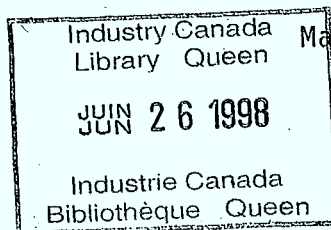


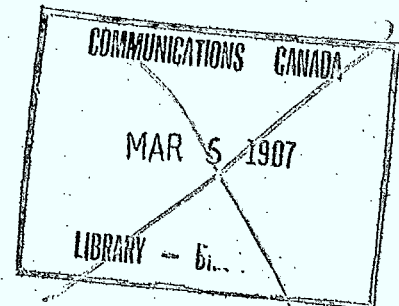
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2 THE HUMAN, SOCIAL AND ORGANIZATIONAL
IMPACTS OF OFFICE AUTOMATION:
Lessons from the OCS trials and other government endeavours



1 Ted Grusec, Ph.D.
Manager, Human and Social Impacts
Behavioural Research Division
Department of Communications
Government of Canada



1.0 INTRODUCTION

1.1 What is OA?

Many have questioned the misleading implications of "automation" in the office context. By now, however, the terms office automation (OA) and other equivalents (eg. office computerization) seem to be generally understood and accepted. Later we will suggest that "automation" is actually quite an appropriate designation to use after all.

OA is a fuzzy term but it usually refers to any system which uses individual workstations to access several functions from a list that includes: text creation and manipulation, storage and retrieval; messaging or electronic mail; decision support (eg. spreadsheets); database management; personal support (eg. calendars, diaries, personal files, etc).

In addition, OA often implies some degree of technical and functional interconnection of workstations among members of a group, small or large, so that

information or work can be shared, passively or interactively. The ability to interface with information sources outside of an organization is another function deemed important to OA.

The preceding describes uses and features of OA systems as presently conceived. Later we will introduce a more general description of computerization to aid our interpretations of impact findings and to guide our suggestions about OA implementation.

1.2 The OCS Program: Goals and Means

Planning for the Office Communications Systems (OCS) Program, an exercise in integrated OA of the federal Department of Communications, began in 1979. This was before the IBM Personal Computer (PC) had arrived. The Program ended in March 1986, well after the large scale penetration of office

work and other situations by the PC and its many clones, and by machines with alternative architectures to that of the PC. This gives some indication of the rapid changes in technology and in the office products market place which were ongoing while the Program was in place.

The Program was funded with about \$14 million. Its main purpose was to stimulate the Canadian OA industry and thus to help stem the Canadian trade deficit in office products. This deficit was already large by the late 70's and was projected to grow at an alarming rate unless something was done. A secondary aim of the Program was to increase federal government experience with OA.

Both of these objectives were addressed by creating five field trials, each in a different government department and each with a different Canadian systems vendor. The vendors were in various stages of the development of new systems which they hoped would be commercially viable. The government departments provided test sites for these systems and participation in the trials gave those departments a low cost chance to explore the possibilities of OA for their own work settings.

Another purpose of the Program was to increase knowledge and awareness of

OA. This was accomplished by funding original research on various OA topics of interest and by publishing and distributing the resulting reports. Also, the Program officers were very active throughout the duration of the Program in writing and publishing papers, and in giving presentations to audiences inside and outside of government, nationally and internationally.

Finally, the Program sought to assess the human, social and organizational impacts of OA. This was done by contracting with private sector consultants(1) and, in one trial, with university social scientists(2), to examine ongoing events while the trials were in progress. The assessment activity involved extensive interaction between the contractors and the end users of the trial systems in order to examine the effects of the introduction of the systems on issues such as user acceptance, work patterns, quality of working life, organizational structure and productivity.

