

Involving Users in Systems
Development

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PEP Paper 19, August 1991



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by Paul Green

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Chapter 1

User involvement in systems development is a major concern

It is common practice for both systems staff and users to be involved in a systems development project. One of the continuing concerns of those who manage systems development work is how to make best use of the knowledge and talents of all those who are involved. Most organisations have improved the effectiveness with which they use systems staff in projects, particularly as the various systems development methods, techniques and tools have become available to support them. However, there is still considerable scope to improve the ways in which users are involved in projects. While there is evidence to show that the successful involvement of users results in better systems, this potential is not being realised in the majority of organisations.

There is a misplaced emphasis on involving users in systems-led projects

We believe that the heart of the problem is a misplaced emphasis on exploiting user resources on projects led by the systems department. In this paper, we provide a framework for a true partnership between systems and user staff. Working closely as members of an integrated team throughout the life cycle of a project, all those involved can make the contribution that they are best equipped to make, their combined knowledge and skills can be used to maximum effect, and high-quality systems can be developed and implemented that meet the needs of the business.

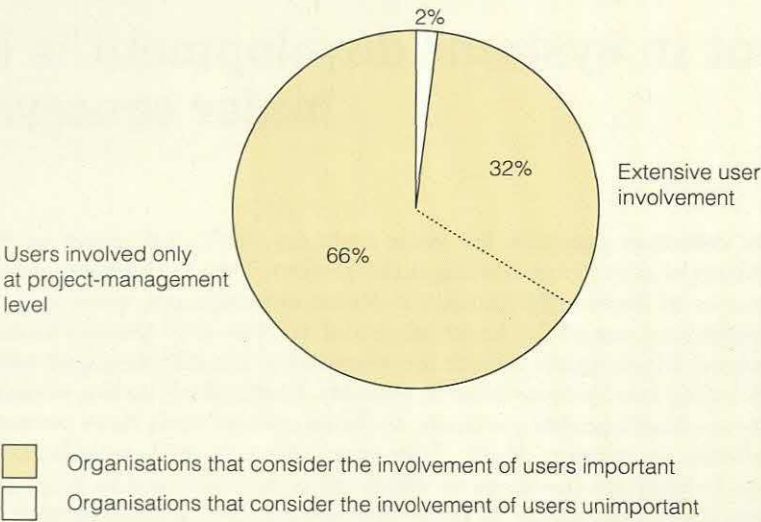
It is common practice to involve users in systems development

Ninety-eight per cent of the organisations we contacted during the research for this paper consider the involvement of users an important aspect of their approach to systems development. The 2 per cent that did not consider user involvement to be important were highly centralised businesses that imposed information systems on their users. However, in two-thirds of those organisations that do consider user involvement to be important, users are involved only at a project-management level – typically by signing-off stage-end deliverables. In only one-third of these organisations do users participate more fully in projects – for example, by contributing significantly to the production of specific deliverables during the various project stages (see Figure 1.1, over-leaf). The vast majority of PEP members have policies specifying how users should be involved in systems development projects, often defining the methods and techniques to be used. Use of these methods and techniques ensures that at least lip service is paid to users by getting their agreement to deliverables, but they do not adequately support users, facilitating their work in project stages.

Users contribute significantly throughout the development life cycle in only a few organisations

There are benefits to be gained by involving users in systems development, the most important of which is the delivery of high-

Figure 1.1 Nearly all PEP members consider the involvement of users important, but only one-third allow users to participate fully

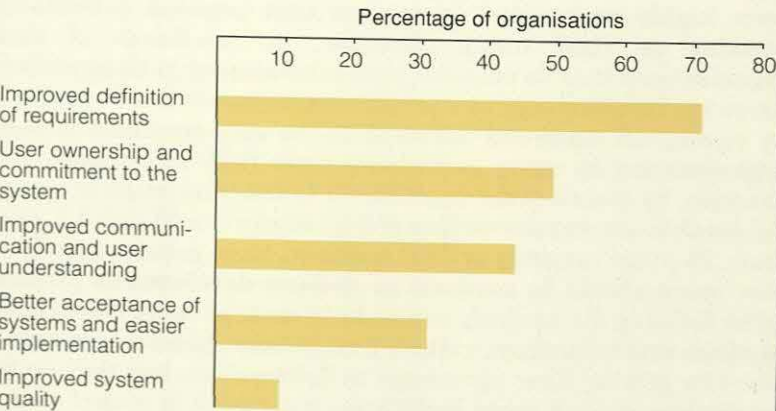


(Source: Survey of PEP members)

quality systems to the business. Involving users effectively will ensure that the systems developed and implemented closely fit their needs. The five benefits most frequently cited by PEP members are shown in Figure 1.2. While improved system quality comes fifth, the real quality benefit comes from the improved definition of requirements, reported by 71 per cent of members. Involving users extensively in the requirements-definition stage of a project should ensure that their needs are understood. Their involvement throughout the other project stages should ensure that the resulting systems meet those needs. Failure to involve users properly will lead to the development of systems that do not meet business needs and that are difficult to implement because users will see little benefit in using them.

PEP members report the greatest benefit of involving users as a better definition of requirements

Figure 1.2 PEP members cite many benefits of involving users in systems development



(Source: Survey of PEP members)

There is a relationship between user involvement and better systems

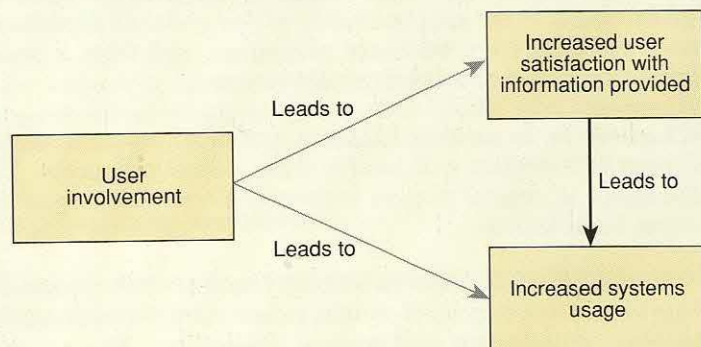
When we began the research, we expected to be able to prove a relationship between user involvement in systems development projects and improved systems development performance, either in terms of reduced development, maintenance and enhancement costs, or in terms of systems that met the users' requirements better. In fact, no organisation we talked to had sufficient reliable data on which we could base comparisons of systems with low and high user involvement. Nor does academic research in this area establish a conclusive relationship between greater user involvement and enhanced systems development performance.

Baroudi, Olson and Ives, American academics specialising in systems development, show that it is possible to derive a link between more extensive user involvement in systems development projects and improved systems development performance. They have developed a statistically proven model that links user involvement to user satisfaction. The more users are involved in the systems development process, the more satisfied they are with the information provided by the developed applications. They also make more use of systems that they are satisfied with. This model, shown in Figure 1.3, has been validated across 200 manufacturing organisations in the United States. Baroudi, Olsen and Ives have shown that increased user involvement leads to systems that more closely meet organisations' needs and that are more widely used.

User involvement results in greater user satisfaction with the developed system

Figure 1.3 There is a relationship between user involvement and better systems

Many studies have shown positive relationships between user involvement and increased satisfaction, and between user involvement and increased systems usage. Baroudi, Olsen and Ives also showed a positive relationship between increased user satisfaction and increased systems usage.



(Source: Baroudi, J J, Olsen, M H and Ives, B. An empirical study of the impact of user involvement on system usage and information satisfaction. *Communications of the ACM*, vol. 29, no. 3, March 1986.)

User involvement frequently creates serious problems

Despite PEP members' acknowledgement of the importance of involving users in systems development projects, they are

experiencing many problems – the organisations we contacted identified a total of 130. We have classified the most serious of these into three types – problems stemming from the user community, problems with systems staff, and group-working problems. The major problems in each category are listed in Figure 1.4 and are discussed below.

Three types of problem arise from user involvement

Figure 1.4 User involvement in systems development creates problems of three main types

Problems with the user community	Problems with systems staff	Group-working problems
Lack of commitment to systems development projects	Poor interpersonal and communications skills	Communications difficulties
Unwillingness to be involved in systems development	Lack of business understanding	Diverse value systems
Lack of familiarity with project working	Lack of commitment to user involvement	Different motivating factors
Poor analytical skills	Under-valuation of user skills and knowledge	
Misunderstanding of expectations		
Over-extended responsibility		
Diversity of user involvement		

Problems with the user community

Seven problems are of major concern in this category.

Lack of commitment. Lack of commitment derives from the perception that it is the responsibility of the systems department to deliver systems, from business pressures, and from a lack of understanding about the development process.

Unwillingness to be involved. Users are often concerned that secondment to a project will hinder their career prospects. They are also likely to regard project responsibilities as being of only short-term significance.

Lack of familiarity with project working. Users are not accustomed to having to conform to project-management requirements such as timekeeping, monitoring and control disciplines. Nor are they used to having responsibility for the production of individual deliverables, such as those required in systems development projects.

Poor analytical skills. Most users are not trained to address problems in an abstract manner or to work in a structured, analytical way.

Misunderstanding of expectations. Few PEP members provide the user community with the sort of education that they provide for systems development staff, so users often fail to understand what is expected of them in a systems development project.

Over-extended responsibility. Project-management methods that give users a major role are becoming much more common. If these methods are used on the basis of limited understanding, however, poor decisions may be taken.

Diversity of user involvement. Where diverse groups are involved in a project, it may be very difficult to build a consensus about requirements, to prevent time slippage, to control the amount of effort being used, to monitor and control the project, and to maintain the commitment of all parties.

