A Performance Audit of a Graduate Training Program

Maria Emma Garcia
Western Michigan University

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A PERFORMANCE AUDIT OF A GRADUATE TRAINING PROGRAM

by

Maria Emma Garcia

A Thesis
Submitted to the
Faculty of The Graduate College
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of the requirements for the
Degree of Master of Arts
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Western Michigan University
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December 1984
A PERFORMANCE AUDIT OF A GRADUATE TRAINING PROGRAM

Maria Emma Garcia, M.A.
Western Michigan University, 1984

The present study consists of a performance audit of a graduate training program. The performance audit is an engineering model created by Gilbert (1978) to design, analyze, and evaluate organizations. This performance audit was applied to the Behavioral Systems Analysis Program (BSAP), a graduate training program of the Psychology Department at Western Michigan University. The mission of BSAP consists of training behavioral systems analysts to effectively create or improve systems that benefit humanity.

This study had two objectives: first, the identification of the areas of BSAP with greatest potential for improvement and the identification causes of their deficiencies; second, to determine the feasibility of application of Gilbert's performance audit to an educational system. The method used consisted of identifying the accomplishment of BSAP, determining the performance deficiencies of BSAP by comparing typical with ideal standards and by determining the causes the differences between the ideal and the typical performance. The results of this study indicate that the major areas of deficiencies of BSAP were the processing and management of data and the functioning of the staff supervision system; the major causes of these deficiencies were the insufficient number of well trained staff, and the lack of some performance measurements. In addition,
the application of Gilbert's performance audit to a complex educational system was feasible by modifying some aspects of the model: the simplification of terms and levels of analysis of the performance audit, the establishment of standards based on exemplary performance, the measurements of the performance deficiencies, the estimation of stakes and deficiencies, and the clarification and definition of the concepts involved in Gilbert's behavioral engineering model.
ACKNOWLEDGEMENTS

I am very grateful to Richard W. Malott, the faculty director of BSAP, for giving me the opportunity to actively participate in BSAP and learning from his mastery of behavior systems analysis. I want also to thank him for the inspiration of doing the present research and for his excellent supervision, good advise, and time dedicated consistently to this research. I am also indebted to Norman Peterson, my graduate advisor, for sharing his knowledge and expertise in performance auditing and for his valuable contributions of suggestions for conducting this investigation and writing this manuscript. I also benefited greatly from Dale Brethower for his quality of teaching and original contributions to systems analysis with the creation of the Total Performance System model which has helped me to understand the functioning of systems. I must also thank the students of BSAP for their active participation and dedication to BSAP without which this study could not be possible, for their contributions to the analysis of the performance audit of BSAP, and for their new applications and revisions of the concepts of Gilbert's performance audit. Finally, I wish to thank David Lyon and the Department of Psychology at Western Michigan University for the opportunity of professional development in working as an assistant in BSAP.

Maria Emma Garcia
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CHAPTER I

INTRODUCTION

The present study consisted of a performance audit of a graduate training program. The performance audit is an engineering model created by Gilbert (1978) to analyze, design, and evaluate organizations. This performance audit was applied to the Behavioral Systems Analysis Program (BSAP), a graduate-training program in the Psychology Department at Western Michigan University. The general mission of BSAP consists of training behavioral systems analysts to effectively improve or create systems that benefit humanity.

This study attempted to identify the areas of BSAP with greatest opportunities for improvement performance and to determine the feasibility of the application of the performance audit on it. The method used consisted of the identification of the accomplishments of BSAP, the determination of the performance deficiencies of BSAP by comparing typical performances with ideal standards and the determination of the causes of the differences between ideal and typical standards.

Approaches to the Assessment and Analysis of Systems

Different approaches have been implemented in the assessment and analysis of systems. Those approaches could be classified into two general categories: process and output oriented.
Process-Oriented Approaches

Most of the traditional approaches to program evaluation focus on the assessment and analysis of processes or behaviors rather than on outputs or products (Frederiksen, 1982; Malott, 1972; Madaus, Scriven and Stufflebean, 1982). Two representative process-oriented models are the behavior-based assessment and the behavioral systems analysis models. The behavioral-based assessment model emphasizes the definition and specification of observable behaviors. Frederiksen (1982), a representative of the behavioral-based organizational assessment approach, uses performance appraisals in the analysis of organizations; the performance appraisals are based on the analysis of critical behaviors required in each specific job. The causes of behavioral deficiencies could be determined by observing the employees' behaviors on their jobs. Deficiencies could be decreased by setting specific goals and giving feedback to the employees about their performance.

The behavioral systems analysis approach consists of an integration of behavior theory and the system approach. Its main emphasis is on the functional relations between the behavior and the environment; the basic unit of analysis used in this approach is the behavioral contingency (Frederiksen, 1982). Malott (1972) indicated six steps in doing a behavioral systems analysis: the analysis of the existing system in terms of the contingencies in operation, the specification of goals of the system, the design a new system, the implementation of the design, the evaluation of the results of this
implementation, and the recycling to the earlier phases of the behavioral systems analysis.

Output-Oriented Approaches

The output-oriented approaches emphasize the assessment and analysis of the products of the system. Representative models of this approach are systems analysis, performance audits and the total performance system models.

The systems analysis approach consists of the analysis of the interdependence between the components of an organization in order to determine the operations and procedures needed to accomplish a general goal. Systems analysis has traditionally been focused on the analysis of hardware rather than on the human components of systems. Early attempts at systems analysis were originated in the field of engineering to determine effective decision-making procedures (Frederiksen, 1982).

The Total Performance System (TPS) is a systems analysis model created by Brethower (1972). The TPS contains five components: inputs which are materials or resources the system needs to function; processing system, which integrates all the sequences required to transform the inputs into products of the system; the outputs or products; the receiving system, which receives the outputs of the system; the receiving system feedback, which refers to information or evaluation of the outputs by the receivers; and the processing system feedback, which refers to information or evaluation of the process used to produce the outputs of the system. The TPS model is presented
The other output-oriented approach to be considered is the performance audit model (Gilbert, 1978). The performance audit consists of three steps: first, the development of the accomplishments of the organization at its various levels, including performance standards; second, the identification of the performance deficiencies and the estimation of the value or cost of the differences between the accomplishments of the exemplar and typical; and third, the identification of the causes of the differences between the exemplary and typical accomplishments. The causes are identified by using Gilbert's behavior engineering model which involves the analyses of the effects of the environment and behavioral repertories on performance.

Program Evaluation Approaches

Stufflebeam and Webster (1980) have reviewed 13 types of traditional evaluation studies for education; the studies involved both process and output evaluation programs. The authors formed
three categories for the 13 types of studies: political-oriented, questions-oriented, and value-related. The political-oriented studies emphasized public support of programs; the questions-related studies emphasized answering specific questions of the system; the values-oriented studies emphasized cost-benefit analyses. Stufflebeam and Webster showed that in these traditional approaches, the standards have been based on cultural or on hypothetical criteria.

A Contrast of the Performance Audit with other Approaches

Performance audits, TPS, and systems analysis involve the assessment of measurable and observable outcomes or products of the system. An important difference among them is that systems analysis is based on the assessment of only the accomplishments of the system and the performance audit and the TPS are based on the performance, which is a combination of accomplishments and behaviors. Therefore, an advantage of the performance audit and the TPS over systems analysis consists of the analysis of the behaviors, when the system fails to accomplish the desirable outputs because, in those situations, problems of behavior might be the cause of the deficiencies in the outputs.

The analysis of performance rather than behavior reduces the risks of losing the perspective of the goals of the organization. When the analysts concentrate too much on only activity or behavior, they may lose sight of why they are doing the analysis, and analyzing behavior becomes a false goal in itself; then the analysts
have fallen into the activity trap (Odiorne, 1974). This may happen more often, using methodologies that focus on processes rather than on products, methodologies such as behavior-based assessment and behavioral systems analysis; however, process-oriented methodologies are very effective in the analysis of specific problems within systems.

