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**APPLICABILITY OF VARIANCE CONTROL ANALYSIS
AND DELIBERATIONS IN ASSESSING NEEDS IN AN
EDUCATIONAL INSTITUTION IN BRAZIL**

By

JOELLE BARBOT-COLDEVIN, B.A., D.I.A.

**A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfillment of
the requirements for the degree of**

Master of Management Studies

School of Business

Carleton University

Ottawa, Ontario

March, 1990

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APPLICABILITY OF VARIANCE CONTROL ANALYSIS
AND DELIBERATIONS IN ASSESSING NEEDS
IN AN EDUCATIONAL INSTITUTION
IN BRAZIL

Submitted by Joelle Barbot-Coldevin, B.A. Admin.(Honours)
in partial fulfillment of the requirements for
the degree of Master of Management Studies.

DR. MOSES KIGGUNDU, Thesis Supervisor

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Carleton University
April 10, 1990

ABSTRACT

In an effort to improve their organizations' performance, leaders and managers from developing countries seek the counsel of experts from industrialized nations. One of the emerging areas of concern is the need to secure the participation of organizational members in all the phases of the process. The first step towards the achievement of improved performance is the conduct of an organizational diagnosis.

The socio-technical systems field has developed diagnostic methodologies which require staff participation to assess the technical and social subsystems. Two such tools developed for the analysis of the technical subsystem are the focus of this research: variance control analysis and deliberations. While variance control analysis has been used in process and service industries in industrialized and to a much lesser degree in developing countries, deliberations represent a new attempt to diagnose technical problems when the workflow is non-routine.

The objectives of this thesis are: 1) to replicate the applicability of variance control analysis in a Latin American institution; 2) to test the applicability of deliberations in a developing country setting, 3) to contribute to socio-technical systems literature regarding the robustness of two of its diagnostic tools in a developing country setting; and 4) to contribute to the North-South cooperation literature by analyzing the applicability of a participative method of needs assessment.

Results show that variance control analysis can be successfully used as a participative tool to gauge the organization's technical subsystem, whereas deliberations seems to be culturally biased.

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CHAPTER I

USE OF SOCIO-TECHNICAL SYSTEMS DIAGNOSTIC TOOLS IN

DEVELOPING COUNTRIES

1.1 Introduction

As developing countries' organizations strive to increase their productivity and become more competitive in the world market, their leaders turn to specialists in industrialized countries for advice on how to bring about such change. The sharing of knowledge and the seeking of solutions requires the design of effective working relationships between all concerned.

All too often, expertise is viewed as a one way stream where specialists from industrialized countries counsel organizational members in developing countries after a short-term mission in the country. The consultants' abilities to understand the country's language, culture and socio-political context is often not given the attention it deserves. Vested with an aura of 'expertise', the foreign consultants' recommendations are often accepted without question, and the effective participation of local stakeholders in the decisions is not systematically sought. The desired results rarely occur with

such a process.

The most important step in designing remedial interventions is, arguably, the conduct of a proper needs assessment. Yet, that fundamental step is often neglected (Wallender 1979; Kiggundu 1989). All too often the result of this omission is the implementation of unsustainable programmes which inherently reflect the consultants' cultural and technical biases, and poorly address the recipient's needs and capabilities.

The literature on socio-technical systems (S.T.S.) (Barko and Pasmore 1986; Pasmore, Francis, Haldeman and Shani 1982), a field which has based its methodologies on the participation of workers in all the phases of organizational change, claims that its tools and techniques for diagnosing, designing and implementing changes are indeed applicable in developing countries. But what little is available in the literature (Kiggundu 1986) does not describe the methodology used for diagnosing organizational problems, nor does it critically analyse worker involvement in the process.

The organization in which the present research was conducted is a not-for-profit community based educational institution which operates 1,500 schools throughout Brazil. Its mission is to provide quality education

and community support services to the most needy sectors of the Brazilian population, where provincial or state government services are either unavailable or insufficient. The participation of community members in the decisions affecting their schools has always been central to the organization's philosophy.

Due to increasing economic problems nationally and the declining governmental support of educational programmes, the organization has sought support from the international development community to maintain and improve its delivery of services.

The main purpose of this research was to test the applicability in a developing country setting of two organizational diagnostic tools which incorporate participation as a key feature. Using variance control analysis (V.C.A.) and deliberations, two tools which have evolved from the socio-technical systems field, the Canadian researcher in cooperation with local participants performed a technical needs assessment of the above mentioned educational institution in Brazil.

1.2 Objectives of the Research

This study has four objectives:

- 1) to replicate the applicability of variance control analysis in a Latin American institution;
- 2) to test the applicability of deliberations in a developing country setting;
- 3) to contribute to socio-technical systems literature regarding the robustness of two of its diagnostic tools in a developing country setting;
- 4) to contribute to the North-South cooperation literature by analyzing the applicability of a participative method of needs assessment.

The use of these tools will be deemed applicable if:

- a) they provide the local organization with an analysis of the strategic management issues which need to be addressed, as well as the operational key variances and informational gaps which need to be controlled in order to improve its delivery of services;
- b) the quantity and quality of information obtained during variance control analysis and deliberations is greater than that gathered prior to training of the participants on the use of the tools.

1.3 Literature Review

1.3.1 Principles of Socio-technical Systems Theory

Socio-technical systems theory and practices were developed in England immediately following the Second World War. During that period, the Tavistock Institute of Human Relations became involved in the process of integrating war veterans in the reconstruction effort. At the outset the institute's researchers, among whom were included psychologists and other social scientists, focussed their attention on group dynamics as it related to organizational endeavours (Bion 1959). As a result of that focus, for years one of the preferred methods of remedial intervention in organizations was the creation of autonomous work groups.

Two researchers at the Tavistock Institute (Trist and Bamforth 1951) spurred the development of socio-technical systems by studying the consequences of the introduction of a mechanized system of coal getting on productivity levels in the coal mines of Northern England. The mines' managers had observed that in spite of substantial investments in technology, productivity levels were declining. As well, the rate of absenteeism was increasing and turnover rates were on the rise.

Trist and Bamforth (1951) observed that in the mines where productivity was low, the new technology had destroyed a social system which had evolved over the years. That social system combined with the traditional method of coal getting provided the workers with autonomy, multiskilling and responsibility for the completion of their tasks. In a few successful mines where the new technology had been incorporated, the miners had been able to recreate a social structure which included some of the elements of the traditional mining system while addressing the imperatives of the new technology. Thus, in successful mines, the social system depended on the participation of workers who combined their skills and made decisions regarding issues which affected their work.

Based on these findings, Trist and Bamforth (1951) postulated the basic principles of socio-technical systems theory: a) an organization is an open system interacting with its environment; b) an organization is comprised of both a technical and social subsystem; and c) in order for an organization to achieve high performance, the joint optimization of the subsystems needs to be achieved. The technical subsystem is comprised of the tools, techniques, skills and knowledge used by organizations to achieve their goals, whereas

the social subsystem is comprised of the people who carry out the work and the relationships they form in order to do so (Pasmore, Francis, Haldeman and Shani 1982). Joint optimization means that when an organization is being analyzed, care must be taken to consider the demands of both technical and social subsystems. Effective performance requires that both subsystems be jointly optimized, as opposed to sub-optimizing one in favor of the other (Kelly 1978).

Socio-technical systems theory introduced a significant change to the technological deterministic view of organizational design espoused by Taylor (Adie and Thomas 1982). Unlike Taylorism, socio-technical systems theory proposes that technology need not take precedence over people when striving to achieve high performance and emphasizes the importance of optimal consideration of both technical and social factors for improving organizational effectiveness.

From this principle of joint optimization followed the concept of 'organizational choice' (Trist, Higgin, Murray and Pollock 1963). Aside from providing an alternative to the bureaucratic/technocratic models of Taylor and Weber, 'choice' means that a universal 'best fit' does not exist between

technical and social systems, as the optimum fit varies according to the dynamics present in each enterprise. Socio-technical systems practitioners therefore seek to identify and achieve a 'best fit' dependent upon a given organization's stated philosophy and objectives.

The open systems concept is an important one in socio-technical systems theory as it underscores the dynamic nature of organizations. Organizations constantly interact with their environments to remain competitive. It can be argued that in developing countries, where the external environment is highly volatile and turbulent, the assessment and management of those environmental forces acquires an even greater significance for the successful operation of the organization. Yet, available evidence shows that strategic management is largely neglected in organizations in developing countries (Paul 1983; Wallender 1979; Kiggundu 1989). As stated by Pasmore et al: "The open system perspective implies the need to examine transactions with the environment, maintain contact with environmental changes, and build adaptability into the organization to respond to both anticipated and unanticipated change." (1982, 1186). Thus, the understanding and control of environmental forces is part and parcel of a socio-technical systems

analysis.

Building on the open systems perspective, Pava (1983) makes a distinction between transactional and contextual environments in analyzing environmental factors. Transactional environments include the intraorganizational departments with which the unit under study interacts, whereas contextual environments pertain to forces outside the organization, which significantly impinge upon the unit's management.

1.3.2 Diagnostic Tools: Variance Control Analysis and Deliberations

Based on the principles outlined above, socio-technical systems researchers have developed tools and methodologies to help organizations identify problems and achieve and sustain high performance (Barko and Pasmore 1986).

True to the initial investigations of group dynamics undertaken by members of the Tavistock Institute, and further strengthened by the coal mines studies, socio-technical systems practices are built upon the premise of participation from those involved in the process under study.

The number of steps involved in a socio-technical systems analysis

varies according to the preferences of the researcher and the needs of the organization to be analyzed. Thus, one finds in the literature a nine-step method of analysis (Emery and Trist 1971), a seven step method (Cummings and Srivastva 1977), a five step method (Kiggundu 1981) and a three phase method (Bostrom and Heinen 1977).

Although the number of steps varies from study to study, the content of the procedure is virtually the same. Thus a complete socio-technical systems analysis always includes four stages: an environmental scan, a technical subsystem analysis, a social subsystem analysis, and the design of remedial interventions.

The methodology developed to diagnose problems in the technical subsystem is called variance control analysis. Originally developed for use in continuous process industries (Taylor 1986), it has since been used with success in white collar service industries as well (Bostrom and Heinen 1977).

The analysis pertains to the identification of unit operations and key variances which negatively impinge upon the transformation of inputs into a work system or unit into outputs (Kiggundu 1981; Cummings and Srivastva 1977; Pava 1983). Unit operations are stages in the transformation process

where inputs into the system are converted into outputs (Pasmore and Sherwood 1978). Variances are deviations or unprogrammed events from an established norm, and key variances are those which critically affect the unit's outputs (Cherns 1976; Bostrom and Heinen 1977).

Bostrom and Heinen (1977) provide a list of the criteria used to gauge key variances. Thus, variances can be considered key if they: 1) impact on one or more variances within a unit operation; 2) impact on one or more variances in subsequent unit operations; 3) significantly affect quantity of output, quality of output, operating costs, or social costs such as hazards or high stress for people performing the tasks; and 4) are considered key by participants based on past knowledge and experience within the system. However, the authors do not indicate whether some or all of the criteria listed need to be used to identify key variances. Pava (1983) used only one criterion in his research, namely that they affect previous or subsequent unit operations. Cummings and Srivasta (1977) also performed an analysis based upon the premise that key variances affect either the quantity or the quality of output. Thus, according to these researchers all of the aforementioned criteria need not be used in a single study to identify key variances.

According to Pava (1986), the socio-technical systems field has come to rely too much upon its tried and proven methodology, thereby stifling creativity and preventing improvements upon its diagnostic and intervention strategies. Earlier, he (Pava 1983) advocated that the selection of tools appropriate for analyzing a technical subsystem should depend on the nature of the work performed within the work unit under study. He suggested that work units be placed on a continuum from routine to non-routine tasks. Routine tasks are characterized by a single conversion process, short time horizon, predominantly internal information, narrow scope, and fixed sequence steps. Non-routine work involves multiple, concurrent, non-linear conversion processes in which inputs, outputs and transformations are hard to specify. Thus, clerical work is placed at one end of the continuum, whereas line executive tasks are placed at the opposite end.

That categorization is admittedly rough, for it can be argued that certain conversion processes in either category can be non-linear and/or non-sequential. Pava (1983) argues that routine work predominantly involves linear, sequential and unitary conversion processes, whereas non-routine work is typified by multiple, concurrent, non-linear processes. Accordingly,

he suggests that the traditional method of socio-technical systems analysis (variance control analysis) be used for routine tasks; a combination of variance control analysis and a new method of socio-technical systems analysis developed by him, called 'deliberations', be used for mixed routine and non-routine tasks; and finally deliberations should be used for non-routine tasks. Pasmore lends support to this point of view, by stating that "In most service settings, technical system analysis is probably best accomplished using some combination of traditional and newer methods (of socio-technical systems analysis)." (1988: 68).

