

PRODUCTIVITY PROGRAMMING:
PERSPECTIVES FOR A PERIOD OF RETRENCHMENT

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Under the pressure of cutbacks many Program Directors and their staff will try to increase program productivity, so that as many clients are served as possible. It is important therefore the PD's understand the different kinds of productivity strategies that may develop. In particular I believe that managers and administrators make two kinds of errors in developing such programs. First, they underestimate the significance of organizational strategies. For increasing individual productivity, second they underestimate the significance of effectiveness increasing as against efficiency increasing strategies.

Effectiveness

Let me explore these distinctions in greater detail.

Efficiency is a measure of the relationship between inputs and output under the assumption that the activity or service is appropriately targeted--that is the service fits with the manifest need of the client. Effectiveness in contrast, is determined by the fit between the service delivered and the client's need. If the client appears with a straight-forward divorce problem, the service may fit poorly with client need that is, it is delivered ineffectively: if (a) too skilled a lawyer is used, (b) too complex a strategy is developed for the case, (c) an excessive amount of information is collected and filed. Effectiveness determines the framework within which the service is developed, efficiency measures the productivity of resources expended within that framework, such as cost of data processing, down time of various resources and, the appropriate combination of "labor" and "capital."

How do we know if a service is being delivered effectively. I want to suggest the following heuristic definition. An organizational design

promotes effectiveness, when all the salient differences between different kinds of client problems are mirrored by differences in legal practice.

Thus as in the above example. it is ineffective to develop a complex strategy or collective excessive information when the divorce problem as a case type can be effectively solved with fewer resource. To be sure, there is no objective definition of "effectiveness", for effectiveness and quality are clearly linked. It is possible that a lawyer can commit much time and effort to an apparently "simple" divorce case, discover some distinctive aspects of the case and so increase the quality of delivery. Yet the PD or staff as a whole makes the judgement either explicitly or implicitly, that relative to other case types and available legal resources, such on extra effort should not be expended. The possible gains in effectiveness do not outweigh the possible losses of effectiveness in dealing with other cases. A program thus operates with effectiveness if (a) it recognizes, though protocols, procedural guidance, training and supervision a continuum of case types, (b) it deploys program resources in a manner consistent with this continuum.

When such a continuum does not exist and/or it is not matched by an appropriate deployment of legal resources, there are two possible consequences.

- (1) Too many program resources are spent on a particular case so the service is unproductive
- (2) Too few resources are spent on a particular case so the service is of a poor quality.

In the former case there is an immediate or "short-term" loss of real resources, in the latter there is a long-term loss of real resources as the viability and credibility of the program drops.

The following diagram demonstrates the relationships between ineffectiveness and resource loss

		<u>Ineffectiveness</u>	
		Too many resources committed	Too few resources committed .
Short-term losses	waste	quality decline	
Long-term loss	underutilized skills, lack of professional growth, staff turnover	staff turnover-burn-out decline in ability to <u>mobilize</u> resources for the long run	

Efficiency

Efficiency in contrast measures the ratio of input to output within some effectiveness framework. Thus for example, once the program has a procedure, protocol, supervisory system or professional norm that regulates the disposition of legal resources to divorce cases, we can ask if this disposition is done with efficiency. Are, for example pleadings unnecessarily duplicated, do attorneys spend a lot of time waiting for clients, is equipment (typewriters, duplicating machines), efficiently used?

I can demonstrate the differences between these two concepts by showing what kinds of questions one asks to improve each.

Effectiveness questions to ask:

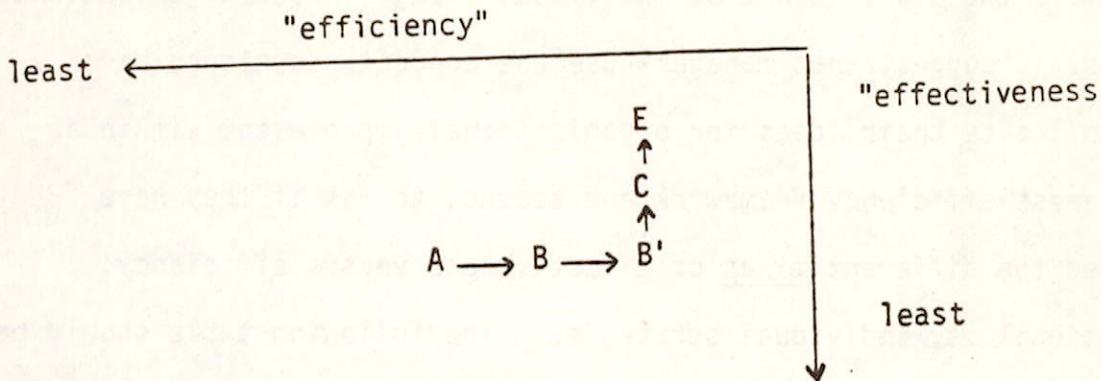
1. Are resources (human, capital) targeted appropriately or:
 - a. Are salient distinctions in the types of cases understood?
 - b. Are these differences mirrored in organizational practice?
 - c. Are legal skills sufficiently developed to match the salient differences in case type?

Efficiency questions to ask:

1. Are resources (office equipment, information, workers' time) appropriately combined?
2. Is the "down time" of different resources kept at a minimum?
3. Are materials purchased at the best possible price?

A productivity program

In developing a productivity program staff will want to increase both the effectiveness and efficiency with which it organizes its work. The following figure shows how staff can conceptualize combining efficiency and effectiveness measures.



Figure

Let point 'E' be the point of maximum effectiveness and efficiency.

A program is at point 'A'. To improve effectiveness it first moves to point B by changing organizational practice. It does this by substituting phone work for a certain proportion of face to face work in serving clients. Staff judge, that they can effectively serve clients with simple cases through phone consultation alone. In this way they plan to save on lawyer time costs and office expenses. It further increases effectiveness through a move to 'B', by increasing legal skills. It does this by developing a supervision system within which "appropriate strategies" by case type are emphasized. It moves to 'C' to increase efficiency, by developing and using a document retrieval

system to increase the speed with which particular documents can be located. Finally, it moves to 'E' to further increase efficiency by reducing the "down time". of lawyers time. It does this by improving the scheduling system through which lawyers and clients are brought together. The first two moves, B and B' are effectiveness increasing moves, the latter two, C and E are efficiency increasing.