Another aspect of the performance audit is that the systems are analyzed from the most general to the most specific levels; the levels, called levels of vantage, consist of the philosophical, cultural, policy, strategic, tactical, and logistic levels. The highest vantage levels (philosophical and cultural) involve the analysis of the long-term outcomes of the systems, but those levels are generally ignored by systems analysts. Milani (1983) pointed out that systems often fail in identifying their long-term goals mainly by analyzing only the lower vantage levels, such as the logistic and tactical levels.

The analysis of the accomplishments at various levels of the system is also a feature of the TPS; the outputs of the system are evaluated not only in terms of the processing-system feedback, but also receiving-system feedback. In a hierarchy of organizational levels, the superior level might be the receiver of the accomplishments from lower levels; this allows the analysts to have a clear picture of the system as a whole, as well as the specific issues. Traditional evaluation programs differ from the performance audit and the TPS in the analysis of the accomplishments at various levels of the system; with traditional evaluation programs it is
more difficult to analyze how an achievement of an accomplishment at a specific level of the organization could affect the achievement of an accomplishment at higher levels. Furthermore, traditional evaluation models, which evolved from a social research methodology (Gooding, 1960), may be appropriate for assessing program merit, or determining whether the program was implemented as planned, but do not include a systematic cause analysis model such as Gilbert's (1978) behavior engineering model.

The standards in the performance audit are based on the exemplary or best performance; whereas, in traditional approaches, the standards are based on the minimum or average performance (Stufflebeam and Webster, 1980); often the conclusions from the application of these approaches indicate less room for improvement than with the application of the performance audit. On the other hand, in Brethower's model (1972) the standards are based on the criteria established in the receiving system; he indicates that the standards of performance of an individual performance within a system should be based on the criteria the receiving-system establishes for that particular performance.

The Behavioral Systems Analysis Program

This section provides a brief overview of the Behavioral Systems Analysis Program (BSAP). The mission of BSAP consists of producing behavior systems analysts who will improve the conditions of humanity. BSAP was founded on the assumption that most problems of
humanity are a consequence of poorly functioning systems; many systems are not designed to improve the quality of life, or if so, their missions are not accomplished successfully. Behavior systems analysts design, manage, and evaluate systems to make them work well, so that the desired behaviors occur to produce the desired outcomes. These analysts compare the ideal model of a system with the real one, then they design and implement cost-effective alternatives for changing the existing system.

BSAP not only stands for Behavioral Systems Analysis Program, but also for Black Social Action Program. A more specific goal of BSAP is to produce Black behavioral systems analysts who improve the quality of life of the Black community. Black behavior systems analysts are particularly needed because Blacks have difficulties in achieving their potential within the White community of the United States. The Black Social Action Program has also the goal of helping Black students achieve their academic potential at Western Michigan University. Because Blacks are less likely to succeed in university programs, WMU needs more systems that effectively support these students; therefore, it needs experts in behavioral systems analysis dedicated to Black students. An evidence of the low success of the Black students in the university is that only 11% of the students that enter through the Martin Luther King Program graduate. However, the present study is only going to deal with the Behavioral Systems Analysis Program; the Black Social Action Program is left for future analysis.

Several characteristics of BSAP differentiate it from more
traditional graduate training courses:

1) In order to develop these skills, BSAP gives many opportunities for individual performance and provides feedback to the students on a weekly basis. This is not typical of traditional courses where the students acquire knowledge but they frequently do not have the opportunities for rehearsal and feedback needed to develop skills.

2) Developing skills takes time; therefore, the students are actively involved in the system for one and one half to four years during their graduate programs. In more traditional courses, the students stay four months in the course and afterward they might not make much use of what they have learned.

3) The students work in a practicum setting while in BSAP. The practicum settings are internal and auxiliary systems of BSAP; they are managed by and composed of students from BSAP. These systems are presented in Table 1.

4) BSAP is a supervisory system; the students with more experience and skills supervise others who are still acquiring those; Ph.d students supervise master's students, master's students supervise bachelor's students, and bachelor's students supervise undergraduate students with academic problems.

5) BSAP is currently composed of 18 students; 14 are involved full time, while four are partially involved. Eleven of the 18 are Black students.
Table 1
The Internal and Auxiliary Systems of BSAP

<table>
<thead>
<tr>
<th>Internal Systems</th>
<th>Auxiliary Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Supervisory System</td>
<td>Center of Self-Management</td>
</tr>
<tr>
<td>Quality Control System</td>
<td>Arts and Sciences Students</td>
</tr>
<tr>
<td>Coordination System</td>
<td>Martin Luther King Program</td>
</tr>
<tr>
<td></td>
<td>Psychology 194</td>
</tr>
<tr>
<td></td>
<td>Performing Contracting System</td>
</tr>
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<td></td>
<td>Seminar on Black Issues</td>
</tr>
</tbody>
</table>

Objectives of the Present Research

The present research has two main objectives: The first is to identify those components of BSAP with the greatest opportunities for performance improvements and to identify the causes of the performance deficiencies. The second and more general objective is to determine the feasibility of the application of the performance audit to an educational system by analyzing the components of the performance audit that were useful and not useful in the analysis of BSAP.
CHAPTER II

METHOD

This study was conducted during the first three academic semesters of the existence of BSAP: Fall 1983, Winter 1984 and Fall 1984. The researcher was a full time student participating in BSAP while the study was conducted. Dr. Richard Malott, the faculty director of BSAP, actively participated in the performance audit of BSAP on a weekly basis; Dr. Norman Peterson, the researcher's advisor, participated as an external consultant on performance auditing. Dr Malott, Dr. Peterson, and the researcher formed the analysis team of the performance audit of BSAP. In addition, the students of BSAP participated in this analysis during various class discussions.

The performance audit consisted of three steps: first, the identification of the desired accomplishments of BSAP at its various levels; second, the measurement of the ideal and typical performance and the evaluation of the performance deficiencies in terms of the differences between both; and third, the identification of the causes of the performance deficiencies.

Desired Accomplishments

The audit was based on the accomplishment that BSAP produced, or should have produced at its various levels. Five vantage levels were included in the audit: the philosophical, a combination of cultural and policy, strategic, tactical, and logistic levels. The
accomplishments of BSAP at the five vantage levels were defined as a result of discussions between Dr. Malott, Dr. Peterson, and the researcher.

In determining the accomplishments at the philosophical level, the analysis team analyzed the ultimate goals of BSAP in terms of the benefits BSAP should produce for humanity and the general culture. The accomplishments at the policy level consisted of the evaluation of the overall mission of BSAP. A test called the ACORN test (Gilbert, 1978) was administered in order to evaluate the mission in terms of the following questions: 1) Is the mission stated in terms of accomplishments rather than behaviors? 2) do the managers have control over the processes necessary to achieve those accomplishments? 3) are those accomplishments the overriding goals of the system? 4) are those accomplishments recognizable with the mission? 5) are those accomplishments measurable? The accomplishments at the strategic level were analyzed in terms of the behavioral repertorie needed to achieve the mission of BSAP. The accomplishments at the tactical level consisted of an analysis of the accomplishments required to acquire the behavioral repertorie referred to at the strategic level. The accomplishments at the logistic level consisted of an analysis of the resources available to achieve the accomplishments specified at the tactical level; resources such as materials, syllabuses, written descriptions of the evaluation system, books and trained staff.
Measurements

The ideal and typical performance were expressed with the units of measurement existent in BASP at the time of this performance audit. The performance deficiencies were considered in terms of the idealized and the actual performances achieved in BSAP; the analysis team analyzed the differences between both.