Deliberations are "Sequences of reflective and communicative acts employed to resolve problematic issues" (Pava 1983, 177). The use of deliberations to gauge the technical subsystem of an organization entails the analysis of communications and exchanges between parties involved in making decisions on non-routine issues. According to Trist "By saying that the technological system for such work (non-linear) consists of deliberations, Pava has pinpointed the fact that the technology involved has become cognitive" (1981, 166).

Socio-technical systems interventions are based on action-research,

meaning that practitioners use their tools and methodologies to actively participate in the efforts to solve problems (Hill 1971; Nitish 1979; Cummings 1986). The tools and methodologies used are flexible enough to allow researchers to adjust them to suit the needs of different client organizations. As stated by Kiggundu "... there are no established methods for carrying out an S.T.S. analysis of an organization" (1981, 122). This means that though a framework is provided within which to conduct socio-technical systems based research, each user of the tools can modify them, within certain limits, to suit the purpose of his or her investigation.

This is both a strength and a weakness. While on the one hand it has allowed socio-technical systems practitioners to tackle specific organizational problems, on the other hand the multiplicity of tools used, as well as the divergent criteria for judging performance and the limited quantity of documented interventions (Pasmore, Francis, Haldeman and Shanl 1982), have left an unclear picture of just how effective socio-technical systems theories and practices are. This is especially the case in developing countries (Kiggundu 1986).

1.3.3 Socio-technical Systems in Developing Countries

Socio-technical systems theories and practices have been applied in a few cases in developing country settings (Rice 1958; Kanawaty, Thorsrud, Semiono and Singh 1981; Blunt 1983; Nitish 1979; Kidwell, Jack and Ketchum 1981). As was the case in industrialized countries, the first excursions were in blue collar, continuous process industries, but since then interventions have been recorded in service organizations as well (Nitish 1979; Kanawaty, Thorsrud, Semiono and Singh, 1981). Kanawaty et al. (1981) and Nitish (1979), have pointed to the strengths and weaknesses of socio-technical systems in a developing country setting, suggesting that most of the weaknesses pertain to the implementation of intervention strategies. Unfortunately, the articles do not provide information on how good the diagnostic tools were at fostering participation from locals or the extent to which the intervention strategies were based on the information supplied by participants.

A thorough review of the socio-technical systems literature did not provide any documented evidence of its use in Latin America. Speaking about western-based methodologies in general, Latin American organizational

behaviour specialists have repeatedly stated that the implementation of such intervention strategies in their countries is difficult because of the cultural assumptions on which they are founded (Bourgeois and Boltvinic 1981; Faucheux, Amado and Laurent 1982; Nitish 1979).

It is also claimed that the adoption of western based assumptions when considering interventions – such as participation – goes against the rigid power structure in place in most Latin organizations and leads to failure (Da Costa Moura 1978; Carvalho Da Cunha 1979; Pinto 1979). This research attempts to demonstrate that at least when performing a needs analysis, the participation of organizational stakeholders can be properly secured.

According to Kiggundu (1986), although limited, the documented evidence available would suggest that socio-technical systems diagnostic tools are indeed robust in developing countries. As stated by Kiggundu "S.T.S. research thus far in developing countries begs the question; Is S.T.S. a false start or a promising future in these countries?" (personal correspondence). That question can be answered through more and better documented cases attesting to the applicability of socio-technical systems theories and practices in diagnosing and improving performance in developing countries.

This research aims at contributing to the debate on the applicability of western-based interventions in developing countries in general, and of socio-technical systems tools in particular. To that effect, the objectives of the study are:

- 1) to replicate the use of variance control analysis in a Latin American institution;
- 2) to test the applicability of deliberations in a developing country setting;
- 3) to contribute to the socio-technical systems literature regarding the robustness of two of its diagnostic tools in a developing country;
- 4) to contribute to the North-South cooperation literature by investigating the use of a participative method of needs assessment.

The objectives will be met by performing a technical needs assessment using socio-technical systems diagnostic tools in an educational institution in Brazil.

1.4 Significance and Limitations of the Research

1.4.1 Significance

The research is considered significant at three levels:

- 1) Theoretically, it adds to the support of the universal applicability of variance control analysis, a socio-technical systems diagnostic tool;
- 2) Methodologically, it provides a first attempt to test the robustness of a new method of socio-technical systems diagnosis, the combination of V.C.A. and deliberations;
- 3) Practically, it provides a framework for organizational diagnosis using V.C.A. and deliberations for the specific Brazilian institution studied, in addressing present and future problems.

1.4.2 Limitations

Since this is a pilot project, using only one school and a relatively small, non-random sample of participants, caution must be exercised in generalizing the results to other schools belonging to the organization, Brazilian institutions in general, and to other organizations in developing countries. The object of the research is not to establish the generalizability of its

findings to other situations, but to test the applicability of the tools in a developing country setting. In essence, this is a constructive replication of variance control analysis and deliberations, as socio-technical systems diagnostic tools (Lykken 1975).

CHAPTER II

DESCRIPTION OF THE RESEARCH SETTING

As the organization in which the research was conducted is central to the findings and recommendations made at the end of the study, a brief description follows to help readers understand its peculiarities. The name of the organization and of the school where the study was conducted are withheld, in order to respect the wishes of some participants to remain anonymous.

The institution in question is a not-for-profit community based educational institution which operates throughout Brazil. Its mission is to provide quality education and community support services to the most needy sectors of the Brazilian population. The means by which it seeks to accomplish its mission include the participation of local communities in all aspects of the teaching and services offered by the schools. Thanks to the lobbying efforts of its leaders, community schools are now recognized within the Brazilian Constitution as a legal alternative to private and public schooling. The organization is said to have educated 10 million Brazilians

over its 45 year tenure.

Financially, the organization depends mainly on community support to carry out its programmes. Federal, state and municipal government bodies provide on average 30% of the organization's funding, albeit in a highly fluctuating fashion. Local communities supply the balance by paying minimal school fees and providing support services to the schools (e.g. maintenance, organizing fund raisers, etc.).

Each school within the system can be considered unique in that the organization tries to adapt its schools to the needs of the communities it serves. For example, in an effort to provide basic schooling to rural communities and help farmers improve mastery of their environment, the organization has developed an agricultural school system which is still at its initial stages. Four such schools are presently in existence, and one of them is the subject of this research.

Located in the North-East region of Brazil, the agricultural school was created in 1987. The region where the school is located has a population of 22,000. Socio-economically the region is very poor, with high rates of unemployment. The pull to the nearest urban centers is very high but

employment opportunities are scarce, particularly for unskilled, illiterate peasants.

One of the primary motives for creating the agricultural schools was to provide farmers with the appropriate technologies and know-how to improve their yield and stop as much as possible the local population's exodus from the land. Thus, local youths would be provided with basic elementary schooling with an agricultural option, and adult farmers' would receive short-term practical courses in areas of interest to them. At the same time, the school would serve as a research center for studies on developing local technologies appropriate for the climatic, topographical and socio-economic realities of the region. Through extension services in the form of radio broadcasts and free technician support, the knowledge gained during research is disseminated to local farmers. The services offered by the school thus combine education, research and extension.

Research at the school was initiated in 1987. At the time, an attempt was made to implement the agricultural school as well, but enrolment fell far short of expectations and the idea was temporarily shelved. In the meantime, short term, practical attachment courses were offered on a

sporadic basis to adult farmers living in the region. In 1988, judging that they were in a better position to provide the necessary training and support services to the potential farmers in the community, the institution decided to re-open its doors to the elementary level students. Initially, only the first grade of junior high school was to be created, with additional class levels to be incorporated as the students graduated into higher levels. Thus, predictions were for 30 students the first year, 60 students the second and 90 the third.

In February, 1989, the first class of 29 students of ages varying from 11 to 18 registered at the school. The objective of the school was to provide a traditional curriculum enhanced with theoretical and practical courses in agricultural cultivation and production to those enrolled in the programme. Both the theoretical and practical agricultural courses were to be based on the ongoing research being carried out at the school, geared to determining the appropriate technologies and crops for the region.

The agricultural school is located 18 km from the nearest town, and the dirt roads leading to the school often do not provide easy access. There is no transportation to and from the school except for the trucks and buses owned

by the organization. Therefore, the school has to offer live-in facilities for students from remote areas and daily transportation for those who live in the surrounding towns. Transportation also has to be provided for teachers and administrators. The staff members responsible for the supervision and care of the boarders (e.g. cook and grounds keeper and field workers) also reside at the school during the week.

Ideally, according to the organization's administrators, the staff at the agricultural school should be composed of: the director, the pedagogical supervisor, the student counselor, the secretary, two agricultural technicians, six elementary school teachers, one kindergarten teacher (for the children of the support staff who live on the school's premises), a librarian, an inspector of students, a groundskeeper, a driver, a cook, a cook's helper and 9 labourer/handyman to take care of the fields, livestock and general maintenance. Adapted organigrams of the organization and of the agricultural school are presented in Appendix 1 and 2. As will be explained in later parts of this study, one of the challenges faced by the institution has been hiring and retaining qualified personnel, resulting in less-than-ideal staffing.

CHAPTER III

METHODOLOGY

This study was performed over a six month period in Brazil. All meetings, interviews, collection and interpretation of material were conducted in Portuguese. A significant amount of travel was undertaken during that time as I was researching Brazilian literature on organizational development issues in Rio de Janeiro, liaising with the organization's top management in Rio and Brasilia, conducting the study in the Northeast and consulting with my thesis supervisor in Ottawa. A timetable of the research is included in Appendix 3. Appendix 4 provides a summary of the proposed methodology and expected results versus the actual field modifications and the results obtained.

3.1 Sanctioning of the Study

The first meeting with the institution's upper management was held at the headquarters in Rio de Janeiro. The founder, who is also Executive Director, was present, as were two regional directors. I explained to them

the potential benefits of the socio-technical diagnostic tools, in terms of identifying human and technical needs and the importance of the study from a cross-cultural point of view.

Entry into the organization was facilitated by my previous acquaintance with the organization's founder and executive director whom I had met in 1984 when I lived and worked in Brazil for a Canadian non-governmental organization. I was able to build trust and convince management that the research I wished to conduct could provide the institution with information regarding its strengths and weaknesses and help identify areas where local and international assistance could be used.

As will be further elaborated in this research, this support was enough to ensure approval throughout the organization. The other managers were very supportive of the idea as well.

3.2 Identification of the Research Site

Several school locations were identified as potential research sites. The managers present at the meeting represented different regions of Brazil and were interested in having an analysis of schools under their jurisdiction done.

I explained that the criteria that I had chosen for identification of the research site were: 1) that the school be located in the Northeast region, as that part of the country was admittedly the poorest and in most need of support; 2) that the school be in operation for at least three years which would provide an indication that the institution's administrators had a sound understanding of the problems faced by that particular community; and 3) that the participation of the local community in the organization's activities be medium to high (see Appendix 4).

Although the founder liked the criteria to be used, especially since he was from the Northeast region and had committed a lot of time and effort in trying to provide local communities with education and support services, the second criterion had to be relaxed, because he had an agricultural school in mind which he favoured for the analysis. The school had only been in operation for two years, and so far only agricultural research and short-term courses to local farmers had been provided. A year earlier, an unsuccessful attempt had been made to provide local youths with an elementary school with an agricultural option as well. Nonetheless, confident that they now had all the prerequisites for the successful implementation of the elementary

school, including staff, equipment and high student enrollment, the founder felt that it would constitute a good site for the research to be conducted.

Community support for the institution's activities in the area was understandably high, as the founder of the institution is revered in his home town and although he travels constantly, he tries to keep in close contact with the local people and abreast of all the developments there. Thus, it was decided that the founder would accompany me to the town where the research was to take place and introduce me to the organization's local personnel.

3.3 Identification of Participating Team

Twenty four people worked on location at the agricultural school and were identified as potential participants in the research. Not clearly shown in the adapted organizational diagram (Appendix 1), some of the people who participated in decisions related to the agricultural school worked at the institution's coordinating center and at the school located downtown. Such was the case with the Director of the coordination center and the Director of Personnel, who were included in the group which performed deliberations.

To reinforce the organization's philosophy of community participation, a

committee was formed composed of community representatives, whose mandate was to oversee the school's activities. The members of this committee were slated to participate in deliberations. Table 3.1 gives a listing of the potential candidates for V.C.A. and deliberations, and for reasons explained in section 3.4.1, those who actually participated in each group.

The participants were divided into two groups for the performance of either variance control analysis or deliberations, based on whether their tasks were considered routine or non-routine (Pava 1983). The division of staff according to the nature of the tasks they performed was done in consultation with the organization's coordinator and each staff member. Thus, operational staff were mainly involved in routine tasks and took part in V.C.A., while management described their tasks as non-routine and participated in deliberations.