Problems with systems staff

We have identified four main problems in this area.

Poor interpersonal and communications skills. Problems in this area have been reported by both systems development managers and users. They include poor listening skills, an inability to use non-technical language and a lack of group-working skills. If these problems persist, systems development staff will not get the best out of users, and users will not want to be involved in projects.

Lack of understanding of business issues. Systems staff often have little understanding of the business issues that are being addressed by a project. Users feel that they have to spend a lot of time and effort explaining basic principles to development staff. This means that they have only limited time left to address the significant business issues.

Lack of commitment to user involvement. Many systems development managers have become aware of the need for greater involvement of users, recognising that they are the 'real' customers of the systems development department. Few believe, however, that any fundamental change is required to tried and tested ways of working.

Under-valuation of user skills and knowledge. Many users feel that systems staff under-value their skills and knowledge and emphasise only their own technical abilities.

Group-working problems

PEP members are experiencing three major problems associated with group working.

Communications difficulties. Users and systems staff often have difficulty understanding each other. Systems staff are renowned for speaking 'gobbledegook', and specialised groups of users often have their own function-specific jargon.

Diverse value systems. Users and systems staff often have different grade and pay structures, with different reward and development schemes. When staff from different groups form a team, these factors can cause friction and prevent effective team working.

Different motivating factors. Staff from different groups will usually have different value sets, different loyalties and different

aims. When users and systems staff are brought together in a project, this can cause conflicts.

A new focus is required to get the most from user involvement

Organisations can overcome the problems they are currently experiencing and gain enormous benefits from involving users in systems development, particularly in terms of improved systems quality. To do so, they need to take action at three levels – at the broad organisational level, at the project level, and at the level of the supporting methods, techniques and tools. In organisations that have successfully involved users in systems development, users and systems developers are not distinguished during development projects. Directors, senior managers, middle managers, junior managers and other staff are treated equally as team members, each of whom can make a valuable contribution in his particular area of expertise.

Getting to this position may take several years, because the staffing and career policies for both users and systems staff will have to be reviewed and probably modified. To involve users successfully, organisations need to build a comprehensive, organisation-wide infrastructure that ensures that both users and systems staff have appropriate skills and that policies are in place to support user involvement. In the remaining chapters of this paper, we provide guidance on how PEP members should go about this task.

In Chapter 2, we explain the actions that must be taken at an organisational level to establish the necessary infrastructure and culture that will facilitate user involvement.

In Chapter 3, we show how user involvement can best be accomplished in a systems development project. In particular, we describe a project-management framework that will support effective user involvement, point out the stages of development where user involvement should be concentrated, and describe how to build effective project teams.

Chapter 4 gives practical guidance on the methods, techniques and tools that can help support user involvement.

Scope of the research

Involving users in systems development projects has been a major issue for a long time. Over the past 20 years, there has been a considerable amount of academic research on the subject and we have reviewed the published material in some detail. A selected bibliography is included at the end of this paper. We have undertaken a questionnaire survey of PEP members, conducted a series of detailed telephone interviews and held workshops for both systems development staff and users. Throughout, our aim has been to provide a balanced view based on the opinions of both users and systems staff.

The topic was also the subject of the first PEP paper, *Managing User Involvement in Systems Development*. This paper com-

To involve users successfully, divisive organisation structures should be eliminated

Creating the right infrastructure to support user involvement will take time

plements rather than supersedes PEP Paper 1, which describes a stage-by-stage approach to involving users throughout the project life cycle. In this paper, we are concerned with what an organisation must do to support effective user involvement in systems development projects.

Chapter 2

The organisational infrastructure must support user involvement

To ensure that users are most effectively involved in systems development projects, organisations must create an infrastructure that fully supports their involvement. This may involve modifying the organisation structure and will certainly require effective staff-recruitment and staff-development programmes to be put in place for both users and systems development staff. Corporate policies, which ensure and facilitate user involvement, will need to be formulated and promulgated.

Clearly, such an infrastructure cannot be achieved overnight. Nevertheless, PEP members should view changes at this level as an integral part of their approach to involving users in systems development projects. Otherwise, more immediate support for user involvement, such as the introduction of new tools, will fail to be effective.

Some organisation structures support user involvement better than others

Several of the problems outlined in Chapter 1 stem from a lack of understanding between systems development departments and users. This leads to communications difficulties and divergent goals, and hinders the creation of effective joint project teams. Misunderstandings are most likely to occur when the systems development function is clearly separated from user departments and where there is no mechanism for 'bridging the gap'. Two organisational solutions have gone some way to overcoming this problem. The first involves the introduction of business systems managers to act as communications links between user departments and the systems department. In the second, systems development activities are devolved to user departments, which also serves to bring the two groups closer together. These two solutions are illustrated in Figure 2.1.

Business systems managers serve as communications channels

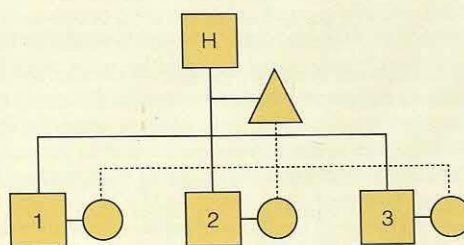
Several PEP members who have reported the successful involvement of users throughout projects and easy communication between users and systems staff have created the position of business systems manager. Business systems managers are positioned between the user departments and the systems development department and bridge the gap between the two by acting as channels of communication. Rowntree Mackintosh Confectionery Ltd, the international food group manufacturing and retailing confectionery, snack foods and grocery products, has

Two organisation structures help to bridge the gap between users and systems staff

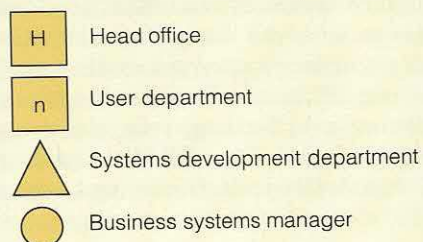
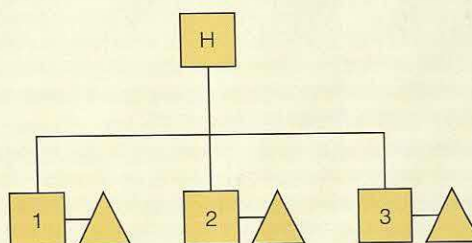
Business systems managers are positioned between the user and the systems departments

Figure 2.1 Two organisation structures provide particular support for user involvement in systems development

Business systems managers, positioned between the user departments and the systems development department, act as channels of communication.



Devolving systems development activities to user departments creates stronger links between them.



introduced this concept and considers it to have been a great success. Its experience is summarised overleaf in Figure 2.2.

The experience of Rowntree Mackintosh and others highlights several imperatives if this approach is to be adopted:

Select business systems managers with care. The role calls for people with a variety of skills and aptitudes. A business systems manager must understand both the business of the area that he represents and the basic IT and systems development issues. He must have a strong personality and be able to solve problems and resolve conflicts.

Ensure that business systems managers report to a user department. Some organisations have appointed business systems managers who report to the systems department. We believe this to be a mistake. A business systems manager reporting to the systems department is less likely to develop a complete understanding of the issues faced by user departments and is more likely to be regarded simply as another mechanism for controlling users.

Figure 2.2 Rowntree Mackintosh has introduced the role of business systems manager and considers it a great success

Rowntree Mackintosh Confectionery Ltd established its current systems development procedures in 1987. At that time, the company saw the need to bring its main functional departments closer to its systems development group in order to improve the systems group's understanding of business requirements and provide systems of high quality that fully met the needs of the business.

It created the role of business systems manager as an interface between the functional and systems development departments. At Rowntree Mackintosh, there are eight main functional departments, each of which has its own business systems manager. Business systems managers report to the management in their functional department and are responsible for coordinating and agreeing on the information needs of their department and for liaising with the systems development group and other IT functions. Business systems managers do not have any line management responsibility for systems staff.

The approach is considered to have been very successful and to have been a major contributing factor to the introduction of important new systems across the organisation. The business systems managers come from a variety of backgrounds, including users with a good knowledge of information technology and systems developers with a good understanding of their business area. In effect, business systems managers have hybrid skills; they are seen as systems staff by users, and as users by systems staff. The role of business systems manager has clearly been satisfying for those appointed – seven of the eight have remained in their posts for the last four years.

Rowntree Mackintosh believes that the most important characteristic for a successful business systems manager is a strong personality – to enable him or her to develop the trust and understanding of both the functional department and the systems group, and to resolve any conflicts and problems.

Give business systems managers executive authority. User departments should give business systems managers executive authority to take most decisions regarding systems issues on their behalf. In some organisations we contacted, business systems managers had only a coordinating and liaising role; decisions always had to be referred to management, and the business systems managers served only as a bottleneck. Business systems managers should refer strategic systems decisions to management.

Ensure that business systems managers maintain a current understanding of the business. There is a danger that business systems managers may themselves 'go native' and become too systems-focused if they spend too much time on project work. To ensure that they continue to reflect user views accurately, they must maintain a current understanding of the business of their department. They should be involved in the everyday activities of the department – for example, by ensuring that they are part of the planning and business-development process.

Devolving systems development to user departments creates stronger links

Devolving systems development from a central department to smaller units within user departments can be a major stimulus to user involvement in projects and should overcome communications problems between users and systems staff. With the devolved structure, each user department has its own small development group dedicated to providing the systems it requires.