Causes of Performance Deficiencies

At each vantage level, a performance deficiency was analyzed by using Gilbert's behavioral engineering model. The behavioral engineering model included two main areas of analysis: the environment and the repertories of the individuals. Three aspects were evaluated in relation to the environment: the data available, which included instructions and feedback; the resources such as materials, time, and people; and the short-term and long-term incentives. Concerning the individuals' repertories, three aspects were also evaluated: knowledge and training; capacity of the individuals in terms of the basic perceptual discrimination necessary to perform properly; and the motives. The analysis of motives was based on the extent to which the current incentives would function as effective reinforcers. The questions of the behavioral engineering model were related to BSAP: Does BSAP have available the data required to identify specific performance deficiencies? Does BSAP have the resources to reduce these deficiencies? Does BSAP have the incentives to cause the desirable behaviors to occur? Does it have
the knowledge needed to effectively reduce the deficiencies? Does BSAP have the capacity to reduce the deficiencies? Does the incentive system of BSAP effectively cause desirable behaviors? As the conclusion of the analysis of each vantage level, a summary table was presented that contains the accomplishments identified at that level, the areas with greatest opportunities for improvement, and the causes of one of these performance deficiencies.
CHAPTER III

RESULTS: PERFORMANCE AUDIT OF THE BEHAVIORAL SYSTEMS ANALYSIS PROGRAM

The results are presented for each of the five vantage levels: the philosophical, policy, strategic, tactical and logistic. At each level, the analysis consisted of the specification of the desired accomplishments at that level, the analysis of the actual accomplishments and performance deficiencies, and the reasons for those deficiencies. The reasons were analyzed in terms of Gilbert's behavioral engineering model which covered the following areas: data, resources, incentives, knowledge, capacity, and motives.

Three tables were presented at each level: the first indicates the performance deficiencies identified at each level; the second consisted of the analysis of the deficiencies using the format of Gilbert's behavior engineering model (this was not done at the philosophical level); and the third consisted of a summary table indicating the accomplishments at that specific level, the major performance deficiencies, and the causes of one of these deficiencies.

Philosophical Level

Philosophical Level: Desired Accomplishments

The desired accomplishment of the philosophical level was the achievement of optimum human potential. Achieving the human potential was equivalent to achieving the survival of the culture (Skinner,
1978) or achieving the survival of humanity (Malott, 1980). These were different ways of stating the same thing; the goal was to improve human wellbeing, which BSAP believes should be the philosophical goal of all systems.

**Philosophical Level: Measurements**

Achievement of human potential meant the optimal use of the physical and psychological capabilities of the humanity to improve the quality of human life. Measurements of the achievement of human potential might have been available in population data, for example, life expectancy data (e.g. life expectancy, deaths by heart attack [data presented in Table 2]), physical conditions (e.g. degenerative and contagious diseases, physical capabilities, exercise, diet), psychological conditions (e.g. population with psychosomatic diseases such as stress), productivity (e.g. unemployment, income, sales), family's interactions (e.g. number of divorces, abandoned children).

**Philosophical Level: Causes of Performance Deficiencies**

Optimum human potential is not being achieved because of three reasons: 1) Many systems in the culture do not have a mission compatible with the optimization of human potential (sellers of street drugs, sellers and producers of cigarettes). 2) Systems working toward the improvement of human wellbeing are not functioning properly. 3) There are not enough systems working toward this goal. This analysis is summarized in Table 3.
### Table 2

Measurements at the Philosophical Level

<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Measurements</th>
<th>Ideal</th>
<th>Typical</th>
<th>Difference</th>
<th>Stake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy increased</td>
<td>years of life expectancy at birth</td>
<td>85</td>
<td>73.7 in USA</td>
<td>11.3</td>
<td>very high</td>
</tr>
<tr>
<td>Deaths caused by heart attack reduced</td>
<td>Number of deaths caused by heart attack per year in USA</td>
<td>24,000</td>
<td>780,000</td>
<td>256,000</td>
<td>very high</td>
</tr>
</tbody>
</table>

**Note.** The exemplary number of deaths caused by heart attack was estimated by reducing several secondary risks indicators: systolic blood pressure, diastolic blood pressure, cholesterol level, diabetes, exercise, parents who die of heart attack before age 60, smoking, and weight. Table 2 only illustrates how the performance deficiencies at the philosophical level could be estimated. Data for the USA population was available for this study; however, similar analyses could be done with population data from other countries. The data are from: Bodyworkbook by Herbert Haessler. Avon Books, 1980; and Vitality and Aging by James F. Fries and Lawrence M. Crapo, Freeman, 1981.
Table 3
Results of the Analysis at the Philosophical Level

<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Deficiencies</th>
<th>Causes of Deficiencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimum human potential achieved</td>
<td>Low life expectancy</td>
<td>Systems incompatible with optimization of human potential</td>
</tr>
<tr>
<td></td>
<td>Poor physical conditions</td>
<td>Systems working poorly</td>
</tr>
<tr>
<td></td>
<td>Poor psychological conditions</td>
<td>Insufficient systems working to optimize human potential</td>
</tr>
<tr>
<td></td>
<td>Low productivity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor family interactions</td>
<td></td>
</tr>
</tbody>
</table>

Policy Level

Policy Level: Desired Accomplishments

As indicated in the previous section, the philosophical goal was the achievement of optimum human potential; therefore, the mission of BSAP involved the production of professionals who create or improve systems that contribute to this goal. The ACORN test was applied in order to evaluate this mission in terms of five criteria: accomplishment, control, only, reconciliation, and number.
ACORN Test.

Accomplishment.

The production of professionals who create or improve desirable systems was an accomplishment.

Control.

The management of BSAP did not have complete control over its mission; outside sources control most factors such as job opportunities, work demands, and legislation. However, BSAP exerted more control over the creation or improvements of systems that are under its coordination, systems such as the Center of Self-Management and the Research Supervisory System.

Only.

If the only accomplishment of BSAP were the creation or improvement of systems that facilitate the well being of humanity, the existence of BSAP would be worthwhile; the achievement of the BSAP's mission would make BSAP a successful system.

Reconciliation.

The mission of the Psychology Department might have also been that the alumni create or improve systems that achieve human potential. Therefore, the missions of BSAP and the Psychology Department are not conflicting.
Could the mission of BSAP be measured? Yes. The creation or improvement of systems could be measured through the evaluation of the alumni performance in systems. Another measurement of the mission might have been the performance evaluation of current BSAP students in the systems where they did their practica or research.

Policy Level: Measurements

Measurements of the Performance of the Alumni in Systems

The performance evaluation of the alumni of BSAP might have been the best indicator of the extent to which the mission was being accomplished. Were they working in systems that favor the betterment of humanity (number of persons)? Were they making valuable contributions to the system? ($ value of the contribution to systems; number of instances where they have helped humanity or improved the achievement of human potential, such as the number of students they prevent from dropping out of the school, the number of clients whom they helped to lose weight, the amount of productivity they were enable to enhance). By the time of this performance audit, eight students left after being in BSAP one or two semesters; 100% of these students were working in systems that might contribute to humanity. However, no direct contact was established with them for purposes of evaluation.
Measurements of the Performance of the Current BSAP Students in Systems

Were the students, currently enrolled in BSAP, making improvements in the systems where they did their practica? It might have been possible to measure their effectiveness in the following terms: Did they carefully analyze the status of the systems? Did they do an accurate performance audit in their systems? Did they successfully implement new projects in the systems or do the systems remain stagnant? Did they implement systems improvements based on their performance audit? BSAP had not systematically measured the systems contributions of its current students by the time of this performance audit. Two difficulties were found in trying to measure the systems contributions of the current BSAP students: first, it was necessary to differentiate between the systems contributions of the new and advance students, who had been two or three semesters in BSAP; it might have been too much to expect new students to make contributions to systems during their first semester when they were becoming familiar with the system; second, it was difficult to determine how much of the systems improvements during this semester, Fall 1984, was a consequence of individual contributions of current students or a consequence of the evolution of the systems created in past semesters. Although BSAP did not have precise data about the contributions of its students to systems, there were some indicators of improvements and deficiencies in the BSAP systems.
Indicators of Improvements in BSAP Systems.

High-risk student maintainance at the university.

Sixteen out of 25 high risk students from the semester of Winter 84 continued this semester in the university, Fall 84. They were in the Center of Self-Management doing weekly contracts for completion of the academic work required in their courses. Jager (1984) found statistically greater improvement in grade-point average for the group working in the Center of Self-Management in relation to those who were not in this performance contracting system. The Center of Self-Management was managed by BSAP students. A similar program was managed with high risk students from the Martin Luther King Program. Eleven BSAP students worked in these settings. This semester approximately 35 high risk students were clients in these systems.

Thesis completion.