1.3 The Work Situations in the OCS Trials

There is still, occasionally, some confusion about what goes on in offices. The conception of some writers is that an office is a kind of factory, with raw information coming in, being processed, and leaving again in some changed or repack-

aged form. This may be an apt description of some offices which have been called "procedural"(3), a term we will expand and capitalize on later. For now, we will say that a procedural office is one where highly routine functions dominate. In the recent past, a major use of computer technologies has been in procedural offices. This is where data processing has been targeted.

Generally, such "back" offices are not where OA has been aimed. Instead the target of OA has been the predominantly non-routine "front" office. There are, of course, many routines in any work setting, front or back and it may be better to think of procedural and non-procedural as end points along a continuum.

Above, we have been dealing with "offices" as the unit of description, using the terms "procedural" and "non-procedural". But all that any machine can do, whether it is a computer, as in OA, or a mechanical device, is procedures. So, with OA systems, we have a situation in which a totally procedural device is being introduced into a largely non-procedural environment. Subsequent sections of our presentation will clarify this seeming anomaly.

The departmental work situations in the OCS trials were ones where non-procedural functions predominated. The OA technologies in these,

and in other government trials to which we will refer, were intended for use by executives, managers, professionals and associated support workers. While support staff are often concerned with carrying out many procedures, when they are closely associated with knowledge workers, their work takes on many of the non-procedural characteristics of their clients, such as responsiveness to fast changing priorities.

The OCS trials took place mostly in the Ottawa-Hull region but Toronto, Winnipeg and Jasper sites of some of the government departments were also included. Across the trials, the office work included quasi-legal operations, finances, administration, program management, correspondence handling and policy systems.

In most of the trials, the user population was a homogeneous sub-group of a department although in some trials the OA system was scattered widely among different branches. Between 100 and 200 workstations were installed in each trial except in the smallest one which had considerably fewer. Overall, a broad spectrum of ages was found among the users, probably typical of offices in general, and there were roughly equal numbers of each gender. The physical settings varied widely and included open and closed office configurations.

1.4 Problems: Time and Technical Stability

The OCS Program was a sunset program and had to end, unfortunately, before longer term, stable impacts were fully manifest at the trial sites.

Empirically, it has now become clear that it takes as long as two years, or more, of end user, hands-on experience in order for stable impact effects of OA to begin to show up. An appreciation that such a long time period is essential for individual and organizational learning to become evident in work transformations may be one of the most important lessons to emerge from the OCS impact assessment research. This assumes too, that the OA system itself is technically stable throughout that period.

Neither of these two conditions, sufficient user hands-on time coupled with technology stability, could be met in the OCS trials. The technology development component, an essential part of the OCS Program thrust, was an unavoidably prolonged process that had to take place within the fixed sunset time-frame. The hands-on portion in the OCS trials did not exceed one year in any trial because of the time consumed in development. Also, in some of the trials, the systems lacked stability even while in use during the trial period since development of these

systems was still ongoing after the trials began.

1.5 Effects of These Problems on Impact Assessment

Despite these limitations, we did learn a great deal about human, social and organizational impacts in the OCS trials. Through memberships on steering, advisory and other committees, impact assessment personnel also became involved with other OA-related projects which began to multiply in various government departments after the OCS trials were underway. Some essential data about longer term impacts came from these other government activities. These included pilot trials that have lasted for more than two years, where OCS impact assessment was represented on review committees from the beginning of the trials throughout their duration.(4)

One finding that emerged was that, even when fully tested, off-the-shelf systems were implemented in the longer trials, the period after system installation was one of some turmoil. This suggests that, even though technology development in some of the OCS trials continued after system installation, the turbulence observed in these trials was due as much to the disruptive changes in general organizational and

work processes which all OA installations entail as it was to technology factors.

Furthermore, even proven, "stable" systems in the longer trials often behaved in apparently unstable ways, initially and for some time into the trials. Later, it turned out that this unstable behaviour was due at least as much to user factors as to technological ones. This implies that a similar factor may have been acting in the OCS trials. The ongoing technology development may not have been the sole factor in the technical instability apparent in some of the trials.