As will be further explained in Chapter IV, some of the people working for the organization occupied several posts. For instance, two of the teachers at the agricultural school were also respectively the pedagogical supervisor and the educational orientator at the school. As such, they fitted into both

TABLE 3.1
POTENTIAL VS. ACTUAL PARTICIPANTS IN THE S.T.S. ANALYSIS

POTENTIAL V.C.A. PARTICIPANTS (20)ACTUAL V.C.A. PARTICIPANTS (7)

At the agricultural school

- Two technical trainers;
- Two elementary school teachers;
- One kindergarten teacher;
- A secretary;
- A librarian;
- An assistant librarian/secretary
- A students' supervisor/driver;
- A cook;
- An assistant cook;
- 9 agricultural support staff.

- Two technical trainers;
- Two elementary school teachers;
- A secretary;
- A librarian;
- An assistant librarian/secretary.

POTENTIAL PARTICIPANTS IN DELIBERATIONS (9)ACTUAL PARTICIPANTS IN DELIBERATIONS (6)

At the organization's head offices in Brasilia

- The Executive Director

- The Executive Director

From the community council

- The town mayor,
- The local representative of the Ministry of Education;
- A councilman.

At the organization's downtown offices

- The Director of the coordinating center;
- The Personnel Director.

- The Director of the coordinating center;
- The Personnel Director.

At the agricultural school

- The agricultural school's director;
- The Pedagogical supervisor,
- The Educational Orientator.

- The school's Director;
 - The Pedagogical Supervisor;
 - The Educational Orientator.
-

management and operational staff categories. To avoid having people undertake both variance control analysis and deliberations, and to clearly separate management from operational staff analyses, it was decided that in cases where participants occupied such two jobs, they would only take part in one of the procedures, either variance control analysis or deliberations. Thus, Table 1 does not reflect the dual roles of some of the workers.

The people who actually participated in the socio-technical systems analysis were chosen after the researcher had gotten acquainted with the work environment.

3.4 Initial Scanning and Training

3.4.1 Initial Scanning

Although the research had been sanctioned at the highest organizational level from a person with considerable influence in the community and I was repeatedly assured of everyone's cooperation at work or whenever it was convenient to me, I decided to conduct formal investigations strictly during working hours, and avoid disturbing people's private time. During those working hours, I tried not to disrupt daily activities by convening meetings

only when the participants could be available without major changes to their schedules.

Instead of immediately starting the training of staff and analysis of the school, I felt that a period of time was necessary to acquaint myself with the workers at the school and let them get to know and trust me and understand the reasons why I was interested in working with them and conducting this particular research. Roughly a month was spent talking and socializing with people in the community in general, and the school's staff in particular.

This period of time allowed me to become aware of certain problems with the school's personnel, which impinged upon the conduct of V.C.A. The nine agricultural support staff were for the most part illiterate personnel as were the cook and assistant cook, which prevented them from effectively participating in a variance control analysis, given the steps involved in that analysis. I thus decided to tape record the problem areas identified by the illiterate support staff using an unstructured interview format to keep the records for future use. The interviews were conducted with one or two illiterate participants at a time. Thus, eleven potential candidates were eliminated from V.C.A., leaving nine candidates.

Later on, due to resignations the students' Inspector/driver and kindergarten teacher were not available for the study. Therefore, a total of seven people participated in V.C.A.: two technical trainers, two teachers, one secretary, a librarian and an assistant secretary/librarian. A succinct biographical profile of each participant is provided in Table 3.2.

As regards deliberations, I found out that the community council had never met to discuss the agricultural school, thus the members of that council could not participate. Finally, six people participated in deliberations: the executive director of the organization, the director of the coordination center, the director of personnel, the director of the agricultural school, the pedagogical supervisor and the educational orientator (Table 3.2).

After that period of time, the initial scanning of the institution's problems was undertaken with the participants. It is important to note that throughout the study the confidentiality of the information to be gathered was repeatedly emphasized. I also had to stress that the purpose of the exercise (performing a needs assessment) was not to criticize the

TABLE 3.2
PROFILE OF PARTICIPANTS

<u>TITLE</u>	<u>AGE</u>	<u>SEX</u>	<u>EDUCATIONAL BACKGROUND</u>	<u>PREVIOUS EXPERIENCE</u>
FOUNDER & EXECUTIVE DIR.	65	M	Lawyer by trade	Teacher
DIRECTOR OF COOR. CENTER	34	M	Master's degree in agriculture	Researcher
DIRECTOR OF PERSONNEL	30	M	High school diploma	Teacher; no experience in H.R. management
DIRECTOR OF AGRI. SCHOOL	30	M	B.A. in agriculture	Civil servant at the Min. of Agriculture
PEDAGOGICAL SUPERVISOR	25	F	High school diploma	Community developer; no teaching experience school administration
EDUCATIONAL ORIENTATOR	26	F	B.A. in communications	Teacher & 1 yr. experience as pedagogical supervisor
TEACHER 1	33	M	High school diploma	Teaching inmates
TEACHER 2	33	F	Junior college degree	Teaching experience
TECHNICAL TRAINER 1	34	M	Junior college degree in agriculture	Pharmacist; no teaching exp.
TECHNICAL TRAINER 2	24	M	High school diploma	N/A
SECRETARY	30	M	High school diploma	8 years exp. as secretary
LIBRARIAN	18	F	Enrolled in high school	Assistant clerk
ASSISTANT LIBRARIAN/SECT.	20	F	Enrolled in high school	1 year as assistant secretary

organization, but to pinpoint areas where improvements could be made to strengthen the delivery of its services. It was explained that initially the methodology required the outlining of problem areas (construction of variance matrices) but that the second step involved the seeking of possible solutions (development of the variance control table).

It was my intention to conduct initial scanning on a group basis, but as it was often difficult to gather the whole group at the same time without disrupting everyone's schedule, and because of absences and unpredictable hitches, the analysis was done on a one-to-one basis. Another reason for deciding on this change was the discovery that some of the workers felt uncomfortable 'criticizing' the organization in front of others, and that others tended to monopolize the conversation thus impeding peers from voicing their opinion. Conducting part of initial scanning on an individual basis provided participants with the privacy they needed to be candid and the time to express their opinion.

After the individual comments were recorded, I formed groups of two or three to further facilitate the analysis. These groups were formed when I detected that a certain trust or camaraderie existed between participants

which could serve as a catalytic force to ensure that all important problem areas were identified. This also allowed them to get used to sharing ideas with others.

The procedure involved tape recording each worker's observations, then writing up the list of identified problem areas and reviewing the list with the participant; this was followed by sharing the anonymous lists with members of the group and having them discuss, compare and delete redundancies and agreeing on a final list. At the end, the seven participants agreed upon the items mentioned in Table 4.1.

The information on deliberations obtained during initial scanning was collected on an individual basis (Table 4.2).

3.4.2 Training

Training in the use of socio-technic²' systems tools was done in a group setting (2 to 3 people per group) for those who were to participate in V.C.A., and on an individual basis for deliberations participants.

Both types of training sessions started by briefly explaining my interest in the area of cross-cultural applicability of management theories and

practices in general, and socio-technical systems interventions in particular. I then gave a five minute presentation on the origins of socio-technical systems theories, and gave examples of interventions in both industrialized and developing countries. Stressing the limited amount of documented information available on the latter, I situated the purpose of my research as aiming at testing for the validity of two of the diagnostic tools which evolved from the socio-technical systems field.

I stressed that it was my intention to schedule meetings in a manner that would not disrupt their work and that their participation was needed not only in performing either V.C.A. or deliberations, but also to conduct an environmental scanning and take part in interviews to assess the social subsystem.

3.4.2.1 Variance control analysis

Training is deemed an important part of the methodology, especially in the case of variance control analysis, as it is proposed that proper training in the use of the tools will lead to an increase in the identification of problem areas which need to be controlled. Thus, much attention needed to be given to

the thorough understanding of the various steps involved in the analysis.

After the introductory remarks mentioned in section 4.4.2, I explained to the group undertaking V.C.A., that the purpose of the analysis was to both identify problem areas in the work flow, and to generate possible ways of controlling those problems, by involving all those working in the unit under study in the analytical process.

My role as a consultant or change agent was described in terms of lending support and providing additional information about the tools if need be, and of coordinating the analysis. I stated that as an external consultant, I knew that management was concerned about areas that needed to be strengthened, but could not guarantee that changes would occur as a result of the research. I explained that my allegiance was to the organization as a whole, and to the people working in it, rather than to a particular group of people (e.g. upper management).

It was repeated several times that the information they provided would remain confidential, in the sense that it could not be traced to a specific individual and that the end product would be the result of the group's opinion.

Variance control analysis was then explained to them in detail: 1) the

construction of the variance matrix which entailed breaking down the work flow into unit operations, the listing of variances and the identification of key variances; and 2) the construction of the variance control table.

Throughout the training session, I encouraged participants to ask questions about the tools and their use.

After the detailed explanation of V.C.A., the participants were required to use it to analyze an issue they were familiar with. To the men, I suggested performing V.C.A. of a soccer game (the national sport in Brazil) and to the women, that of the organization of a party.

When I first started training in V.C.A., I did it on an individual basis. But when participants were asked to perform the trial analysis, especially in the case of the soccer game, it was at times difficult to identify unit operations. I therefore decided to group participants in two's or three's, to stimulate the analysis. This turned out to be very successful, as the participants seemed more comfortable bouncing ideas off each other and they had fun doing the exercise. By the end of the exercise, everyone understood the basic principles underlying V.C.A.

3.4.2.2 Deliberations

Deliberations were explained to the participants in terms of a new tool for assessing technical needs of managers. As a cognitive exercise, it entailed the identification of important issues which needed to be deliberated in order for management to fulfill the organization's mission, the identification of the people who took part in the deliberations, the information that each participant brought to the deliberations, and the identification of gaps in information which needed to be filled in order to successfully settle the issue in question. Component office activities which support deliberations (e.g. secretarial support) were also to be identified with a view to strengthening their effectiveness.

The practical exercise for the male managers involved the analysis of the major decisions or issues in managing a soccer team, and for female administrators, that of managing a household. All participants understood the premises of deliberations.

3.5 Environmental Scanning

Once training was completed, environmental scanning was started and participants added to the analysis throughout the remainder of the study.

After an explanation of what transactional and contextual environmental forces were, the information was gathered by asking participants to comment on what they perceived to be the forces relevant to the school. V.C.A. participants conducted the environmental scanning in either an individual or small group setting, and participants to deliberations conducted the analysis of an individual basis.

The environmental scanning included in the results section also includes observations I made during my tenure in the community and discussions with the members of that community.

3.6 Technical Subsystem Analysis

3.6.1 Variance Control Analysis

Variance control analysis of the agricultural school was performed over a two month period. Initially, because of difficulties in getting groups of people together, the analysis was conducted on an individual basis. I wanted

to let each participant work at his/her own pace and only use me as a consultant, if and when questions arose.

After a period of one month, in order to ensure that a steady pace was being maintained in the construction of the variance matrix and control table, I scheduled small group (2-3) sessions during which the matrices and control tables became a team effort. These groups were not necessarily made up of the same participants as during training, as I had to take care to group people who trusted each other so that the feeling of confidentiality would not be destroyed.

Once again, the most difficult part of the analysis was the identification of unit operations. The breakdown of the school's workflow into discrete units was the subject of much debate, most of all since there were so many parallel activities which were of importance for the accomplishment of the school's mission: e.g. management of a cafeteria serving three meals a day, after hours supervision of students, transportation, etc. The final division crystallized when all the participants were present. Given the nature of the work undertaken at the school, it was not possible to list the units of operation in a progressive manner. Most of the activities within and between

units occurred simultaneously.

An attempt was also made to list variances on a priority basis. This turned out to be time consuming and not very productive. It appears, however, that variances located in a unit can sometimes affect upstream variances within or without the unit of operation.

The construction of the variance matrix was very much an iterative process as meetings had to be scheduled and rescheduled several times to accommodate participants, and the listing and analysis of variances required several revisions. Due to the number of variances generated, the group decided to include in the matrix only those variances which had a direct significance on the performance of the unit operation's activity. Thus, as was the case with the list obtained prior to training, the variance matrix was compressed to remove redundancies and include what the group identified as important disturbances.

At the last stages of completion of the variance matrix (before the identification of key variances), I decided to put the groups together to assess the similarities or differences in their findings and discover interrelatedness. This generated considerable discussion, which led to the

integration of the tables into one and the collective identification of key variances.

Initially, I intended to identify as key variances those which 1) impact on one or more variances within a unit operation; 2) impact on one or more variances in subsequent unit operations; 3) are considered key by participants based on past knowledge and experience within the system; and 4) significantly affect quantity of output, quality of output, operating costs, or social costs.

Using all these criteria, the group identified 21 key variances. Due to the number of key variances generated, the group decided to further distill them for inclusion in the variance control table. Thus, the key variances to be analyzed in the control table were determined by 1) their impact on three unit operations or more; 2) whether considered key by the participants; and 3) whether they significantly affected the quality of output, in this case, teaching. Therefore, seven key variances were chosen for further analysis. This is a much more rigorous test than normally used in the literature (e.g., Bostrom and Heinen 1977; Kiggundu 1981).