Three theses were completed in the Center of Self-Management (Yancey, 1983; Wittkopp, 1984; Jager, 1984); a student was managing a similar thesis with the Martin Luther King population. A total of five students completed their master's thesis during the first three semesters of BSAP. Nine masters thesis proposals were in active preparation during the Fall semester, 1984 (the third semester). These were the accomplishments facilitated by a research supervisory system formed by all BSAP students. During the third semester, this system was run by a student who was doing her master's thesis in this area.
Potential Systems Contributions.

The new thesis proposals involved potential systems contributions: two studies were designed to increase professional involvement of students after they obtained their bachelor's degree, one dealt with all the students in psychology and the other with Black women across the campus; a study was being prepared to develop instructional programming of concepts relevant to the analysis of rule governed behavior; another study involved helping Black students learn standard English in addition to the Black English they have already mastered; a study was designed to train pre-school children to acquire the ability to follow rules that specify indirect-acting contingencies; two other studies involved the design of systems to improve staff management; a study was trying to help students acquire the mathematical and quantitative logic skills needed to do well on the GRE; and another study involved the development and evaluation of a performance-management system to help minority students improve their academic performance in an introductory psychology course. Finally, the present study consisted of a performance audit of BSAP.

Indicators of Systems Deficiencies in BSAP Systems.

Weight lost.

Seven persons with weight problems participated in a weight lost program. This was a behavioral contracting system managed by a student who is doing her master's thesis in this area. At the time of this performance audit, the persons that participated in the program had not decreased their weight.
Physical exercise.

Six students participated in a contracting system managed by a student who was doing her master's thesis in this area. The participants contracted to attend the gymnasium on campus three times per week and work on improving their physical conditions. The contracting system was not effective in improving the amount of exercise of its participants at the time of this performance audit.

General Systems Deficiencies.

Most of the BSAP systems had at least one big area of deficiencies, such as the management and collection of data, the establishment of specific measurements of performance, the implementation of effective feedback systems, and the implementation of cost-effective solutions. (A summary of the measurements at the policy level is presented in Table 4).

Policy Level: Causes of Performance Deficiencies

Some causes of deficiencies identified at the philosophical level were the poor functioning of systems, and the insufficient number of systems that pursue the improvement of the human condition. BSAP expected systems improvements or implementations from its students, so they would be more likely to contribute to beneficial systems to humanity once they leave BSAP. But, some systems of BSAP had considerable room for improvement; they were not accomplishing
their goals; they were not improved by the participation of the students. Therefore, the behavioral engineering model was applied to identify the causes of these deficiencies (the application of the behavioral engineering model is presented in Table 5, and the results of the analysis at the policy level is presented in Table 6).

Table 4

<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Measurements</th>
<th>Ideal</th>
<th>Typical</th>
<th>Difference</th>
<th>Stake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alumni working in systems that improve human condition</td>
<td>% of alumni working in systems that improve human condition</td>
<td>100%</td>
<td>100%</td>
<td>-</td>
<td>none</td>
</tr>
<tr>
<td>% of systems improved</td>
<td>100%</td>
<td>ND</td>
<td>high impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current BSAP students doing research or practica in a system that benefit humanity</td>
<td>% of students working in those systems</td>
<td>100%</td>
<td>100%</td>
<td>-</td>
<td>none</td>
</tr>
<tr>
<td>% of systems improved</td>
<td>100%</td>
<td>Indicators of improvements &amp; deficiencies</td>
<td>high impact</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ND= no data available
Table 5

Behavioral Engineering Model of a Deficiency at the Policy Level

**Performance Deficiency**

Some BSAP systems were not being improved or implemented by its students.

<table>
<thead>
<tr>
<th>Data</th>
<th>Resources</th>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal and casual data from weekly meetings with Dr. Malott and from weekly staff meetings for the coordination of BSAP systems</td>
<td>More trained staff that supervise the BSAP students in the systems</td>
<td>Facilitation of coordination, management &amp; implementation of BSAP</td>
</tr>
<tr>
<td></td>
<td>Needs: Systematic measures of students performance in systems.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Capacity</th>
<th>Motives (Evidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs: BSAP needs to determine the effectiveness of the methodology used to train, motivate and cause students to improve systems</td>
<td>NA</td>
<td>Available: students of BSAP help to coordinate, manage and implement BSAP</td>
</tr>
</tbody>
</table>

NA: No applicable

Available: currently existing in BSAP

Needs: causes of the deficiencies.
Table 5 --Continued--

Note. Although BSAP has not yet systematically demonstrated the effectiveness of its teaching techniques, in the past, the students who were under similar programs for various years under the supervision of Dr. Malott supervision have been subjectively evaluated as good behavior analysts.

Table 6
Results of the Analysis at the Policy Level

<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Deficiencies</th>
<th>Causes of Deficiencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce professionals that create or improve systems that achieve an optimum human potential</td>
<td>Probably not enough systems improvements by students of BSAP</td>
<td>Insufficient well trained staff (resources)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor measures of performance (data)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Systems contributions of the alumni (No data)</td>
</tr>
</tbody>
</table>

Strategic Level

**Strategic Level: Desired Accomplishments**

The general accomplishment at this level was skills acquisition.
BSAP students should acquire the repertorie necessary to cause appropriate systems to exist, systems that produce the optimization of human potential. These skills were grouped in four categories: professional, research, behavior analysis, and the development of human systems. Professional skills involve reading, writing, speaking, presenting, self-management, staff management and social skills.

**Strategic Level: Measurements**

**Reading Skills**

Reading skills were defined in BSAP as the ability to express accurately the position of other authors; this was evaluated through oral participation in class discussions of readings, and written reading reactions. Class reading discussions were conducted every week; the students participated in a round table and they received immediate feedback about the accuracy of their description of the author's position.

In addition, the students wrote approximately three reading reactions every week, and they received feedback on the quality of their reactions.

**Writing Skills**

The evaluation of writing skills had two components: logic and
English. Logic was evaluated in terms of sequence and relations of ideas. Logic and English were also evaluated with a four-point scale through oral presentations in the reading discussions and through the weekly written assignments. Like the evaluation of reading skills, the students lost one point per error to a maximum of four points. The repetition of the same kind of error was only counted as one error.

**Speaking Skills**

Speaking was measured in terms of the number of mistakes in pronunciation, grammar and the use of non-standard English. The students received immediate feedback about their speaking in class participation and formal presentations.

**Presentation Skills**

Two presentations per semester were required for each student: a formal presentation of their research project and a presentation of the performance audit of the system where they did their theses or practica. The presentations were evaluated by Dr. Malott through a speaker evaluation form. The maximum points possible was 20. The criteria for evaluation included content, transparencies, voice, gestures, organization, etc. In addition, each presenter received written comments from each student, which included aspects relevant to the project presented or feedback about the quality of the presentation.
**Self-Management Skills**

The self-management skills were measured through activities that involved behavioral contracting for the students: participation in the research supervisory system, assistantships, and supervision of clients.

The Research Supervisory System was a system that provided the students with a structure to help them complete their research project; it involved the specification of tasks and deadlines. The percentage of tasks completed per week was considered a good measure of self-management skills.

Thirty-five percent of the BSAP students had assistantships in BSAP or systems coordinated from BSAP. Tasks and deadlines were specified in these assistantships; also their self-management skills were evaluated in terms of the tasks completed. In the supervision of high risk students attending the Center of Self-Management, the contractors had weekly meetings with a supervisor who recorded the percentage of tasks assigned completed.

**Staff Management**

Every student in the system had the opportunity to supervise someone else. The supervisees could be participants of the research supervisory system, clients of the Center of Self-Management, contractors, or evaluators of BSAP.
The staff management skills were measured through the number of overall tasks that the supervisees completed. For instance, if someone supervised the contractors' performance, quality of the work of the contractors would be an indicator of their staff management skills. The measure could involve the number of complaints by the supervisees in relation to the supervision.

