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ABSTRACT

The literatures of library science and management were searched for material concerning the history of centralized processing of library materials and the Planning-Programing-Budgeting System (PPBS). Literature on the history, major components, and advantages of PPBS was reviewed and features of PPBS such as comparison of alternatives, zero-base budgeting, and annual program review were found to be very applicable to centralized technical processing. The specific application of modern management systems, such as PPBS and management by objectives, to learning resource centers and libraries in higher education was considered, but little information was found. The literature survey discovered plentiful material on centralized library processing and on the theoretical basis of PPBS and a shortage of information in the fields of processing nonbook materials and the application of management systems to technical services processing centers. Thirty-nine references are included. (PF)

CENTRALIZED TECHNICAL PROCESSING AND PPBS: A LITERATURE REVIEW

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CENTRALIZED PROCESSING

Centralized processing and other cooperative efforts are not entirely new concepts for libraries and learning resource centers. Melvil Dewey (1877) in an article on cooperative cataloging wrote:

> At the present time, if a specifically valuable book is published, it finds its way to at least a thousand different libraries, in all of which it must be catalogued. One of the highest salaried officers of each of these thousand libraries must take this book and examine it for the scores of points that only a cataloguer can appreciate the necessity of looking up. Then the title must be copied and revised. Perhaps a half day is spent in preparing a satisfactory note to append for the benefit of the readers, etc., etc. And all of this work is repeated to a certain extent in each of the thousand libraries! Can librarians complain if practical businessmen call this sheer extravagance (p. 170)?

The thrust toward getting processing centers developed was not too fruitful during the late 1800's and early 1900's. It was not until the mid-1940's that processing centers began to come into existence. The number of processing centers began to grow in the 1950's and several centers were established in the 1960's. These centers served public and school libraries almost without exception. Leonard (1969) did not find any evidence of processing centers serving a group of academic libraries or learning resource centers in a study he conducted. However, during the latter 1960's the literature revealed that different studies had begun in order to discover if centralized processing was a viable approach for the academic library and learning resource center.

According to Piercy (1964), the specific gains of centralized processing are:

> (1) Advantages in purchasing books (higher discount, more consideration by the dealer, approval and return privileges, etc.); (2) economy for all in eliminating duplication of tasks (e.g., cataloging the same title but once for many libraries); (3) availability of needed bibliographic and professional tools (too expensive for each library to have); (4) assurance of having the work done expertly and uniformly (thus aiding the user going from library to library); (5) advantageous buying of supplies in large lots; (6) saving time and labor by utilizing machinery, equipment, and physical space too expensive for individual libraries; (7) better development and training of personnel and providing staff specialization and promotional opportunities in the work; (8) elimination of duplicate records, such as authority files; and (9) installation of better work planning and management (p. 199).

Cox (1955) listed two additional advantages: (1) the freeing of librarians for other areas of work, and (2) the possibility, through a union catalog and interlibrary loan arrangement, of making the total resources of the system available to each member. In this manner, the breadth of any individual library or learning center in the centralized processing system would be materially increased and the necessity for duplication reduced.

Disadvantages associated with processing centers include the possibility of a time lag in getting the materials to the learning resource centers from the processing center. However, the time lag is anticipated only during the beginning months of the center's development. Within six months the time lag is replaced with greater speed in getting the materials processed than could be expected from each learning resource center. The processing center should include both the acquisitions and cataloging activities. Bendix (1958) predicted that processing centers which

handled cataloging only and did not have anything to do with acquisitions would be operating at a disadvantage.

Hendricks (1966) had stressed that the economic aspect is the "paramount motive" in centralized technical services. One must investigate the advantages of centralized processing to see if they offset the economic factor. According to Kurtz (1970), when a processing center begins, the costs can be extremely high, but they need not be viewed with alarm. As the work flows are changed, steps are eliminated, and the staff becomes better trained, the per unit cost begins to decline. Kurtz revealed that during the first four-month activity period of the processing center of the Rhode Island Department of State Library Services the operating cost per book was $2.9105. The cost per book after six months was down to $2.224. The decrease occurred in spite of a rise in costs for all facets of the center along with the addition of more employees.

