Achieving Worker Participation in Technological Change: The Case of the Flashing Cursor

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ABSTRACT
The Union Research Centre on Organisation and Technology (URCOT) is a product of, and part of the ongoing pursuit of, industrial democracy in Australia. URCOT has implemented a variant of praxis research through setting up Investigative Work Groups (IWGs) among workers affected by technological change processes. This paper examines the experience of one IWG which set out to identify ways in which their computer systems could be improved. The paths along which their investigation took them shed light on the opportunities and difficulties involved in achieving participatory design in large organisations, and illustrates the dependence of successful improvement of business processes on workers' knowledge.

Keywords
Industrial democracy, praxis research, trade unions, user involvement, IT development

BACKGROUND
From the mid 1970s Australian workers and their unions have been interested in influencing the technological choices exercised by management. In 1977 the Australian Council of Trade Unions followed the example set by many of its affiliates and adopted an industrial democracy policy. This coincided with the passing of the Joint Regulation in Working Life Act in Sweden, and was several years after the introduction of codetermination arrangements in Germany. Australia has enjoyed a highly centralised industrial relations environment, in which conditions of employment, wages and other work place matters have been established for the majority of work places by the Australian Industrial Relations Commission and its state counterparts. The right of workers and their unions to participate in technological change was established by the Commission in 1984.

In 1990 a public sector union and a large public sector agency signed a technological change agreement which included provision for the union to participate in decision making on a range of administrative, development and legislative projects. This agreement, called the Modernisation Agreement, also allowed for a 'Union Advisory Unit' to be established to 'carry out research and provide advice' to the union (ATO, 1990, clause 29.12(i)). During discussions leading to the establishment of the Unit it was agreed between the parties that the unit would be more useful if it were seen to be independent of both the union and the agency. In 1991 several existing research centres and universities were invited to tender for the collocation of the research unit.

One of these research centres acknowledged the novelty of the proposed unit in the Australian research context and sought inspiration from other countries for the management and governance of an independent research unit with an explicit relationship with and responsibility to a trade union. One model of particular interest was the Swedish Arbeitslivcentrum (Centre for Working Life), whose researchers had developed a research framework which was intended to enable trade unions to acquire independent knowledge (Gorazon, cited in URCOT, 1996, p. 6). This became the model for the creation of the Union Research Centre on Organisation and Technology Limited (URCOT).

Praxis Research
Like researchers at the Arbeitslivcentrum, URCOT researchers were aware of various approaches to research which could be used to inform the union. They did not want the union members with whom they worked to merely gain knowledge about the changes which were occurring in their work places, they wanted to ensure that the union members also gained knowledge about how they could influence these changes. This distinction has been described as one between **task** centred participation and **power** centred participation (Hampson 1991, p. 67). It was important that the participants in these studies should not be seen as objects of the research process (URCOT 1996, p. 6).

Participatory approaches raise questions of 'democracy, power, and control at the work place' (Ehn 1993, p. 41). A participatory action research approach would also enable the union to gain knowledge of both the matter under study and the methods for obtaining that knowledge and expand the awareness of both researchers and participants to enable

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joint action and to solve shared problems (Szell 1992, p. 618). This was also seen to be consistent with the tenor of the Modernisation Agreement, which emphasised the participation of the union in decision making about change in the public sector agency.

However, a participatory action research approach was not sufficient in itself as there could be varying degrees of closeness between researchers and workers, and their union. The concept of 'praxis research' was developed at the Arbeitslivcentrum. This variant of participatory action research has been characterised as 'an activity that contains a dialogue, and has an action part subordinated to an action practice and a conceptual or reflective part subordinate to a scientific practice' (Sandberg 1985, p. 89). In the dialogue between researchers and participants different kinds of knowledge are developed and exchanged.

Investigative Work Groups

The vehicle for praxis research in the URCOT approach is the Investigative Work Group (IWG). An IWG is comprised of a group of volunteer union members from a workplace or workplaces who are facing a similar experience of change. Each member of an IWG is permitted to spend two hours per week on IWG activities. At least one URCOT researcher is associated with each IWG and meets with them every 2-4 weeks, more often if the IWG requires it. The URCOT researcher maintains regular telephone, fax and email contact with the IWG. To facilitate regular contact with the local union site committee each IWG is encouraged to include at least one workplace delegate among its members. The URCOT researcher generally has the responsibility of reporting to the national union structure, although this can vary between projects and is sometimes dependent on membership of the IWG.