Social

The students of BSAP used what is called the self-development interview. It consisted of a meeting where the supervisee and the supervisor gave specific feedback to each other about their social skills; also feedback related to other skills was given: the professional, research, behavior analysis and systems analysis skills. The feedback was based on two written evaluation forms, one for the supervisor and one for the supervisee. These forms were developed in BSAP with the participation of all the students; every student contributed three items related to being a successful supervisor and three for being a successful supervisee. The tactics of the self-development interview consisted of summarizing the strengths and weaknesses of both supervisor and supervisee, identifying areas that required improvement, designing strategies for reducing the deficiencies, and maintaining weekly follow up through the supervisory meetings. Therefore, the social skills were measured in terms of weekly instances of occurrence of the problem.
behavior. The problem behavior was treated through a behavior modification program conducted between the supervisor and the supervisee.

**Research skills**

In the research supervisory system, the tasks required to complete a thesis were divided into weekly recurring and non-recurring tasks. Recurring task were those tasks the students should repeat every week during the development of his or her research project, tasks such as writing 200 works, collecting data, reading two articles. Non-recurring tasks were those that were only required once during the research, such as selecting a research topic and preparing the subject consent forms. The percentage of these tasks completed in the research supervisory system was a measure of the research skills.

Percentage of tasks completed was a measure of quantity, but measures of quality might have a greater impact on the quality of the final thesis. Therefore, during the present semester, Fall 1984, some units of quality measures were incorporated in the research supervisory system; for instance, quality measures of writing. This created some problems with the point system of the supervisory system. As a consequence, a new method would be implemented. It would consist of a subjective weekly evaluation of the supervisor in
relation to the quality of the supervisee's performance on a scale of 10 points.

**Behavior Analysis Skills**

The behavioral analysis skills were measured in terms of the number of technical concepts properly used and the originality of accurate applications of the concepts. These measures were obtained from two sources: written reactions and oral presentations of the personal position during class discussions of the reading reactions. The maximum points possible per reaction was four. They were obtained when the student properly used at least four concepts; in case the student used more than four concepts, he or she would lose one point per concept incorrectly used. Originality was also evaluated in a scale from one to four based on the similarities of the readings and personal applications of the concepts.

**Human Systems Skills**

Human systems skills were measured in terms of the number of improvements the students made in the system where they did their practica or research. In addition, the students did a weekly assignment dealing with performance audits. The objective of these assignments was for the student to produce a short version of a performance audit similar to the present, but the audit was to be study in the system where they worked. A student could obtain a
maximum of four points in these weekly assignments. A summary of the units of measurement of BSAP and the specification of the exemplary and typical performances were shown in table 7.

Strategic Level: Causes of Performance Deficiencies

In the present study, only the writing performance deficiencies of the BSAP students were analyzed more extensively. The students wrote three weekly assignments: one to three reading reactions, one performance audit of their system, and sections of their thesis. The performance on those assignments was determined by several repertories including skills of logical analysis, skills of writing, skills of behavior analysis, skills of reading, and perhaps the skills of generating original reactions to written material. However, in the analysis of the behavioral engineering model (Table 8), only the measures of writing were considered: logic and English. The entry writing skills of the students were evaluated after the correction of the first written reading reaction. The students with very poor writing skills attended the Writing Lab of the Academic Skill Center one or two hours per week. They wrote a first draft of the reading reactions and corrected it with their tutor at the Academic Skill Center. Then, they turned in the first draft with revision. In addition, the Academic Skill Center tutor worked with individual writing deficiencies of the students, doing specific kinds of writing exercises. The students received additional weekly feedback from
their tutors. The data collected from the weekly evaluators indicated improvements in logic and English of most students. The average score obtained in English usage in the reading reactions assignments was 2.0 at the beginning of the semester, and 2.7 ten weeks later; the average score of logic in the same assignments was 3.3 points at the beginning of the semester, and 3.6 ten weeks later. Even though, the average points did not seem to show too much progress, the number of mistakes decreased considerably; the point system did not show the magnitude of the improvement because the scale used only allowed the evaluator to record a maximum of four mistakes. In addition, some of the tutors of the Academic Skill Center presented a report of their students which indicated improvements in their writing skills.

Although there were improvements in the writing of BSAP students, the performance on the written assignments of the students fell below the quality standards established in BSAP. (A summary of the analysis at the strategic level was presented in Table 9).

Tactical Level

Tactical Level: Desired Accomplishments

As indicated in the previous section, the main accomplishment at the strategic level was of the acquisition of the skills that would allow the students to make worthwhile contributions to worthwhile systems. The main issue to address at the tactical level was the
identification of the necessary accomplishments for insuring that the students acquire those skills. At the strategic level, the acquisition of writing skills was analyzed; the analyses at the tactical and logistic levels were also focused on writing skills.

In order to acquire good writing skills most easily, the students should be able to state the rules of writing, discriminate between instances and non-instances of those rules, and generate new instances.

Stating the Rules

Stating the rules of good writing could be considered a useful initial step in learning to write. Two kind of rules could be identified: antecedent rules for generating written material and consequent rules for editing.

Discriminating Instances versus Non-Instances of the Rules

The students should be able to recognize good and bad examples of writing and criticize them based on the set of rules they have learned. In the Writing Lab of the Academic Skill Center, when the students could not discriminate between examples and non-examples, they worked on special programs to learn the specific rules deficient in their repertories.

Generating new instances
The students had opportunities to apply the rules of good writing. They received feedback about their performance as many times as necessary for the rules to exert control over their writing behavior, the main issue considered at the strategy level.

Tactical Level: Measurements

Stating the Rules

The measurement for this accomplishment consisted of the percentage of rules the students might have been able to recite or state. This measure was not implemented in BSAP.

Discriminating Instances and Non-Instances

The students of BSAP took three tests over a list of examples and non-examples of writing; the students were asked to correct the bad examples and not to modify the good examples. The results of these tests were used as measurements of the discriminations the BSAP students could make.

Generating instances and non-instances

This accomplishment was measured in terms of the number of written assignments the students turned in each week (the quality of these assignments was measured at the strategic level). Three different assignments were considered in the generation of instances.
Table 7
Measurements at the Strategic Level

<table>
<thead>
<tr>
<th>Accomplishment</th>
<th>Measurements</th>
<th>Ideal</th>
<th>Typical</th>
<th>Difference</th>
<th>Stake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td># of points for author’s position</td>
<td>4</td>
<td>3.61</td>
<td>.39</td>
<td>small</td>
</tr>
<tr>
<td>Writing</td>
<td># of points for English</td>
<td>4</td>
<td>2.1</td>
<td>1.9</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td># of points for logic</td>
<td>4</td>
<td>3.3</td>
<td>.7</td>
<td>medium</td>
</tr>
<tr>
<td>Speaking</td>
<td># of mistakes when presenting personal position</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>high</td>
</tr>
<tr>
<td>Presenting</td>
<td># of points earned in the thesis presentations</td>
<td>20</td>
<td>18</td>
<td>2</td>
<td>small</td>
</tr>
<tr>
<td>Self-management</td>
<td>% of tasks completed: supervisory system,</td>
<td>100%</td>
<td>95%</td>
<td>5%</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td>assistantships, clients' supervision</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff management</td>
<td>% of task completion by supervisees</td>
<td>95%</td>
<td>-</td>
<td>-</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td># of supervisees' complaints</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>high</td>
</tr>
</tbody>
</table>

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Table 7 — Continued—

<table>
<thead>
<tr>
<th>Accomplishment</th>
<th>Measurements</th>
<th>Ideal</th>
<th>Typical</th>
<th>Difference</th>
<th>Stake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td># of instances of the problem behavior recorded per week</td>
<td>decrement -</td>
<td>-</td>
<td>high impact</td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td>% of tasks completed</td>
<td>100%</td>
<td>95%</td>
<td>5%</td>
<td>medium impact</td>
</tr>
<tr>
<td></td>
<td># of points on a subjective evaluation scale from 1 to 10</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>high impact</td>
</tr>
<tr>
<td>Behavior analysis</td>
<td># of concepts properly used on written reactions</td>
<td>minimum 3</td>
<td>1</td>
<td>medium impact</td>
<td></td>
</tr>
<tr>
<td></td>
<td># of concepts properly used in oral presentation of personal points</td>
<td>minimum 3</td>
<td>1</td>
<td>medium impact</td>
<td></td>
</tr>
<tr>
<td></td>
<td># of points for originality</td>
<td>4</td>
<td>3.5</td>
<td>.5</td>
<td>high impact</td>
</tr>
<tr>
<td>Development of Human Systems</td>
<td># of improvements made in system per week</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>high impact</td>
</tr>
<tr>
<td></td>
<td># of points in the performance audit assignments</td>
<td>4</td>
<td>2.5</td>
<td>1.5</td>
<td>high impact</td>
</tr>
</tbody>
</table>

Note. Accomplishments were defined as skills acquired.
Table 8

Behavioral Engineering Model of a Deficiency at the Strategic Level

Performance Deficiency.