The seven participants were present for the construction of the variance

control table which was completed over several meetings. It was my intention to include two categories in the variance control table which would show 1) the resources which were available either in-house or in Brazil to control the pertinent key variances and 2) those resources which required the assistance of foreign agencies. Due to the fact that the group selected to conduct variance control analysis had no input into securing resources or funding - that was the purview of management - participants felt that they could not speculate about the resources available either within the organization or elsewhere. Therefore these two categories were not included in the table.

The variance control matrix and table (Appendix 5 and 6) were thus the result of the effort of all the literate participants.

3.6.2 Deliberations

Several attempts were made at conducting deliberations. The attempts were always made on an individual basis, over a period of two months.

During initial scanning, the participants were asked to list problem areas which hampered the successful undertaking of the school's mission

(Table 4.2). During deliberations, the participants were asked to prioritize the issues which had to be deliberated for the same purpose. The first three steps in deliberations were successfully undertaken. That is, a priority list of topics dealt with by management was completed, as was the identification of the various forums in which these topics were deliberated and the roles of those who participated (Table 4.3). The priorities identified by participants varied depending upon the participant's role within the organization. For reasons to be discussed in Chapter IV, the remainder of the steps in deliberations, namely the comparison of who should be included in deliberations as opposed to those who are included, an analysis of the information supplied by each participant, the listing of obvious gaps in information and the analysis of component office work activities for each deliberation, were not successfully completed.

3.7 Social Subsystem Analysis

3.7.1 Unstructured Observation of Participants at Work

During the six month period of the study, most of the time was spent on location at the school. The school day started at 6:30 a.m. when the bus left town, and finished at 4:30 p.m., five days a week. During the course of the research, I shared office space with the teachers, rode on the school bus with the teachers and administrators, ate lunch with students and staff members at the school cafeteria, participated in showing the school to visiting dignitaries, sporadically taught English and French to the students and teachers, and, living in the community, socialized with everyone. This allowed me to unobtrusively interact and observe the participants at work and at play.

3.7.2 Analysis of School Records

The reason for looking into the school's records was to verify and complement the unstructured observations and interviews. I was looking for data on productivity levels, absenteeism, turnover rates, etc. The record-keeping was theoretically located in two places. the secretariat at

the agricultural school and the personnel department at the Coordination Center. Results of this analysis are presented in Chapter IV.

3.7.3 Unstructured Interviews

Unstructured interviews were conducted during the initial scanning period and during environmental analysis. Those interviewed included all participants to V.C.A. and deliberations, as well as other institutional staff members. In total, thirty four people were interviewed. The results are discussed in Chapter IV.

3.7.4 Job Satisfaction Questionnaire

Towards the end of the research period, as information gathered during the previous stages (unstructured observations, analysis of the school's records and unstructured interviews) began to crystallize, I decided to try to gauge the accuracy of the findings by developing a questionnaire based on Emery and Thorsrud's (1976) psychological criteria for job satisfaction.

To strengthen some observations made during the course of the research, I wanted to assess whether significant differences existed between the

workers at the agricultural school and those at the institution's coordinating center. For that purpose, I developed and administered a six point open-ended questionnaire to assess the level of worker satisfaction with their job (see Table 4.4). The translated version of the questionnaire can be found in Appendix 7.

The first part of each question asked the respondent to assess how important that criterion was to him/her as a worker, on a scale of one to six, one representing the lowest value and six the maximum. The second part of the question asked the participant to briefly state whether the job he/she presently occupied within the organization met the stated criterion. The differences between perceived importance of each criterion and actual job fulfillment were then taken as an indication of worker satisfaction.

Nine workers at the agricultural school and five from the downtown offices were used as subjects. The questionnaire was developed in Portuguese. Cross-translation to verify the clarity of the text was not possible due to the unavailability of people fluent in both English and Portuguese. I remained available for further explanations during the completion of the questionnaire, and according to the participants, its

contents were clearly understood.

CHAPTER IV

RESULTS

4.1 Identification of Research Site

As mentioned in Chapter III and shown in Appendix 4, one of the criteria proposed for the identification of the research site had to be relaxed, in order to accomodate the executive director's preference for the agricultural school.

Consequently, instead of having been in operation for at least three years, as initially proposed, the agricultural school has been operational for two years, and only in the area of short term courses and research. This is not considered to be a major modification of the methodology, nor does it have an important impact on the results obtained, for the purpose of that criterion was to ensure that the institution's administrators had a sound understanding of the problems faced by the community. As it turned out, all the administrators were natives of the local community and had experience working for the organization, and as such, were knowledgeable about both the community's and the organization's constraints and challenges.

4.2 Initial Scanning

As shown in Table 4.1, prior to training 14 problem areas were identified by the future V.C.A. participants. The list represents an analysis of the information provided by the participants during the initial scanning period. The information was compressed in order to remove redundancies, but in essence it contains all the pertinent data provided at the time.

TABLE 4.1

**PROBLEM AREAS IDENTIFIED BY OPERATIONAL STAFF
DURING INITIAL SCANNING**

1. School's isolation;
 2. Lack of water on the school's premises and in the area;
 3. Teachers lack necessary skills;
 4. Staff lacks necessary skills;
 5. Low salary levels;
 6. Lack of direction from management;
 7. Transportation problems;
 8. Lack of teaching experience in course subjects;
 9. Lack of school supplies;
 10. No time allowed for taking care of personal concerns during school hours (e.g. banking);
 11. Non-recognition of overtime;
 12. Inadequate support facilities (e.g. library, recreational area);
 13. Non-systematized recognition of workers (e.g. carteira assignada);
 14. Management does not trust workers.
-

As mentioned in Chapter III, initial scanning prior to the undertaking of deliberations was conducted on an individual basis. The listing of problem areas identified by each participant is provided in Table 4.2.

TABLE 4.2

**LISTING OF PROBLEM AREAS IDENTIFIED BY PARTICIPANTS
TO DELIBERATIONS DURING INITIAL SCANNING**

Executive director:

- . lack of funds
- . lack of water in the region
- . poor road conditions
- . uncertainty caused by future elections
- . poor health of regional population
- . unpredictability of government funding

Director of the coordinating center:

- . lack of time to undertake the multiplicity of required tasks
- . lack of continuous funding for school activities
- . administration of staff 'borrowed' from different institutions and with varying salary levels
- . transportation to and from the school
- . school's distance from coordinating center
- . need for staff upgrading

- . lack of time to undertake research
- . need to involve the international development community in school efforts
- . lack of community/parental support for the school, partially due to the prevailing economic situation
- . effectively mobilizing the community to participate in the organization's programmes

Personnel director:

- . no opportunities for developing/improving employee skills
- . is not well acquainted with particular problems of the agricultural school and its staff

Director of the agricultural school:

- . lack of staff training
- . lack of funds to undertake needed activities (e.g. infrastructure and equipment)
- . need for more staff (e.g. student supervisor)
- . distance to nearest city
- . unreliable transportation
- . low salary levels
- . problems in supervising personnel with different organizational ties
- . lack of time to do the various jobs required
- . lack of water in the region
- . inappropriate transportation arrangements
- . obtaining food for the students (3 meals a day)
- . student and staff's health related problems

Pedagogical supervisor:

- . lack of staff training, including her own
- . lack of community involvement
- . lack of funds to purchase needed materials
- . need to adapt class materials to the community's circumstances
- . lack of appropriate staff to guide and provide support to students
- . transportation problems
- . need to develop parent/teacher association
- . school's isolation
- . low salary levels
- . poor student health (mental and physical)
- . 'politiquing' and backstabbing within the organization
- . lack of management support
- . lack of guidelines to undertake assigned tasks

Educational orientator:

- . lack of teacher and staff training
 - . lack of guidelines regarding tasks to be performed
 - . lack of qualified management staff
 - . school's distance from nearest town
 - . lack of infrastructure (roads, water, materials)
 - . teachers do not always cooperate
 - . low salary levels
 - . unclear allocation of functions and tasks
 - . inflexible working schedule
 - . lack of transportation
-

4.3 Environmental Scanning

The analysis of environmental contextual and transactional forces which are significant for the maintenance of the school activities was undertaken by V.C.A. participants and the participants to deliberations. The observations I was able to make during the conduct of the research and the results of discussions with members of the community also confirmed or augmented the participants' analysis.

4.3.1 Transactional Environment

The agricultural school entered into transactional relationships with the following groups: the staff at the downtown coordination center; the staff at the downtown personnel office; the organization's administrative offices in Brasilia and personnel in the institutions' other agricultural schools. The types of transactions engaged in include supply of school material, provision of budgetary information, planning of ad hoc agricultural training courses, etc.

Transactions between those who work at the school are very direct, in view of the small size of the premises. All workers are in close proximity

during the course of the school day, and this proximity continues for those who reside on the premises during the week. Transactions which involve the sharing of information (e.g. new school policies) are mostly done orally.

Memos are seldom written.

The transactions between the agricultural school and the coordinating center or other units belonging to the institution are carried out in an unsystematic manner. Communication between the various units is done partly through the phone, but mainly through the direct involvement of the school director who physically meets with the director of the coordinating center or the director of personnel. Once again, written information rarely exchanges hands. Transactions with Brasilia usually occur when the institution's executive director visits the town.

As an example of the unsystematic nature of transactions within the various institutional units, we can take the case of the personnel director who works downtown. Although the personnel director is formally responsible for processing all information regarding employee hiring, grievances, benefits, etc., no one at the agricultural school has actually contacted him for anything pertaining to their jobs. The reason for this is

that the personnel director does not have any decision-making power regarding personnel matters at all. In principle, all those matters are to be decided upon at headquarters in Brasilia. He merely processes the information (e.g. benefit forms and leave of absence requests) to Brasilia.

In reality, many decisions regarding personnel are handled very informally either by the school's director or the center's coordinator, or directly by the organization's founder when he is in town. In several instances, those employees who had access to the founder went directly to him to settle matters, and his decision would then be communicated to the coordinator or school director, oftentimes in direct conflict with decisions already netted out by them. Such practices undoubtedly contributed to the vying for favors and a certain mistrust amongst peers, as each one felt that he/she had to watch out for him/herself.

As shown in the variance matrix (Appendix 5), unclear or conflicting information from management was one of the variances listed by the operational staff. The conflicts often arose because information was obtained from various management sources, while no formal pronouncements were made.

Management was also affected by these practices, as decisions within their jurisdiction were often taken by the founder without consultation. Interestingly, in spite of these findings, none of the participants suggested that proper procedures be created to ensure professional respect and fair treatment of staff. Change in that direction was not even viewed as a possibility.

4.3.2 Contextual Environment

The contextual environment as identified by the participants has the salient feature of being in constant turmoil. Politically and economically, Brazil is undergoing a period of change, and not necessarily for the better. Inflation increases at a rate of 40% per month officially (much more according to unofficial calculations), and corruption levels have almost guaranteed the election of a young political candidate riding on a presidential campaign based on the elimination of corruption.

What this means for organizations which must secure political favors and hard to come by funds in order to survive, is that lobbying is an activity that has to be undertaken on a full-time basis. Involvement in political

games therefore becomes an art born out of necessity for the organization's upper management, but the effects of the country's political and economic strife pervades all levels of the organization.

Contextual forces or elements of importance for the survival of the agricultural school were identified by the participants as the following. the monetary and fiscal policies determined by the federal government; the communities served by the school; the Mayor of the closest town, who worked in close collaboration with the institution's founder; representatives of the federal and state ministries of education; the various shopkeepers from which supplies for the school were obtained; the nearest town's hospital, where afflicted students and workers were tended in case of emergency; the local banks from which some donations or loans could be secured; the autodealers in various towns who took care of the institution's fleet; other educational institutions and government departments with which the organization had signed agreements to share staff and materials; and the various research and funding groups which support the school's activities, including the Canadian Embassy in Brasilia.

The level of influence participants believed could be exerted depended on

the contextual force in question. Thus, when it came to government monetary and fiscal policies, all that could be done was to try to gain advance notice on future changes, and cope as best as possible with the constant modifications. On the other hand, participants felt that they stood a better chance of influencing decisions made in the community.

The contextual analysis also showed the communities the students and staff of the agricultural school come from were generally very poor, with low levels of education. This poses special problems for the recruitment of qualified personnel to teach at the school. According to management, they were forced to hire whoever was available locally, as few out-of-towners would be interested in moving to the region, given the lack of infrastructure and the low salaries and benefits offered.

The school's staff was composed exclusively of people from the nearest town. Yet, in spite of the admittedly limited pool of candidates, few efforts were made to train or retain the services of personnel. In part due to the limited employment possibilities in the region, people had to accept the conditions offered by the organization, unless they were willing to emigrate. This fact was mentioned repeatedly by the operational staff at the school,

and is taken here as an indication that the organization is not entering into effective exchanges with the contextual environment.