Although the role of the URCOT researcher can vary considerably between IWGs, members are encouraged to treat their experience seriously and to reflect upon it. However, real emphasis is also placed on ensuring that the outcomes of its work will be credible, whether it is scrutinised by management, unions or an academic audience. This is partially met by ensuring that the IWG members have training in research methodology and are encouraged to ensure that their use of particular research methods is in accord with accepted procedure. This reflects the commitment to addressing both intellectual rigour and practical outcomes which is implied by Sandberg, and constitutes a significant departure of praxis research from the more usual forms of action research (URCOT 1996, p. 9).

An evaluation of URCOT's first two years of operation reported favourably on the implications of praxis research for union members. The review team's comments indicate that URCOT has achieved its goal of power centred participation:

> ....the praxis research approach provides members with the tools to better consider work organisation issues for themselves. Members appear to be heartened that their workplace has been objectively assessed, and their own participation in the project is held in high regard. From a number of comments made by [union] members one significant aspect of this work place based research id the increased confidence of members in influencing the changes occurring in their workplace (Crombie et al 1994, p. 9).

ISSUES IN PARTICIPATORY DESIGN

Within the broad framework of industrial democracy, URCOT has deliberately examined the tradition of 'participatory design' and how it can be applied to the design of work organisation and computer information systems to support organisational goals. The need for participatory approaches has been nicely formulated by Greenbaum and Madsen (1993) from three different perspectives, pragmatic, theoretical and political:

- the pragmatic perspective is that this is the way the job gets done better;
- the theoretical perspective is that understanding between systems developers and people in the workplace is only possible through shared hands-on experience;
- the political is that people have the right to influence their own workplace.

The pragmatic argument - that good systems depend on 'user' involvement - has been widely accepted, and formal systems development methods identify the points at which this should occur. Whereas the term 'participatory design' has a European history, at the pragmatic level there is much in common with North American approaches such as Joint Application Design and Rapid Application Design, which have been widely used as methods for enhancing business input into systems development (Carmel, Whitaker and George, 1993).

Whatever the tradition or label, and however much there is agreement that participatory processes are valuable, there are barriers to their effective use, even at the pragmatic level. To achieve all three goals outlined by Greenbaum and Madsen is even more difficult.

These themes emerged in PDC '94. Morten Kyng, in his keynote address, noted that over twenty years the involvement of users in relation to systems development has changed dramatically. Now Microsoft wants end-users involved early in the design process. But he argued that the political agenda has not progressed; users 'are not viewed as influencing the overall requirements, but rather as contributing to meeting the goals set up by others' (Kyng 1994, p. 1).

In their PDC '94 paper, Bjerknes and Bratteteig discuss various approaches to co-operative design and the techniques advocated by researchers where the design process is closely tied to a concrete work situation (for example Greenbaum and Kyng, 1991). But they argue that this focus 'tends to disconnect the design process from the larger organisational context in which power is enacted' (Bjerknes and Bratteteig, 1994, p. 6). The strength of co-operative design is to

enhance understanding between the designer and the user, but the designers themselves may be relatively powerless.

Managers should have the power, but like the workers, they too have not found it easy to shape technology. Business process re-engineering (or redesign) (BPR) has emerged as one of the management responses to the recognition that business and workplace needs have often not received appropriate technological support. BPR attempts to make explicit the aim of designing systems to meet business requirements, and to use information technology (IT) to support significant changes in how work gets carried out (see for example the definitions used in the IFIP conference on BPR, Glasson, 1994).

However the full costs of organisational re-engineering, (taken to include developing new business processes, as well as automating, restructuring and downsizing) are often not adequately taken into account. The human costs have the potential to reduce or negate the benefits of organisational re-engineering (Leung and Lewis, 1996). Once the human costs are made more visible, the connection between the pragmatic and political arguments for worker participation becomes once again prominent. The anticipated benefits of re-engineering are unlikely to be achieved with a disempowered and insecure workforce.

Large Organisations

Mike Hales has thought carefully about issues relating to organisational context, and in particular, in large organisations:

> We mean to invoke a setting in which (a) heterogeneous technical elements must be integrated, some of them already in place and some of them given (not available for re-engineering at this time); (b) the technical whole thus created is positioned and appropriated within social/cultural practices that have their own strong histories; and (c) these practices thus bring other resources (both material and symbolic) than those that have been introduced as newly-engineered artefacts (Hales, 1994, p. 401).

In these organisations the term 'user' does not readily identify a recognisable individual or group. The very term 'user' is problematic; it assumes that everything is related to the computer, and suggests that users are interchangeable (Grudin, 1993). The term does not distinguish between managers commissioning a system (clients, or customers) and workers in a particular setting who will use the system as part of their daily tasks.