In a devolved structure, each user department has its own development group

PEP members have reported the following benefits from locating systems development units within user departments:

- A better understanding by systems development staff of the business for which they are providing solutions, which means that users do not have to spend time explaining basic issues during a project. This makes the requirements-definition process more efficient, ensuring that systems staff can readily interpret business needs.
- A better understanding by users of the systems development process, which means that they understand what is expected of them during a project and how to express their needs in an appropriate way.
- The development of personal relationships between systems staff and user staff, making team building easier.
- A feeling of common purpose, and therefore commitment, as both user and systems staff are working for the benefit of their department.

Organisations that distinguish between analysts and programmers may find it appropriate to devolve analysts to user departments, but to retain a central programming group. This would enable users to work closely with their department's analysts to specify requirements, while the coding could be undertaken by an efficient, specialist, service department.

Devolving systems development to user departments can certainly create greater understanding between systems staff and users. However, our research has shown that devolution must be managed with care and sensitivity. Research for the Butler Cox Foundation Report 81, *Managing the Devolution of Systems Responsibilities*, has shown that, to be efficient, devolved groups need to consist of about 20 people. This is necessary to offer rewarding career structures, which will help to retain valuable systems staff. Thus, devolved systems development groups are a feasible proposition only for large organisations.

Devolved structures are suitable only for large organisations

Staff-recruitment and staff-development programmes are critical

Our research has shown that organisations can introduce programmes for staff recruitment and staff development that will encourage better user involvement in systems development projects. Such programmes should apply both to systems development staff and to users.

User staff

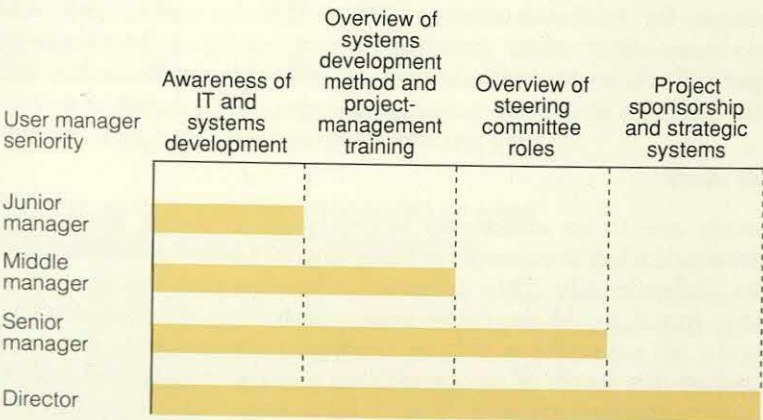
If users are to be effectively involved in projects, they must understand what is expected of them and be able to complete their tasks professionally. They will need to be educated and trained to do this, but it would clearly be neither practical nor cost-effective to train all users for a role in systems development. We have identified five levels of user staff that should be involved in systems development projects. At each level, user staff have different roles and responsibilities in projects, as shown overleaf in Figure 2.3. Awareness should be developed and training provided as these users progress in their careers (see Figure 2.4, also overleaf).

Five levels of user staff should be involved in systems development projects

Figure 2.3 Five levels of user staff should be involved in systems development projects, with clearly defined responsibilities

Staff level	Project position	Responsibilities
Director	Project sponsor	Agreeing that the project should take place. Paying for the project from the departmental budget. Chairing the steering committee.
Senior managers within the sponsoring department	Steering committee members	Representing the interests of the sponsoring department and ensuring that business requirements are met.
Senior managers outside the sponsoring department	Steering committee members	Representing the interests of their own department and taking a broader, organisation-wide view of the issues raised by the project.
Middle managers	Project manager reporting to the project sponsor and steering committee	Working closely with the systems development project manager to plan the project and manage progress. Specifically responsible for the contribution of user resources, ensuring that resources are available and that deliverables are of appropriate quality.
Junior managers	Team leaders, reporting to the project manager	Leading small teams organised from the team members, to produce specific deliverables. Ensuring that team members' work is satisfactory.
Other staff	Team members	Working as directed by their team leaders to contribute to the production of specific deliverables.

Figure 2.4 The training and awareness of users should be appropriate to their seniority in the organisation



Junior staff, such as clerks or operatives, should be trained at the start of specific projects to which they will contribute.

Junior managers should be given a basic introduction to information technology and systems development as part of a standard management-development programme. This will ensure that, at a conceptual level, they have an understanding of information systems and the process that leads to the creation of the systems they use. At this level, users may be responsible for a small part of a project. This level of training will provide them with the grounding that they need to carry out their responsibilities professionally.

Middle managers are likely to act as user project managers. They therefore need to be trained in project management and to have a good understanding of the organisation's systems development methods. Only about 15 per cent of PEP members provide any such training for users.

Some organisations have introduced project-management training for business staff

Several organisations we talked to have introduced project-management training programmes for business users, concurrently with training programmes to meet the specific needs of systems project managers. An example is Willis Corroon, international insurance and reinsurance brokers and underwriting agents, where an increasing amount of work in the user environment – both systems-related and that concerned with general business issues such as setting up a new office – is carried out on a project basis.

While individuals will continue to receive the specialist training they need, the company has recently introduced a new training programme designed to raise the quality of project leadership for all types of projects. It believes that this approach will bring many benefits, among them more effective user involvement in systems development projects.

Senior managers are likely to form part of a project's steering committee. The project may not have been commissioned by the senior manager's department, but if it affects his area, his involvement is desirable. At this level, user managers should be made aware of the roles and responsibilities of steering committee members.

At *director* level, user managers are likely to become sponsors for projects – that is, commission and pay for them. These very senior users should be educated in the responsibilities of project sponsors and given periodic reviews of appropriate strategic systems issues so that they can guide their department's use of technology.

Training of user management in the systems area must, of course, remain relevant and up-to-date. If a new systems development method is introduced, for example, user managers must be made aware of how their roles and responsibilities are affected.

Training for users is best provided by specialist third parties or by the users themselves

Training for users should be specific to their roles and responsibilities in each organisation. Senior systems managers should be involved in certain aspects of user training – for example, the involvement of systems staff in development projects – but our research has shown that user education and training is best provided by specialist third-party organisations or by users themselves. If users plan, develop, manage and deliver their own training, they will be encouraged to think about their roles, develop commitment to involvement in systems development projects and

understand exactly what is required of them. User training by the systems development department has not proved very effective for most PEP members. Systems developers typically do not understand user concerns and are not able to view user responsibilities from a user perspective. Nor do users respond well to being told what their responsibilities are by systems development staff. This is often seen as a form of systems department control, rather than as a way of passing initiative to users. All training should be tailored to the culture, characteristics and practices of each organisation.

Some PEP members we spoke to give users access to the development tools used in the projects on which they are working. This access usually extends to the level of middle managers, and the tools are used by users to develop prototypes and reporting routines. To ensure that users can undertake these tasks effectively, they are usually given training at the beginning of a specific project. However, PEP members who have a stable and well defined set of development tools should consider sending junior and middle managers on appropriate courses in the use of tools that they are likely to use, as part of their standard management-development programme.

Some PEP members train users in the use of development tools

Systems staff

For users to be effectively involved in systems development projects, systems staff must have skills and attitudes that will enable them to work closely with users and derive maximum benefit from their involvement. This is essential for analysts, who will normally work closely with users to help them define requirements, but it is also important for programmers, technical specialists and so on, who need to talk to and work with users. Three particular aspects of systems staff development should therefore be considered – recruitment, career structures and training.

Recruitment

One of the most important characteristics required of systems development staff who work closely with users is that they be good communicators. PEP Paper 7, *Influence on Productivity of Staff Personality and Team Working*, showed that systems development staff are typically unlikely to be effective communicators. While communications skills can be taught, a special effort should be made in any recruitment drive to seek out staff who are good natural communicators. This is particularly the case for analysts and any other systems staff who will come into close contact with users throughout projects.

Development staff who work closely with users should be good natural communicators

Career structures

In most organisations, the career structure for systems development staff militates against user involvement in projects. Typically, recruits to systems development departments are young and have had little or no experience of working in a business function. Throughout their careers, systems development staff will work with users, and will develop an understanding of specific areas of their organisation's business only as this becomes necessary for individual projects. Rarely will they have a detailed understanding of the business area in which they are working.

Systems staff should be encouraged to work in user departments . . .

Recognising this, several PEP members second new recruits, especially graduates, to a user department, perhaps for between six months and a year. During this time, the recruits will normally undertake the same work as a user in the department and thus build up a detailed understanding of that department, its goals, its working procedures and the way it uses information. In some organisations, recruits are seconded to several user departments before beginning their formal training and careers as systems professionals. Other organisations have a policy of encouraging systems staff to work in various business units throughout their careers, often taking on non-technical roles when working in user departments.

. . . and systems developers might be recruited from user departments

An alternative approach, which ensures that systems development staff have a good understanding of user needs, is to recruit systems developers from business departments. The Inland Revenue in the United Kingdom has adopted this approach. Many of its systems development staff have transferred from local tax offices and therefore have a detailed understanding of users' requirements for new systems. The Inland Revenue considers this policy to have been an important factor in the successful development and implementation of major new systems.

Systems staff need training in interpersonal skills

Training

For user involvement in projects to be effective, systems development staff need to have skills that go beyond purely technical skills. The majority of PEP members provide systems development staff with training in methods, techniques, software tools and so on, but only 10 per cent reported that they provide training in human and interpersonal skills for development staff. Given the fact that many systems staff are poor natural communicators, more emphasis must be given to training in this area.

Policies that support user involvement must be formulated and disseminated

A major factor contributing to the difficulties of involving users in systems development projects is a lack of appropriate and widely disseminated policies aimed specifically at supporting user involvement. In two areas, in particular, corporate policies can lead to greater commitment and involvement of users in projects. These relate to charging for systems development work, and to the use of systems development and project-management methods.