The performance on the written assignments of the students fell below the quality standards established in BSAP.

<table>
<thead>
<tr>
<th>Data</th>
<th>Resources</th>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available: Writing samples of thesis and reading reactions</td>
<td>Available: Computer services of the university to facilitate rewriting</td>
<td>Available: High quality theses &amp; review papers</td>
</tr>
<tr>
<td>Needs: Implementation of point system based on number of errors</td>
<td>Auxiliary training programs to help students to improve their writing up to</td>
<td>Improve the quality of the evaluation &amp; feedback on</td>
</tr>
<tr>
<td>Implementation of more accurate feedback system</td>
<td>achieve the minimum standards required in BSAP: ASC</td>
<td>the written products of students</td>
</tr>
<tr>
<td>Needs: Advanced trained staff &amp; evaluation check-list</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Capacity</th>
<th>Motives (Evidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available: Knowledge of how to train and motivate the students to improve their writing: many opportunities for performance and feedback</td>
<td>NA</td>
<td>Available: A writing training is implemented which demands time &amp; work</td>
</tr>
</tbody>
</table>

NA: Not Applicable; ASC: Academic Skill Center
Table 9
Results of the Analysis at the Strategic Level

<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Deficiencies</th>
<th>Causes of Deficiencies of Assigned Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills acquired:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td>There is variable room for improvement in the repertories of the students in relation to all the skills BSAP tries to teach</td>
<td>Insufficient well trained staff (resources)</td>
</tr>
<tr>
<td>Writing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presenting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systems Analysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

and non-instances of writing: the written reactions, performance audit and thesis sections. Table 10 summarizes the units of measurements and the differences between exemplary and typical performance at the tactical level.

Tactical Level: Causes of Performance Deficiencies

As pointed out in the analysis of the causes of the performance deficiencies at the strategic level, the students' performance of the written assignments fell below the quality standards established
in BSAP. At the tactical level, some performance deficiencies that might have affected the students' performance on writing were identified. As shown in Table 10, the typical number of rules correctly stated by the students had not been identified yet in BSAP; the ability to state the rules by the students might have been a potential deficiency in the acquisition of their writing skills. The possible causes of this deficiency in the students' repertoire were identified using the behavioral engineering model in Table 11. (A summary of the analysis at the tactical level is presented in Table 12).

Logistic Level

Logistic Level: Desired Accomplishments

As indicated in the previous section, the tactical level involved the analysis of the students' accomplishments needed to learn the rules of good writing: the statement of rules, the discrimination of instances and non-instances of the rules, and the generation of instances and non-instances. As a consequence, the analysis at the logistic level consisted of the resources needed to implement a program that achieves the accomplishments at the tactical level.

There were various resources needed to implement a writing training program in BSAP: Check-lists of English rules and logic rules or guidelines that could be used for writing and for
evaluation or editing of the written assignments; a description of the evaluation system used in the correction of the written assignments; a course syllabus that indicates the writing activities required in BSAP; textbooks of how to write English; the Publication Manual of the American Psychological Association (APA), which specifies the publication requirements in psychology; lists of examples and non-examples of good English and logic; instructional programs for specific deficiencies in writing such as the use of grades; evaluation sheets to give feedback on the assignments; auxiliary writing training systems where students with very poor entry writing repertories could acquire the prerequisite skills needed to be in BSAP; and, well trained staff that already had the prerequisites and resources needed to evaluate the writing of other students.

**Logistic Level: Measurements**

The deficiencies of the resources needed for a writing training program of BSAP are presented in Table 13.

**Logistic Level: Causes of Performance Deficiencies**

A potential problem of training writing skills in BSAP was presented at the tactical level, it consisted of the ability to state the rules by the students. A check-list of rules or guidelines of English usage and a check-list of logic might help the
Table 10
Measurements at the Tactical Level

<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Measurements</th>
<th>Ideal</th>
<th>Typical</th>
<th>Difference</th>
<th>Stake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rules stated</td>
<td>% of rules stated by the students</td>
<td>100%</td>
<td>ND</td>
<td>medium</td>
<td>impact</td>
</tr>
<tr>
<td>Instances and non-instances</td>
<td>% correct discriminations of the rules</td>
<td>100%</td>
<td>50%</td>
<td>50%</td>
<td>high</td>
</tr>
<tr>
<td>non-instances discriminated</td>
<td></td>
<td></td>
<td>100%</td>
<td>0</td>
<td>none</td>
</tr>
<tr>
<td>Instances and non-instances</td>
<td>% of reading reactions per week</td>
<td>100%</td>
<td>100%</td>
<td>0</td>
<td>none</td>
</tr>
<tr>
<td>generated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of thesis assignments per week</td>
<td>100%</td>
<td>64%</td>
<td>36%</td>
<td>low</td>
<td>impact</td>
</tr>
<tr>
<td>% of performance audit assignments per week</td>
<td>100%</td>
<td>100%</td>
<td>0</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>

students to learn the rules for good writing; they might use these check-lists to edit their own papers. Both English and logic check-lists were resources deficiencies of BSAP at the logistic level (Table 14 shows the possible causes of this deficiency). (The analysis at the logistic level is summarized in Table 15).
Table 11

Behavior Engineering Model of a Performance Deficiency at the Tactical Level

Performance Deficiency.

It might have been that the students are not able to state the rules for good writing.

<table>
<thead>
<tr>
<th>Data</th>
<th>Resources</th>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs: BSAP did not have data about the ability of the students to stating the rules of good writing</td>
<td>Needs: Exams to test the students to state the rules of good writing</td>
<td>Available: Improve the quality feedback on writing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improve the quality of writing in theses, dissertations, and review papers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assignments that require stating the rules</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Capacity</th>
<th>Motives (Evidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available: BSAP has the knowledge needed to cause the students to state correctly the rules for good writing: giving opportunities for improvement, establishing contingencies on performance, and giving frequent feedback</td>
<td>NA</td>
<td>Available: BSAP has been working on improving the quality of feedback on writing, and the quality of theses writing</td>
</tr>
</tbody>
</table>

NA: Not Applicable
<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Deficiencies</th>
<th>Causes of Deficiencies of Stating the Rules RDIR* of Good Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rules stated</td>
<td>Potential deficiencies of stating the rules</td>
<td>Absence of data about the ability of stating the rules (data)</td>
</tr>
<tr>
<td>Instances and non-instances discriminated</td>
<td>Low percentage of instances and non-instances discriminated</td>
<td>Absence of exams or assignments that required stating the rules of good writing (resources)</td>
</tr>
<tr>
<td>Instances and non-instances generated</td>
<td>Low percentage of thesis writing</td>
<td></td>
</tr>
</tbody>
</table>

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Table 13

Measurements at the Logistic Level

<table>
<thead>
<tr>
<th>Accomplishments</th>
<th>Measurements</th>
<th>Ideal</th>
<th>Typical</th>
<th>Difference</th>
<th>Stake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check-list of English rules</td>
<td># of check-lists in BSAP</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>high</td>
</tr>
<tr>
<td>Check-list of logic rules</td>
<td># of check-list in BSAP</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>high</td>
</tr>
<tr>
<td>Description of BSAP’s evaluat.</td>
<td># of descriptions per semester</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>medium</td>
</tr>
<tr>
<td>Course syllabus for english</td>
<td># of syllabus in BSAP</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>medium</td>
</tr>
<tr>
<td>Standard English Textbook</td>
<td>% of students with access</td>
<td>100%</td>
<td>0</td>
<td>0</td>
<td>medium</td>
</tr>
<tr>
<td>APA manual</td>
<td>% of students who have the APA manual</td>
<td>100%</td>
<td>100%</td>
<td>0</td>
<td>none</td>
</tr>
<tr>
<td>List of examples &amp; non-examples</td>
<td>% of lists of rules</td>
<td>100%</td>
<td>20%</td>
<td>80%</td>
<td>high</td>
</tr>
<tr>
<td>Instructional programs</td>
<td># of instructional programs per set</td>
<td>1</td>
<td>0</td>
<td>1 X set of rules</td>
<td>medium</td>
</tr>
<tr>
<td>Evaluation sheets</td>
<td># of evaluation sheets of writing assignments</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>none</td>
</tr>
<tr>
<td>Auxiliary systems</td>
<td># of systems minimum</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>none</td>
</tr>
<tr>
<td>Well trained staff</td>
<td># of well trained persons available</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>high</td>
</tr>
</tbody>
</table>

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Table 14

Behavior Engineering Model of a Performance Deficiency at the Logistic Level

Performance Deficiency.

