can provide information regarding demand and other constraints relevant to a systems designer.

At level two, accessing general cultural meanings is also not straightforward, especially when sub-cultures or different organisations are involved. National culture also can have a large impact on implementation (Narula, 1988; Tacchi et al., 2003). Similarly, the symbolic significance and meaning of pieces of hardware or specialist roles, while self-evident to a given sub-culture, may not be evident to other interdependent groups or those charged with implementing systems. For example, technical elites may see older systems as icons of obsolescence, but users who are familiar with them and exploit them effectively, may value them highly.

Level three analysis imposes similar problems as level two, but in addition must allow for individual idiosyncracies of meaning. Presumably the subjective world of individuals needs to be embraced.

Importantly, this takes us close to the sphere of action in which implementation must take place. Here biases, perceptions and other subjective reactions are crucial elements affecting the implementation strategy (Bruce, 1999). This is particularly so when these reactions include embarrassment or threat. Defensiveness by users can render the most clever technology ineffective. Finally, to intervene in this defensiveness and bring about new patterns of behaviour requires accessing the implicit theories that bring about idiosyncratic meanings. Given these may be difficult to articulate or threatening, this is clearly a difficult task requiring quite intensive interaction with people and possibly highly developed interpersonal and communication skills.

Any single universal approach to design will probably ignore important parts of the total complex process. For example, traditional information systems design processes are dominated by empirical methods and tend to ignore cultural and human action components of implementation or to operationalise them in simplistic ways. User participation may ignore basic technical requirements. A systematically diverse process within an action research meta-process can be used to inquire into all these levels of meaning, and may overcome these deficits (Hearn, Mandeville, & Anthony, 1998). Of course, the essence of such a process is the production of actionable knowledge through learning.

## **Producing actionable knowledge through learning**

Conventional media and communication studies have evolved a research process which defines relationships between research sponsors, researchers, respondents and respondent communities. Roles are compartmentalised. In particular, it is only the researchers who are constructed as 'doing' research. As such, domains of knowledge about, and perceptions of, the research process are therefore differentiated. For example, researchers are often more aware of hypotheses and where the research is heading than participants. Difference in knowledge leads to differences in power and vice versa.

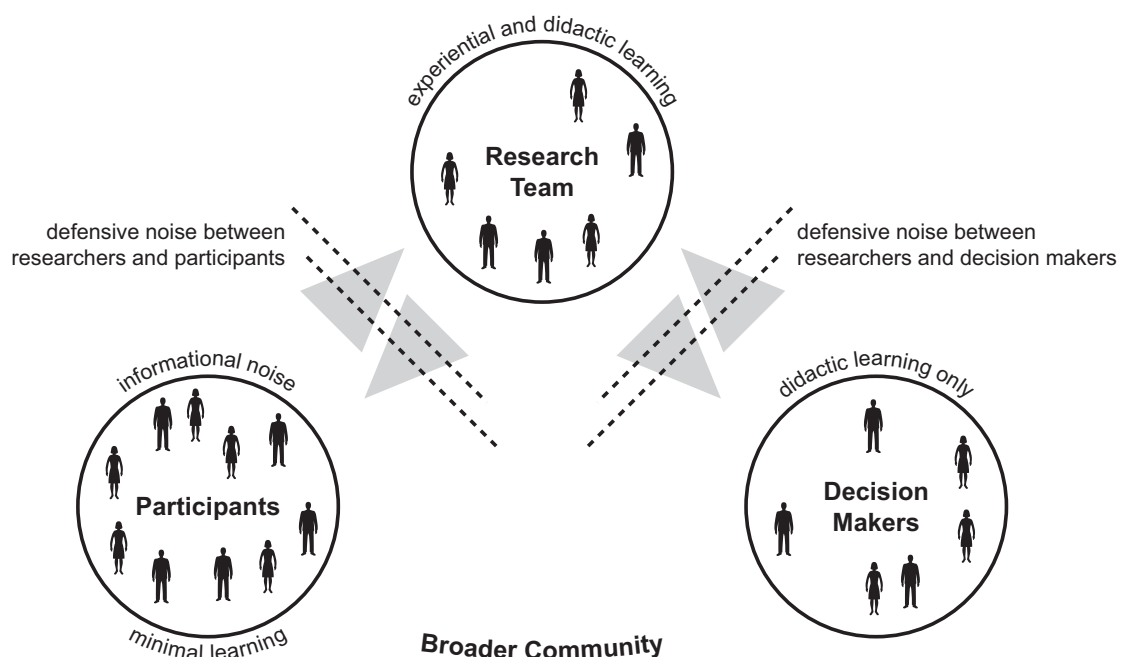
Action researchers (Argyris, 1982; Kemmis & McTaggart, 1988; Reason & Bradbury, 2001) argue that this limits the validity of data that researchers are able to access in traditional research. The data that respondents provide is often limited to conscious socially acceptable espousals, or worse, respondents may simply be unable to articulate their experience in terms acceptable to the formal processes of traditional research (Naples & Clark, 1996). For research that seeks to produce action beyond the researchers, this is particularly problematic, because action requires critical reflection, insight and emotional risk taking. The traditional research process limits the production of these precursors to action (Gronhaug & Olson, 1999).