Recharging for development work

There is a general lack of commitment on the part of users to involvement in systems development projects. This lack of commitment often emanates from very senior users and spreads through all the levels of a user department. Several senior users we spoke to explained that they were not as strongly committed to systems development projects as to other initiatives in their areas. Other initiatives, such as the introduction of a new product or service, or a relocation, were seen to have clear, measurable returns against which their performance could be judged, while the systems development process was often considered to have little direct impact on the performance of the user department for which

work was being undertaken. Senior managers therefore give systems development work a relatively low priority within their department and are often slow to assign appropriate users to a project.

Several people we spoke to during the research, both from systems development and user departments, felt that recharging for systems development work makes managers more committed. Previous research by Butler Cox confirms this view. In Foundation Report 66, *Marketing the Systems Department*, we reported that about 70 per cent of organisations recharge users for operational and development services. Recharging was seen as promoting the cost-effective use of systems resources by making users accountable for their use of systems services. As a result, users become more involved in the management of their applications. Recharging for systems services, instead of providing them free, helps to make the systems department's customers more aware of their value. Several PEP members who have recently introduced recharging believe that user managers are now more keen to play an active role in systems projects than was previously the case.

Some PEP members, however, have recently moved away from a policy of recharging because they believe that it has caused friction between the systems and user departments. They believe that abandoning recharging has in fact brought users and developers closer together and removed a barrier that had previously prevented users and systems staff from working closely together.

Overall, we believe that recharging can be a major force in gaining the commitment and involvement of users in projects, providing that some basic principles are adhered to in the policy:

- Charges must be made on a 'commercial' basis. 'Real' money should exchange hands for services, and the project sponsor from the user department must have the authority to agree to and control payments, rather than being told on a regular basis what he will be charged. This will give him an incentive to ensure that the projects over which he has budgetary control are delivered professionally and meet his department's requirements.
- Charges must be seen as fair and easily understood. Charges that are continually disputed will lead to conflict and prevent effective group working. Users must be able to understand the basis of the charges so that they can feel confident that they are getting value for money.
- Charges for systems development work should be treated in the same manner as other charges faced by user departments and have an impact on the budgetary performance of the sponsoring department(s), thus giving their senior management an incentive to be involved.

Introducing recharging for systems development work should also improve the way systems staff work, making user involvement easier and more effective. Establishing a recharging mechanism should make systems staff, from management to programmers, aware that they are providing a valuable service to customers. As a consequence, the relationship between the systems department and user departments usually becomes more formal. Often, when

Recharging for systems development work often makes user managers more committed

The charges must, however, be commercial, fair, and have an impact on financial performance

Recharging can also give systems staff confidence that they are providing a valuable service

recharging is introduced, user departments become free to buy their systems development services from external suppliers, removing the systems development department's status as a monopoly supplier. In this situation, systems development staff are forced to develop good communications skills and to become more customer-focused in order to compete with external suppliers.

Using systems development and project-management methods

Most methods are adopted on the assumption that they will be used by systems staff

In most organisations, methods for systems development and project management are available. However, those in use in the majority of PEP members have been selected on the implicit assumption that most tasks in a systems development project will be undertaken by systems staff. Systems development and project-management methods often fail to explain in detail how much user and systems involvement is likely to be required at each stage and what tasks and roles users and systems staff are expected to perform. Furthermore, training in the project-management method, and in particular, in the systems development method, is often confined to systems staff.

Policies should make explicit the extent of user and systems involvement throughout a project

If user involvement in projects is to be encouraged, organisations should have policies on project-management and systems development methods, which make explicit the type and extent of both user and systems involvement required throughout a project. These methods must be disseminated around the organisation. If users are not aware of their responsibilities, they cannot be expected to fulfil them. Likewise, if systems staff do not know the extent of their responsibilities, they will not play their own roles effectively, nor provide support for user involvement.

Chapter 3

User involvement in projects must be structured, planned and managed

Within an individual systems development project, users should be involved at two levels – both in the management of all stages of a project and in the day-to-day work as the project progresses. Most PEP members who claimed that users were extensively involved in projects meant that users participated in their management. While they are right to encourage this, they must recognise that if users are to make a really valuable contribution, they must be involved in lower-level tasks as well.

Structuring user involvement in projects

The project-management framework should make provision for the role of the user. The framework shown in Figure 3.1 is consistent with the practice adopted by many PEP members. It has three main elements:

- A strong steering committee, which is user-led and chaired by a user project sponsor.
- A joint project-management role for users and systems development staff.
- An integrated project team of users and systems development staff who report to team leaders for the production of project deliverables. The team leaders will be either users or systems development staff depending upon the nature of the work for which they are responsible.

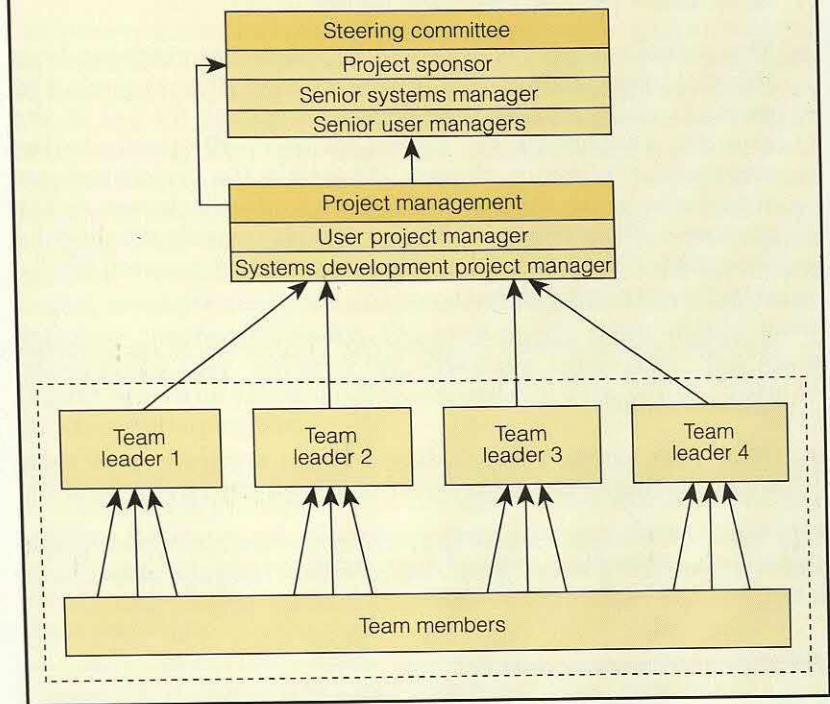
The framework shown in Figure 3.1 is appropriate for use in all organisations, but it should be scaled appropriately to the size of projects. For example, for small endeavours, the steering committee may consist of only one or two people and the project managers may undertake project tasks *and* fulfil their project-management roles. What is important is that the person responsible for user resources and user contributions should fully understand the role of users in the project, and that the person responsible for systems staff resources and their contributions should fully understand their role in the project.

During the research, we found no PEP members who used precisely this project-management framework, although many did have someone responsible for the users' contribution to each project and someone responsible for the systems department's contribution. Organisations that have introduced the role of business systems manager also said that to ensure success, business systems managers must work closely with their systems development project managers throughout projects. Our suggested

Our suggested project-management framework has three main elements

The project-management framework should be scaled to the size of the project

Figure 3.1 The project-management framework has three main elements



framework makes explicit the roles that are often implicitly undertaken at present.

The user-led steering committee

At the highest level is the steering committee. This committee should be user-led as the project is delivering a system to the business as a whole, and it should be chaired by a project sponsor responsible for the particular business area.

The steering committee provides direction for the project

The primary role of the steering committee is to provide direction for the project, to make management decisions, and to offer guidance on the resolution of issues. Specifically, it is responsible for:

- Reviewing and approving plans and deliverables.
- Resolving issues relating to priorities, overall objectives, the realisation of objectives, requirements and procedures.
- Approving and setting priorities for, or deferring, any major change requests that are made during the project.
- Resolving issues that require a trade-off to be made between costs, benefits and schedules.

It also provides a link between the project and the senior management of the organisation

Its secondary role is to provide a link between the project and the senior management of the organisation. This ensures that senior managers are aware of the project, its objectives, progress and timetable, and that they are committed to its success.

The membership of the steering committee will vary to meet the requirements of each individual project. Usually, however, it will comprise:

- A *chairman*, who should have the authority to make decisions without reference to other senior managers. In general, the more senior the chairman, the better.
- The *project sponsor*, who should be the senior manager from the department that has commissioned the project. For example, if the project is to develop a system for use in the accounts department, the project sponsor will usually be the organisation's finance director. If possible, the project sponsor should also be the chairman of the committee. However, as the sponsor is likely to be very senior, the chairman's role may be delegated. The project sponsor is responsible for paying for the systems development work.
- A *senior systems manager*, either the IT director or the systems development manager with responsibility for the project's application area.
- Other *user managers*, including a senior manager from each area of the business that is significantly affected by the project.

This membership will ensure that the systems department plays a part in managing the strategic issues concerning the project and that users can influence the direction that the project takes.

Joint project management

Systems development projects usually have a single project manager with responsibility for planning and control. He runs the project, manages it on a day-to-day basis and makes decisions about matters that are not discussed by the steering committee. He is usually responsible for progress-monitoring, and reports to the steering committee.