Absence of check-lists of rules for good writing in terms of English and logic.

<table>
<thead>
<tr>
<th>Data</th>
<th>Resources</th>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available: Some students suggested the need of a checklist of rules of good writing</td>
<td>Available: APA manual, books writing</td>
<td>Available: Students might start to edit their papers before turning them in</td>
</tr>
<tr>
<td></td>
<td>Samples of writing mistakes from the students assignments</td>
<td>Feedback might be more consistent</td>
</tr>
<tr>
<td>Needs: A person in charge of preparing the check-lists</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Capacity</th>
<th>Motives (Evidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available: Dr. Malott knew most of the rules for good writing</td>
<td>NA</td>
<td>Available: The check-list would be developed next semester</td>
</tr>
<tr>
<td>Needs: Some of the rules could not be stated, they are learned by contingencies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NA: Not Applicable

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Table 15

Results of the Analysis at the Logistic Level

<table>
<thead>
<tr>
<th>Accomplishment</th>
<th>Deficiencies</th>
<th>Causes of the Absence of Check-Lists of Rules for English and Logic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources available</td>
<td>Check-list of English rules</td>
<td>Absence of a person in charged of designing the lists</td>
</tr>
<tr>
<td></td>
<td>Check-list of logic rules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Written description of the evaluation system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Course syllabus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>List of instances and non-instances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Writing instructional programs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well trained staff</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER IV

RESULTS: FEASIBILITY OF APPLICATION OF GILBERT'S PERFORMANCE AUDIT TO AN EDUCATIONAL SYSTEM

Gilbert's performance audit was selected to analyze BSAP as opposed to other models because Gilbert model has important features that differentiate it from more standard systems analysis models; those features are the vantage levels, the analysis of accomplishments rather than behaviors, and the notion of the exemplar as the criteria for establishing performance standards. In addition, Gilbert's performance audit is also an important component of the training program of industrial psychology at Western Michigan University Michigan, as is Brethower's Total Performance System. Therefore, the researcher has been exposed to those models more intensively than to other program evaluation models.

In this section, the basic components of Gilbert's performance audit were analyzed in terms of their feasibility of application to an educational system: the Behavioral Systems Analysis Program. The results of these analyses were presented in three areas: accomplishments, measurements, and the causes of the deficiencies which refers to the application of the behavioral engineering model.

Accomplishments

According to the level of the system, Gilbert classified the accomplishments of a systems in terms of ideals, goals, missions, responsibilities, duties, and schedules. The use of these terms was a
source of confusion and disagreements in the identification of the accomplishments of BSAP. Much time was invested trying to classify the accomplishments with Gilbert's terms without success; therefore, simply the term accomplishment was used to make reference to the products the system should produce at its different levels.

Gilbert differentiated between a philosophical, a cultural and a policy level. The accomplishments at the philosophical level consisted of the quality of life, the accomplishments at the cultural level consisted of the contributions of the organization to the culture, and the accomplishments at the policy level consisted of the mission of the organization. It was very difficult to distinguish between the philosophical, cultural and policy level; perhaps they should be combined into two categories. In this study the accomplishments at the cultural and policy levels were combined in the policy level.

Further analyses should be oriented to better define the philosophical goal of systems: the achievement of an optimum human potential. It might be that most of the existing systems could rationalize their contributions to humanity. For instance, automobiles contribute to humanity, even though the automobile producers pollute the world.

It might be useful to distinguish between functional and ideal missions of systems. The functional missions of almost all organizations might be the immediate wellbeing and the convenient life style of the members of the organization. This might be true in most of the systems, including BSAP, the Department of Psychology,
the university, and the state university system. Systems should be
designed to accomplish the ideal goals, even when they are in
conflict with the functional goals.

An interesting point of analysis of the ACDRN test at the policy
level was the limitations of BSAP on its overall control over its
mission. This might also be true in most organizations, especially if
their missions are defined in terms of the functioning of the system
in the culture.

When doing performance audits of educative systems, it might be
always necessary to consider two kinds of learning procedures:
learning by rules and learning by contingencies (Malott, 1978). In
learning by contingencies, the individuals' repertoires are shaped by
the contingencies operating on their behavior. For example, many
people won't be able to state some rules of English grammar, although
they might be able to behave in a manner described by those rules;
their behavior was shaped by contingencies and it was not rule
governed. However, shaping the behavior by contingencies involves
more time than teaching rules; for this reason, the students of BSAP
might learn faster if they memorize the rules first and then receive
feedback on the application of those rules.

Measurements

When evaluating the performance of individuals, it might be
convenient to do so in terms of exemplary and typical performance, as
Gilbert does; but in BSAP it seemed more reasonable to evaluate in
terms of ideal versus typical performance. The ideal performance was based on outside exemplars, for instances exemplar writers or exemplar speakers. In this circumstances, the term ideal seems more appropriate than exemplar.

The potential for Improvement performance (measure of performance deficiencies is used by by Gilbert (1978); it is computed by dividing the exemplar by the typical) was not a useful concept in the performance audit of BSAP. It was more understandable to express the potential for improvement in terms of the differences between the exemplary and the typical performance than to express it with an indirect measure of the deficiencies. However, the potential for improvement performance might be a useful concept when it is necessary to make a decision about improving two deficiencies that have the same stakes. In this case, a common measure of both deficiencies might indicate which deficiency would be easiest to reduce; that would probably be the one with greater performance for improving performance.

The differences between the ideal or exemplar and the typical could be another way to indicate the potential for improving performance. However, this difference itself does not mean much if the stakes are not considered. The stakes consist of the value of reducing performance deficiencies and they might be the most important criteria for making the decision of whether or not to implement methods for improvement. In this study, it was not possible to determine economic value of the deficiencies, instead, the stakes
were subjectively determined by indicating the impact of improvement the deficiencies might have.

Causes of Performance Deficiencies:
Behavioral Engineering Model

The behavioral engineering model was a useful tool to determine the causes of the performance problems; by using it, it was possible to systematically analyze causes of the deficiencies. The model forced the analysis team to consider aspects that might not be considered otherwise.

However, the behavioral engineering model was also a source of confusion due to the ambiguity of the concepts used in the model: data, resources, incentives, knowledge, capacity and motives. It took much time for the analysis team to agree about the questions that should be answered based upon these concepts. For instance, did the data refer to the data needed for an individual to perform well, or the data needed by the system to identify poor performances? Did the incentives refer to the incentives that an individual needs to produce the desirable behavior, or the incentives the system needs to reduce its performance deficiencies?

These questions might lead to two different analyses: a behavior analysis or a systems analysis. In an early phase of the present research, the researcher used the behavioral engineering model in the analysis of the students' behaviors the results were that the behavioral engineering model was more useful for analyzing individual
performance deficiencies than for analyzing systems performance deficiencies. A list of recommendations based on the first applications of the behavioral engineering models is presented in Appendix A. However, the consideration of the vantage levels in the audit of BSAP gave a good framework to determine that the analysis had taken a wrong direction; the vantage level analysis was useful to determine the importance of a specific performance problem in relation to the mission and major accomplishments of the system.