According to Gipson (1967), an analysis of costs for adding a book to the Macomb County Community College can be broken down into five cost items: materials cost, personnel cost, equipment cost, supplies cost, and area cost. However, each of these cost items contains some hidden costs. The "hidden costs" for processing items need further analysis.

A study done with the Louisiana State Library Processing Center supports the financial savings concept of processing centers. After the Louisiana State Library Processing Center was in operation for one year, an analysis of operations revealed that the center saved, as compared with former independent operations,

a total of 1,508 man hours ($3,136.64), a savings of $184.24 on supplies, and a savings ($214.00) on increased discount figured at 3.6 percent on the overall book budget for a total savings for 1969 of $3,534.88 (Roundtree, 1970).

Leonard (1969) with the assistance of a National Science Foundation grant conducted one of the more analytical studies concerning costs and centralized technical processing. In his study with nine state-supported academic libraries in Colorado, he discovered that the processing center would save the libraries at least $117,000.00. A dollar savings of $1.40 per book would occur for single volume processing and $1.92 for processing two or more identical copies could be saved.

The cost savings realized through centralized processing do not reflect the nonquantifiable benefits realized by the individual learning resource center or library. One such benefit is that of released time from the repetitive, clerical tasks associated with acquisitions and cataloging. The new time for the learning resource center personnel to engage in more substantive aspects of the academic program may be valued as highly as the financial savings realized from centralized processing. With all learning center costs constantly rising and increasing demands being put on learning resource centers in the teaching processes, few learning resource centers can afford technical processes which are inefficient and of undue cost.

Progress toward the developmen of processing abroad and outside of the United States has not occurred very rapidly. For example, Sukiasian (1966) made clear that the U.S.S.R. is far behind

other countries in centralized processing. He denotes that the classification scheme is also decentralized and is carried on by many organizations. Apparently, much preliminary work needs to be done before the Soviet Union can engage in centralized processing on a large scale. The idea of centralized processing in Great Britain has perhaps been more talked about than practiced. It is a curious fact that the public libraries of Great Britain which were most active during the prewar years in promoting the notion of centralized cataloging are turning away from it while academic libraries which were least interested in such a prospect are now turning toward it. In 1950, the British National Bibliography was started with the hope of creating bibliographic control for the major libraries of Great Britain. However, the ineffectiveness of the British National Bibliography has resulted in its meeting only a small fraction of Britain's library needs (Francis, 1950). Bringing the centralized processing activity back closer to the United States, it should be noted that Canada did not establish a national office of Library Resources until 1968. According to Sylvestre (1969), the lack of cooperative efforts through centralized control has left Canada with an isolated fragmentation of its library resources.

Although centralized processing cannot be considered new in the United States, it has taken on many new facets since World War II. With the passage of the Library Services Act by the United States Congress in 1956, funds became available for public and school libraries to use in creating processing centers. Cronin (1967) reported that when Congress approved Title II-C of the

Higher Education Act of 1965 it took two very important steps in aiding libraries and learning resource centers of higher education in the United States. The steps were described: (1) it fully recognized for the first time the importance of granting Federal aid and assistance toward solving the problems of cataloging in this country; and (2) it gave the Library of Congress a clear mandate to provide new and unparalleled services for the benefit of academic and research libraries and learning resource centers in the United States.

Problems still exist in the many operations of centralized processing. One problem is that of developing standardized times. Time measures have been conducted in certain clerical activities in technical processing. Voos (1965) engaged in a doctoral dissertation study dealing with a microtechnique motion measurement of particular technical services. Two conclusions developed from this study: (1) cost is more subject to change than time (i.e., salaries normally increase annually, but the time involved in completing a technical services task is not likely to change significantly), and (2) each technical services operation should be under constant surveillance to determine whether it is necessary and whether it accomplishes the task it was originally set up to perform. In regard to time and its relationship to technical services, the computer is on the horizon as being the one innovation which will enhance the argument for centralizing the technical processes to save time. The computer has and will continue to add new dimensions to technical services. Kilgour (1973), director of the Ohio College Library Center, continues to advocate

that the only economic viability for libraries and learning resource centers is cooperation by centralization.