During the research for this project, we heard widely differing views about whether this project manager should be a user or a member of the systems development department. The following views were expressed:

There are diverse views about whether the project manager should be a user or a member of the systems staff

- In about 15 per cent of PEP member organisations, a user always takes the role of project manager. Typically, these organisations believe that users should have full responsibility for their systems and that it is not essential for a project manager to have a detailed understanding of the technology being used in the project.
- The majority of PEP members structure their systems development projects so that the project manager is always a member of the systems development department. Typically, they believe that the emphasis should be on technical understanding of computing systems and of the techniques used during their development rather than on managerial abilities and skills.
- Many PEP members thought that the ideal would be a project manager with a grasp of both the users' concerns and the technical aspects of a project. Unfortunately, people with this combination of skills are difficult to find. However, for organisations that follow the advice outlined in Chapter 2, people with these skills should progressively become available as users gain a greater understanding of systems issues and

project working and as systems staff become more aware of the business issues.

We recommend the appointment of joint project managers

Our recommendation is therefore to appoint joint project managers, one from the user side and one from the systems development department. In this way, each aspect of a systems development project can be managed by someone with an appropriate level of understanding, and both users and technical staff feel that their contributions are taken into account and valued. It is important that these project managers develop a close working relationship, bringing both the technical and business aspects of a project together. Neither the user-appointed nor the systems-appointed project manager needs to be seen as overall project manager, with complete responsibility for the endeavour. Each should have responsibility for the area for which his skills and experience qualify him. The two project managers can then report jointly to the steering committee.

Figure 3.2 shows which areas of responsibility should be allocated to each project manager. With the user project manager and the systems development project manager working closely together, an integrated project team will be able to develop an understanding of all the issues pertaining to a project, and to deal with them sensibly.

Figure 3.2 There should be a clear allocation of project-management responsibilities between user managers and systems development managers

User managers	Systems development managers
Selecting user staff for project	Selecting systems development staff for project
Developing and agreeing on the business case	Producing the technical design
Defining and agreeing on requirements	Managing the development of the system
Planning and completing acceptance tests	Planning and completing systems tests
Planning and managing implementation	Establishing operational procedures
Producing user documentation	Producing technical documentation
Conducting user training	Conducting operations and support training
Monitoring progress on user tasks	Monitoring progress on systems tasks
Coordinating with systems staff work	Coordinating with user work
Reporting to steering committee	Reporting to steering committee

The integrated project team

Systems development projects should have integrated teams of users and systems staff

When the client is a user department, systems development projects should always have an integrated project team of users and systems development staff because on such a project, issues relevant to both will arise throughout the development life cycle. Only about 10 per cent of PEP members have reported using such teams.

It is important that team stability and continuity is maintained throughout a project. When selecting team members and team leaders, PEP members should, where possible, choose people with skills that can be used throughout the development life cycle. This

will ensure that the team is committed to the success of the project throughout all stages of work.

Within each project stage, team leaders should be assigned with responsibility for a specific area of work and for the production of predetermined deliverables. A team leader must have the knowledge to enable him to guarantee the quality of his deliverables. For example, the team leader responsible for defining functional requirements should usually be a user, and the team leader responsible for developing the technical design should usually be a member of the systems development staff. Team members should be selected to work for team leaders on the basis of the appropriateness of their skills. Individual teams will often comprise a mixture of both users and systems staff.

Team members should be assigned responsibility for work for which they are best suited

Planning for user involvement in projects

For the project-management framework to support user involvement, the work of both users and systems staff should be planned so that each group can work effectively with the other. Three particular issues must be addressed – project-specific education of users and systems staff, agreement on what and when user and systems resources will be required, and the establishment of mechanisms to monitor user and systems involvement.

Provide project-specific education

In Chapter 2, we explained why user managers should be trained in systems development issues as an integral part of their management development. Most user managers, however, are only infrequently involved in systems development projects. This means that they will typically be unaware of any changes in the roles and responsibilities of users that have taken place since their last project. Users who will be involved in the management of a systems development project should also be given a brief 'refresher course' at the beginning of a project. This will give them an opportunity to understand precisely what is required of them, to clarify any issues about which they are uncertain, and to ensure that when they begin work on a project, they are up to speed. Junior user staff who will be involved in a project should have the objectives and their responsibilities explained to ensure that they understand their project work and are committed to its success.

Users need a refresher course at the beginning of each new systems development project

All systems staff who will be involved in a project must be made aware of the current business situation in the department that is sponsoring the work. This will improve communications between users and systems staff, reduce the scope for misunderstanding and help to build personal relationships and team spirit. Systems staff who have previously worked for a specific department may find that their knowledge is out-of-date and that a 'refresher session' can be very useful. Several PEP members have addressed this issue by appointing users to explain the work of the business area and the business aims of the project.

Systems staff must be aware of the business situation in the user department

Agree on the resources that will be required

Both systems staff and user project managers complain that appropriate user resources are often not available when they are

needed. One user manager described a project to deliver a system that was to be used by two user departments. One of them failed to make appropriate staff available when they were needed. The delivered system met few of the requirements of that department, but fully met the requirements of the department that had made staff available.

The requirements for user resources need to be precisely defined, but frequently reviewed

In extreme cases, failure to make appropriate user resources available can result in severe delays to projects, or can exclude users from the project team. To ensure that this does not happen, the precise requirements for user resources throughout the project should be defined. The requirements for user resources should be reviewed and amended, if necessary, at the end of each project stage. The user project manager should get the commitment of the project sponsor to provide the necessary user resources before the project begins and before each subsequent stage starts. Throughout a project, the user project manager should resolve availability problems with the project sponsor and see that any changes in the requirements for user resources are dealt with.

Agreed systems resources must also be made available as and when required

It is equally important to agree what systems resources will be required throughout a project and it is then the responsibility of the systems development project manager to ensure that those resources are made available. As with user resources, the requirements for systems staff should be reviewed and amended, if necessary, at the end of each project stage. The systems development project manager should also obtain commitment to the systems resource requirements from the systems representatives on the steering committee both before the start of the project and at the beginning of each individual stage. Any potential problems should be reported to the committee. Systems resources should be chosen bearing in mind their appropriateness for working with users. For example, systems staff who will have regular contact with users throughout a project should have good communications skills.

Put mechanisms in place to monitor involvement

The contributions of users must be monitored, just as those of systems staff are

An important part of project management is the monitoring of effort used, work completed and projected work outstanding. When the user resources have been agreed, mechanisms must be put in place to monitor their contribution. Such mechanisms will usually already be in place for systems development staff, but are often ignored when users are involved – many PEP members we talked to do not record the time spent by users in systems development projects. One systems manager we spoke to said that when he tried to get users to complete timesheets, he realised that the online time-recording system was available only to staff in the systems department. The teleprocessing system had to be reconfigured to provide access to users. The same project-management tools and information should be available to the user project manager as to the systems development project manager, and the mechanisms for monitoring the involvement of both groups of staff should be compatible.

Quality-assurance procedures usually already exist to review the work of the systems department. They should be extended to include reviews of the deliverables for which users have been responsible.

Managing user involvement in projects

Users can be effectively involved in work throughout a systems development project, but the extent of their involvement should vary depending on the project stage. PEP members should pay attention to the selection procedure for project staff because it is important that the right level of user and systems staff is involved and that the team dynamics contribute to effective team building.

User involvement is most important during the early and later project stages

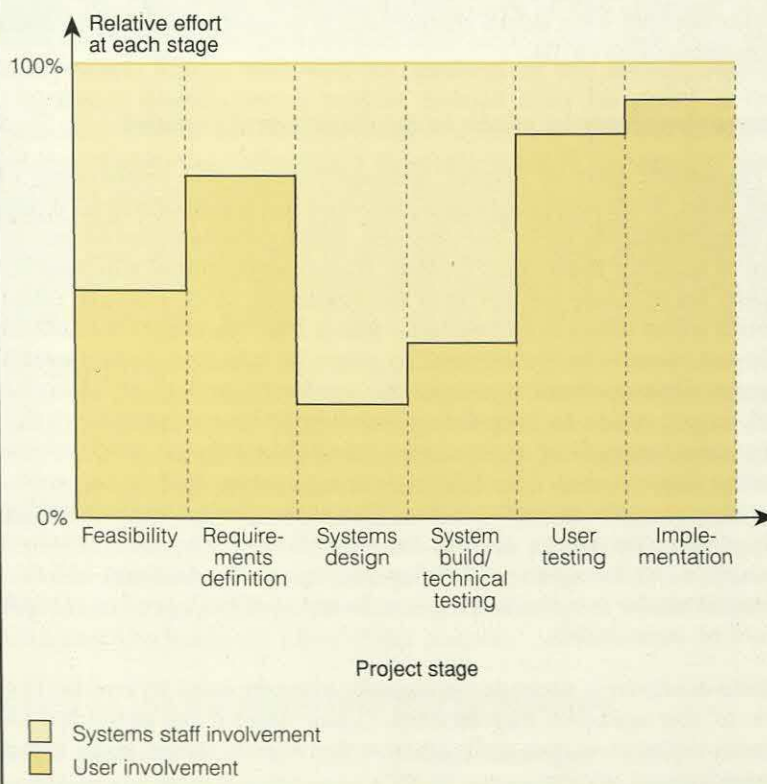
Our research has shown that users can make their most valuable contributions during the initial project stages, particularly at the requirements-definition stage, and when development is nearing completion (during acceptance and implementation of the completed system).