The Strategic Mix in Productivity Programs

I suggested that, Managers and administrators often make two kinds of errors in developing "productivity programs." They underestimate the significance of effectiveness versus efficiency programs and they overestimate the significance of individual change versus organizational redesigns. I suggest that managers use the concepts developed here first, to locate their ideas for organizational improvement within an effectiveness-efficiency framework and second, to ask if they have considered the different mixes of effectiveness versus efficiency; organizational vs. individual strategies. The following table should be helpful in evaluating a particular set of policies or strategies for productivity improvement.

Productivity Strategies

	Individual	Organizational
Efficiency	work methods Taylorism 1	Cost Control scheduling substituting capital for labor 2
Effectiveness	training supervision 3	Organizational redesign the targeting of services. 4

Box one is the traditional "make them work harder strategy" identified most often with crude Tayloristic approaches to productivity. Box two is associated with the recombination of resources (e.g., the substitution of office machines for clerical help), box three is associated with individual training and education and box four is associated with organizational redesigns which improve the fit between resource use and client profile or need.

Strategies in each box might be:

Box 1:

1. Increase case-load quotas
2. Time management
3. Faster turn around time for documents/letters, fewer errors
4. More efficient division of labor-standardization of certain decisions/routines/activities

Box 2:

1. Purchase of word processors - link up to automated pleading bank production process
2. Greater control of over purchases - shift to bulk purchase, when items are on sale, elimination of slack resources, reduction of unnecessary overhead.
3. Reduction in idle time of workers through scheduling systems.

Box 3:

1. Better training/socialization of new entrants
2. Focused supervision on time/resources spent per case-type.

Box 4:

1. Review of resources spent per case type - identification of areas of under, over expenditure of legal, non-legal resource.
2. Reorganization of services, greater use of phone work, client self help.

3. Redeployment of geographic coverage - satellite office structure and circuit riding

It is a good rule that a robust strategy for improving organizational performance will draw strategies from all four of these boxes. Excessive reliance on one kind of strategy to the exclusion of others indicate that opportunities for improving productivity and performance have been missed.

PRODUCTIVITY IMPROVEMENT EFFORTS
IN LEGAL SERVICE PROGRAMS:

A FRAMEWORK FOR ESTIMATION

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I. INTRODUCTION

Program staff facing budget cuts want to manage and staff their programs in the most efficient manner. In order to develop effective efficiency/productivity policies it is important for staff to develop a rough understanding of the impact of different efficiency measures. Thus, for example, staff often hope to save much on "administration" but since administrative personnel costs are only about 12% of total program costs, even a 50% increase in efficiency (which is nearly impossible to attain) will only reduce total program costs by 6%. In the following paper I develop a framework for estimating the likely impact of different productivity policies. I used data from both legal service and non-legal service sources, though sometimes I must guess the value of certain magnitudes because no published or unpublished data is available. Nevertheless, I believe that the results provide both a rough and ready guide as to what program staff can expect and a framework through which staff, by supplying their own data, can produce more refined estimates. The paper is divided into three sections. In the first, I provide estimates of productivity gains from efforts in other services, in the second I develop a framework for estimating efficiency gains in legal service programs and in the third I examine the meaning of my results.

II. PRODUCTIVITY PROGRAMS IN THE SERVICE SECTOR

To estimate gains from productivity or efficiency programs, it is important to get a sense of how much and through what methods productivity has improved in other services. The table below lists a range of productivity improvement programs and their consequences. I obtained them by reviewing relevant issues of the Public Productivity Journal.

PRODUCTIVITY IMPROVEMENT PROGRAMS

ACTIVITY	MEASURE	PROGRAM	RESULTS
Clients waiting for Food stamp applications/information	Staff time to serve clients	Appointment system for clients	Staff time falls by 43%
Social Security processing in Washington, D.C.	No. of staff	- Automation - Telephone - Advice	5% a year for 10 years
Topography Division	Miles mapped per man year	- Capitalization - Computers - Visual aids	5% a year, five years
Bureau of Customs	Processing of foreign mail	- Specialized facilities to separate cargo from letters	3% a year for 11 years
Sanitation Collection	Dollars budgeted	- Balanced routes - One foreman in charge of a particular area - Crews in a particular area have only one foreman	7% a year, less funds for 3 years
Custodial	Cost within measureable standards	- Careful study of standards and work processing - Contracting-out with budget specified in the RFP	50%
Making sandwiches in a cafeteria	Time	Time-Motion Study	50% time reduction
Labelling of books	Time	Time-Motion Study	52% time reduction
Teaching students in a college -- scheduling classes	Number of professors that must be paid extra to teach in summer	Flexible scheduling system, time modules of varying lengths	16% reduction in costs

As the table indicates, productivity improvement programs produce a wide range of results. It is useful however, to distinguish between three levels or kinds of effort. At level one productivity can be improved by changing the way a particular workpiece is processed and moved. These programs most resemble classical time-motion study and work best where the managers and staff examine only a small piece of work flow. The method is most applicable when the work flow is organized by routine activities and produces clear physical changes in a particular product or paper. It is not useful when the activity is organized by discretionary decisions and produces ideas or services.

At level two, productivity can be improved by changing the pattern of coordination between distinct activities, e.g., the matching of client interviews with professional schedules, students with teachers, police patrols with the expected time patterns of criminal acts. These programs examine the frequency distribution of different interconnected activities and makes changes in scheduling (who should be where, when), scheduling systems (from first come first serve, to appointment) or the geographical disposition of resources -- (all inspectors must be placed in decentralized sites, sanitation teams should be deployed in the following way, etc.). Such productivity programs have greater systemic impacts than the programs of level one since they entail, at minimum, the coordination of two distinct units, each with its own distinct work flow and support requirements.