PLANNING-PROGRAMMING-BUDGETING SYSTEM (PPBS)

Planning-Programming-Budgeting System is many things for modernizing management and decision making at all levels. It is an integrated system to improve the information base for policy, program, and resource-allocation decisions. It is a unifying and comparing process for higher level review and analysis of program alternatives. It provides, through narrative and numerical expression, an explicit determination of the relative efficiency and economy of allocating limited resources to alternate plans for achieving concrete objectives. Also, it is a means for revealing the long-range consequences (in terms of estimated costs and benefits) of annual or short-range decisions and actions on plans, programs, and resource allocations.

The program budgeting and systems analysis elements of PPBS can be traced in American industry to the 1920's when General Motors and DuPont formulated working documents whose purpose was to identify major objectives, to define programs essential to these goals, to identify resources and to relate them to specific types of objectives, and to analyze systematically the alternatives available. At about the same time the Bell Laboratories introduced methods of systems analysis which are similar to those used today except they were primarily limited to hardware or equipment (Novick, 1969).

In government, the two Hoover Commissions (1947-1949

and 1953-1955) introduced concepts, "performance budget" in the earlier case, and "program budget" in the latter which gave emphasis to the activities or outputs for which inputs are used (Gross, 1969). The first general public awareness of PPBS occurred when Charles Hitch of the RAND Corporation became comptroller of the U.S. Defense Department and introduced the system for Secretary Robert McNamara. Prior to the use of PPBS, the Department of Defense did not have an integrated mission-oriented system for planning and allocating its resources. It relied upon the classification and allocation of resources on the basis of categories such as research and development, procurement, construction, operations and maintenance, and military personnel (Held, 1966).

The experience of PPBS in the Department of Defense prompted President Lyndon B. Johnson to decide that the PPBS approach should be applied to the other departments and agencies of the executive branch of the Federal government. On August 25, 1965, the President announced his decision (Novick, 1967):

> This morning I have just concluded a breakfast meeting with the Cabinet and with the heads of Federal agencies and I am asking each of them to immediately begin to introduce a very new and very revolutionary system of planning and programming and budgeting throughout the vast Federal government, so that through the tools of modern management the full promise of a finer life can be brought to every American at the lowest possible cost. This program is designed to achieve three major objectives. It will help us to find new ways to do jobs faster, to do jobs better, and to do jobs less expensively (p. xix).

One way of viewing PPBS is to see it as a response to the inadequacy in traditional budgeting. In the United States, the budget design of the Federal government was built largely with

the need to control financial improprieties on the part of public officials. Being a comptroller's budget, it was "not designed to assist analysis, planning, and decision making, and it does not work well for that purpose (Anshen, 1965, p. 12)."

With objects of expenditure or inputs as its orientation, from the perspective of top-level decision making, the budget, according to Anshen (1965), did not provide the necessary information to:

> (1) Choose among alternative goals when available resources are insufficient to undertake the achievement of all goals concurrently, (2) measure the total immediate cost of activities designed to achieve any single goal, (3) identify currently the implicit future costs of present program decisions, (4) chart with confidence the probable future course of the expenditure side of the budget in total and significant detail, or (5) evaluate the efficiency and effectiveness of the performance of ongoing programs by comparing costs with achievements (p. 14).

Traditional budgeting did not pay much attention to the goals and objectives of programs for which the government committed resources. Neither was there much concern with alternatives or better ways for achieving program objectives. Capron (1969) called attention to the fact that when agencies made recommendations on programs and budget dollars to the Bureau of the Budget and the President, the absence of alternatives and the absence of the kind of information needed for judging the effect of either an increase or decrease in funding level on a given program had led to the situation in which the judgment of the Bureau of the Budget staffs had, at times, to replace arbitrarily the judgment of those who knew much more about the program.