The analysis of the contextual environment led operational staff to explore the possibility of interacting with it more effectively. An indication of this is the desire mentioned earlier to gather information on the academic and socio-economic background of the student population. Although the creation of a parent-teacher association is stipulated in the school's incorporation documents, little or no effort had been expended in that direction. The medium and long term consequences of such oversight became clearer after performance of the environmental scanning. According to operational staff, one of the major risks faced if parents and community members did not participate more fully in the school's activities was that the school would have to close down, as occurred in 1987. They strongly believed that enrolment would dwindle if parents and community members did not trust the work being done at the school. And, given the overall paucity of resources, if parents did not increase their contributions or involvement, the school's services could not be sustained. In conclusion, data gathering to obtain a profile of the surrounding communities and the fostering of a better

interface with parents and community members, was seen by operational staff as a means of effectively interacting with the contextual environment.

Although management also saw the need to deal more effectively with all identified elements of the contextual environment, its priority was to secure funding. Thus, it was management's opinion that better information gathering on national and international donors could increase access to these groups. Also, in their opinion, more time was needed to conduct research and develop proposals to be submitted to donors. In view of all the activities they were involved in (including other organizational programmes) time was a commodity they lacked.

Better control of contextual forces was further hampered by the lack of delegation. As management felt obliged to engage in a variety of tasks often more appropriate for support staff (e.g. conceiving menus and purchasing food for the school cafeteria), little time was left for what is traditionally considered the purview of management (e.g. strategic planning).

4.4 Technical Subsystem Analysis

4.4.1 Variance Control Analysis

According to the participants, the work undertaken at the agricultural school could be contained within four units of operation: planning of classes, teaching in class and in the field, support services and extra-curricular activities. Within those units, 67 variances were identified which impinged upon the workflow (Appendix 5).

As mentioned in Chapter 3, after a review of the criteria used to identify key variances, seven key variances were chosen for further analysis by the group: 1) lack of teacher/staff training; 2) lack of guidelines, orientation and terms of reference; 3) inappropriate administrative controls; 4) lack of funds; 5) lack of academic materials in the library; 6) lack of information regarding the student population's socio-economic and academic background; and 7) student's lack of discipline.

As shown in Appendix 6, the participants also successfully completed the variance control table.

The increase in the quantity and quality of information gained between pre- and post training in variance control analysis can be gauged by counting

the number of observations made by the participants in each situation. Quantitatively, 14 problem areas which affect work in the school were identified by the seven participants prior to training. The same participants identified 67 variances of importance for the successful undertaking of their mission after training was completed. Thus a 479% increase, or almost five times, the number of variances was observed after the participants learnt how to use the tools. Figure 4.1 graphically demonstrates these differences.

Qualitatively, an analysis of the observations made shows that the participants were better able to focus their attention on specific problems which clearly impinge upon each facet of their work, and analyse the interrelatedness of the various workers' tasks. A clear indication of the quality of information obtained after training is that during initial scanning every participant believed that the lack of water in the region in general and at the school in particular, and the school's isolation, constituted major problems which needed to be rectified. After the identification of variances it became clear that although the lack of water was a major inconvenience, as was the distance between the school and the nearest town, those factors did not prevent or impede the proper conduct of the school's activities.

FIGURE 4.1**COMPARISON OF PRE AND POST TRAINING IDENTIFICATION
OF ORGANIZATIONAL PROBLEMS BY V.C.A. PARTICIPANTS**

Another case in point is that out of the 14 problem areas identified during initial scanning, only 3 were later retained for inclusion in the variance control table, namely improper teacher training, lack of directives from management and inadequate support facilities (e.g. library equipment).

After completion of V.C.A., I asked participants to express their opinion regarding the worthiness of the exercise, and to compare the amount of information gained with problem identification prior to training. They unanimously agreed that the results obtained during V.C.A. were well worth the time and effort. Interestingly, they commented that although they were not certain that management could or would heed their recommendations, they had nonetheless learned to share information among themselves, became aware of concerns they had in common, and realized that even without management's cooperation they were in a position to implement changes on their own, to improve delivery of services.

Thus, they planned to continue working together, sharing information on student progress and instituting a behavioural code in class and on the school's premises which would be reinforced by each one of them. They were also thinking about conducting a systematic, though informal, investigation

of the students' academic and socio-economic background, in order to better adapt their teachings to that reality. When asked whether or not they felt that they would use V.C.A. in the future, again they unanimously stated that they would use it to identify problems as the school progressed.

In conclusion, it can be stated that the proposition that training would improve the results of V.C.A. has been strongly supported. Training has also resulted in other positive effects for the participants and for the organization, as it has included a participative diagnostic tool in the list of mechanisms available for continued organizational development.

4.4.2 Deliberations

As mentioned in Chapter III, the study of deliberations was only partially successful. Only the first three steps in deliberations were engaged in, namely prioritizing issues that need to be deliberated by management, listing of the forums in which those issues are deliberated and of the people who engage in them.

The results obtained are shown in Table 4.3.

TABLE 4.3**DELIBERATIONS**

<u>TOPIC</u>	<u>FORUMS</u>	<u>PARTIES TO DELIBERATIONS</u>
<u>Founder and Executive Director:</u>		
. Acquisition of funds	Letters to concerned parties, telephone conversations; informal and formal meetings; newspapers, radio, television, magazine articles	Government officials; school alumni; international development community; community leaders; prominent citizens, embassy personnel
. Improvement of road conditions	Letters, telephone and personal contacts	Municipal and state government officials.
. Regional health problems	Letters, telephone and personal contacts	Representatives of the Federal, state and municipal Health Departments; representatives of regional hospitals, universities and research centers
<u>Director of coordinating center:</u>		
. Securing funds	Letters, telephone, formal and informal meetings, written proposals; memos	Executive director of the organization, upper management in Brasilia; representatives of the Ministry of Agriculture and Education; officers at funding institutions; community leaders
. Research pertaining to agri-school	Formal and informal meetings, telephone; memos;	Management at other agri-schools, director of local agri-school; representatives of research centers
. Transportation to and from the agri-school	Informal meetings; telephone	Executive director; director of agricultural school; local auto-dealers and repair shops
. Management of staff	Formal and informal meetings; telephone	Individual staff members; director of agri-school; executive director, personnel director; own counsel

Director of Personnel:

. Processing of staff's requests	Memos, telephone calls; informal meetings	Executive director; upper management in Brasilia; director of coordinating center; director of the agricultural school
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Director of the agricultural school:

. Capture and allocation of funds	Formal and informal meetings;	Executive director; director of coordinating center; representatives of funding institutions; various creditors; own counsel
. Staff management	Formal and informal meetings;	Executive director; director of coordinating center; personnel director; concerned party; own counsel
. Coordination of teachers' activities	Informal meetings	Executive director; director of coordinating center; own counsel; pedagogical supervisor
. Research	Formal and informal meetings; telephone; letters; reports	Director of coordinating center; directors of the other agri-schools; representatives of research institutions; technicians;

Pedagogical Supervisor:

. counselling students	Formal and informal meetings	Director of coordinating center; director of agri-school; individual students; teachers;
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Educational Orientator:

. Supervision of teachers' work	Formal and informal meetings,	Director of coordinating center; director of agri-school; individual teachers; own counsel; secretary
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A comparison of pre- and post-training reveals that issues which were considered important during initial scanning were not necessarily being addressed during deliberations. Given some of the areas of concern (e.g. the

distance between the school and the nearest town, lack of water in the region), it is obvious that tremendous barriers existed for their solution. Nonetheless, other important issues (e.g. lack of staff training) are seemingly not dealt with at the present time.

Thus, initial scanning allowed participants to deliberations to list all the problem areas which needed to be resolved, whereas deliberations helped them focus on those issues which were actually being addressed.

4.5 Social Subsystem Analysis

4.5.1 Unstructured Observations

A major observation of the workforce at the agricultural school and at the organization's other centers downtown, is that employees are quite willing to take on several roles at the same time. For example, the pedagogical supervisor was also a teacher and a social worker, and active in creating and supporting community work parties to build homes, teaching history and geography at the school, and providing academic advice to the students. All these roles were taken on without accompanying salary

3. Variety ()

Do you accomplish a variety of tasks on the job?

4. Exchange of Information with Colleagues and Professional Respect ()

Do you frequently exchange ideas with your colleagues? Are your experience, suggestions and professional acumen respected by others?

5. Significant Contribution ()

Do you have the feeling that you are contributing in a significant manner to the accomplishment of a common goal or goals?

6. Prospects for the Future ()

Do honest work mean that you will be considered for promotions, with the attendant salary increases? If not, why?

THANK YOU VERY MUCH.

several times a week.

One would predict, given this level of staff involvement in the organization's activities, that commitment to the organization would be high. Yet, as confirmed by interviews and answers on the job satisfaction questionnaire, such was not the case.

As was mentioned in the section on initial scanning, I observed that though a small unit, the employees at the school formed cliques based on certain affinities between its members. Some of the workers were decidedly loners, preferring, when free time was available, to concentrate on individual activities. Generally, the cliques were composed of people sharing the same types of tasks within the organization. Thus, the cook and assistant cook were always seen together; the technicians kept on their own and so did the librarian and the assistant secretary. Outside of school hours, the same groups met socially downtown. Interestingly, the three members of management (the pedagogical supervisor, the educational orientator and the school director) kept very much to themselves, rarely mingling with either operational staff or amongst themselves.

I attended several meetings between management and operational staff

during my visit at the school. The way these meetings were held denoted a top-down approach to decision-making and even a paternalistic approach to dealing with subordinate inputs. This top-down communication pattern was further confirmed when, after V.C.A. analysis, operational staff expressed doubts regarding management's interest in acting upon their recommendations.

4.5.2 Analysis of School Records

The school records were located on two premises. at the secretariat in the agricultural school, and at the personnel office downtown. The type of information contained in each place differed. The secretariat kept accounts on information pertaining to the conduct of classes (e.g. number of classes taught by each teacher and content of each lecture) while the personnel office gathered files on individual employees (e.g. salary levels, whether formally registered with the organization, academic credentials, etc.).

Nowhere in the record keeping system could information be found regarding employee performance, absenteeism, turnover or evaluation. As later discovered during the unstructured interviews, performance reviews and

evaluations were not systematically conducted, and when they were, the results were not communicated to personnel office. This underscores the employees' statement that promotions or salary increases are unrelated to performance levels. The lack of personnel related guidelines and records also allows the founder to make human resources based decisions without consulting with the personnel director. As previously mentioned, theoretically, all decisions regarding promotions and personnel relations are settled at head office in Brasilia, but in practice a lot of those decisions were handled personally by the founder when he was in town. The personnel director's duties limit themselves to facilitating the paperwork involved when an employee claims health insurance premiums or other benefits.

It becomes obvious that in such a system, there is no need for strict record keeping on employee performance. As a matter of fact, the personnel director had no training in human resource matters, being a mathematician and accountant by trade. He also holds several jobs: accountant, teacher and personnel director. He was promised on-the-job training in personnel matters but had been on the job for two years without receiving it.

4.5.3 Unstructured Interviews

Unstructured interviews conducted with the agricultural school's staff during the course of the research lead to various observations. The low remuneration offered by the organization was an issue which preoccupied everyone within the school, but as one went up the organizational ladder the complaints regarding remuneration diminished. This is not necessarily the result of better salaries offered to management, but rather the fact that most of those belonging to this category were on loan to the organization from government institutions or departments. Thus, they received appropriate remuneration from the government, supplemented by a gratuity from the organization. All of them consider the amount of the gratuity to be a paltry sum, but their welfare was secured by the government salary.

This is further proven by the fact that the one member of management who was thoroughly dissatisfied with the organization's salary offerings did not belong to a government body and as such only received the organization's stipend. Eventually, this led to her resignation from the organization, and the securing of a post paid by the municipal government to work once again at the agricultural school. Unfortunately, the salaries offered by the municipal

government are not much higher than those offered by the organization, but the upheaval created by her defection and return to the school created much animosity among the staff.

Further, on the topic of salary, the ad hoc determination of level of remuneration was also a cause of tension amongst workers. In such a small community, where everybody knows everybody else, information is easily obtained and the unexplained discrepancies between salary levels tended to increase resentments and animosities between individuals. Once again, this was much more the case amongst operational staff.

4.5.4 Job Satisfaction Questionnaire

As mentioned in Chapter III, a job questionnaire was administered to the organization's staff working downtown and at the agricultural school. The information collected on the forms confirm many of the observations I recorded during my stay at the school and in the community, as well as some of the comments made by participants during interviews and informal meetings.

The questionnaire shown in Table 4.4 was administered to both

management and operational staff at both locations.

TABLE 4.4

(SAMPLE QUESTIONNAIRE BASED ON EMERY AND THORSRUD'S (1976) JOB SATISFACTION CRITERIA WHICH WAS TRANSLATED INTO PORTUGUESE)

PSYCHOLOGICAL CRITERIA FOR EVALUATING JOB SATISFACTION

Beside each criterion listed below, please place a value from 1 to 6, indicating the importance of that criterion to you in a work environment. On the scale, 1 corresponds to 'no importance whatsoever' and 6 to 'extremely important'. Thus, for example, if a value of 3 is assigned to the criterion "Autonomy and discretion", it means that that criterion is of medium importance to you

Next, please describe in the space allocated how your present job satisfies or fails to satisfy the stated criterion by answering the questions.