At level three, productivity can be improved through the significant capitalization of the activity, e.g. automated data processing, the construction of new sites, tools, equipment, the investment in holding equipments, sorting systems, etc. Such programs typically entail entire offices or programs, require substantial funds, and have long term rather than short term

affects. Economic history suggests that level three programs are the only way to sustain long term productivity gains. The table reveals a pattern of relationships between three levels. Level one can achieve the highest gains in the quickest time (less than a half year), level two, significant though less dramatic changes, level three, the lowest yearly but the most sustained and continuous change over time .

Nonetheless, it is likely that the overall impact of these efficiency efforts to the program as a whole will be just the reverse because the lower the level of the productivity program the less systemic is its impact. Thus for example, the ratio of direct linear physical work flow processes to the total processes in a service organization will be quite low. A level one program will, for example, have minimal impact on professional productivity. Similarly, level two activities can improve productivity through better coordination but once optimal coordination is achieved, no further productivity gain is possible. Continuous increases in capacity can be obtained only through extensive capitalization. Level two makes better use of existing resources; level three adds new resources.

Finally, each level of productivity improvement faces different degrees of implementation difficulty. In general, the more systemic the program, the longer the time it takes to implement the program and the greater is the likelihood that political and interpersonal forces will inhibit program development. The following table reorganizes the entries in the first table to emphasize these differences between levels of productivity improvement efforts.

TABLE OF
IMPLEMENTATION ISSUES

-526-

Level	Range of Improvement	Time	Implementation Difficulty
I			
- Custodial - Sandwich making - Labelling books	50 - 52	Short run	resistance of workers to speed-up
II			
- Food Stamp Application - Teaching Schedules	16 - 43	Gain over one to three years	Integration of two departments or activities requires much discussion, appreciation of each group's work-reality by other groups
III			
- Social Security - Topography - Bureau of Customs	3-5% per year	Long run gains	Needs much capital, may displace workers

This analysis thus suggests that:

1. Immediate gains may be obtained from the more intensive use of existing resources.
2. Intermediate but more systemic efficiency gains may be obtained from the better coordination of resources.
3. Long term and program wide gains may be obtained from a significant infusion of capital resources.

I describe these methods (in order) as processes of intensification, rationalization and reorganization, intensification because people are working harder, rationalization because people are working "smarter" and reorganization because people are working differently. Capital investment is most often the driving force behind the most systemic changes, but in service systems, such changes may also be obtained through redefinitions of the service (e.g., from curative to preventive) or significant changes in the deployment of consumers, professionals and paraprofessionals in the service production process (e.g., self-help versus professional help). In developing a productivity improvement program for legal services, staff will want to be sensitive to the distinctions between these three levels. I believe that ultimately, reorganization strategies based on service redefinitions, capital infusion and the redeployment of lawyers, paralegals and clients in the service production process will prove to be the most long run viable method for increasing and sustaining productivity.

III. ESTIMATING PRODUCTIVITY GAINS

In this section I present a method for estimating possible gains from efficiency programs and develop rough and ready figures for calculating the results of such programs. I examine efficiency programs for a) administrative staff, b) secretarial staff, c) professional staff, and d) four non-personnel expenses (travel, purchasing, telephone and training).

Increasing Administrative Efficiency

Program staff will want to improve the efficiency of its administrative and support system. Two facts must be kept in mind. First, as I argued in the introduction, administrative costs only come to about 12% of total program costs on the average. This means that a 50% improvement in administrative labor productivity saves only 6% of the total budget. Second, improvements in the support system are often intertwined with changes in the organization of legal work. Secretarial productivity can be improved with a word processing system, for example, but this will most often mean a change in the way in which the lawyers themselves work.

With this caveat in mind let me first briefly explore some of the ways in which administrative productivity might be increased and then develop rough estimates of the likely gains from efficiency programs.

No program can improve its administrative productivity unless it knows how administrative personnel use their time. There is little aggregate data on this issue, but the following chart on the distribution of managerial time between activities in industry is suggestive.

Managerial Work Distribution

<u>Activity</u>	<u>Percent of Time</u>
Meetings	59%
Unscheduled Meetings	10
Desk Work	22
Telephone	6
Tours	3

As the chart suggests, close to 75% of managerial time is simply spent talking, either in scheduled and unscheduled meetings or over the telephone. The data apply to upper level management. Let me make the arbitrary assumption the program administrators in Legal Services programs spend only 50% of their time talking with a corresponding increase of 20% of their time writing at their desk (in general, the higher the level of the manager, the greater the proportion of his or her time is spent talking).

Modified Table for Administrators

<u>Activity</u>	<u>Percent of Time</u>
Meetings	40%
Unscheduled Meetings	10
Desk Work	41
Telephone	6
Tours	3

Experience to date suggests that organizations can increase the productivity of these activities by (a) investing substantial sums in capital programs that make communications more efficient (e.g., answering machines for telephones, and electronic mail systems to replace memo production and circulation), (b) management techniques to increase the productivity of scheduled meetings (e.g., clear agenda setting, leaving "small business" to the end rather than the beginning of a meeting, holding meetings in the late afternoon rather than in the mornings, training staff to function as facilitators, etc.), and (c) better time-management techniques, (e.g., going through a piece of mail only once, introducing office quiet times, etc.).

Telephone communication can be made more efficient through moderate capital improvement programs. Analysts suggest that up to thirty minutes a day of a managers time is wasted on incompletd calls, call backs waiting time on the phone, etc. In a seven-hour day this comes to 7% waste of time. Aswering machines can resolve these problems in those settings, where staff spend much time talking with one another on the phone. Many messages do not require immediate responses, but can be delivered onto the machine and answered later by the recipient of the message. Programs might investigate the pattern of their phone use to discover if in fact lawyers are spending a lot of unproductive time on the phone with other staff. This might prove particularly relevant for large state wide programs, but less significant for smaller single-site programs.