In traditional media and communication research, the transfer and putting into action of knowledge generated is seen as a separate problem from the research process itself, both in terms of transfer to sponsor organisations and the broader community. Traditionally, there are two significant

barriers in the learning involved in the transfer process. Firstly, there is the complexity and amount of information and secondly, there are psychological defensive processes in the relationship between the researchers and those targeted in the transfer (Argyris, 1987). Defensive processes are automatically invoked in learning about new information which is sensitive, embarrassing, change-oriented or potentially threatening in some other way. Information complexity and defensive noise are significant problems in the transfer of information between researchers and other stakeholders such as sponsoring organisations.

Information complexity is compounded by compartmentalised and therefore different contexts of meaning that researchers and other stakeholders inhabit. It is also often compounded by different time orientations. Complexity takes time to come to grips with. Defensive interference is also complicated by differing contexts of meaning, distorted perceptions and lack of time to develop relationships between stakeholders. This can sustain confrontation on issues.

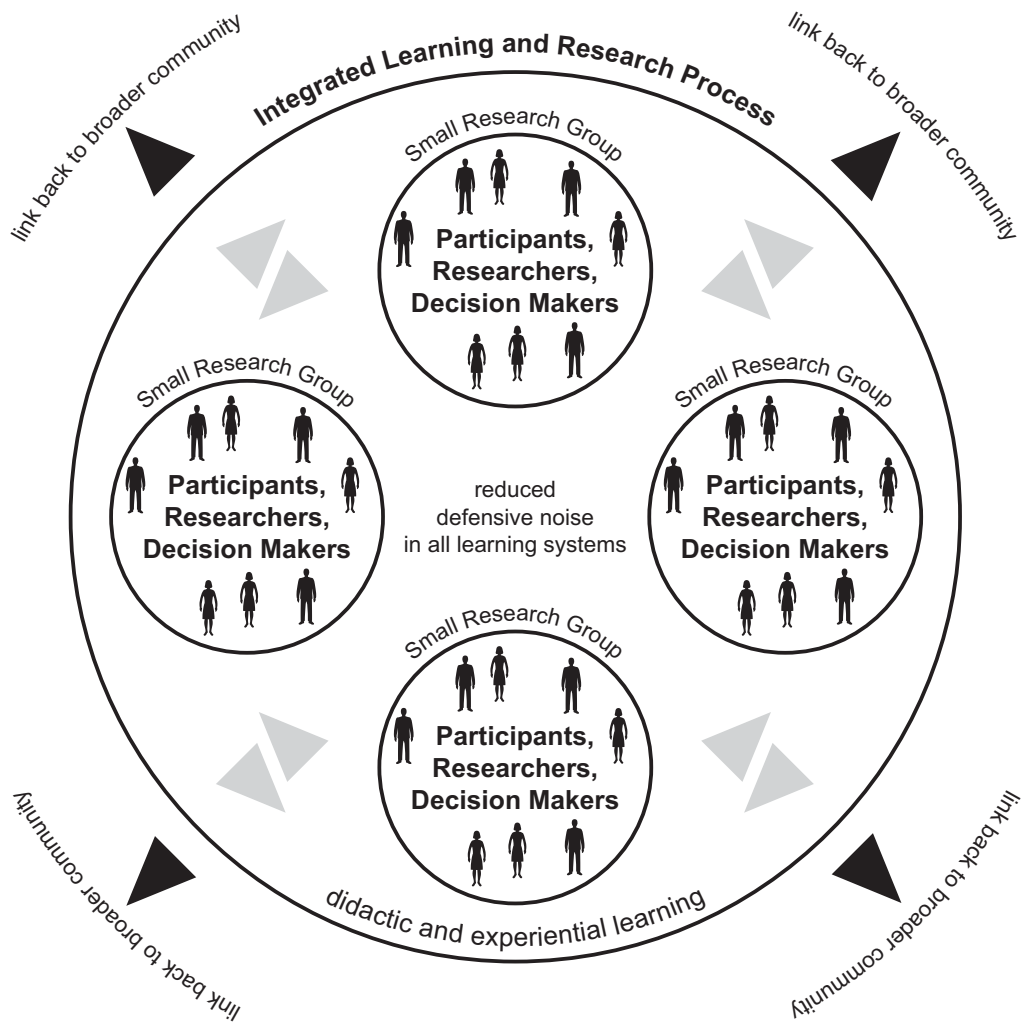
The essential processes which have been developed to overcome information complexity and defensive noise are didactic and experiential learning. As Figure 2 depicts, in the conventional research process the opportunities for didactic and experiential learning are limited and constrained within different parts of the process. Only within the research team do both experiential and didactic learning occur.