The objectives of PPBS. One objective of PPBS is the specifi-

cation and clarification of the goals and objectives of an organization's programs. Unless an organization is aware of what its programs are intended to do, it becomes difficult to know whether such programs are serving their purposes. PPBS in this respect has the effect of impelling the organization to take stock of what it is doing, and to chart its course accordingly.

Being output oriented, PPBS is interested in the relation between the output of a program and its objectives. Only when the output of a specific program is analyzed in the context of its objectives does it become meaningful. Such analysis is also the basis for determining the effectiveness of a program.

According to Tok (1970), an objective of PPBS is the identification of the entire costs of program decisions, whether the costs are immediate or extend into the future. The system seeks to measure, or at least take cognizance of, the total costs of programs as fully as possible, whether present or future, direct or indirect.

PPBS aims toward planning programs for the first year and subsequent years. Planning is long-range and considers the multi-year implications of current decisions. Planning and programming normally utilize a five-year forward time horizon. However, the time horizon is dependent upon the PPB System being considered. Nevertheless, the first future year is the detailed budget year.

The application of analysis to the search for the most effective alternatives for accomplishing the objectives of programs, if possible, at the lowest cost is a further pursuit of PPBS. Under PPBS, programs are to come under periodic review to ensure

that resources are used to the best advantage.

An overall objective of PPBS is to integrate the planning, programming, and budgeting functions of an enterprise into a formal system. The system would provide better information on organizational objectives and alternative ways to attain them, including explicit presentation of the costs and benefits of the alternatives. The primary aim is to assist administrators in improving their decision making in the spheres of resource allocation and management. PPBS also creates a decision-making environment in which the basis of competition among subordinate organizational units in an enterprise is the effectiveness of subordinate unit contributions to an organization's goals.

Interrelated dimensions of PPBS. The three major dimensions of the PPBS acronym are: planning, programming, and budgeting. It cannot be emphasized too much that these three dimensions are not separate dimensions but are interrelated and interdependent.

Novick (1964) makes it clear that "planning and programming are really aspects of the same process; they differ only in emphasis (p. 58)." To him planning is a "more informal process than programming, more a matter of procedures (p. 69)." He visualizes programming as being the more specific determination of courses of action generated through planning. Plans are translated into programs. De Ganaro (1971) defined the three dimensions in the following manner: (1) planning--the study of objectives and alternative ways to achieve objectives, of future environments, and of contingencies and how to respond to them; (2) programming--

a method of describing activities according to objectives or outputs and of relating these objectives to the costs or inputs needed to produce the outputs or effectiveness desired; and (3) budgeting--the activity through which funds are requested, appropriated, apportioned and accounted (p. 30).

The final element of PPBS--system--is merely the structure within which the planning, programming a[illegible]eting takes place. Perhaps it would be more accurate to state that the system is the process of planning, programming, and budgeting falling within the foregoing definitions of the three interrelated dimensions.

Major components of the PPB System. The Bureau of the Budget Bulletin Number 68-9 (The analysis and evaluation of ...; 1969) developed four components in order to present PPBS as a formal system. The four components, with brief descriptions, are: (1) program structure--this component describes the framework of the system with its objectives. Three levels of classification (i.e., categories, subcategories, and elements) are used in composing a complete program structure; (2) program memoranda--a comparison of the characteristics of each alternative given for obtaining the objectives make up the document known as the program memoranda; (3) program financial plan--this document contains a continuing record from year to year of the outputs, costs, and financing of all agency programs. It reflects the multi-year programs of an organization by summarizing the past, the current, and subsequent budgetary years; and (4) special analytic studies--studies supply the analytic foundation for decisions made in the

program memoranda. Part or all of program issues may be exposed to analytic studies in order to enhance the decision-making process. Special analytic studies may also be called cost-effectiveness, cost-benefit analysis, or systems analysis. Whatever they alled, their basic goal is to provide a quantifiable evaluation of alternatives. Cleland and King (1968) defined the systems analysis function in the PPB System as: (a) systematic examination and comparison of those alternative actions which are related to the accomplishment of desired objectives, (b) comparisons of alternatives on the basis of the resource cost and the benefit associated with each alternative, and (c) explicit consideration of uncertainty.