1. Autonomy and Discretion ()

Does your job provide you with the opportunity to take decisions and monitor their execution? Are clear guidelines given to you regarding how to accomplish your job?

2. Opportunity for Growth ()

Are you constantly learning on the job? Are support mechanisms available to help you learn, if need be? Do your superiors follow your progress?

3. Variety ()

Do you accomplish a variety of tasks on the job?

4. Exchange of Information with Colleagues and Professional Respect ()

Do you frequently exchange ideas with your colleagues? Are your experience, suggestions and professional acumen respected by others?

5. Significant Contribution ()

Do you have the feeling that you are contributing in a significant manner to the accomplishment of a common goal or goals?

6. Prospects for the Future ()

Do honest work mean that you will be considered for promotions, with the attendant salary increases? If not, why?

THANK YOU VERY MUCH.

The interpretation of the questionnaire is based on a comparison between the values assigned by the respondent to each of the six criteria (scale range from 1 to 6 on each; see Table 4.5) and his/her comments regarding the extent to which their present jobs fulfill the criterion in question (Yes, More or Less, or No, see Table 4.6). As might have been predicted, the perceived importance of each job satisfaction criterion did not appreciably vary according to the person's work site. As shown in Table 4.5, all six criteria rated between important and extremely important by everyone who filled out the questionnaire.

Table 4.5**MEAN SCORES GENERATED BY MANAGEMENT AND OPERATIONAL
STAFF WITH REGARD TO JOB SATISFACTION**

<u>Criteria</u>	<u>Down Town Management (n = 2)</u>	<u>Down Town Operational Staff (n = 4)</u>	<u>Agricultural School Management (n = 3)</u>	<u>Agricultural School Operational Staff (n = 5)</u>
1) Autonomy & Discretion	6	4	5.6	4
2) Opportunity for Growth	4.5	5.7	6	5
3) Need for Variety	5	5	4.3	5
4) Professional Respect	5.5	5.3	5	5.4
5) Contributing to Common Goal	6	5.7	5.3	5.8
6) Future Prospects	6	5	6	6

Table 4.6

**RESPONSES GENERATED BY MANAGEMENT AND OPERATIONAL STAFF WITH
REGARD TO FULFILLMENT OF SIX JOB SATISFACTION CRITERIA**

<u>Criteria</u>		<u>Down Town Management (n = 2)</u>	<u>Down Town Operational Staff (n = 4)</u>	<u>Agricultural School Management (n = 3)</u>	<u>Agricultural School Operational Staff (n = 5)</u>
1) Autonomy & Discretion	Yes	2	4	3	--
	More or Less	--	--	--	1
	No	--	--	--	4
2) Opportunity for Growth	Yes	2	4	--	--
	More or Less	--	--	2	4
	No	--	--	1	1
3) Need for Variety	Yes	2	4	2	4
	More or Less	--	--	--	--
	No	--	--	1	1
4) Professional Respect	Yes	2	3	2	4
	More or Less	--	1	--	1
	No	--	--	1	--
5) Contributing to Common Goal	Yes	2	4	3	5
	More or Less	--	--	--	--
	No	--	--	--	--
6) Future Prospects	Yes	1	3	--	--
	More or Less	--	--	--	--
	No	1	1	3	5

Looking at Table 4.6, the first observation that can be made is that the staff working at the agricultural school are less satisfied with their job than those who work downtown. Their answers to whether their present jobs fulfill the various criteria systematically fall into the 'more or less' or 'no' category, whereas the tendency for those working downtown is to answer 'yes'. This takes on added significance if one remembers that during initial scanning all the participants listed the school's isolation as a major problem. Yet, isolation was not identified as a key variance during V.C.A. because it did not affect the work flow as such. What this questionnaire shows, is that in spite of the fact that the school's isolation did not affect the unit's work flow, it did have a negative impact on the workers' satisfaction levels.

As opposed to the other groups, the operational staff at the agricultural school felt that there was little or no autonomy or discretion in the performance of their jobs (Criterion #1). Although they did not consider this variable to be highly important (average score of 4, Table 4.5), the overwhelming majority found that they did not have much input into decision-making (4 out of 5 said no; Table 4.6). Their colleagues downtown

also judged this criterion to be less important than others, but they felt that they had more control over their jobs.

Comments provided to criterion #2 suggest that both management and operational staff at the agricultural school feel that opportunity for growth is not available, whereas their downtown colleagues are satisfied with their development opportunities.

Criterion #3, on the need for variety does not reveal differences between its importance for the respondent and its presence on the job.

Criterion #4, on the other hand is interesting when contrasted to observations made during meetings between upper management and staff both downtown and at the agricultural school and some of the variances listed in the variance matrix. The questionnaire shows that both groups believe that they have worthy exchanges with their colleagues and that they are respected as professionals. Yet, during the conduct of V.C.A. information sharing seemed to be limited to groups of 2 or 3 people. Some of the respondents wrote that they freely exchange with a colleague, which would mean that though there is a certain amount of collegiality, it is contained within a determined group or with a partner chosen on the basis of trust and

comraderie.

During meetings between management and operational staff, communication was systematically of the vertical type, from top to bottom. Even though comments were often asked from operational personnel, it was always clear that the decisions would be taken by management. There was also a good measure of paternalism in the way management dealt with certain requests made by operational staff. Heated exchanges occurred occasionally and management tended to close the argument by pulling rank. If in spite of this all the respondents felt that they were respected professionally, it could be an indication that this method of handling issues is culturally accepted as 'normal'.

Interestingly, the unanimous answer to whether the respondent felt that he/she was significantly contributing to a common goal (criterion #5), was yes. Several people mentioned the organization's philosophy of commitment to the community, and the fact that they were willing to cooperate and even make sacrifices for the welfare of the community.

Criterion #6, regarding future prospects within the organization, shows that while overall the respondents felt that this was an important

engage in deliberations, they repeatedly stated that asking them to identify those who should take part in deliberations as opposed to those who actually do; and to compare the information each party contributes to the information which is needed to resolve an issue, forces them to analyse their communications in an artificial manner, rather than adhering to reality. Given the manner in which roles were allocated within and without the organization, it was impossible for management to separate the people who took part in deliberations from their roles.

Lauterbach addresses this issue when he states that "The selection and promotion of executive personnel in most parts of Latin America remain heavily influenced by family status, political factors, personal acquaintance or recommendations by friends ..." (1966:32). In my opinion, the managers were hesitant to scrutinize the effectiveness of their peers' interventions during deliberations because the issue of proper qualification was probably too complex and sensitive to analyze. Needless to say, their own expertise or lack thereof could also be exposed during such scrutiny, leading to a very unpleasant situation.

For example, when the centre's coordinator was asked who he deliberated

consideration, downtown staff had mixed feelings about whether the organization rewards hard work and personnel at the agricultural school unanimously stated that performance was not tied to salary levels nor promotions.

In conclusion, the analysis of the social subsystem in many instances corroborated or provided a more comprehensive view of the organizational problems identified either during initial scanning or analysis of the technical subsystem.

CHAPTER V

CONCLUSION AND DISCUSSION

5.1 Conclusion

This study, conducted in an agricultural school located in a Northeastern state in Brazil, tested the applicability of variance control analysis and deliberations - two diagnostic tools which have evolved from the socio-technical systems field - in assessing the organization's technical needs. The research was undertaken because of the dearth of documented evidence on the robustness of these diagnostic tools in developing countries.

Whereas socio-technical systems practitioners have lauded its proven methodologies, researchers in Latin America claim that the introduction of western-based practices in Latin organizations is doomed to failure because they go against the existing organizational structures and management practices. Thus, tools such as V.C.A. and deliberations, based on the assumption of worker participation in all phases of organizational change, have little chance of success. It was my intention to methodologically and practically contribute to the debate by demonstrating that those tools could

indeed be used in a developing country.

Although the socio-technical systems analysis performed included initial scanning of the unit under observation, an environmental scanning, and analysis of both technical and social subsystems, the focus of the research was on the applicability of the above mentioned tools in diagnosing technical needs. But it should be mentioned, as reported in Chapter IV, that initial and environmental scanning as well as the analysis of the social subsystem corroborate and explain some of the findings obtained during variance control analysis and deliberations.

Thus, it was not surprising to find during environmental scanning, that management tended to concentrate more on the analysis of the contextual environmental forces (e.g. political and economic) which were of importance to the school, whereas operational staff focussed mainly on the transactional forces (e.g. communications between the coordinating center and the agricultural school) and to a lesser degree on the contextual factors. It is also interesting to note that the higher the rank of the management participant, the greater the tendency to concentrate on factors less tangibly related to the agricultural school. Thus, while on the one hand the

pedagogical supervisor stressed the interactions with the communities from which the student population is drawn, on the other hand the executive director would detail the political and economic factors which hampered or favored the management of the school.

As for the analysis of the technical subsystem – the main thrust of this research – results show that variance control analysis was successfully used by the organization's operational staff to identify problem areas impinging upon their work flow, and to suggest solutions for the improvement of the school's delivery of services. Participants working in groups during the period following training in the use of the diagnostic tool were not only able to increase the number of identified problem areas which needed to be redressed, but were also better equipped to analyze the effects of these variances on their work flow. V.C.A. afforded them the opportunity to exchange points of view with their colleagues, to discover common concerns and to work out common strategies for future interventions. It also enhanced the organization's future capacity to define and solve problems.

Deliberations, on the other hand, seem to be culturally biased. Participants repeatedly stressed that it demanded discussing issues in a

manner which was inappropriate given the prevalent organizational culture. Deliberations provided a listing of the issues which are deliberated, the forums in which they are discussed and the people who partake in them. But, subsequent steps in the analytical process, namely the listing of the informational gaps and component office activities which management needs to control in order to fulfill the organization's mission, could not be identified through deliberations.

5.2 Discussion

5.2.1 Examination of Some of the Issues which arose during the Research

5.2.1.1 Deliberations

The unsuccessful attempt to conduct deliberations in a developing country is an issue which needs to be given special attention, as it was a primary objective of this research. The reasons why deliberations failed, can only be inferred from comments made by participants during the analysis, observations made in the field, and a review of the literature on cross-cultural organizational issues.

Although participants successfully listed the people with whom they

engage in deliberations, they repeatedly stated that asking them to identify those who should take part in deliberations as opposed to those who actually do; and to compare the information each party contributes to the information which is needed to resolve an issue, forces them to analyse their communications in an artificial manner, rather than adhering to reality. Given the manner in which roles were allocated within and without the organization, it was impossible for management to separate the people who took part in deliberations from their roles.

Lauterbach addresses this issue when he states that "The selection and promotion of executive personnel in most parts of Latin America remain heavily influenced by family status, political factors, personal acquaintance or recommendations by friends ..." (1966:32). In my opinion, the managers were hesitant to scrutinize the effectiveness of their peers' interventions during deliberations because the issue of proper qualification was probably too complex and sensitive to analyze. Needless to say, their own expertise or lack thereof could also be exposed during such scrutiny, leading to a very unpleasant situation.

For example, when the centre's coordinator was asked who he deliberated

with in order to resolve issues pertaining to academic matters at the agricultural school, he stated that he turned to either the founder of the organization or resolved the issue alone, as best he could. The reason for this was that neither the director of the agricultural school nor the pedagogical supervisor had the necessary qualifications nor experience to provide meaningful contributions. Furthermore, on official documents the director of the school was someone else, with the proper accreditation, but in practice that role was filled by a person without the requisite skills. Because of contextual environmental constraints (such as the paucity of qualified personnel and the organization's inability to offer competitive salaries), and political or social factors, it has become a common practice in the organization to hire personnel for other than 'economic' reasons.

As will be further discussed in section 5.2.1.2, one of the cultural assumptions mentioned by Pinto (1979) as an impediment to cross-cultural interventions is the industrialized countries' belief in status achieved through competence, as opposed to the reality of Latin America which favors status through role assignment. This research tends to corroborate that finding. It could partially serve as an explanation for the failure to conduct

deliberations.

A comparison of the problem areas listed by the participants to deliberations during initial scanning (Table 4.3) shows that the areas of concern identified were generally not considered as key issues during deliberations. Several reasons were given for this discrepancy: 1) some of the problems listed are impossible to solve (e.g. the lack of water in the region); 2) some issues are not deliberated because more pressing matters need to be attended to (e.g. the need for staff upgrading receives no attention); and 3) deliberating certain topics would be seen by upper management as a form of complaint (e.g. low salary levels, lack of time to carry-out activities in an effective manner).