These observations about organizational turbulence and about the user role in technical system stability, lead us to speculate that, even though the ongoing technology development component made some of the OCS trials unique, the human impacts were, despite that, nonetheless typical of OA implementations in general. The suggestion is that it was mainly the absence of a longer usage period that limited the impacts observed in those trials, and that the presence of perturbations due to technology development may not have been as consequential as might be suspected.

2.0 HOW OA PRODUCES EFFECTS: AN AUTOMATION MODEL

Machines operate strictly according to rules embodied in their structure. In the case of the computer, which is the central and enabling technology in OA, the rules are those of pure logic, and these are used to operate on information which is in binary symbol form.

Telecommunications is another major component of OA because of its ability to handle binary information. This capability is especially evident in computerized telecommunications equipment which can transmit binary information with literally absolute fidelity.

The content of OA, or what it is about, then, is information which can be put into machine-usable form (ie. digitized). This is an expanding set, since, as time goes on, ways are being invented to digitize more and more kinds of information. And the basic processes of OA are (1) active manipulation of this information, strictly and exclusively in accordance with the logical rules which the machine can perform, and (2) passive handling of the information - ie. storage, retrieval, transmission, and reconfiguration into analog or human-usable form.

It follows that OA is useful only for events which are totally and exclusively rule-governed. Here, we

will use the term introduced previously, "procedural", for such events. Procedural events can be simple, such as dialing a telephone; complex, as in highly involved sequences of actions; or, in the most usual case by far, they can be sub-components embedded in a larger context where other essential components require human judgment and action.

An obvious use of OA is in a substitutive mode, as a new way of performing procedures which were previously done in some other way. This substitutive mode was what data processing was all about and it is usually the way OA is first used when a system is installed. If a system is used exclusively in a substitutive way, then traditional efficiency concepts and measures are applicable because the end "products" are essentially the same whether OA (or data processing) is implicated or not. These products can then be counted or measured, the costs of production before and after computerization can be calculated, and simple arithmetic can be used to determine whether or not automation is financially defensible.

A less obvious use of OA is with events which previously were performed, but not in a completely procedural (rule-governed) way. We will use "proceduralization" to refer to this transformation away from what was previously a non-procedural or semi-

procedural mode and into a more procedural one.

Stepping out of the office for a moment, good examples of proceduralization abound in manufacturing. Guns were once carefully hand-crafted. Machine manufacturing did not duplicate the detailed movements of hand-crafting. Instead, rule-governed machines, performing physical motions quite different from those of hand-crafting, produced the end product.

In manufacturing, the end product usually is, at first, essentially equivalent to the hand-crafted one. Thus, at an early stage of proceduralization by manufacturing, it makes sense to count the products, compare the costs and use the old justification model. Eventually, through continuous refinement, the product becomes transformed. It may become one which is easy to repair because of fully interchangeable parts, has very high reliability, etc. At that point, the product may be quite different in essential ways from one which was previously hand-made or that could be hand-made now.

By contrast to manufacturing, proceduralization in the office may produce transformations much more rapidly. The "products" may become non-equivalent to their "hand-crafted" form almost immediately. The before and after products are different ones, hence cannot

be compared by counting or by other simple measures. When this occurs, simple cost justification models just don't apply. We will deal with the justification issue for such cases later.

Finally, beyond substitution and proceduralization, a third way in which OA can operate is by providing new capabilities, so that it becomes possible to do procedural things that were simply not done before. Here it is even more obviously true than in proceduralization that older ways of justification are not at all possible. There are no easily comparable before and after events.

By "new", we do not necessarily mean "radically different" from the "old". Something which was entirely possible to do before but which was not done, because of inconvenience or high effort for example, would qualify as "new" in our usage if now, with OA or computerization, it was done. Most "new" things may be of this type.