**Figure 2: Traditional research approach**

The action research approach seeks to overcome these problems, as Figure 3 indicates. The model seeks to establish integrated learning and research processes composed of groups of

researchers, sponsors and community members. These research groups are involved in both didactic and experiential learning and, as such, offer the opportunity to deal with information complexity and to reduce defensive interference. Under these conditions, it is more likely that transfer of new knowledge can be generated. In particular, insights regarding the social issues concerned can be embedded in sponsoring organisations.



**Figure 3: Action research approach**

A good example of this process occurred in Hearn et. al. (1993), where researchers, sponsoring organisational members, and community members with different backgrounds came together to deal with difficult issues regarding technological assessment. One issue in particular that provoked emotional responses was that of access to credit and other marketing data bases. Representatives of marketing/ credit organisations were strongly positive regarding these facilities, whereas private

consumers and some members of the research team felt strongly negative about these technologies. The reflective process used enabled this complex information to be shared and was successful in increasing the ability of people to hear the viewpoint of other participants.

Another example occurred when an engineer tried to explain new features of the proposed intelligent telephone network to consumers. His use of technical language was perfectly understandable within his frame of reference, but was unintelligible to and perceived antagonistically by community members. In the context of the action research process, this information session was able to be interrupted and taken over by a community member with some technical knowledge who was able to translate important concepts into 'lay' terminology, so that community members could continue to participate and make informed decisions.

In practice therefore, there seem to be advantages for all stakeholders in this conception of the roles involved in the action research process. For example, community members have an opportunity to give voice to their viewpoints in direct interaction with researchers, technologists and other stakeholders from very different spheres of life. This transfer, of course, is two-way and provides technologists with first-hand experience of community members with whom they are unlikely to interact as well. For sponsoring organisations the involvement of key stakeholders in the transfer of knowledge means that not only the intellectual understanding of the problem is increased but also the key ingredients for action, namely: emotional commitment, intrinsic motivation, tangible experience, tacit knowledge, challenged perspectives.

Unlike traditional research, which sets out to produce *objectified* knowledge, action research seeks to produce learning toward insight and *actionable* knowledge. Action research questions both the philosophical validity of objectified knowledge as well as its practical utility (Heywood & Heywood, 1992). Nevertheless, issues of validity, reliability and quality are still criteria which can be brought to bear in assessing outputs from an action research process. The generated knowledge is to be subjected to a process of critical scrutiny: comparing, contrasting and checking for consistency and differences amongst the different sources. As a result there is usually a plethora of knowledge generated under very diverse conditions and from very diverse participants. This represents a multiplicity of perspectives which takes time to digest, time that is not often available to the consumer of the research product. It is impossible in this sense to quantify, or even to structure in quantifiable ways, the emerging information without in some sense distorting the original experience. It is difficult to find a way of knowing whether perceived differences are significant. Not only is the capturing of information and insights problematic because of the volume of information generated but the analysis and reporting of such information presents real challenges.

In this regard, action researchers acknowledge an interpretation process but seek to make this public and challengeable by all members of the research community. For secondary consumers of the research to make sense of the results, some process for distilling outputs is necessary. One option, following Anderson (1987) is to produce a narrative which in some way encapsulates the

results of the inquiry process. Narratives can be constructed through a process of discussion and debate within the research team as well as participants or their representatives. Other action researchers make extensive use of analysis and reflection on verbatim transcripts of action research sessions.

## **Conclusion and outlook**

We have argued strongly for the utility of new media action research. However, the potential of action research should not blind us to its various problems which continue to be discussed and evaluated by researchers and practitioners in the field (e.g., Avison, Baskerville, & Myers, 2001; McKay & Marshall, 2001; Mumford, 2001). First and foremost, the difficulty of finding participants willing to engage in protracted and intense inquiry, but also the difficulty of building mutually inclusive inquiry frames of reference between researchers and participants in the research process. As well, it is necessary to vigilantly maintain a clear distinction between action which advances open inquiry and instrumental action for its own sake.

Despite these problems, we suggest that if action research approaches are adopted more in media and communication studies, they will enable the field to ground the study of media and communication by addressing real human and social problems. Action research also presents a method of inquiry which finally resolves the tension between the observer and the observed by involving the observer in the experiences of the observed. This links up with the potential of action research to improve the design process and therefore the design of new media systems.

In this regard, action research also implies a number of imperatives in the future design of new media systems. There is a need for shared educative responsibility, given the complexity of the new technology and the complexity of associated social change to (a) ensure that the community becomes informed and involved and (b) encourage the development of a strong public awareness to enable assessment of current technologies and future options. User choices which ought to be provided at all stages in development and implementation of ICT and new media systems have to be facilitated through participative and collaborative decision-making processes with users, especially those users with different or special needs, for future ICT policy, design, implementation and assessment to be successful.

Implementation of future ICT developments needs to be based on thorough investigation of its social implications and recognition of the opportunity through which technological change offers to redesign inadequate social institutions. Thus, an integrated frame of reference for decision making which would include anticipatory research methodologies to assist policy formulation as well as systems design is crucial.

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