In my opinion, the difference between problem areas identified during initial scanning and the topics listed during deliberations is that in the latter, participants listed the issues which were being dealt with, as opposed to those which although a source of concern, were not receiving attention for the above mentioned reasons. Hence, deliberations allowed participants to focus on issues which were currently dealt with, but since the analysis was not carried out to its conclusion nor did it deal with problematic issues not

presently deliberated, it failed to reflect the true nature of the managerial concerns which need to be considered in the diagnosis of the technical subsystem.

Another comment to be made about the inappropriateness of deliberations is that time constraints cannot be effectively integrated in this method of analysis. One of the problem areas identified during initial scanning by several managers was the lack of time to perform the needed tasks. Although this is a factor which has probably been evoked by managers around the world, the paucity of effective communication channels, lack of delegation, distance between school and the nearest town, lack of training of support staff and the culture prevailing within and without the organization, made time a decisive element in the effective performance of the various management duties. Thus, the researcher observed that a great amount of time was spent by management to physically transport themselves from place to place to discuss matters with their various interlocutors (e.g. suppliers, colleagues at other centers and agri-schools, etc.).

Although research is now being conducted in Brazil to import time management techniques to administrative practices (Horta 1989), cultural as

well as economic factors significantly hamper the successful introduction of such techniques. In the same vein, deliberations - by not making allowances for time constraints - fails to identify an important source of managerial problems.

5.2.1.2 Definition of the Technical and Social Subsystems

Another major problem encountered during the conduct of this research was related to the definition of what constituted the technical as opposed to the social subsystem of the unit under investigation.

A review of the various definitions in the literature did not dispel the conundrum. For example, Pava states that the technical subsystem is composed of "The equipment and procedures used to control variances and convert input into output." and the social subsystem of "The division of labor and methods of coordination used to control variances and to convert input into output." (1983: 179).

Whereas Pasmore et al (1982) include skills as both a part of the social and technical subsystem, Pasmore (1988) gives a more comprehensive definition of both technical and social subsystems, but avoids skills

altogether. Thus, he states that the technical system consists of "... the tools, techniques, devices, artifacts, methods, configurations, procedures and knowledge used by organizational members to acquire inputs, transform inputs into outputs and provide outputs or services to clients or customers.", and the social system includes " ... the people who work in the organization and all that is human about their presence ... individual attitudes and beliefs; the implicit psychological contracts between employees and employers; reactions to work arrangements, company policies, and design features; relationships between groups, among group members and between supervisors and subordinates; cultures, traditions, past experiences and values; human capacities for learning and growth as well as for sabotage and collusion; power and politics; individual personalities and dissension; for cooperation or conflict; and remarkable, uniquely human emotions such as love, hate, greed, charity, anger, joy, fear, pride, devotion, jealousy, compassion, and excitement." (1988: 25).

As a result of this lack of clear boundaries in the definition of the two subsystems, it is difficult to ascertain what should be considered a technical as opposed to a social problem within the work flow. The situation arose

during both training and conduct of the V.C.A., when participants wondered if some of the problems they were identifying should be considered technical or social in nature. My response was that if it affected the transformation of input into output, whether social or technical it was considered of importance to the technical analysis. As mentioned in Chapter IV, the analysis of the social subsystem often corroborated or strengthened some of the findings in the technical arena.

Another problem arose with the social subsystem analysis. Methodologies for performing the analysis abound, and, once again, researchers tend to use a variety of tools either selected from the available roster, or created by them. As mentioned in Chapter I, and reiterated by Kelly (1978) the unsystematic use of a variety of methods to gauge socio-technical interventions has not helped establish its potency. A good case in point is Pasmore's (1988) comprehensive definition of the social subsystem. While providing valuable food for thought regarding the multi-dimensional nature of the social subsystem, he fails to develop the means to gauge its complex, interacting forces.

5.2.1.3 Job Satisfaction Questionnaire

As regards the Job Satisfaction Questionnaire developed for this study, a few comments need to be made regarding the validity of such questionnaires. Although attitude surveys are widely used in industry to gauge workers' attitudes, values and reactions (Lawler 1986), serious doubts have risen in the literature regarding their validity and reliability (Barbash 1976; Yanowitch 1979; Mortimer 1979). Part of the problem occurs as a result of the discrepancies between reported satisfaction levels and the actual performance of tasks (Lawler 1967; Yanowitch 1979), which leads to the question: what exactly is measured by such questionnaires? Researchers are in agreement that various factors are at play in determining satisfaction levels, and that its measurement remains difficult to achieve. Yet, as stated by Mortimer (1979), job satisfaction has been found to be positively related to some of the criteria used in the questionnaire in Table 4.4, namely autonomy, promotional opportunities, and variety.

The reason why the questionnaire was developed in this study was to test the accuracy of some observations made during the course of the research. In that sense, it confirmed the dissatisfaction of the workers at

the agricultural school, as compared to those located downtown, and underscored the lack of promotional opportunities based on merit within the organization. But, as also mentioned in Chapter IV, these findings do not mean that workers were ready to quit their jobs, lobby to change the status quo or were less motivated to perform their tasks. Other, probably more important factors (e.g. the scarcity of jobs in the region and community recognition) dictated that they forge ahead.

Cultural differences probably exist between the criteria which are appropriate for the assessment of job satisfaction levels, since the nature and content of needs vary according to social groups within one country or between countries (Yanowitch 1979). The criteria used in the questionnaire were based on Emery and Thorsrud's (1976) model, and the issue of its cultural applicability was not taken into account. This, understandably, further limits the pertinence of the answers it generated.

In spite of the limitations discussed above, the questionnaire can be useful as an added tool for assessing the social subsystem. The limitations dictate that caution needs to be taken when interpreting its results.

5.2.1.4 The Variance Matrix as an Interactive Tool

Finally, a comment should be made regarding the use of the variance matrix as an interactive tool (e.g. Appendix 5). In spite of its proven effectiveness, it is nonetheless a cumbersome tool to manipulate when several people have to work on its construction at the same time and the number of variances generated is large, as was the case in this study.

The best way found to tackle the matrix was to construct it on the blackboard, which accommodated roughly fifteen variances at a time. The variances' numbers were then inscribed next to the other variances they impinged upon. The panel thus created was then transcribed onto a large draftsman squared paper, and previously identified variances which affected subsequent unit operations were registered.

Since everyone in the group is asked to identify interrelationships, all must have a clear view of the variance matrix at the same time. To get an overall view on the blackboard is impossible, and to fit 2 to 8 people (including the consultant) around a large sheet of paper is also difficult.

The second problem arises with the changes that are often necessary as new variances are identified or reviewed to replace previously written ones.

In some cases, that means erasing and changing a series of variances downstream, with the attendant numbers signifying interrelationships. This creates a messy presentation and is very time-consuming.

Most of the time taken to conduct V.C.A. is actually spent reconstructing the variance matrix. The time required to modify the matrix or matrices considerably slows down the analytical process. In the future, alternative formats should perhaps be looked at which could significantly reduce the paperwork without affecting the quality of the information collected.

5.2.1.5 Reliability of Variance Control Analysis Tools

The tools used during variance control analysis, namely the construction of a variance matrix and of a control table, are considered reliable because the information provided by the participants was based on consensus. Thus, all participants agreed on the items listed.

The tools' reliability was further corroborated by my assessment of the problem areas facing the agricultural school, which was in agreement with the issues brought forth by the participants.

5.3 Comparisons Between The Results of This Research and Others on the Cross Cultural Applicability of Socio-technical Systems Theories and Practices

5.3.1 Socio-Technical Systems in India and Tanzania

Several comments made by Kanawaty et al (1981) have a bearing on the results of this study. The authors remarked that when workers in India and Tanzania were asked to define the problems in their enterprises and the best ways of tackling them, not everyone felt at ease with what they were expected to do. During the course of this research, workers were very reluctant to express their ideas openly in front of others, and especially in writing. One of the on-going jokes was that if the information provided fell into the wrong hands, I would promise to find jobs for them in Canada, even if it meant shovelling snow in the dead of winter.

The extent of that unease can be illustrated with an anecdote: when conducting V.C.A., the variance matrix was constructed on the blackboard where I would write the problem areas identified by the group and then transcribe that information on a large piece of paper. At the end of each session with the group, I would erase the blackboard before leaving the room.

On one occasion, after the group had left but before I had transcribed the notes, I was called outside of the classroom to meet a visitor. Two minutes later, I returned to find that one of the participants was feverishly erasing the material written on the blackboard

As was the case in Kanawaty et al's (1981) research, participants felt that their 'plans of action' or recommendations would not necessarily be accepted by management. If that does indeed happen, there is little hope that the tools will be used again by the staff to identify other problems which might arise in their work flow. Yet, one factor might attenuate the impact of management's disinterest. Some of the recommendations made by the participants did not necessarily require management sanctioning or involvement, such as devising a student monitoring system or improving the sharing of information between teachers and technicians. Therefore, if they decide to go ahead with these recommendations independently of management, and meet with success, that could increase the likelihood that V.C.A. would be used in the future. Nevertheless, the issue leads to the subject of sustainability.

I observed on several occasions that when I went away for a period of

time, either to another city or to conduct interviews with personnel outside of the agricultural school, the analysis lagged significantly. Although participants were very capable of following the process and in most instances enjoyed the discussions arising from the experience, my presence seems to have been catalytic in spurring or motivating them to make use of the tools.

Kanawaty et al (1981), would argue that internalising the problem or the work group's perception that changes are the result of their input, as opposed to management or change agent's directives, is an important factor for success. Internalising did not seem to occur in the present study. Respondents continued to rely on the external person's presence to continue with the analysis, and they were skeptical about management's implementation of their suggestions. Kanawaty et al, would most likely consider the effort unsustainable.

Yet, in my opinion, due to the momentum gathered and satisfaction experienced by the participants toward the end of V.C.A., and their comments regarding the discovery of shared concerns, this tool can become transportable or used again by the group, providing a suitable catalyst (e.g.

one of the participants) oversees or directs the process.

One factor mentioned by Kanawaty et al (1981) which the authors refer to as an 'impelling' factor for the successful introduction of socio-technical systems methods, is the adequate preparation of the ground. Although the authors are mainly referring to preparing the members of the organization for change and gaining acceptance for the changes contemplated, it has been the experience in this study that the period of 'getting acquainted with the work environment' which was undertaken at the beginning of the research was a key factor in securing the participant's trust and establishing their confidence in the researcher's abilities as a professional. Otherwise, I doubt whether the results of V.C.A. could have been as positive. Needless to say, the sanctioning of the project by management was also instrumental in gaining acceptance.

5.3.2 Organizational Development Theories and Practices in Latin America

As a conclusion to his article on cross-cultural organizational development where he argues that western-based practices cannot be applied in Latin America, Pinto (1979) recommends that further research be

conducted to gauge the success of those practices. In his article, Pinto systematically outlines, among others, the differences between the cultural assumptions on which western-based interventions are founded, and compares them to those of Latin American countries, arrived at as a result of comparative research and observations. Table 8 provides the translated version of the differences between underlying assumptions in industrialized countries and the realities of Latin America as observed by Pinto. He concludes that because of the differences in basic assumptions, a culturally biased method cannot be transposed to another context.

TABLE 8
PARALLELS BETWEEN UNDERLYING ASSUMPTIONS
OF WESTERN-BASED INTERVENTIONS AND LATIN-AMERICAN REALITY

THEORETICAL AND PRACTICAL ASSUMPTIONS ON WHICH O.D. IS BASED	FINDINGS BASED ON COMPARATIVE RESEARCH AND OBSERVATION OF LATIN- AMERICAN CULTURES
1. Freedom, participative democracy.	1. Oppression; political authoritarianism.
2. People find dignity at work; worker's value is recognized.	2. Work as a privilege.
3. Diffusion of power.	3. Concentration of power.
4. Change; adaptability; organizational innovation; modernization.	4. Resistance to change and innovation, preservation of traditions.
5. Openness to learning in a non-formal setting.	5. Resistance to non-formal learning;
6. O.D. through improvements in group processes; dynamic norms and values.	6. O.D. through individual acquisition of content-based knowledge.
7. Affluence and allocation of surplus resources to improve behaviour.	7. Scarcity of resources to be allocated to behavioural changes.
8. Predominance of market forces and private enterprises.	8. Government's supremacy and authoritarian allocation of resources.
9. Climate of trust and openness.	9. Climate predominantly characterized by aloofness, suspicion and reserve
10. Conflict management.	10. Emotional confrontation; decisions arrived at through arguments.
11. Status achieved through competence and experience; secularity.	11. Status attached to traditionally established roles; inviolability.

12. Reasonable level of commitment to organizational goals and consistency with personal goals.

12. Low commitment to organizational goals, due to the predominance of personal goals.

13. Cultural adaptability.

13. Cultural rigidity; preservation of traditional norms and values.

Adapted and translated from Pinto, R.F. (1979), p.54.

Since the main objective of this research was to test the applicability of two western-based diagnostic tools in a cross-cultural setting, the results obtained will be analyzed by comparing them to Pinto's observations (Table 8).