Electronic mail systems require much more substantial capital investments but can significantly reduce the cost of memo production. Office culture dictates that memos must be error free and in office English even if they are for internal purposes only. This means that a manager must draft the memo, have a secretary type it, go over it for corrections, and then have it retyped, a process which can consume close to half-hour in total time(working and cuing)per memo for the lawyer and secretary. In electronic mail systems, messages are typed directly into terminals and sent to the designated recipients. The memo thus takes on a more informal flavor, can be written quickly without attending to perfect appearance and can be sent to others without going through the steps of copying, filing a master, and putting it through the mail room (or placing it in mailboxes). Programs however can only increase the productivity of memo systems if they invest in a word processing and terminal system which is then modified to function as an electronic mail system.

Finally, as the chart indicates, I assume that writing takes close to about 40% of a manager's time. Writing productivity depends on two processes: initial draft production, and the correction process. There is good evidence that dictation machines can speed up the first process, where the administrator can adapt to its use and secretaries can comfortably type from a tape. Professionals often resist dictation because methods of composition are deeply ingrained in one's training and education. But again, distinctions between types of writing are important. Internal documents can be written with less attendance to form and style (unless they address delicate program issues) so that conversational English is suitable. Here, changes in office culture are as significant as improvements in technology.

Let me provide provisional estimates of the gains to improvements in administrative productivity.

(Some of my assumptions will be subjective or arbitrary, but data precision is less relevant here than is the framework for estimating productivity. Moreover, some of the changes are interdependent. Thus for example, some companies report that electronic mail systems actually reduce meeting time since communication of general news can be organized through the electronic mail system. Similarly, if dictation is combined with the phone system, then staff can dictate from any push-button phone (whether at home or in the office) substantially increasing the flexibility of the work system .

If scheduled meeting time takes up 40% of an administrator's time, then in a 35 hour week, 14 hours are spent in such meetings. Assume that 2 hours of this time is spent in scheduled large staff meetings a week, and two hours in small staff meetings for a total of four hours of regularly

scheduled large meetings. A remaining ten is spent in irregularly scheduled meetings as work requirements dictate. On the basis of my experience, poorly organized meetings only go through half their agenda often leaving the most important work unfinished. Thus assume that good meeting behavior doubles the productivity of such meeting time so that all important work is completed by the end of the meeting. This means that one meeting can do the work of two, or meeting time is cut in half.

Assume, however, that the irregularly scheduled meetings entail fewer people and are more focused so that better meeting techniques improve efficiency by only 25%. Applying these efficiency weights to the distribution of meeting time between regularly scheduled and irregularly scheduled meetings we have:

$$4/14(.5) + 10/14(.25) = .32$$

or about a 1/3 increase in the efficiency of meeting time. Assume finally, that unscheduled meetings which take up ten percent of an administrator's time become similarly more efficient, e.g. by one third. This means that meeting time efficiency will improve by a total of

$$.40 (.32) + .10(1/3) = 16\%$$

With respect to the telephone, I have already argued that waiting time on the phone wastes 7%. Since telephone time takes 6% of an administrator's time, gains from using answering machines and automatic redialing systems come to

$$.06(.07) = .4\%$$

Finally, with respect to writing time, improvement in productivity due to dictation will be a function of a) the ratio of memo to report

writing, and (b) the ratio between composition time and correction time in writing either a memo or report. Let me make the following assumptions:

- (a) In writing memos, composition time takes 3/4 of the time to produce the memos, correction takes 1/4.
- (b) In writing reports, because of their greater complexity, composition takes half and correction takes half (here correction entails not only catching typos, but also recomposing).
- (c) The ratio of memo writing to report writing before dictation technology is applied is 1/3 to 2/3.
- (d) Dictation improves the efficiency of composition time by half.

With these assumptions the time cost of memo writing goes down by $3/4(1/2)$, of report writing $1/2(1/2)$ and the total cost of writing time goes down by

$$.33(3/4)(1/2) + .66(1/2)(1/2) = 28\%$$

The following table summarizes the efficiency gains from the administrative productivity program.

Gains in Administrative Productivity

Activity	Significance in Administrator's day	Efficiency Improvement in activity	Method	Time Frame to implement	Efficiency improvement of administrative day
Telephone	6%	7%	-capital program answering machines	medium run	.4%
Meeting (Scheduled)	40%	32%	-time mgt. -agenda setting	medium run	12.8%
Unscheduled	10%	32%	-leadership	medium run	3.2%
Writing	41%	28%	-small capital program, habit change	medium to short run	11.4%
Total					27.8%

Adding the column figures gives a reduction in time of 27.8%. Since an administrative costs of total budget costs are about 12%, this comes to a savings of 3.3%.

Support Staff/Secretarial

Program staff will naturally think about increasing secretarial productivity as a method for improving program efficiency. Great claims for word processing have been made, but as the chart below shows secretaries spend only 20% of their time typing. Even if they double their typing productivity they increase their overall efficiency by only 10%. Exact gains from secretarial processing are

TALK FACE TO FACE 8%
TALK ON TELEPHONE 8%
CLERICAL 13%
PHOTOCOPY MESSENGERING 20%
COFFEE AND PERSONAL-- 2%
FILING 2%
WAITING FOR WORK 18%
MAIL 4%
DICTATION 2%
MISCELLANEOUS 5%
TYPING (20% of day)

Distribution of Secretarial Time

difficult to determine, estimates range from 50 to 300% (the latter figure seems to be based on typing pool designs which have long run quality control and morale costs associated with them).

A report of the impact of word processing on the lawyers to secretary ratio in a private law firm suggests that word processing may reduce the secretarial staff by 14%. Under the assumption that secretaries spend 20% of their typing this is consistent with a typing productivity gain of only 16%*, equivalent to the gain reported in simply using typewriters with correcting tape. Clearly, document complexity is a factor here. If the secretary must

* 'X' secretaries create .2X units of secretarial typing so that a 14% reduction in secretarial staff creates .86(.2)X secretarial typing units. If these units of secretarial help type as much as before the reduction, then their typing productivity must rise by $.2X / .86(2)(X) = 1.16$, or a sixteen percent increase.

still type from a handwritten or type written first draft to enter the document into the processor then productivity gains will only come at the correction stage. At this stage retyping will be faster only if the corrections entail substantial reorganization in the structure of paragraphs. (Optical scanners, which read rough draft typing right into the processor may prove critical here to substantially increasing typing productivity. If optical scanning is not used then typing productivity will rise only if professionals have their own private terminals and do their own typing. Secretaries will become editors, and office equipment "managers".)