Just as problematic as the term 'user' is the nature of their involvement: input, participation, partnership or control are all different but possible (see for example URCOT, 1993; Hales 1993). For computer systems Hales (1995) has advocated the reinterpretation of participatory design in large and politically difficult settings, where design addresses the doing of managing and the negotiation of strategic (re)dispositions of resources.

Hales (1994, p. 403) cites Vedel's proposition that 'doing a good job of designing a computer system is a matter of making it (i) usable (ii) useful and (iii) "really useful"'. These three perspectives indicate some of the complexity of the issues, and the different angles from which they can be approached. Each perspective suggests something different about what kind of users might be evaluating the system, the kinds of involvement they might need to have to promote the development of a good system, and the different interests which they represent. 'Really useful' points to the need for a broad institutional focus, encompassing the way work gets done and how it is supported. 'Usable' suggest a narrower technical focus - the product works, but may not give much added value.

Much of URCOT's work, including the following case study, has been carried out in large public sector organisations which illustrate these complexities. Public sector organisations face additional problems, since the Government itself is a 'user'. Constrained by legislation, they are nevertheless increasingly expected to replace uniform bureaucratic processes with flexible responses to clients' individual needs (Commonwealth of Australia 1995).

AN INVESTIGATIVE WORK GROUP AT WORK

In 1995 URCOT initiated an Investigative Work Group in a provincial city Branch Office of a large public sector agency. The agency was established under its own legislation eight years ago, but operates as one business line within a larger agency, sharing that organisation's human resources, physical and technical infrastructure. The agency was established to support a totally new government initiative, and its business processes and computer system had to be rapidly developed to support the legislation. Since its inception the agency has experienced extraordinary growth rates in the number of cases registered with it, and significant (but not commensurate) growth in the number of its staff.

Dissatisfaction with the agency's service levels has been confirmed by several public reports and enquiries, including a parliamentary enquiry. As a consequence, approval for an increase in the agency's resources has been approved, both for staffing levels and IT resources.

Characteristics of the Workplace

Given this history, it is not surprising that the current workplace is widely perceived as a demanding and stressful work environment. Adding to the problems of rapid growth outstripping resources, the agency's 'clients' (defined in the agency's client charter as anyone who has anything to do with them) would mostly prefer not to be clients. The majority need the agency's services because of family breakdown. For many, the agency's requirements are a source of grievance and are seen as unjust. Current legislative arrangements lead to obligations on clients which are complicated and difficult to explain.

Dealing with angry clients is a source of stress for staff, and staff turnover is high. Client contact is made more stressful

by work arrangements, and computer system deficiencies, which make it difficult to deal promptly and effectively with clients' needs and problems. It impacts badly on morale when staff are aware that there are changes which could be made, and which could significantly improve their daily work, and yet changes are **not** made. This is more aggravating when the reasons are not clear, and plans for improvement are not known. With regard to the computer systems, the staff are increasingly intolerant of clumsy mainframe systems which do compare unfavourably with the Windows office software they can use on their local network.

Despite these difficulties, there is evidence (both from surveys and other sources) that the staff are committed and thoughtful, proud that they work well in a difficult area, and keen to improve the service the Agency offers.

The Investigative Work Group

Having gained management and union support, both nationally and at Branch Office level, URCOT sought volunteers for the IWG at the workplace through the union workplace delegate. In part because of workload demands, and perhaps because the topic - 'the improvement of the efficiency of base level activities and computer systems' - did not have great appeal, initially only four were interested, all male. While the smallness of the group made the IWG's viability doubtful, it was decided to persist until it was clear that the project was not feasible. After a presentation of the Group's plans to a staff meeting, we gained a female volunteer, and with this encouragement, continued. All members of the Group were experienced in the agency's work, and provided a good cross section of perspectives and interests. With regard to their attitudes to IT, one member remarked 'We've got an expert, a dummy and a dreamer'.

Over the next nine months the Group undertook a program of work which led in some unexpected directions.

The First Phase: What Needs Improving?

In conjunction with their colleagues, the IWG constructed a report which identified major problems with using the current system, and suggested some improvements. This took two months. While it might seem an obvious step, it was not without difficulties. The Group felt some reluctance to undertake work which they felt could duplicate work already done. Some of the changes they wanted might already be underway, even about to be implemented. Some of the problems were so obvious to them that it hardly seemed necessary to document them. However, it was eventually agreed that the process of identifying problems and seeking a response from national office was an effective way of establishing just what was the state of affairs.

A business analyst located in the national office responded to this paper, outlining the status of possible improvements in the present IT work program. Many of the desired changes were not on the current agenda. The need for some was not always understood. In other cases, the difficulties involved in modifying the current system were prohibitive.