Figure 3.3 shows an ideal profile of user and systems development staff involvement during a project:

User involvement varies according to the stage of the project

At the *feasibility study* stage of a project, user involvement and systems development involvement are about equal. Users will be assessing their basic aims and developing a business case to gain approval for the project, but they will rely on advice from systems development staff on issues such as the most appropriate technical solutions, the likely size and cost of the project and any technical

Figure 3.3 The contribution of users is greatest during the initial project stages and when development is nearing completion



problems that need to be considered. Users should assess the business-oriented risks to the project, while development staff should provide advice on the risks associated with the technical solutions.

At the *requirements-definition* stage, user involvement increases and systems development involvement falls.

During *systems design*, user involvement declines, as only senior users need to be consulted at this stage. The involvement of systems development staff increases as the technical aspects of the project become more important.

During the *system build/technical testing* stage, the involvement of systems staff is greater than that of users. However, as this stage represents a large proportion of the total effort, the actual contribution of users will be large. The main focus of systems work at this stage is program development, which is primarily undertaken by systems development staff. They are also responsible for program and unit testing. Users may undertake some development work, such as the creation of reporting routines. They are also involved in producing user documentation, preparing for testing, preparing for implementation, introducing appropriate changes to business practices and so on.

During *user testing*, systems development staff's involvement falls. User staff undertake acceptance testing, and systems development staff provide the necessary technical support.

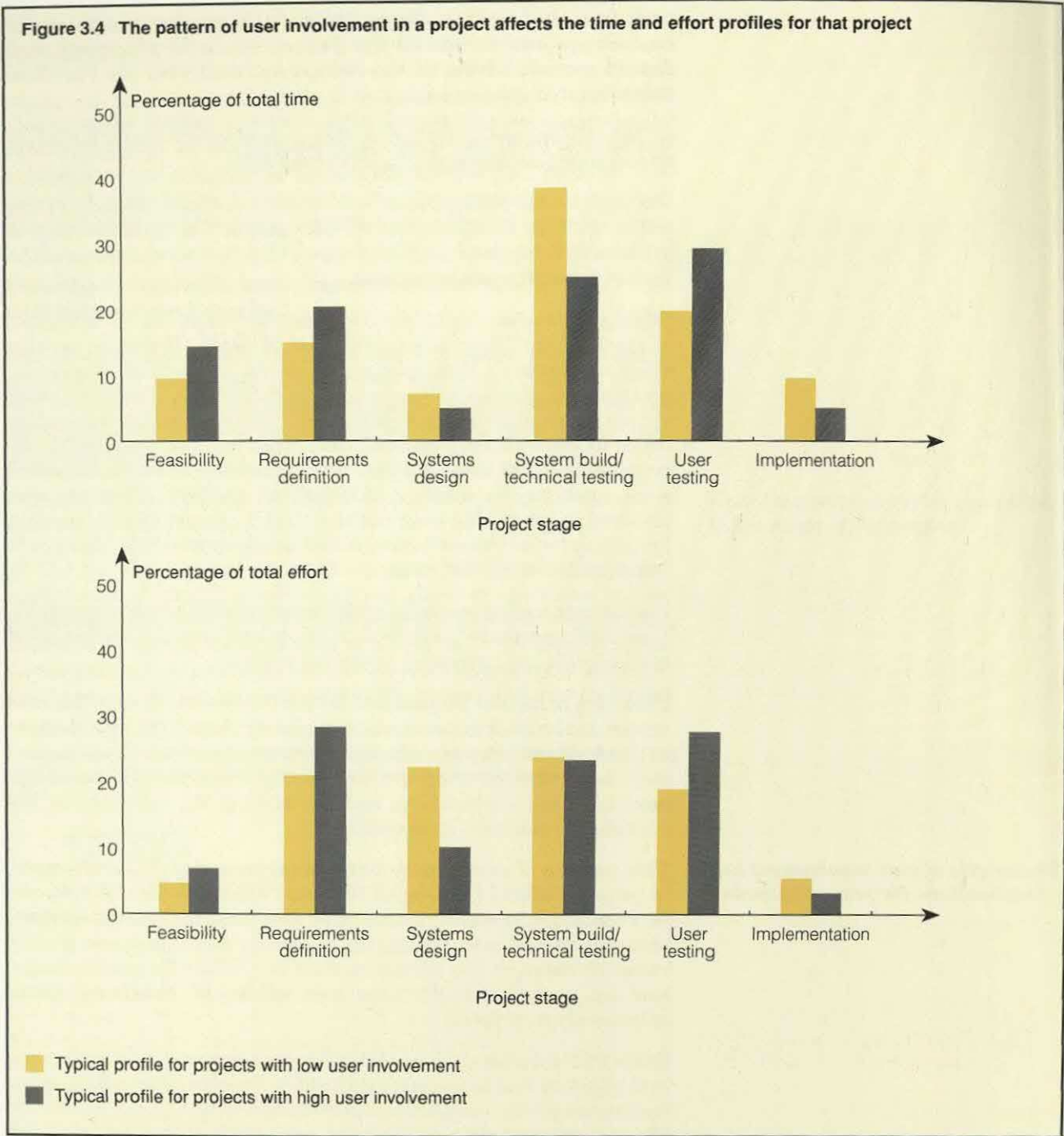
Users are primarily responsible for the *implementation* of the new system in the working environment, giving them high involvement in this final project stage. The involvement of systems development staff is limited as they are responsible only for the technical aspects of implementation, such as moving the software to the operational machine environment.

The profile of user involvement has implications for project planning

This pattern of user and systems development staff involvement in projects affects the overall time and effort profiles of projects, as Figure 3.4, overleaf, shows, and has implications for project-planning procedures. During our research, we came across a wide range of views on the effects on time and effort by project stage, and on overall project time and effort, of involving users extensively in projects.

The involvement of users tends to skew the distribution of time and effort towards the early stages

Some PEP members reported that involving users led to more time and effort as it became more difficult to involve them all, to get a consensus and to work around user availability. Others pointed to the use of workshop techniques as a way of increasing user involvement and saving time and effort. There was, however, general agreement that increasing the level of user involvement in a project typically skews the distribution of time and effort towards the first stages of the work. Thus, more time and effort is used in feasibility study and requirements definition as greater emphasis is placed on the business justification for the work and on obtaining a detailed and accurate definition of the system requirements. This should save time and effort during the systems design stage, and enable coding to be carried out more efficiently. Greater user involvement typically means that more emphasis is placed on testing. However, implementation is more straightforward, requiring less time and effort, as the systems should more accurately reflect users' needs and their involvement should make



user understanding and acceptance of the systems easier. Overall, we see no reason for the *total* time and effort for a project to vary with different levels of user involvement.

The selection of user and systems staff is important

For the involvement of users to be most effective, PEP members must pay particular attention to the staff they select to work on projects. One of the common reasons for the failure to involve users effectively in systems development projects is the assignment of inappropriate staff. Often, users are selected because they can be spared – which means that they may be poorly rated at performing

Staff must not be appointed to systems projects by default

their user role, or they may be new to the department and not yet established, and so on. While it may be an easy option for user departments to assign these staff to projects, it will not pay off in the long term – the system that is ultimately delivered is likely to be of poor quality, the project may take longer and it will probably cost more. Systems staff are also often allocated to projects because they are easily available rather than because they have appropriate skills or experience. Many users expressed the view that systems staff involved in projects are often inexperienced and have little business understanding.

Two issues are of particular importance. First, PEP members should ensure that staff of appropriate seniority are used for each project task, and second, they should select staff for each project so that team building is facilitated as far as possible.

Select users of appropriate seniority

***Users at different levels of seniority
are appropriate at different
development stages***

When project planning is underway, PEP members should ensure that user resource requirements are assessed on a task-by-task basis and that user staff of an appropriate level of seniority are assigned. Each organisation will have its own grading structure for staff, but we have identified five general levels of user staff who should be involved in systems development projects. These grades and their suggested responsibilities were shown in Figure 2.3.

Several PEP members we talked to during our research reported a tendency for user departments to nominate staff of too junior a level for project work. This tendency is probably most marked when senior user managers are not committed to the systems development project. One user project manager referred to this tendency as the 'foot soldier' syndrome.

Very junior staff are likely to lack insight into the wider aspects of the project. For example, when defining the requirements for a new system, junior staff members are not likely to be able to decide how processes and procedures could be improved to make the work of the department more efficient in the future. Requirements are probably best defined by a combination of junior and senior managers.

Select systems staff with appropriate skills and experience

***Systems staff must be allocated to
particular tasks according to
their skills***

During project planning, PEP members should ensure that systems staff requirements are also assessed on a task-by-task basis and that systems staff are selected who have appropriate skills and experience to facilitate user involvement. Generally speaking, the following characteristics are appropriate:

- Good communications skills for all systems staff who will have regular contact with users.
- An up-to-date understanding of the business area for which the new system is being developed.
- A thorough understanding of the systems development process.
- A level of maturity that makes users confident that a professional job will be done.
- A level of experience that clearly goes beyond training alone.
- An understanding of the relevant technical issues.

Select staff to facilitate team building

PEP Paper 7 showed the importance of team building for successful projects. The problems experienced by PEP members with user involvement in projects illustrate that much more attention needs to be paid to effective team building when users are involved as part of an integrated project team because of the different backgrounds, training and loyalties of users and systems development staff. A good user team member is likely to have good analytical skills, the ability to think in an abstract way, the flexibility to deal with change, and good communications skills. Personality testing might help to identify promising candidates. A good systems team member will have good communications and interpersonal skills. Again, personality testing can be a useful aid.