The four PPBS components have been followed as a formal system structure very closely by the various Federal governmental agencies. However, many other agencies (e.g., state governments and school districts) which have been operating supposedly in the PPBS mode have attempted to create their own structure, and consequently resulted in lacking the basic ingredients and philosophical foundation of an effective PPB System.

Advantages of PPBS. Many advantages are inherent in the PPB System. One of them is that it operates as a zero-base budgeting process (Schultze, 1968). Zero-base budgeting differs from incremental budgeting in that it reviews and justifies each program beginning from zero, while incremental budgeting operates on the basis of a percent or actual dollar increment over the present period. With PPBS, the continuation of each program is questioned

and must be documented; this approach encourages reallocation of funds to new programs when old programs cannot be fully justified or better use of resources is identified.

Matrices relate the program structure to the total organization (Carlson, 1969). A three-dimensional procedure (e.g., alternatives, program elements, and time) may be illustrated to reveal how each program element is multi-dimensional in respect to the contribution it makes to the program.

PPBS is an approach to decision making which systematically integrates all aspects of planning and implementation of programs (Alioto, 1971). Many management systems lack the integrating and systematic approach possessed by PPBS.

What PPBS is not. The word "programming" in PPBS does not mean computer programming (Hartley, 1968). PPBS is also not decision making by computer. Decisions will continue to come from the political process, influenced by value judgments, from the pressures coming from the various interested parties as well as from the process of systematic analysis.

PPBS is not a system which in itself centralizes decision making. Sophisticated analytical techniques are used. It is recognized that centralization can result from using PPBS because superior analytical and informational technologies present a decision maker with the opportunity to exercise more control. However, this centralization is intentionally brought about by the decision maker. It does not happen automatically under the PPBS approach (Carlson, 1970).

According to Hartley (1968), PPBS does not imply that the entire output of an organization can be quantified and measured. Many products gleaned from a PPB System may be non-quantifiable, but extremely valuable. PPBS is not limited to cost-accounting and to economic considerations in the narrow sense.

Furthermore, PPBS is not a substitute for the experience, the intuition, and the judgment of the decision maker. On the contrary, its aim is to sharpen that intuition and judgment by stating problems more precisely, by discovering new alternatives, and by making explicit the comparison among alternatives.

PPBS and Accountability in Education. According to Alioto (1971), "no social institution finds itself in greater trouble today and none is less likely to finish the decade recognizably intact than the American system of public education. Public schools and institutions of higher education are embroiled in a major overriding financial crisis; demands for educational services have escalated much faster than the system's ability and resources to meet them (p. 3)." School administrators are being held more accountable than ever for the results of the public tax dollar. They claim that society has articulated inconsistent expectations and they readily acknowledge the absence of any real, systematic way to judge the productivity of the educational systems.

The popular educational term in the 1970's is accountability. It is a goal-referenced term. It is meaningless unless one specifies accountability for what, to whom, and under what conditions (Knezevich, 1973). PPBS may be perceived as a management technique

to use in developing a functional accountability system. PPBS does specify objectives, feasible alternatives, zero-base budgeting, and it emphasizes quantifiable as well as non-quantifiable outcomes.

Hartley (1968) has indicated the need for PPBS in education by stating "let us hope that within the decade of the 1970's educational planning will shift more rapidly from blind, doctrinal faith toward conceptual strategies emerging from administrative theory and management science. PPBS provides a framework for coping with disconcerting changes and awesome responsibilities that will face the schools with increasing intensity each year (p. 127)."

MODERN MANAGEMENT SYSTEMS FOR LEARNING RESOURCE CENTERS AND LIBRARIES

During the last decade several modern management systems have made inroads into the institutions of higher education. Acronyms such as MBO, PERT, and PPBS have become common in management discussions and practices. Even though there is a dearth of literature concerning the application of management systems to learning resource centers and libraries, these very important departments of institutions of higher education will not be able to escape the impact of modern management systems much longer. The need for modern approaches to managing learning resource centers and libraries was stated by Munn (1968):

> Many academic administrators view the library as a bottomless pit. They have observed that increased appropriations one year invariably result in still larger requests the next. More important, there do not appear to be even any theoretical limits to the library's needs. Certainly the library

> profession has been unable to define them. The current pressure to introduce modern management practices to the universities will not leave libraries unaffected. Such techniques as program budgeting require a much more rigorous analysis of the balance of return against investment than has ever been applied to libraries. Just why should the library receive 3 or 6 or 1 or 10 percent of the institution's budget? How should the claims of the library for budget support be evaluated? These and similar questions are certain to be asked. It might be prudent for academic librarians to have answers (p. 51).