We have outlined three kinds of outcomes when OA is implemented - direct substitution, proceduralization, and new capabilities. This three-fold classification refers only to the relationship between pre- and post-computerized work events and not to the nature of the work done by computerized equipment. The latter always is, and can only be, procedural.

OA should be understood not as automation of the office, but as automation in the office. In that meaning, the term is quite accurate and should pose no problems of acceptance.

There is no intended implication here, that the three categories of outcome are sequential stages, although, in specific cases, they may be. All three kinds of outcome are usually ongoing simultaneously. Even what appears to be substitution may really have components of proceduralization and may quickly lead to new capabilities.

We now turn to some of the key findings and recommendations about OA implementation that have emerged from the OCS trials and from the various other government endeavours in which we were involved, including the longer-lasting trials.

3.0 MEETING NEEDS

There may be situations where an organization without prior OA experience knows what it is after in considerable detail. A rational, well thought out plan of organizational change, which includes a large scale OA component, is followed and the organization winds up with a substantially satisfactory OA system on the first try. At the present time, this kind of scenario is probably very rare.

Actually, the beginning of something close to this very rare scenario did occur in one of the OCS trials. There, a particular organizational information function was chosen for computerization. The vendor was involved with the client department in a very extensive analysis and restructuring of the information function - a cleaning up before automation. Only after that did software development begin. The developing software was not a complete OA configuration; rather, it was something which could be embedded within a future integrated system. This was an unusual trial of the Program in that the aim was not integrated OA and in that the focus was clearly on a very specific, well-researched organizational function.

More usually, as evident in the rest of the government trials as well as in those reported in the general literature, there is, whether intended or not, a substantial and prolonged exploratory element when any OA system is introduced. Such exploration is entirely normal and fully appropriate given the present state of knowledge of organizational change and of OA.

Why this should be true is suggested by the automation model presented previously. Most people can easily envisage substitutive uses for OA in their own work set-

ting, especially now with so many case examples readily at hand in their proximate environment. The comment has been made that most people with little computer experience can think of only mundane uses for OA before its implementation.(5) These uses are substitutive.

The appropriateness of active exploration with OA is a function of the extreme difficulty for potential users in envisaging either proceduralization or new capabilities without hands-on experience in an actual work setting. Proceduralization requires looking at things which now demand human judgement and action and being able to see which, among these things or among their sub-components, can be done in ways which totally remove any necessity for uniquely human involvement and thus match computer capability.

New capabilities may be even harder to see in advance. This is true in part because some of these new capabilities imply ways of work, or goals, that have long since been rejected, if ever even contemplated, because they were impossible or extremely difficult to do. In the absence of direct, prolonged and active experience with a computer system, enormous mental, creative effort is needed to try to envisage either proceduralization or new capabilities.

Bringing in external or internal experts in organization or work analysis and in technology is certainly a pertinent approach in the face of user and organization inexperience with OA. Even then, it should be stressed that no one can ever understand an organization - its purposes, methods, goals and culture - like the people within it. A team approach, including user representation along with consultants is highly recommended.

Even after extensive analysis and consultation with a team approach, a pilot trial, using proven technologies, may be the best way to proceed. It is the least costly and most informative way to test whether a given system meets the real "needs" of organizations and of individuals within them. Preceding a first installation, needs cannot usually be known sufficiently well to justify a major financial commitment to a particular system no matter how much consultation and analysis has been done. A fairly long, say two year, hands-on period of experience with that system by a representative target segment of the organization is usually required first.

Needs will evolve and change, sometimes in surprising ways, when technologies are used. Discovering these transformed needs is one of the purposes of a

pilot trial. At their best, decisions about needs in advance of system installation will be approximations. Significantly closer approximations can be made after the experience of a pilot trial.