Data here are unreliable but let me propose the following framework for efficiency assessment.

- (a) In simple memo production, first draft typing takes 2/3 the time for memo production, and correction takes 1/3 the time.
- (b) In complex report/brief production the figures are reversed, 1/3 for initial typing, 2/3 for correction.
- (c) The ratio of simple to complex before the application of the processors is (as we assumed in the writing case) 1/3 to 2/3.
- (d) Word processing - decreases initial typing time by only 10% but correcting time by .50%.

With these assumptions typing time will fall by

$$\begin{array}{r}
 1/3 \quad 2/3(.10) + 1/3(.50) \quad + \quad 2/3 \quad 1/3(.10) + 2/3(.50) \\
 \text{Memo-simple} \qquad \qquad \qquad \text{Brief-report complex} \\
 1/3 \quad .236 \qquad + \quad 2/3 \quad .36 \qquad = 32\%
 \end{array}$$

That is secretarial typing is reduced by 32%, or productivity rises by about 50%.*

* A Federal study on work processor productivity gives a range of 0 to 150% increases in typing rates over self correcting typewriters depending on the proportion of lines revised. The average comes to 62%.

I do not have the figure on the national average of secretarial costs in relationship to budget in legal services programs (aggregate tables give data only for secretarial and support staff). National average for all white collar groupings in the economy suggests that secretarial costs come to about 6% of personnel costs. Applying this ratio to programs suggests that secretarial costs are about four percent of total costs. This seems too low. A legal service program is probably more secretary intensive than many other services and offices because of brief production. Non-professional staff costs are about 20% of total budget. Assuming between 12% for administrative staff that leaves eight percent for secretarial and clerical and therefore six to eight for secretarial. Let us therefore assume a rough average of seven percent for secretarial costs as a proportion of total budget costs. Assuming then that their typing time falls by 32%, program costs would fall by $.07 \times .32 \times 2 = .4\%$ of budget. Clearly any larger, more substantial gains from the use of secretarial time must result from a more comprehensive review of their overall activity, particularly photocopy time, time spent waiting for work, telephone answering time etc. Here savings on secretarial labor cannot be separated from a substantial reorganization of professional work.

Thus for example, the above chart indicates that waiting for work accounts for 18% of secretarial time. Now not all idleness can be regarded as inefficiency. Few people work continuously over an eight hour days unless supervised within a strong system of management control. Even under these conditions workers develop informal agreements about a fair day's work and punish "rate busters" who work beyond that normal standard. Only assembly line pacing can eliminate this "soldering," and here too fast a pace will be counter-productive as rates of errors go up. Let me then make the more realistic assumption that only half of the 18% can be attributed to poor managerial control. In these situations the secretary is not willfully idle,

but rather poor systems of organizing, distributing and predicting work flow lead to either excessively long waiting lines for document production or idle secretaries. Thus if better work flow management reduced waiting time by half its value we would get an efficiency gain of $.07 \times .18 \times .5$ or 6% of the budget. Summarizing then we can expect the following gains from improving secretarial productivity.

Secretarial Efficiencies

Program	Gain	Savings in secretarial cost
word processing	32% efficiency	$.32 \times .2 = .064$
better control over work flow/prediction of load	.50% of efficiency	$.5 \times .18 = .09$
		Total 15.4%

Since I have assumed that secretarial costs are about seven percent of total costs this gives a 1.1 percent cost savings budget in the overall program.

Professional Productivity

Generally two methods are proposed for improving lawyer productivity in particular and professional productivity, in general, are major capital investments in computer technology which support professional decision-making, or the substitution of paraprofessionals for professionals. Let us look at the latter first. On the average, program staff work with a ratio of about two attorneys to one paralegal though the ratio might vary from 1.75 attorneys to a paralegal to 2.5. In contrast to other service systems however, the salary difference between the two groups is not great. It will vary across regions to be sure, but a ratio of 1.7 to 1 for lawyer to paralegal salary is

a good approximation of a national average. (This salary differential reflects the high turnover rates of lawyers when compared to the low turnover rates of paralegals.) These ratios can be translated into a formula which says that total professional costs is equal to $\$P(4.4)P$, where $\$P$ is the salary of paralegal and P is the number of paralegals.*

If the ratio fell from 2 to 1 to 1 to 1 the formula would similarly be

$$\$P(2.7)P$$

Assuming then that there is a direct substitution of paralegals for lawyers so that the total number of professionals stays the same, a simple calculation shows that the number of paralegals increases by 1.5**. Thus in substituting paralegals for professionals, thereby shifting the ratio from 2 to 1 to 1 to 1 and keeping (a) the salary differential the same, and (b) the total number of professionals the same, the resulting proportional reduction in costs would be

$$\frac{\$P(2.7)(1.5)}{\$P(4.4)} = 92\%$$

or an eight percent reduction in total professional costs. Since in turn professional costs are 51% of the total budget costs this reduces total budget costs by 4%.

The reader will recognize that this is clearly an upper bound estimate. Creating a ratio of one to one requires major changes in the delivery system. Up to now most programs have used paralegals as specialists in public benefits and divorce. But in other services the substitution of low priced for high priced

* Total professional costs = $\$LxL+\PxP , where $\$L$ =lawyer salary, $\$P$ = paralegal salary, L = number of lawyers, P = number of paralegals. Then by assumption:

$$L = 2P, \$L = 1.7\$P,$$

$$\text{so that total cost, } TC = 1.7(\$P)x2P+\$PxP = \$P 1.7x2P+P = \$PxP(1.7x2+1) = \$PxP(4.4)$$

** Let P = the initial number of paralegals, P^1 the new number. Then $2P+P = 2P^1$, or $P = 3P^1/2$.

professionals is based on the professional extender model, in which the paraprofessional works closely with the professional in a team framework extending the latter's reach. In this context the para-professionals would do much of the phone/advice/letter follow up work that lawyers do and would also help the lawyer do library and computer research. (Though under these conditions salary of the paralegal will rise.) Legal services programs have little experience with this model, but trends in other human services suggests that this substitution process is the only viable non-technological process available for improving professional productivity. For the sake of discussion, let us retain this estimate of 4% as an upper bound figure for this substitution process.