The community college learning resource center administrators are being placed under the accountability pressures and are becoming more responsible for getting the maximum utilization and benefits from materials and personnel. Fearn (1972) notes that the community colleges are the fastest-growing sector of this country's post-secondary educational system. He stresses the need for management systems that will reflect a benefit-cost approach. If taxpayers are going to continue to give financial support to community colleges, then the administrators of the community colleges are going to have to provide leadership by using management systems which will contain goals, objectives, input-output relationships, and a method for analysis. Components of the community college, such as the learning resource center, must employ the systems approach in order to enhance productivity by meeting specific objectives.

Drucker (1954) began writing in the 1950's on the concept of management by objectives (MBO) in business and industrial management. MBO is a way to manage by identifying objectives and applying them as criteria to judge the quality and effectiveness of inputs and activities. A high priority is placed on defining organizational objectives and communicating them to all

personnel. The "systems management oriented" conceptualization of MBO is much closer to PPBS than is the "human relations oriented" concept based on the interpretation by the designer of the MBO System. MBO may be considered as a subset of the PPB System.

Learning resource centers are going to have to apply the principles of management techniques. The areas of technical processing are large and complex and need to be addressed in a systematic manner. Odiorne (1971) stated that if the executive "can control results, he indeed can manage even the largest (p. 13)" of organizations. MBO becomes a "general system of management" of the "systems approach to administration" in this conceptualization.

According to Battersby (1964), it was in 1961 when PERT (Program Evaluation Review Technique) and other efforts in network analysis were brought into the vocabulary of forward-thinking managers. At that time, as today, it was believed that efficient management must always stem from a precise statement of an objective; that any project must begin with an explicit definition of what is to be achieved. Decisions need to be forecasted between the critical (important) and noncritical jobs. An organization such as a learning resource center with the various routine tasks could apply principles of PERT toward improvement of efficiency.

The learning resource center could use the principles of MBO, PERT, and PPBS concurrently in an active management system. A general MBO model based on the systems management point of view may be useful in implementing PPBS. While the missions and ob-

jectives of the learning resource center are undergoing their cycles, a PERT chart may be drawn with the significant events identified and the time for achieving each of them noted to help ascertain if the learning resource center is on target in implementing the system.

AN ANALYSIS OF THE LITERATURE

The literature surveyed concerning centralized processing was comprehensive and provided an historical as well as a global perspective. Some important research remains to be done with the development of standard times for technical processing activities which could be used as universal guideposts for learning resource centers and libraries. Since the concept of learning resource center is fairly new in the academic world, most of the literature used the word "libraries" rather than "learning resource centers." The handling and processing of nonbook media materials were only briefly mentioned.

After the researcher made a thorough search of all of the indexing tools to periodical, book, and microform materials, it was realized that not one article had been written concerning any type of management system as being applied to technical services processing centers. Apparently, the new processing centers have been developed without much thought given to the benefits of the new management systems.

Many facets of PPBS are revealed in the literature. "Program budgeting" is used in the literature sometimes in lieu of PPBS. Even though the Bureau of the Budget had spent considerable

time in organizing a systematic, hierarchial structure for PPBS, many researchers and writers tend to devise their own system of PPB. In one expression proponents of PPBS will elaborate on how well structured the PPB System is, and then their ensuing statements will reveal how they have begun weakening the structured aspect of PPBS by attempting to subtract some dimension of the system. The bulk of the literature tends to devote pages to the theoretical and conceptual aspects of PPBS, but very little has been done through research to reveal how a comprehensive PPB System can be operationalized.

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