If funding bodies don't like the idea of a "pilot trial", it should be called something else. Regardless of what it is called, it's actually going to be a pilot anyway. A formal pilot usually differs from a full-scale installation only in size. And so, in a first installation, the choice is really between a relatively inexpensive learning process with a small pilot trial on the one hand, or a potential financial disaster with a larger scale system on the other hand, if, as is likely, the first system to be implemented turns out to match the work situation less well than is possible and desirable. Without sufficient hands-on experience, there is really no precise way to know how well-suited a particular system is for a given office.

4.0 TRAINING AND LEARNING

Training needs and time can be very poorly conceived by decision-makers who have not had relevant experience. Much grief can be avoided by calling in professional trainers. They should be brought in very early in the process, preferably as part

of the initial stages in OA planning.

In the cases at hand, such early involvement of professional trainers was done in some of the trials and these were the ones in which training never emerged as a problem. By contrast, in some other trials, the amount of time to devote to training was grossly underestimated and the scheduling of training was poorly related to system access.

Do you really need formal training in the first place? Can't people pick all this up with manuals and a little help from their friends? This is entirely possible if they are sufficiently motivated and if there are good manuals available and if they have friends nearby who are successfully using similar equipment.

All the trials we are dealing with were entirely new installations where the peer group were all neophytes. This precluded self-training. Actually, in one of the longer-lasting trials, a deliberate attempt was made to see if self-training could work. It was found it did not. The lack of a peer group with established system usage appeared to be the key reason.

It should be stressed that OA systems, after all, are complex and multifunctional, and are not to be compared with the single function technologies of the

past for speed of learning. Even the modern telephone, which is quite simple compared to OA systems, may have advanced features like call forwarding, call waiting and parking, conferencing, speed dialing, etc., and these take time much more time to learn to use than most people expect.

Unlike riding a bicycle, or other sets of motor skills, once an OA or other computer system is mastered, that mastery is easily lost with disuse or with new but conflicting or interfering learning. This is typical of cognitive skills, and, among other implications, means that training must be carefully scheduled in relation to active usage. Otherwise, much of the time devoted to training will have been wasted.

Once a vendor has a truly stable, thoroughly tested product as well as much experience in implementation, that vendor may be able to provide a complete package which includes training and trainers. This has been true with older technologies and may eventually be true with OA. It is not generally true now.

"Training" should not be confused with "learning". After training, people know what events to expect by performing a sequence of actions. Learning is how to incorporate these events into jobs and into fulfilling organizational purposes.

The suggested two years of a pilot project are mostly about learning. But, what is happening during the learning period? This is perhaps the central question about OA and will be the main focus of a later section.

The usual pattern is emerging as general cultural experience with computers and with OA grows. Training can proceed very much faster for experienced persons and for sophisticated organizations when new systems or modifications are introduced. People with prior exposure want to get into the learning and want or need less of training.

Once the organization has learned, the learning remains in place as people leave and newcomers arrive as long as there is some substantial continuity in personnel. After the system has been in place for some time, much of the training and learning for newcomers is transmitted as part of the organizational culture. This has always been the natural way things happen in organizations.

In time, as general computer sophistication grows, training in OA will no longer be a major issue. This doesn't mean that it will lose in importance. Rather, the culture and infrastructure to make it happen smoothly will be in place.

5.0 BUILDINGS, ENVIRONMENT AND ERGONOMICS

Environmental and ergonomic issues are extremely important. Again, experts are recommended and they should be brought in very early as part of OA planning. OA systems take up space, may need special furniture, generate heat, modify humidity levels, can require special cabling which a given building may not easily accommodate, may totally upset heating and cooling systems of buildings, can generate unacceptable noise levels, (from printers, for example), and may require new office layouts to deal with glare on monitor screens as well as with all of the above problems. These problems are consistently reported in the literature and were clearly felt in most of the government trials.

Public Works Canada is fully aware of the inadequacies of many present government buildings in the light of the new technologies. In fact, that department was heavily active in measuring environmental and building quality at one of the OCS trial sites. New government policies will be needed to deal with all these matters. In the meantime, these issues cannot be ignored in any OA implementation, regardless of the state of government policies, since the effects of the new OA equipment impinges directly and immediately on the work force.