Productivity Through Technology

People often assume that professional productivity will be raised with the application of technology to professional work. But this assumption requires careful review. Technologies which support decisions tend to have two opposite affects. They may simplify decisions within a decision system already in place (by making calculation easier, by providing ready access to data or information etc.), or they may complicate the decision system itself (e.g., permitting a person to consider more variables, to retrieve more extensive data than before etc.). The former increases the efficiency of professional work, the latter increases the effectiveness and sophistication of professional work. The former thus reduces professional resources committed to a particular decision, the latter may actually increase the level of resources committed to professional decision making.

This general "law of opposite effects" applies to legal work as well. Computer assisted search can both increase and decrease time spent on legal research. The net effect depends on average level of case complexity. Very simple cases (e.g., divorce and some administrative cases) may be unaffected

by computer assisted search since the standard forms and pleadings already exist in files and can be easily and quickly retrieved, and filled out by either lawyers or paralegals. An effective filing system will prove decisive in keeping professional productivity high for such "simple" work. Indeed, evidence suggests that legal clinics can turn a profit on such simple cases, not because of computers, or word processing, but because a good filing system combined with employees training produces a rapid turnover of simple cases.

On the other side, computer assisted search may enable a lawyer to spend less time in the library when he or she is working on a very complex case. But at the same time the lawyer may examine a much larger number of possible judgements and precedents to develop an argument for the particular case under examination. Thus, library time will fall but overall search time may nonetheless stay the same or even increase. This analysis therefore suggests that only on cases of intermediate complexity will computers actually increase lawyer productivity. In such cases, lawyers will not want to use standard pleadings and other documents, but may wish to review documents produced for similar cases in the past and may wish to briefly review the pattern of past judgements on this kind of case to get a quick grasp of the outlines of an effective legal strategy. A good computer search system combine with a word-processing system (for "cutting and pasting" arguments from different cases) may prove very effective. This means that the degree to which computerized search systems increase lawyer productivity depends on the mix of cases a lawyer handles. The greater the proportion of intermediate cases the greater will be the impact of the technology on lawyer productivity.

I know of no reliable set of figures for calculating the distribution of lawyer time over the range of cases. Let me therefore present some arbitrary numbers to again demonstrate a method for estimation. Program staff can supply

their own based on rough assessment of their case files, and then apply the data to the method developed here.

I make the following assumptions. First, a lawyer spends 30 percent of his/her time on the phone and face to face work which requires no legal research or legal documentation at all. Rather, the lawyer gives advice and perhaps writes a letter. In the remaining 70% of her time she divides her efforts equally between the three levels of cases, simple, intermediate and complex. This means that she spends $.7 \times .33$ or 23% of her time on such intermediate cases. Let me then assume that the technology increases the productivity on such cases by 100%, that is, it takes her only half as long as before to complete the work required for such cases, so that she saves 11.5% of her time. Since lawyer costs in turn are 41% of total program costs this gives a savings of 4.8% total program costs. Clearly this number will be higher if one either assumes that less time is spent on advice - letter cases, or more time is spent on intermediate level cases.

If we now add the two together the two methods for improving lawyer productivity, substitution of paralegal for lawyers, and investment in computer search technology we have:

Method	Efficiency gain	Total program savings
Substitution	8%	4%
Technology	11.5%	4.8%
		Total 8.8%

Professional productivity can therefore reduce program costs by 8.8%.

Non Personnel Costs

Thus far I have examined personnel costs only. Since non-personnel costs average about 27% of total program costs, efficiency in this area may not significantly contribute to overall program efficiency. Nonetheless, let me briefly explore four areas: telephone, travel, training and purchasing.

The business press suggests that with a developed telephone management program, telephone costs can be reduced between 20 to 30%, or about 25%. This will be particularly the case where (a) the program is state-wide or may make long distance calls, and (b) there is a pattern of excessive personal use of the phones, particularly for long-distance calls. Under these conditions, a program might consider buying, where possible, an MCI type service (e.g., a company that supplies long distance service, over Bell telephones) or a Watts line. (The phone company however, does not usually supply itemized bills for the latter, this must be worked out with the local phone company office.) At this point experts advise against buying a non-Bell phone system since the pay back period may be as long as three years, and maintenance is not free. In addition experts suggest that management should not buy fancy lock devices to control phones, but should rather develop a good phone management control system. Since phone accounts for 3.3% of total program budget, a 25% savings results is a .8% reduction in program budget.

Travel

Travel costs may be reduced by using cars owned by the program instead of reimbursing staff for private car use. Travel costs may be more significantly affected if program delivery is required by substituting phone/cable service for travel. I know of no good studies on this latter issue. The savings from a car purchase may be analyzed with the following formula.*

$$\frac{\text{yearly fixed cost of a purchased car}}{\text{(your reimbursement rate -- gas cost per mile)}} = \frac{\text{yearly mileage at which cost for purchase = cost of reimbursement}}{\text{cost of reimbursement}}$$

For example, assume that a program purchases a program car for \$6,000 that gets 30 miles per gallon of gas. The car is depreciated over four years with a \$2000 resale value at the end of the four years. Insurance would cost \$500 per year and maintenance would cost \$500 per year. Presently, you are reimbursing staff at the rate of \$.20 per mile.

yearly fixed cost:

$$\text{depreciation } \frac{\$6,000 - \$2,000}{4 \text{ years}} = \$1,000 \text{ per year}$$

Insurance \$ 500 per year

maintenance 500 per year

Total fixed cost \$2,000 per year

$$\frac{\$2,000}{\$.20 - .05} = 13,333.33 \text{ miles break even}$$

Based on this example, if travel for the year that can be handled by one vehicle is 13,333 miles, the program can choose reimbursement or purchase. They will both cost the same. If it is less than 13,333 miles, choose reimbursement and if it is more, buy a car.