The Total Performance System is a useful model in the analysis of systems; some of the difficulties found in the application of Gilbert’s performance audit could be overcome with the Total Performance System. For instance, it is easier to maintain focus on the accomplishments because they are continuously evaluated from the receiving and the processing system. It was difficult to differentiate between capacity and resources when applying the behavioral engineering model to the functioning of the system. Gilbert uses "capacity" to refer to minimum intellectual abilities required to perform a task; therefore, in this research the capacity was not applicable to the analysis of the system. It was also difficult to discriminate between incentives and motives in the behavioral engineering model in the analysis of the causes of deficiencies. "Incentives" referred to the kind of incentives operating in the system, if any; "motives" referred to the effectiveness of the incentive system in producing the desired behaviors. In both cases the main unit of analysis was the
contingencies; the only best way of knowing if the people were motivated was by observing their behaviors; if they were not behaving as desired when data, resources, knowledge and capacity were satisfactory, then, the causes of the performance deficiency were undoubtedly the contingencies which include the motivation and incentive variables as well as the contingency relationship between the response and its outcomes ("incentive") and the relevant discriminative stimulus. Therefore, the concept of motivation was not really necessary to analyze the causes of the performance deficiencies. In future performance audits the sections of incentives and motives could be combined into a section on the analysis of the contingencies.

Once that the behavioral engineering model has been applied, and for instance, data, incentives, resources, and knowledge have been identified, it is necessary to determine how to manipulate the environment and the individuals repertoires to achieve the goals of the system. Therefore, it might be necessary to address at some point the issue of management in the analysis of systems; this seems to be a major weakness of the behavior engineering model.
CHAPTER V

LIMITATIONS AND CONCLUSIONS

Performance Audit of the Behavioral Systems Analysis Program

Gilbert's performance audit was useful in determining the components of BSAP with greatest room for improvement. The results of the application of the performance audit to the Behavioral Systems Analysis Program indicated that the major areas of deficiencies of BSAP were the processing and management of data and the functioning of the staff supervision system; the major causes of these deficiencies were the insufficient number of well trained staff and the lack of precision of some of performance measurements.

Feasibility of Application of Gilbert's Performance Audit to an Educational System

The results of the present study also indicated that it was feasible to apply the performance audit to a complex educational system. However, it was necessary to modify some features of the model in its three major areas: accomplishments, measurements, and the behavioral engineering model. The modifications consisted of: First, the simplification of the terms used by Gilbert to describe the accomplishments at the various levels of analysis of the system and the reduction of the number of levels of analysis. Second, the used of standards based on external or ideal criteria instead of internal exemplary performance, the estimation of the performance
deficiencies in terms of the differences between the ideal and the
typical rather than in terms of computing the potential for improving
performance, and the identification of the stakes by indicating the
possible impact of reducing the deficiencies rather than by
estimating their economic value. Third, the clarification and
definition of the concepts involved in the behavioral engineering
model.

The present study had various limitations; one of them was the
inexperience of the researcher in doing a performance audit. The
current training programs in psychology at Western Michigan
University do not fully prepare novice analysts to do a complex
performance audit; the students read about Gilbert's model, but they
do not sufficiently practice its application. Furthermore, reading
Gilbert's Human Competence (1978) causes many students to accept his
theoretical points, but the book does no allow the reader to
implement a performance audit in a practicum.

Another limitation consisted of the general structure of the
performance audit of BSAP concerning the indirect relation between
the strategy and the policy level. The mission of BSAP consisted of
the creation or improvement of systems that contribute with the
betterment of humanity, and it has been assumed that the skills
presented at the strategic level are necessary to make those
contributions. But, does writing skills have something to do with
systems improvements? Are social skills necessary to contribute with
systems?, Are research skills really important? These questions
should be answered in further research.
An additional issue to consider is the relation between the units of measurement and skills acquisition. For instance, does the performance in the performance audits assignments of BSAP contribute to the acquisition of systems-analysis skills? Does the percentage of tasks completed in the research supervisory system have something to do with the acquisition of self-management skills?

In addition, the collection of data was another limitation encountered in the present study. During the first two semesters of BSAP, many areas of the system did not have any measures at all; and measures available were quantity and not quality measures; the measures were often far from indicating skill acquisition or improvement. Measurement in BSAP as of Fall 1984 still had a long way to go; for instance, more precise measures of research and social skills should be identified; however, considerable improvements had been made especially in the area of quality measurements, such as the evaluation of the quality of writing, and the application of the concepts of behavior analysis. The absence of accurate measures of performance seems to be a common problem in systems. In another application of the performance audit, Milani (1983) also found the absence of performance measures to be a serious problem of her study.

A major limitation of the present research is the kind of results obtained. This was not an experimental study; causal relations between variables were not determined. Most of the data obtained did not have formal inter-observer reliability, bias
control, and completely defined criteria; therefore, the effects of the application of Gilbert's performance audit on the improvement of BSAP were not empirically demonstrated. The data obtained in analyses of performance audits should be obtained in a rigorous way.

However, this was a preliminary study and it might be a source of future applied and experimental research. A detail analysis of each accomplishment identified in BSAP might be an area of research. For instance, at the philosophical level, a worthwhile study would be to demonstrate how existing systems improve or damage humanity; at the policy level, it would be useful to determine what repertorier behavior analysts need to make valuable contributions to humanity.

BSAP needs much experimental research in the area of training and learning to demonstrate the effectiveness of specific training programs or methodologies on the acquisition of the skills considered in the audit (reading, writing, speaking, presenting, self-management, staff management, social, research, behavior analysis, and systems analysis skills).

The present study should be replicated in other systems. In the Winter of 1985, as a requirement of BSAP and the Research Supervisory System all students of BSAP were scheduled to do a performance audit of the systems where they do their theses. Also the increase of Black behavior analysts in BSAP should be considered in further research. In addition, the performance audit of BSAP should be completed; many areas of BSAP still have considerable room for improvement, and only the persons doing such research could dedicate the time and effort necessary to analyze and improve those areas.
APPENDIX

Recommendations for BSAP Based on of the Analysis of the Students Performance

Recommendations Related to the Policy Level of BSAP

1) BSAP should maintain feedback with its alumni in order to determine its cultural impact, to evaluate its training program, and to modify the training program if necessary. This might be done through annual presentations with the alumni of BSAP where they describe the activities they do, present data, and evaluate their contributions to humanity.

2) An evaluation questionnaire should be administered to the current BSAP students in order to determine the extent to which their contributions to the systems where they do their practica or research are consequences of their training in BSAP.

3) Systems contributions should be defined in terms of specific accomplishments. After completing their first semester in BSAP, the students should report their contributions to systems on a weekly basis. During each academic semester, the students should contribute to the design, management, evaluation, and problem solving in their systems. The delegation of responsibilities of the advanced students should consist of worthwhile systems contributions.

Recommendations Related to the Writing Skills of the BSAP Students

4) Rewriting the assignments might help the students to follow
the rules of good writing better than writing only one draft. In order to reduce the time rewriting would require from the students and editors, the size of the written assignments might be reduced; in this way, the students could turn in new drafts and edited versions of old drafts every week. Another alternative to reduce the time students invest on rewriting might be to require their assignments written with their personal computers or the computer facilities existent at Western Michigan University.

5) There should be consistency in the evaluation of English usage and logic in all the written assignments of BSAP because this consistency might have a greater impact on the improvement of the students writing. Therefore, the assignments of performance audit should be evaluated in the same way that the reading reactions and the thesis writing are evaluated, not only based on the content, but also based on the quality of writing.

6) The point system of the evaluation of the written assignments should consist of the total number of errors instead of a scale that allow the evaluators to record a maximum of four errors. In addition, the students should continue graphing the number of errors per week in order for them to keep track of their progress.

7) The students should find the rules that are relevant to their mistakes. In order to be sure that this happens, point contingencies on rules identification should be established.

8) Check-lists of English and logic rules should be designed; contingencies should be established for the students to use these
check-lists to edit their assignments before turning in their final product.
BIBLIOGRAPHY