6.0 WORK CHANGES

We now turn to the very central question of what is learned during the two year and longer period that seems to be needed before work and organizational effects of OA begin to show up.

As we mentioned, OA is typically used, at first, to simply mimic pre-OA procedures and patterns. In some of the OCS trials it was a conscious decision that this mimetic mode be deliberately followed. In other trials, no such deliberate decision was made but the same outcome followed anyway. It is not surprising that there was some persistent confusion between when certain work events should be done electronically and when in the older way. This confusion could be expected to disappear naturally given sufficient time.

We should emphasize too that most of the OCS and the other government efforts were trials. This meant exploration, but it also meant that the previous work methods had to remain fully available. The obvious reason is that it was not known what would occur after the exploratory trial period; hence the previous ways of doing work could not be abandoned. But also, in most cases, the users were not the whole of a coherent functional group within their branch but only a subset of one. They still had to interact with the larger

group and could only do so by using the previous means of work.

An additional fact is that the exploratory nature of the exercise meant that, in most of the trials, individuals were free to use or not use the new systems at their discretion and without pressure. This was stated explicitly to the potential users by most of the participating departments. It should be remembered too, that technology development was ongoing in many of the trials after the hands-on period had started. This sometimes meant that needed functionality was missing. Finally, and perhaps most crucial of all, the total trial period was far too short for stability of any kind to occur.

All of these factors together worked very strongly against individual and organizational learning and, therefore, against meaningful long-term impacts becoming evident. Assessing impacts under these conditions is analogous to trying to evaluate a new house from the occupants' point of view where the house is based on very advanced architectural concepts foreign to the occupants and the assessment must be done on moving day while construction is still going on.

Despite all of this, the beginnings of some general patterns of effects could be seen in the OCS trials. The availability of data from

the longer-lasting trials in other departments greatly aided seeing and interpreting these patterns.

Except at the one site we briefly discussed, where an explicit, planned, organizational change in an information function was being pursued, the substitutive, mimetic mode tended to predominate in the OCS trials, as we have mentioned. In some trials, the hands-on period was too short for usage of almost any kind to be established. But in others, and in the longer-lasting trials, proceduralization and new capabilities were beginning to emerge.

As an example, answering written inquiries from the public occupied substantial time at one site. Before the OA system, replies were hand-drafted by officers, passed to secretaries for keyboarding, and the usual cycle of re-drafts and corrections followed. The officers then began to do their drafts using the word processing package made available on the new system. Only the final polishing was left to the secretaries who were on the same system.

Gradually, the high degree of similarity among inquiries and replies started to become very evident. The officers had been aware of this previously and did consult their own past correspondence before the new system arrived. But the de-

gree to which this was done was limited and each reply tended to be treated in a relatively unique way.

Since access to stored material was so easy with the new system, reference to previous replies increased. Soon, a form of boilerplating came to the fore. As time went on, the officers tended to turn over more and more of the inquiries to their secretaries who could handle them completely since the boilerplating was becoming routine. The officers could then focus on inquiries which were more truly unique and also on other high priority business.

The net effect was that the secretaries were now doing work at a higher responsibility level than before, answering most of the inquiries. The officers were able to concentrate more of their time on higher priority matters. Increased efficiency was easy to document since, at peak public inquiry times, no additional staff was needed unlike before. But thinking of the change exclusively in efficiency terms tends to miss some major points.

Beyond efficiency in correspondence handling, the freeing of officers' time and its re-investment in fulfilling central missions and goals of the organization were the truly consequential gains. Also the secretaries' jobs, by their own assessment, were up-

graded because they were now doing more responsible work. Simply measuring the correspondence flow would miss these larger effects as well as the consequent boost in the quality of working life which both officers and secretaries agreed had happened.