The Flashing Cursor

One of the suggested improvements was a particular enhancement to the screen interface. The software linking the workers' personal computers on the Local Area Network to mainframe applications displayed the cursor as a vertical bar, which was not readily visible. Difficulties in screen navigation created additional stress for workers attempting to deal promptly with enquiries, often with an aggressive client on the line. The Group proposed a flashing cursor, but the business line's national office IT staff responded that it was not technically feasible to alter the way the cursor was displayed. This was correct, in the current environment.

However, through information gained in another area of URCOT's work (ways of enhancing computer interfaces) it was known that the organisation's technical infrastructure was currently being modified. Software and hardware which had the potential to overcome this particular problem had already been purchased, and were currently being trialled in another branch office.

A demonstration of the new configuration to members of the Group was organised, and it confirmed that the flashing cursor was indeed an option. Further, the occasion provided the specialist technical staff responsible for the new products with an opportunity to demonstrate other facilities now available. Some of these could be used to tailor the screen and keyboard mappings in ways which simplified screen navigation. The technical staff were keen to show what was possible, but lacked the workplace knowledge to be proactive in suggesting to business lines ways in which they could take full advantage of the new facilities. Once aware of the possibilities, the Group followed up by identifying ways in which the tailoring could be of benefit in their work, and the most IT oriented member prepared a specification of their requirements.

This was an extremely positive experience, but one which was diminished by subsequent events. It was hoped that the Group's branch office would be the next pilot site for the products, that their proposed interface would be trialled, and that they would have a role in enabling others to take advantage of the new infrastructure. In the event, the implementation of the new products became linked with other refurbishment of the network, and the pilot did not occur. Lack of a sponsor for such a project was also a problem.

This process made visible some important issues:

- workplace users did not realise the value of their knowledge and experience, and there were no ongoing processes to make use of these, let alone enhance them;
- the change management process for systems improvements was not visible to workplace users;
- it required expert input at the centre to ascertain the status of proposed changes;
- priorities for implementation of changes could change quickly, and the process was not clear;
- the case of the flashing cursor showed that communication between the managers of the whole

organisation's technical infrastructure and those in the business lines dependent on that infrastructure was not adequate if optimal advantage was to be taken of new technology. Information about the changes had been disseminated, but as it turned out, not in a way which enabled people to understand their potential significance. Input from the workplace had the effect of retrieving some of the opportunities;

- technical staff did not have the business knowledge which would enable them to identify benefits potentially available from technical innovation.

The Second Phase: Redeveloping the System

From the perspective of workplace users, ongoing enhancements to the system would be much preferred to a 'big bang' approach to change. However, one of the reasons why some of the necessary improvements had not been made to the computer system was that the original system, written in haste when the agency was established, was extremely difficult to modify. In responding to the investigations of the parliamentary enquiry, the agency proposed major changes to the way it carried out its responsibilities. These changes had major implications for the computer systems. The scale of these changes, plus the difficulty of modifying the existing system to accommodate current known requirements (let alone the improvements identified by the IWG), indicated that full redevelopment of the system had to be considered as a serious option.

However full redevelopment was a very costly option. Although there was approval for an increase in resourcing, the size of a full redevelopment meant that additional, formal approval would be needed. The body empowered to make such an approval required a submission which included a business case which showed the benefits which would flow from redevelopment, and also an assessment of the impacts on staff.

Given that the IWG had already identified problems with the current system, they were well placed to contribute to the development of the submission. The national manager responsible for preparing the submission sought their input into the cost benefit analysis. There was in existence a nationally conducted workplace survey conducted regularly which attempted to measure time spent on the agency's major processes. While it provided a very broad picture of how the agency's resources were used, it was widely agreed that it was not reliable for detail.

The Group agreed to contribute, and as a first step identified particular work activities which would be the most useful to measure in order to demonstrate and quantify productivity gains which could be anticipated from an improved system. Their workplace knowledge was invaluable for this process. They then constructed an instrument for workplace use which defined the activities, and asked workers to record over a period of time how long these took. This instrument was also used in other workplaces. This data, when applied to projections of anticipated volumes of work, provided estimates of savings which could be expected.

The submission also required an assessment of the staff impact of the redeveloped system, and URCOT was requested to undertake this work in conjunction with the IWG. Data collection and preparation of the report took three months.

Staff Impact Assessment

Attempting to assess the potential impacts of the redeveloped system on the workplace was a complex process involving constructing pictures of the agency's future external environment, how the workplace would be organised, and what the computer system itself would be like. Shaping this future are current initiatives underway within the agency to implement its five year vision, broader corporate requirements, Government policy and legislation, and changes in the client population and their needs.