Personality testing is a useful aid to selecting staff who will work well in a team

Once the users' roles have been decided and the team members have been agreed, it is important to build up the identity and the spirit of the team. Some PEP members send both systems development and user managers on management-development courses aimed specifically at improving team working. Others stress the need to build up good team spirit through social activities. Leeds Permanent Building Society reported a very successful project start-up meeting that was held at a hotel over the weekend and was attended by both user and systems development staff. Managers outlined the project objectives and how these would be met, so that all the staff involved fully understood the nature of the project and their own responsibilities. Team members also got to know each other socially, which facilitated effective group working.

It is important to create team spirit

While it is clearly not appropriate to go to such lengths for smaller projects, project managers should find the time and resources to build a team spirit, ensuring that all staff are committed to the project and work effectively together. Indeed, team building and familiarisation with the project's objectives are so important that a budget for time, effort and other appropriate resources for project-initiation meetings should always be included in project plans.

Chapter 4

Techniques, methods and tools can support user involvement in projects

Appropriate methods, techniques and tools can play a major role in facilitating user involvement in systems development projects. It is now possible for users to undertake tasks that were previously considered the preserve of systems staff. The advent of sophisticated but easy-to-use query languages and report writers, for example, has enabled users to develop their own reporting routines.

At the highest level, techniques and methods for project work are very important. If appropriate methods are adequately supported by appropriate tools and standards, organisations will find it easier to involve users effectively in systems development projects.

Methods that genuinely support user involvement are not widely used

Few organisations use methods that truly support user involvement

Seventy-two per cent of the organisations we contacted during the research claim to use methods that support the involvement of users in systems development projects. We believe, however, that probably only 14 per cent of organisations have methods that really ensure adequate user involvement. The reason for this disparity is that while traditional systems development methods ensure that users are consulted and are responsible for signing-off certain stage-end deliverables, they do not ensure real user commitment or encourage user participation during the various stages of a project. To ensure full user involvement, specialised methods, tools and standards are needed.

JAD is based on a workshop approach

We have investigated two such methods, JAD and ETHICS. JAD (Joint Application Development) was originally developed by IBM in 1977 and is an IBM-sponsored method. It is also backed by many consulting firms and software engineering authorities such as James Martin. JAD aims to involve users, particularly in the requirements-definition stage and is based primarily on a workshop approach. The basic JAD method has been designed for use in defining the requirements for a new system. However, some PEP members have extended its use throughout the development life cycle. For all but small systems developments, multiple JAD sessions are used to define requirements. Each session addresses a specific aspect of the new system.

ETHICS is based on a socio-technical approach

ETHICS (Effective Technical and Human Implementation of Computer-based Systems) was developed by Professor Enid Mumford, formerly of Manchester Business School. It is based on a socio-technical approach to systems design and development that emphasises users' participation in the design and implementation of their own systems.

JAD, being supported by IBM, is far more widely used than ETHICS. We identified nine PEP members who were using JAD. We were unable to find any PEP member who is currently using ETHICS, although staff at two PEP members had been involved in ETHICS projects at previous employers. We understand that ETHICS has recently been successfully used in major projects within Digital in the United States and within the United Kingdom's National Health Service.

ETHICS is supported by various books, video tapes and worksheets that explain the method and support its use. The JAD method consists of relevant manuals, guides and various visual aids and is supported by training. Consultancy support is available for JAD.

Using ETHICS is said to require more elapsed time at the design stage than conventional approaches. However, the effort required is likely to be the same as with a conventional approach and implementation should be faster and easier. Using JAD is said to provide organisations with major benefits. These include:

Users of JAD claim major benefits

- *Increased productivity.* Studies – for example, those reported by Cyrus F Gibson and Barbara Bund Jackson in their book, *The Information Imperative: Managing the Impact of Information Technology on Business and People* – report 20 to 60 per cent increases in productivity over traditional design methods, both in terms of the time and the effort needed to complete the objectives, requirements and external design phases.
- *Enhanced design quality.* Users and systems staff who have had experience with JAD usually cite high-quality design as JAD's most significant benefit.
- *Teamwork.* JAD promotes cooperation, understanding and teamwork among the various user groups and the information systems staff. Users and information systems staff truly design the system together and become jointly committed to the successful development of the system.
- *Lower development and maintenance costs.* JAD's high-quality design should ensure that the design is right first time, thus eliminating most of the error-associated development and maintenance costs.

While methods such as JAD and ETHICS are designed to produce systems that fit users' needs better, PEP members should be cautious about introducing them. We are convinced of their value in the longer term, but the implementation of this type of method can be difficult and can take some time. Discussions with several PEP members on their use of JAD highlighted the following points:

Implementation of such methods is difficult and time-consuming

The role of facilitator is difficult. A JAD workshop or session is run by a facilitator, whose role it is to ensure that the objectives of each session are clearly defined and achieved. To do this, the facilitator must chair the session, build consensus and have an understanding of all the relevant issues. Most PEP members have found it necessary to use external facilitators initially, while they train and develop their own. Identifying potential facilitators is often

difficult as few staff have the appropriate personality characteristics or knowledge.

Planning the sessions is vitally important. For JAD to be effective, the objectives must be clearly established and all the sessions must be carefully planned and the objectives adhered to. JAD sessions usually involve users with a wide variety of commitments, but they must assign a high priority to their systems development responsibilities to avoid continuing delays.

Those involved in JAD sessions must be carefully selected. The problems of group dynamics are of particular relevance to JAD sessions. As mentioned in Chapter 3, particular attention must be paid to selecting those staff with appropriate skills and attitudes. PEP Paper 7 shows that teams made up of unlike individuals are good for problem-solving tasks and for tasks involving complex decision making, while teams consisting of people with similar personalities work best on simple routine tasks. PEP members should seek to ensure that the right balance of people is involved in JAD sessions. Personality testing could be a useful aid to preventing group-dynamic problems.

JAD is most effective when combined with appropriate tools. Sessions are most productive if sophisticated prototyping tools are available. This enables the participants to gain a real understanding of the 'look and feel' of their work and helps them to refine quickly what they have produced. Tools also support the efficient recording of work during a JAD session – so that participants can confirm that what has been produced is what is required. However, the use of prototyping tools can limit JAD sessions to the external view of the new system. PEP members wishing to use JAD to assess technical issues, such as systems security, access control and so on, should ensure that issues of this type are explicitly included in the relevant JAD sessions.

JAD teams should be established throughout the duration of a project. This ensures that those participating in the requirements-definition and design stages produce implementable solutions. Throughout the development life cycle, the JAD team is available to ensure that the system being developed meets business needs. The JAD team will also be able to plan user-testing and implementation activities and to design and implement any new business procedures that form part of the new system.

JAD can devise the best business solution. Most of the points we have made about JAD in this report show how it can be used to support systems development projects. JAD can, however, be used to devise the best business solution, not necessarily in terms of a computerised system. JAD should certainly be used to design the non-computer components of any new system.

Some PEP members have used JAD successfully

Figures 4.1 and 4.2, overleaf, describe the experiences of two PEP members who have successfully introduced JAD. Both believe that JAD greatly assists with the definition of user requirements. However, while ANZ Bank believes that JAD is not appropriate in its prototyping environment, Ferntree Computer Corporation thinks that the greatest benefits of JAD are likely to be realised in this type of environment.

Figure 4.1 ANZ Bank uses JAD for the development of some mainframe applications but not in environments fully supported by modern development tools

ANZ Bank (an international banking group with its headquarters in Melbourne) structures projects in a formal way, with senior project sponsors, project managers and implementation teams. It uses JAD for the development of some mainframe applications and encourages joint teams, comprising users and systems development staff. The JAD technique requires the involvement of a facilitator.

The role of the facilitator is very difficult as he needs knowledge of both the business and the technical issues. He must also be a leader who is also a good communicator and he must be able to resolve conflicts while remaining impartial. The facilitator must ensure that the sessions do not deviate from the agreed scope. JAD sessions are effective only if participants know that they will ultimately have major roles in implementing the system they are designing. Participants in JAD sessions should therefore be involved in the testing and implementation stages of the project. ANZ Bank has a programme to train its own staff as facilitators of the processes for decision-making, quality coordination and so on. The selection of those to be trained is made by the training instructor and management following personality assessments.

ANZ Bank does not use JAD for the development of its IBM AS400 systems, which are developed using IEW and Synon. These tools have made it possible for the bank to move towards an iterative development process based on prototyping. Users and systems development staff work together to develop the prototypes, with users involved throughout the development cycle. In this environment, JAD is viewed as out-of-date and unnecessary.

Figure 4.2 Ferntree Computer Corporation believes that strong project management and prototyping make JAD more effective

As an Australian software house, Ferntree Computer Corporation considers it essential to get a full and accurate definition of requirements and an agreed system definition and scope and/or specification before developing a system for a client. It has successfully used JAD to this effect. Other benefits of JAD are that it ensures that users and developers become closely integrated as a team and that senior users become 'champions' for systems, easing their acceptance and implementation.

However, one shortcoming that Ferntree Computer Corporation found with JAD was that it placed insufficient emphasis on project management. Strong project management is needed to deliver projects on time and budget. To provide an appropriate project-management framework, Ferntree Computer Corporation is expanding its own systems development method, which incorporates JAD, to ensure that progress is monitored in a project-management framework, with clear milestones, deliverables and tasks. For projects to be effective, the roles of project manager and JAD facilitator need to be kept separate.

Ferntree Computer Corporation plans to use JAD in environments with good prototyping tools. It strongly believes that JAD is more effective when supported by prototyping as the team can quickly see the results of its work, refining it as necessary.

Ferntree Computer Corporation also believes that JAD teams should be established throughout the duration of a project. To ensure the necessary input from users, they should have minimal responsibility in their own area while involved in systems development projects.