Skeptics might suggest that boiler-plated correspondence means decreased quality. This is not necessarily the case. If, indeed, a great many inquiries fall into standard patterns, they do not warrant highly customized replies. One could go further and suggest that a small amount of polish applied to a boiler-plated document (which has already been highly polished) can produce a higher quality final document than one produced from scratch. What has happened to correspondence here, is that something which was done in a non- or semi-procedural way, relying heavily on human judgement, was proceduralized so that less unique judgement was needed.

Another example from one of the trials is the use of in-house electronic mail to relay short items of information within a peer group. These bits of information were not communicated at all before due to ongoing pressures of other time-consuming matters. This could be considered a new capability. Such information could have been

shared without the system, but was not because of inconvenience.

The more general picture that is implied is that OA does not necessarily produce radical changes - certainly not at first. What seems to happen, and this is quite consistent across those trials where effects were starting to show, is that relatively small bits and pieces of work methods get changed. The number of bits and pieces gradually grows as the result of a slow discovery process. At some later point, the net cumulative effect will only then be seen as a large change, a true overall transformation in ways of work.

During this two year plus period, then, what is happening is the gradual development of applications appropriate to the needs and wants of particular individuals and organizations. The users, individually and collectively, go through a path of discovery. They are stimulated by the presence of computer capabilities to systematize, proceduralize, and to think of new kinds of procedures appropriate to their specific situation. After they have gone far enough down this path, reversion to the older ways would be seen as a retrogressive step by all concerned.

Let's remember that we are dealing with offices which are towards the non-procedural end of the con-

tinuum. When work is proceduralized in such offices or when new procedural capabilities are introduced, the major effect will be new patterns of work with re-channeling of time into the main business of the organization. The main business requires uniquely human and non-procedural, judgement, thought and action.

7.0 JUSTIFYING OA

One of the OCS trials was especially interesting since it was the only trial where an attempt could be made to measure productivity in a traditional way. The work of professionals at this trial site was of a quasi-legal type and consisted of judging the disposition of cases on the basis of regulations and past precedents. A performance monitoring system was in place whereby the number of cases processed per unit time was tracked for each employee. The attempt was made to compare the number of cases processed in two comparable time periods, one year apart. The second time period was one during which the OA system was in place.

The results showed no differences in productivity between the two time periods, but this was not at all surprising. For one thing, the OA system was hardly used at all, partly because some needed functionality was missing. At least as impor-

tant was the crucial time factor that we have previously stressed. The trial period was far too short to allow for long-term learning to occur.

The intriguing thing in that trial was the way the performance monitoring system was used. When any professional came upon a case which would require deeper research than normal, that person was taken off the monitoring system for the duration of the research. Thus, on the one hand, the work was treated as procedural for "average" cases, but on the other hand, it was recognized that there were other cases that had to be treated uniquely as quite non-procedural.

Presumably, a successful OA system in that situation would address the many proceduralizable components of work - for example, rapid access and retrieval of information about regulations and precedents.

This trial and its monitoring system illustrate the point that procedural and non-procedural are end points on a continuum with most offices and office work falling somewhere in between the extremes. Classifying offices or work is not too interesting. What is more important for OA is discovering what can be proceduralized, and what new procedures can be devised, regardless of the office or the job.

We have already discussed the situation where work is so highly procedural that data processing principles and methods can be applied. There, quantitative productivity concepts and simple cost justification approaches can be used. In less highly procedural work, the pattern that we have previously suggested may become dominant; namely as elements of work are proceduralized and new procedures are devised, the time and effort of individuals will shift toward the non-procedural aspects.(6)

What this means, by contrast with highly procedural work, is that the nature of the "outputs" of the work will change and quantification by counting or measuring will make less sense, if any at all. Theoretically, a cost-benefit analysis could always be done. The cost side is comparatively easy. The benefit side may, in practice, be impossible because it requires being able to place a dollar value on the outputs of an office, or a job, before OA, and then also again on the transformed, new products after OA.(7)