If program staff have cut back branch offices and staff must

* This section was developed by Dennis Cohen.

travel extensively, the purchase of program vehicles may result in significant savings. For instance, if a staff member will travel 20,000 miles during a year, the cost for reimbursing him/her will be \$4,000. The cost for a program car will be the \$2,000 fixed cost plus \$1,000 for gasoline or \$3,000 resulting in a 25% savings on your travel budget.

Let us then take this example and assume a 25% savings on travel cost. Since the latter is 2.1% of total program costs, the savings represents a $.021 \times .25 = .5\%$ of total program costs.

Training

Training costs may be reduced by a) reducing the travel component of the training budget, and b) using videotaped as against live training sessions. In this training system, people would not travel to training events, but would rather learn on program facilities from a videotape accompanied by instructional material. Such an instructional system would work if individuals would learn in groups to provide the stimulation and leadership normally provided by live instruction. I know of no studies that cost out the differences between live-away from home training, versus taped at home training. But if one assumes that the bulk of training costs are in the travel and per diem costs, clearly substantial savings are possible. Let me make the arbitrary assumption that the program can save 50% of training costs (it will have to pay for the tape, and may have to contribute to a consortium of programs that develops training materials). Since training costs are 1.3% of budget, a 50% reduction in expense comes to $.013 \times .5$ or .6% of total budget costs.

Finally, bulk purchase of supplies with other programs may enable a program to get a discount of up to 10% on the purchase price. It should be remembered however, that such discounts are normally available only on

unprocessed supplies, such as legal pads and xerox paper and not on processed supplies, e.g., program stationery. Assuming that the ratio of the former to the latter is 1 to 1, a ten percent discount should give .05 reduction in purchase costs, since office supplies are in turn 2.7% of total program costs, this gives a savings of .1% of total program budget.

Adding up the gains from saving on non-personnel costs, we have

Non-Personnel Savings

<u>Area</u>	<u>Method</u>	<u>Efficiency</u>	<u>Total Program Efficiency</u>
Telephone	Control over long distance, cheaper long distance rates	25%	.8%
Travel	Buy program car	25%	.5%
Training	Videotape instruction at home	50%	.6%
Supplies	Bulk purchase	.05	.1%
Total			2.0%

We can now add up the total expected gains from all the programs outlined here. This is done in the following table.

Total Program Savings

<u>Area</u>	<u>Efficiency Gain</u>	<u>Bias in Estimate</u>	<u>Timeframe for Program</u>
Administrative Personnel	3.3%	high	medium to long
Secretarial	1.1%	?	medium run
Professional Productivity	8.8%	high	long run
Non-personnel	2.0	?	short to medium
Total	15.2%		

As the table shows total program savings come to 15.2% of total budget. The table also clearly shows that the bulk of savings comes in the professional area (professional productivity contributes close to 60% of total savings) and that the two highest areas of savings, professional and administrative, are possible only if program staff undertakes extensive and long lasting efforts. Finally, I have listed what I believe to be the bias in the estimates. I believe that the savings calculated for both the administrative and professional area are upper bound estimates since each figure depended on assumptions of significant capital investment, changes in managerial and administrative behavior and changes in the delivery system. If these changes prove impossible to sustain, the overall program estimate could drop as low as 10%. I will retain the 15.2% figure for purposes of argument.

Finally, since lawyers account for 41% of total program costs, this savings is equivalent to increasing the legal staff by about 37%. It is useful in reviewing the meaning of this table to imagine the shape of a program that can make and sustain this 15.2% increase in efficiency. In such a program

- a) the ratio of paralegals to lawyers is one to one, paralegals intensive legal work is emphasized and paralegals function in new ways as lawyer extenders. Staff structure takes on an "hour glass" shape with a senior attorney at the top, paralegals at the bottom, and fewer junior lawyers in between;
- b) administrative staff dictates much of its work to secretaries, time management systems reduce the number of meetings and the average time for a meeting, answering machines reduce waiting time for completing phone calls;
- c) secretaries work with word processing to reduce error correction time, better management controls reduce secretary waiting time for work;

d) lawyers use computerized legal research systems and word processing to speed up work on cases of intermediate complexity. Simple cases are managed through effective filing and recall systems, the most complex cases take as much time as before if not more.

Program staff should judge if the program shape outlined here seems realistic for their program culture.

III. The Efficiency Gain in Perspective

Program staff may feel that a 15% reduction in cost seems small when compared to the trouble required to attain it and sustain it. Such a reduction is equivalent to an 18% productivity gain*. Yet, in the economy as a whole, productivity gains never accrue quickly. Major productivity gains over a long period of time are the result of small by continuous gains each year. The methods proposed require long term efforts, and in this culture the long term is between five and seven years. (The new information technologies diffuse that fast, if not faster.) Assuming that the efficiency program proposed here is a six year program of implementation, an 18% productivity gain is the equivalent to a 2.7% increase in productivity. This is consistent with much present productivity experience in the economy.

Indeed, a review of a recent effort to measure productivity gains in the federal government levels show the following rates of growth:

<u>Activity</u>	<u>Rate of Productivity (labor) growth per year (%)</u>
Education and Training	1
Finance and Accounting	2
General Support Services	4
Information Services	.4

* If Y is the program budget, then the efficiency creates a program budget of .85Y. If costs are not cut but output expands instead the program can operate at a level of 1/.85 (Y) = 1.18Y

<u>Activity</u>	<u>Rate of Productivity growth per year (%)</u>
Library	5
Loans and Grants	4
Medical Service	negative
Legal Service	negative
Printing	negative
Social Service	2
Military Base Services	1
Postal Services	1
Procurement	1
Records Management	3
Compliance	2
Regulation/Rule Making	3
AVERAGE	2.26%

Thus, the proposed 2.7% growth rate for six years falls within the bounds of productivity growth experience in other services.