Prototyping and documentation standards are important

Methods must be supported by appropriate tools and standards. We believe that prototyping tools and appropriate documentation standards are particularly important.

Prototyping is a powerful way of supporting user involvement in projects

Prototyping can aid user involvement

Much of the literature published in the early to mid-1980s about user involvement in systems development projects concerned the use of prototyping and it remains one of the most powerful ways of supporting user involvement in projects. Many PEP members use it for this purpose. Prototyping has the advantage that users can see something that approaches the final system, while they are refining their requirements. This should ensure that the system that is ultimately produced meets their needs and is readily accepted. Some PEP members allow users to produce their own prototypes. The majority have policies that involve users in the development of prototypes, which are subsequently developed by systems development staff.

In those organisations where users develop their own prototypes, certain characteristics about the users and the tools they use are discernible:

- Typically, users have been trained in the use of the prototyping tool. This training usually extends to the level of providing an understanding of how the prototyping language works, rather than just the user interface.
- The tools used for prototyping are usually supported by technology with which the user is familiar – for example, personal computers and workstations.
- Users may prefer to use tools for prototyping that were not developed with that application in mind. This often occurs when users are familiar with software that they use for other purposes. Examples include word processing and presentation tools.

When used to support user involvement, prototyping must be carefully managed

The potential problems with prototyping are well known and it is not our purpose to discuss them in this paper as these issues were discussed fully in PEP Paper 6, *Managing Contemporary System Development Methods*. However, as far as user involvement in projects is concerned, five recommendations are relevant:

- *Ensure that prototyping tools are available to users.* Tools should be easy to use and to run in an environment, such as personal computers, with which users are familiar.
- *Train users who develop prototypes.* If users are to develop prototypes, they must be adequately trained in the use of the tools that are to be used. This will ensure that they can undertake their work efficiently.
- *Ensure that prototyping is controlled.* PEP members should adopt policies that define who does what in a prototyping environment. Several PEP members reported that users often want to develop prototypes when the technology available is inappropriate or too complex for non-technicians to use or when they have insufficient knowledge of the tools because they have not received adequate training. Responsibilities should be defined and agreed at the start of a project.
- *Clearly define prototyping boundaries.* The system boundaries for which the prototype is being developed should be clearly defined. Scope drift is always a potential problem in a systems

development project and this appears to be a greater problem when users have a significant influence over prototyping.

- *Ensure that users understand the limits of the prototype.* Users should be made aware of the limitations of a prototype. Failure to explain the limits can lead to frustration for both users and systems developers. Users need to understand what the prototype represents and the work that needs to be completed before a usable system is available.

Documentation standards must support users

One of the major problems in involving users in systems development projects is communications difficulties caused by the fact that much of the documentation produced as standard by systems development staff is incomprehensible to users. One person we interviewed during our research told us of a problem faced by a senior user involved in a systems development project in his organisation. The user had been involved in several projects before, and had produced deliverables including a system specification in written English, which users and systems development staff could understand. Unbeknown to the user, the systems department was in the process of introducing a new development method supported by a new CASE tool. The user was visited by an analyst who was using the new method. He was given a detailed functional decomposition produced by the CASE tool and told that he had to agree to this document before any new progress on his system would be made. Clearly, this is an extreme example of technically oriented documentation preventing effective user involvement in a project. However, we suspect that problems of a similar nature are not uncommon.

Documentation produced by systems developers is often incomprehensible to users

Documentation standards that support user involvement in projects should be agreed. While an organisation should have generally applicable documentation standards, these should be reviewed for each project to ensure that they are appropriate. Every document to which a user needs access should be produced in a format that the user can understand or has been trained to understand. As far as possible, documentation should be of a WYSIWYG (what you see is what you get) nature or in clear, concise, everyday language, as this improves user understanding. Clearly, some documentation, such as database design, must be produced in a technical form, but if users need to use any of these documents, they should be translated into everyday language.

Documents to be accessed by users should be written in everyday language

Modern tools can be effective

Used correctly, modern tools can effectively support user involvement in systems development projects. Many PEP members reported users successfully using user-friendly report generators to provide the reporting facilities in their systems. Often, this can be an effective way of enabling the best report formats to be developed and of ensuring that report formats are flexible and can readily be amended by users to meet their specific requirements. However, in certain environments, priority is given to speed of response and machine performance. In this situation, some organisations have opted to use their traditional tools to rework reports produced quickly by users.

Modern tools can be used effectively by users

Our research has also shown that some users have successfully used fourth-generation languages to develop part of their systems. For this to be effective, the tool must be suitable for use by users, or the users must be trained in the use of the tool. For example, products such as FOCUS can facilitate user involvement as users can begin by using TableTalk, FOCUS's user-oriented query tool, before getting more involved with the sophisticated capabilities of the wider FOCUS toolset.

*The more advanced tools are best
used by an analyst in conjunction
with a user*

A few PEP members have reported that their users have successfully used CASE tools to play a major role in projects – for example, by taking control of the requirements-definition process using analyst workbenches. Most PEP members believe, however, that CASE tools are too complex for users. Nevertheless, several reported that when looking for new CASE tools, their ease of use for users and the ability to facilitate user involvement were prime concerns. In those organisations where users do use CASE tools, members have reported difficulties in training users to use the technology. Our view is that CASE tools are probably most effective when used by an analyst in conjunction with a user. The analyst can 'drive' the technology, while the user can provide the input and check the accuracy of the work. Our previous researches into CASE technology – for example, Foundation Report 67, *Computer-Aided Software Engineering (CASE)* – have shown that the implementation of CASE tools in an organisation results in increased user involvement in systems development projects.

Chapter 5

Realising the benefits of user involvement in projects

There are real benefits to be gained by involving users more in projects, in terms of improved quality of systems, systems that are more readily accepted and implemented by the business and so on. PEP members can begin to realise these benefits by taking action at three levels, as listed in Figure 5.1.

Figure 5.1 Action checklist
<i>Organisational level</i> Assess organisational structure to ensure that it fully supports user involvement Consider introducing the role of business systems manager Consider devolving systems development to user departments in large organisations Ensure that users receive appropriate training throughout their careers Ensure that systems staff are recruited and developed with user involvement in mind Try to enhance the commitment of senior users to systems development work Consider the use of recharging as a means of encouraging commitment Ensure that methods support user involvement Ensure that methods are effectively communicated
<i>Project level</i> Structure projects to ensure that users are involved Ensure that there is a user project sponsor Ensure that the steering committee is user-led Appoint both a user and a systems development project manager Ensure that project teams consist of an integrated set of users and systems staff Plan the involvement of users as well as systems staff Give project-specific education to users to ensure that they understand their responsibilities Give project-specific education to systems staff to ensure that they understand the business area Select both users and systems staff to encourage good team dynamics
<i>Techniques, methods and tools</i> Review methods to ensure that they require and support user involvement Consider the use of JAD Use prototyping to aid user involvement Ensure that users have appropriate training for the tools they use Ensure that documentation standards support users Be aware that the use of CASE tools by analysts can increase user involvement

For most organisations, however, improving user involvement in systems development projects will be a long-term undertaking. Providing appropriate methods and tools and supporting project structures will pay off only when both users and systems staff are fully committed to user involvement and when their skills are developed accordingly.

Bibliography

- August, J H. *Joint application design: the group session approach to system design*. Englewood Cliffs, NJ: Yourdon Press, 1991.
- Baroudi, J J, Olsen, M H and Ives, B. An empirical study of the impact of user involvement on system usage and information satisfaction. *Communications of the ACM*, vol. 29, no. 3, March 1986.
- Friis, S. Action research on systems development: case study of changing actor roles. *Computers & Society*, vol. 18, no. 1, January 1988, p.22-31.
- Garrett, R L and Bourgie, L. Users and providers: another perspective on systems development. *Optimum*, vol. 18, no. 1, 1987, p.55-70.
- Gibson, C F and Jackson, B B. *The information imperative: managing the impact of information technology on businesses and people*. Lexington, MA: Lexington Books, 1987.
- Hirschheim, R A. Assessing participative systems design: some conclusions from an exploratory study. *Information and Management*, vol. 6, no. 6, December 1983, p.317-327.
- The human side of information processing: proceedings of the Conference on Computer Impact (Copenhagen: 25-27 October 1978)*, edited by N Bjørn-Andersen. Oxford: North-Holland, 1980.
- IFIP Conference on Human Choice and Computers (2nd: Baden, Austria: 4-8 June 1979)*, edited by A Mowshowitz. Oxford: North-Holland, 1980.
- Keyes, J. Systems design with the user in mind. *Datamation*, vol. 35, no. 7, 1 April 1989, p.48-50+55-56.
- Kraushaar, J M and Shirland, L E. A prototyping method for applications development by end users and information systems specialists. *MIS Quarterly*, vol. 9, no. 3, September 1985, p.189-197.
- Martin, C F. *User-centered requirements analysis*. Englewood Cliffs, NJ: Prentice-Hall, 1988.
- Morrison, W. Communicating with users during systems development. *Information and Software Technology*, vol. 30, no. 5, June 1988, p.295-298.
- Mumford, E. *Designing human systems for new technology: the ETHICS method*. Manchester: Manchester Business School, 1983.
- Mumford, E and Henshall, D. *Designing participatively: a participative approach to computer systems design: a case study of the introduction of a new computer system*. Manchester: Manchester Business School, 1983.
- Srinivasan, A and Kaiser, K M. Relationships between selected organizational factors and systems development. *Communications of the ACM*, vol. 30, no. 6, June 1987, p.556-562.

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