While a "value-added" technique has been developed for measuring the dollar implications of OA in non-procedural work, that method is a very indirect one which identifies neither benefits nor costs but only the net effect of both on profit and loss statements.(8) Except

in unusual kinds of situations, the method is not at all applicable in governments or in other non-profit organizations. So far, evaluating the benefit side in dollars has totally defied the best of efforts and some knowledgeable observers have simply concluded that OA cannot be cost justified.(9)

Instead of trying for an impossible cost justification, perhaps the best that can be done is to document comprehensive descriptions of what changes to operations a given OA implementation has yielded. One could try to "prove", in whatever seems the most convincing way, for each item of claimed change, that the change was actually obtained. After that, normal human (non-procedural) business judgment, rather than arithmetic, could be used to decide whether or not the demonstrated, described benefits are worth the costs of OA.

This sidesteps the presently unanswerable question of the dollar value of benefits, but it does focus on clear identification and demonstration of those benefits in detail. This means that each specific situation will need an individually tailored justification. The future for consultants is bright in this scenario; however, general checklists and cookbooks will, no doubt, arise.

As the number of OA installations increases, it may become entirely self-evident if OA has undeniable benefits. If that point is reached, the cost justification issue may simply disappear. This will be the case if and when an office will be as obviously impeded in its operation without OA, as it now would be without a telephone or xerox machine.

8.0 WHAT'S NEXT ?

A legitimate question is, why is OA not now so obviously beneficial that the justification issue hasn't disappeared? Two answers to that question will be provided here. The first is that the technology still has to make major gains in one vital ingredient, namely communications. Networking among local machines of a given system, let alone among different systems in remote locations, is not yet easily done due to a lack of hardware and software standards.⁽¹⁾ This means that distribution and retrieval of information remains a major bottleneck. Distribution and storage of paper still dominates yet is colossally inefficient and cries out for the electronic solution.

The major world vendors, governments, and other groups are actively working on these crucially important communications problems and this work includes a strug-

gle to reach agreements on various standards and protocols. One hopes that the general technical solutions will be in place soon.

The second answer is that, for a great many people, OA now IS so obviously beneficial that the justification issue HAS disappeared. These are the people, including many of the participants in the OCS and other government trials, who are now actively using the new technologies and to whom it is transparently clear that there is no turning back. They are not only committed and enthusiastic users, but are active seekers after still further evolutionary developments. The transformation of the workplace has advanced considerably since the time that the OCS Program was started. There are no sharp, revolutionary discontinuities here. Seen in the long perspective, the progression is quite steady.

(1) Abt Associates of Canada, Toronto; Engel & Townsend, Toronto; Socioscope, Ottawa; Wescom Communications Studies, Vancouver

(2) a consortium headed by Prof. Susan Clark of Mount St. Vincent University

(3) Panko,R.R. Office work OFFICE TECHNOLOGY AND PEOPLE, October, 1984, 205-238

(4) Many thanks to Brian King of the Bureau of Management Consulting and to Wayne Atkinson of Peat, Marwick and Partners for access to their assessment reports

(5) Johansen,R. & Baker,E. User needs workshops: a new approach to anticipating user needs for advanced office systems OFFICE TECHNOLOGY AND PEOPLE, April, 1984, 103-119

(6) Grusec,T. Office automation in government offices: "productivity" and other myths OPTIMUM, Fall, 1985, 7-24

(7) Silver, I.R. Creation of a cost/benefit evaluation framework for Office Communications Systems OCS REPORT, Feb., 1984

(8) Strassmann,P. INFORMATION PAYOFF, Macmillan,Inc., N.Y., 1985

(9) Hammer,M. The OA mirage, DATAMATION, February, 1984

(10) Computers: When will the slump end?, BUSINESS WEEK, April 21, 1986, 58-66