Nonetheless, to those looking for quick gains the results of this essay will seem disappointing. Yet, I believe that the framework for estimation developed here reveals one simple truth. Program staff should decisively reorganize the delivery system. In particular unless they increase the paralegal to lawyer ratio, redefine the functions of the paralegal, create a "team" system for delivery assistance and invest in computer search technology, there can be no significant gains in productivity. Indeed, analysts of other human service program return to this simple truth. In the appendix, I have included a list of suggestions for improving productivity in other services. Note how frequently the deployment of paraprofessionals and computer technology is mentioned.

Finally, program staff may find that they can create short run efficiencies by depleting the program. Thus for example, a program can postpone maintenance, postpone cost of living increases, encourage turnover of senior staff to keep salaries low, move to a cheaper location, cut out training, deliver only mass production services, etc. But this depletion strategy brings short term gains at the expense of great long term losses. The program would lose all of its innovative thrust.

In sum, the framework for estimation developed here suggests that legal service programs could realistically pursue a six year program for increasing efficiency at about 2.7% a year. The ultimate consequence of such a program will not only be savings in cost, but I suspect a generally more sophisticated management system able to develop the strategic capabilities of the program in a period of austerity and uncertainty. This long term "unmeasurable" gain may in the end be the most important.

Following, in sections B through G, are current practices or proposals that may increase productivity in specific local government services. While they represent views or judgements of experts in the separate fields, many of the activities remain controversial or of not fully proven merit.

B. Law Enforcement: Police.

1. Reallocation of policemen to assign them to times and locations more in accord with the workload (e.g. crime patterns and other calls). This potentially can increase police productivity in terms of response time, arrests, crime prevention and other police services without significantly increasing costs.

2. Assignment of priorities to incoming calls so that important calls can be handled more quickly.

3. Substitution of civilians for certain tasks currently done by policemen, including: clerical, computer services, school crossing guards, police lab work, and meter maids. These may reduce costs and provide better trained individuals for these specialties.

4. Assignment of detectives to geographical areas and times more in accord with the demand for their services, as measured by past experience.

5. Mailing of summonses in some misdemeanor cases rather than sending patrolmen.

6. Use of new technological devices such as walkie-talkies to expand the scope of action and flexibility of patrolmen and to permit them

to receive information more quickly.

7. Use of on-line computer systems to provide information such as data on suspects and automobiles. This might help to make the police more productive in the field.

C/ Law Enforcement: The Court System.

1. Better scheduling of court cases to improve court productivity as well as that of other personnel such as police witnesses, prosecutors and juries. The time of all is frequently misused because of current practices arising out of the various uncertainties in hearing and trial times.

-- Use of computerized procedures to schedule cases more effectively (based on such factors as severity of offense, likelihood of conviction, age of the case, whether the defendant is incarcerated, likely future availability of witnesses, and likelihood of repeated offenses by the defendant).

-- Use of trained court administrators instead of judges for scheduling, court management, and other administrative practices.

2. Improved procedures to save police time by calling police and other witnesses only when needed.

3. Assignment of prosecutors to cases on the basis of factors such as listed in (1). This could potentially increase the productivity of the system, particularly in jurisdictions with large case backlogs. This is currently being tested in the District of Columbia.

4. Setting of time limits for cases so that if the defendant is

not tried within the designated time period, say 60 days, the charges would be dropped. This forces the prosecution to act more quickly and discourages the granting of continuances.

D. Solid Waste Collection.

1. Too frequently solid waste collectors accompany the truck and its driver long distances to and from the disposal site. Possibilities exist for using waste collectors on other collection vehicles while letting loaded trucks and drivers go alone to disposal sites.

2. Development of more mechanized sanitation trucks and easier to handle waste receptacles. See, for example, reference #18 in the Bibliography.

E. Health.

1. Use of paramedical personnel or physician assistants as substitutes for physicians to provide such services as: portions of examinations, inoculations, teeth cleaning and even basic medical care in regions with scarce physician supply. (For example, HEW's MEDEX program is attempting to train returning Armed Forces medical corpsmen to become physician assistants.)

2. Use of group, rather than individual, practice to provide more specialization and therefore more effective diagnosis and treatment, as well as to reduce total overhead costs.

3. Use of prepaid medical fees rather than fee-for-service on the assumption that this will encourage physicians and medical staff to be more efficient (if it does not increase patient demand excessively).

4. Use of computers for monitoring, diagnosis and prescription control as a substitute for manpower resources and to provide improved health care.

5. Greater use of the telephone to save patient visits to the physician's office. It may be that a significant number of cases can be handled over the telephone through conversations between the patient and skilled personnel without requiring trips to the physician and the recurring tie-up of medical services.

F. Fire Protection.

1. Reallocation of existing fire fighting resources to increase productivity in some instances with little cost involved. The location of fire stations and amount of response to fires (e.g. number of vehicles) has been the subject of recent analyses. Operations research techniques have been used to develop mathematical models and simulations which aim at the selection of preferred locations for fire stations and at the number of vehicles to be stationed at individual stations or sent to respond to alarms of specific characteristics. (This includes work in New York City, the National Bureau of Standards, and the District of Columbia government.)

2. Use of a chemical additive, "slippery water," to reduce the friction of water in a hose, thereby permitting considerably greater water flow per minute or the use of smaller, lighter, easier to handle, hose. New York City has been experimenting with this and has identified significant possibilities for productivity increase through its use.

G. Education.

1. Use of schools twelve months per year and more hours per day, in part, perhaps, for other than educational purposes such as for community recreation. This could lead to more productive use of capital facilities.
2. Use of various types of computer-assisted instruction, programmed learning equipment and perhaps cable TV to increase productivity.
3. Adoption of school "accountability" procedures to provide measurement of individual school performance, using criteria such as achievement criteria. Such procedures are receiving considerable current interest. The ability of individual school superintendents and principals to undertake annual assessments of a school's strengths and weaknesses and in comparison with other schools in the school district could provide information and incentives for increased performance. (See reference #26 in the Bibliography for an example of an assessment approach.)
4. Use of performance contracting for elementary schools. Private companies might be able to provide improved education for which payment is based on improvements in student achievement levels. Some such experiments are currently being tried.