It is only possible here to touch on some aspects of this complexity, selecting two which have particular relevance for the themes of this paper.

Work and Job Design

At the time when the preparation of the staff impact assessment began, the agency was in the last stage of planning the implementation of new work and job design, focussing on the introduction of client based, multi-functional teams. The design process was participative and iterative, involving significant consultation, feedback and redesign. The team structure is designed to enhance focus on clients and their needs. These teams will provide most of the services their clients require, but within there will be some specialisation. The aim is to have the team responsible for a complete work product that is clearly linked to wider organisational objectives. Management structures will be simpler and flatter.

Thus the redeveloped computer system would be implemented in workplaces where work organisation and jobs are markedly different from the present. The current system does not adequately support the way work is handled now, and will be the source of further impediments when the new team structures are implemented, since it was not designed to support team ownership of clients, nor to support the workflow of an office organised around team structures. The work and job design team identified a number of system changes needed to support their recommendations, but accepted that initially the new structures would have to work within the constraints of the current system.

Learning About the Redeveloped Computer System

Four Business Redesign Teams, consisting of business and IT staff, had the responsibility for developing visions of the redeveloped system. Each was allocated a key business process to redesign, selected on the basis of the major elements in the agency's vision. This was in the best tradition of business process redesign - the IT requirements were to flow from the business needs. The teams also had to respond in their visions to the recommendations of the parliamentary enquiry.

Thus to find out what the future system would look like, the IWG had the task of integrating the visions of the four

teams. The information was gathered through a mixture of gaining access to relevant documentation, group interviews of each team, and finally a workshop which brought the four teams and IWG members together. This workshop used work mapping (URCOT, 1994) to assist the communication process and to develop a common view of how work would be carried out.

This process of gaining a picture of the systems was difficult enough in itself, but was exacerbated by the confidential nature of some of the proposals, for which Government approval and legislative change were needed.

Issues For Quality Of Working Life

The work mapping exercises showed a clear tendency for the redesigned system to increase the dependence of workers on the keyboard and screen as the main form of support and information. A significant amount of paper processing and manual searching will be eliminated. When dealing with clients over the telephone or even in face to face interviews, staff will need access to the system for basic information. There is the prospect of electronic lodgement and imaging to further reduce paper flows. While elimination of routine paper processing is commonly seen as a plus, both electronic lodgement and imaging have the potential to create equally unsatisfying work. Scanned documents typically require checking and correction before becoming usable. The physical document handling associated with imaging can create problems, also.

The report recommended that the redesigned business processes and their IT support need to allow explicitly for some user choice in the way certain tasks get carried out. The user should where possible have the option of a non screen based method. Dependence on the system already causes frustration for staff who cite system down time as one of the current problems they encounter in their work.

CONCLUSION

In spite of barriers, the investigative process brought to the surface valuable information, including previously unrecognised conflicts between the teams' planned redesigns. In particular, the workshop which brought the four redesign teams together successfully facilitated communication between the teams, and between the teams and IWG members, by using work mapping. The concrete examples which were stepped through provided a perfect illustration of the growth of understanding between systems developers and people in the workplace through shared hands on experience (Greenbaum and Madsen, 1993).

And for the IWG members involved, there was significant learning and empowerment. It became obvious to them that without their workplace knowledge, successful change would be impossible. They also found that through the process they acquired an understanding of the agency's future directions which was superior to that of some of the far more senior managers they encountered.

The process also identified significant tensions between the new systems proposals and the work and job design changes about to be implemented. By concentrating on key business processes, the redesign teams had to a degree neglected the implications of the new team structures. Further, the opportunity to develop a system which supported the team form of work organisation had not been a priority.

The IWG could not have made the contribution it did without significant support from national and local management who recognised the need for their involvement and ensured that necessary doors were opened. This enabled the IWG to navigate the complexities of the organisational setting, ranging from the technical infrastructure to strategic directions. While beginning at the workplace, they became increasingly involved in providing input to key national initiatives. By pursuing the need for particular improvements, they also at times acted as a catalyst and integrator. This process has continued. At the time of writing, a national project is underway to design a 'front end' for the redeveloped system. One of the IWG members was selected to be a regional representative for this project, and a reinvigorated (hopefully) IWG with some new members will participate in evaluation of both the prototype and the design process itself.

We can agree with Sandberg that 'praxis research is a fruitful approach in a field where the democratization of working life is an essential value. Praxis research allows for direct worker participation in development and design work, at the same time as these local efforts are seen and analyzed in the wider context of societal change' (Sandberg 1992, p. 674).

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