Assumption #1 (Participative democracy vs. political authoritarianism). The first point to be made is that the pervasiveness of the economic, social and political forces in Brazil and their effect on Brazilian organizations are not to be underestimated, but those forces cannot be analyzed given the constraints of the present research. Nonetheless, it can be said that Brazilian society is presently undergoing a tremendous amount of change, and the idea of participative democracy is at a budding stage, since Presidential elections have been called for the first time in 30 years.

Although several studies have shown that culture pervades organizations

(Hofstede 1980), participation in the political process does not in itself guarantee that organizations will be run in a democratic fashion. But, by the same token, one could argue that the decision-making power offered to individuals in a democratic society facilitates the cross-over to more power and involvement in organizational endeavours as well.

During the conduct of V.C.A., the importance of secrecy and the fear of sanctions were an indication of the lack of power of those in lower positions. On the other hand, during top management meetings in Brasilia it was obvious that the powers that be were aware of the need to decentralize and secure the commitment of organizational members, neither of which could be accomplished without loosening the control of top managers (namely the executive director).

Assumption #2 (Recognition of worker's value vs. work seen as a privilege): The differences between cultures on this assumption were noticed several times during the course of this research. When some of the operational staff's grievances were voiced to management, oftentimes management's reply was that workers should just be satisfied to have a job to go to instead of complaining about their working conditions.

One comment often heard was: "If they don't like it here, they can always try to find work elsewhere". The workers themselves did not feel valued for their skills and thought they could easily be replaced. Given the high unemployment rate in the region, work was indeed a privilege. Perhaps partly because of this, the staff at the agricultural school was willing to work hard and was very committed to their tasks.

Assumption *3 (Diffusion vs. concentration of power): The concentration of power in the hands of few was a fact that I observed throughout the study. Delegation seldom occurred. Nonetheless, those who had no power did not necessarily feel its need (e.g. answers to Criterion *1 on the Job Satisfaction Questionnaire regarding the need for autonomy and discretion).

Instead, they favoured improved control systems and directives from management. This is not to say that they were not willing to take on more responsibility, as the recommendations made in the variance control table (Appendix 6) show that workers would prefer to control certain aspects of their work flow. But, they were not contesting management's legitimate power to make decisions.

Assumption *4 (Adaptability vs. resistance to change): Maybe as a

consequence of the changes operating on the social and political arena, I felt that workers in the organization at large, but especially operational staff, were willing to envisage change. I say operational staff especially because they have less to lose and perhaps more to gain from change.

It cannot be said that management was resistant to change, but management was certainly cautious about it. In view of the comments elicited during deliberations, I think management is very leary of western practices in general, for although the positive results obtained in industrialized countries are acknowledged, people are also very much aware of the contextual differences between North and South. The fear of implementing western-based changes or the skepticism expressed towards its appropriateness comes not so much from the possibility of losing power, but from taking high risks with little guarantees of success.

Therefore, I don't think that the introduction of western-based theories and practices is an impossibility, but since those in power are hesitant to institute those changes without careful consideration - and rightly so - it will probably take place in a slow, cautious manner. The process will be aided by the Latin American researcher's efforts to adapt and/or develop

methodologies of their own.

Assumption #5 (Receptivity vs. resistance to formal training): Formal or informal training was not an issue in the context of this research, but it can be said that the learning of a new, "informal" technique for diagnosing problems (V.C.A.) was readily accepted by the group of participants. As mentioned earlier (Chapter IV), they expressed the desire to use the tool in the future.

Assumption #6 (O.D. through group dynamics vs. O.D. through improvement of individual knowledge of content): Observations made during the research would confirm that the organization does lean toward to training of individuals rather than groups.

The agricultural school was seen more in terms of individuals with discrete tasks than as a group or groups of people working together to achieve organizational goals, therefore precluding any group dynamics based interventions. Staff development was seldom mentioned by management as a critical problem to be solved although operational staff identified lack of proper training as a key variable. But, when it was mentioned - as was the case with the personnel director in Chapter IV - the tendency was to focus on

individual, content training as opposed to work team interactions.

Assumption #7 (Affluence vs. scarcity of resources to be allocated to behavioural changes): The scarcity of resources, as stressed during V.C.A. (Appendix 5 and 6) was a factor which impinged upon the organization as a whole. Financial consideration aside, it is telling that during deliberations when management listed the issues which were considered priorities, the allocation of funds for the training of staff or investigation of behavioural factors related to work, were not mentioned.

This does not mean that there is no interest in the matter, but that several other issues are considered more pressing by management.

Assumption #8 (Market vs. government supremacy): As mentioned for Assumption #1, government forces are indeed predominant.

Assumption #9 (Climate of trust vs. climate of suspicion and reserve): At the beginning of the study, the climate between the staff at the agricultural school was one of suspicion and reserve. But, as small groups started working together members discovered not only that they had common concerns but that they could perform better if they shared information. Therefore, suspicion if not completely eliminated was at least attenuated.

This of course does not address the issue of the long term sustainability of that behaviour. Some Latin American researchers (Costa Moura, 1978) would argue that organizational members are quite capable of mimicking whatever behaviour the change agent or management wants them to display, but true behaviour modification is very difficult in a cross-cultural setting, given that the individuals in the organization have to adapt to a different form of socialization from that taught or prevalent in society at large.

In my opinion, given the philosophy of participation of the organization under study, and if the observations made during V.C.A. are any indication, if management seriously considers changes in its practices, the workers could effectively learn to work together.

Assumption #10 (Conflict management vs. emotional confrontations): Since I was privy to most of the meetings which occurred at the agricultural school during the time of the study, I was able to gauge how people reacted during interpersonal situations.

Overwhelmingly, discussions tended to lead to heated emotional confrontations between proponents of different courses of action. Negotiation or conflict management was almost never evident, possibly

because the person with the higher official rank (generally a member of the management team) settled the matter by virtue of his or her status. But, as mentioned earlier for assumption #3, this type of communication pattern did not seem to disturb anyone concerned, and is very much accepted as a way of life. In other words, it does not necessarily demotivate people from working alone or together.

Assumption #11 (Status achieved through competence vs. through role assignment): As was mentioned in section 5.2.1.1, this assumption has the most bearing on the conduct of deliberations. Field observations undertaken during this study have corroborated what Latin American researchers have said about hiring practices in that part of the world.

As a result of the allocation of jobs on other than competence-based assessments, it becomes very difficult, if not impossible or futile, for managers to distinguish between ideal situations (who should partake in deliberations given their area of expertise) and reality (those who occupy certain posts but are unqualified and therefore cannot be consulted). Given that reality, another flaw with deliberations is that it forces managers to critique other people's role for little return, as changes in hiring practices

(within the organization and in society at large) are not presently envisaged.

Assumption #12 (Commitment to organizational goals vs. predominance of individual goals): As shown in the answer to Criterion #5 (Significant Contribution) in the Job Satisfaction Questionnaire (Table 4.4), respondents not only believe that the above criterion is important, but feel that they are contributing significantly because they are working toward common goals.

Perhaps this factor is an idiosyncrasy of the organization with its emphasis on participation and development, but nonetheless, it goes against local organizational theory which states that in Latin American organizations, individualism reigns.

In view of some of the findings mentioned earlier, in my opinion collectivism can be fostered, and when properly managed, people are willing and able to work effectively in groups.

Assumption #13 (Cultural flexibility vs. rigidity): This assumption indirectly relates to assumption #1 regarding political, social and economic forces present in the environment.

While the country's is undergoing a tremendous amount of change - much of it acknowledged by researchers who state that just like in industrial

countries during the period following the second world war, Brazilian youth will not tolerate authoritarianism and traditional management styles – similar changes are operating within organizations.

I was privy to a letter written by the organization's top management in which the need to develop a more participative management style and to establish hiring and promotional policies based on competence and experience was clearly acknowledged. Given the size of the organization, the distance between its various centers and the environmental constraints mentioned in this research, these organizational changes will undoubtedly take years to implement. Nonetheless, the intent expressed by management is an indication of their willingness to contemplate substantial change. Given such overtures, it is both inaccurate and unfair to talk about cultural rigidity and the preservation of traditional norms and values.

In conclusion, some of the observations made by Pinto regarding the differences between western-based assumptions and the realities of Latin America were confirmed in the present study, and others were shown to have a somewhat different interpretation and a few were found questionable. The results of this study would tend to demonstrate that there are many

attenuating circumstances which affect the success or failure of western-based practices in Latin America. As changes continue to take effect in both worlds, it is perhaps limiting to paint similarities and differences in terms of black and white. Such a dichotomous focus prevents the discovery of grey areas where the two worlds might meet, fruitfully share experiences and grow together.

The fact that variance control analysis - a tool which was developed in the West and which is based on the assumption of participation - has been successfully used in a Latin American country in spite of the underlying cultural differences shows that there is hope that the North-South dialogue can continue to develop.

5.4 Suggestions for Further Research

In spite of the successful conduct of V.C.A. in a developing country, the study's limitations, mentioned in Chapters I, IV and V also provide fuel for further research. Thus, the small sample size from which the data was gathered and interpreted might not adequately reflect the reality of the work unit under study or of the population from which the sample was drawn. Further research could address the issue of sample size by including the total work unit population, thus increasing the accuracy of the findings.

The failure to conduct deliberations in a developing country setting also needs to be further investigated. Several interpretations have been given as explanations for why deliberations might be inappropriate in such an environment, but those interpretations need to be tested, and alternative methodologies developed to explore the issue of diagnosing cognitive technologies in developing countries.

Aside from addressing the limitations of the present research, several suggestions can be offered to improve the conduct of future research on the subject of the cross-cultural applicability of the two socio-technical systems tools.

1) The analysis of deliberations requires focussing on the interactions between interlocutors. In order to assess the applicability of deliberations as an analytical tool in other cultures, more information needs to be collected on the way people interact and communicate in the cultures under study. This type of information gathering could lead to a framework for analysing cultural factors favoring or hampering the conduct of deliberations as well as a framework for adapting the tool.

The present research also suggests that deliberations need to be extended outside the boundaries of the organization in order to obtain a comprehensive understanding of the technical problems faced by management.

2) In order to better gauge the value of the information gained following variance control analysis, it would be a good idea to ask participants during initial scanning to prioritize the identified problem areas. When compared to the key variances listed after the construction of the variance control matrix, it could yield significant information regarding the quality of data gathered after training.

3) The problem of illiteracy has not been properly tackled in this research. A significant number of workers at the agricultural school were illiterate and

therefore incapable of conducting V.C.A. due to the progressive nature of the analysis and the amount of information contained from one step to the next. Yet, the input of those workers in terms of understanding the school as a unit, is undeniable.

Given the rate of illiteracy in developing countries, this is quite possibly far from being an atypical situation. Therefore, for researchers involved in diagnosing organizations and designing remedial interventions in developing countries using variance control analysis, there is a definite need to find ways of accessing the illiterate population.

4) The present research attempted to assess the effectiveness of socio-technical systems diagnostic tools which require worker participation, by providing documented evidence of the methodology used. Although one of the methods used was successful (V.C.A.), reservations were expressed regarding management's willingness to act upon recommendations made by operational staff. Thus, the issue of the tool's sustainability needs to be addressed in another study. It should be the concern of future researchers to gauge whether participants continue to use the newly acquired analytical skills once the consultant is gone, and to assess the effective implementation

of change, based on recommendations made by those workers.

5) The development of a Job Satisfaction Questionnaire was based on the model created by Emery and Thorsrud (1969). Aside from the issues surrounding the validity and reliability of job satisfaction questionnaires in general, attention needs to be given to the appropriateness of the criteria used to gauge satisfaction in a cross cultural context.

In summary, this study has attempted to provide documented evidence of the use of two socio-technical systems diagnostic tools in a developing country. V.C.A. seems to work well; deliberations doesn't. Further research is needed in other cross-cultural settings, however, before V.C.A.'s global transferability is deemed appropriate.

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* The agricultural school is part of this division

Adapted and translated from documents provided by the organization.

APPENDIX 2
ORGANIZATIONAL DIAGRAM OF THE AGRICULTURAL SCHOOL

(Adapted and translated from documents provided by the organization.)

APPENDIX 3

TIMETABLE FOR FIELD RESEARCH

	November	December	January	February	March	April
Sanctioning of the Study and Identification of the Research Site	-----					
Getting Acquainted Period		-----				
Initial Scanning		-----				
Consultations in Canada			-----			
Training				-----		
Environmental Scanning					-----	
Analysis of the Technical Subsystem						
Variance Control Analysis					-----	
Deliberations					-----	
Analysis of the Social Subsystem						
Analysis of Records						-----
Unstructured Observation					-----	
Unstructured Interviews					-----	
Administration of Questionnaire						-----

APPENDIX 4

SUMMARY OF PROPOSED METHODOLOGY AND EXPECTED RESULTS VERSUS FIELD MODIFICATIONS AND RESULTS OBTAINED

<u>STEP</u>	<u>METHODOLOGY</u>	<u>EXPECTED RESULTS</u>	<u>FIELD MODIFICATIONS</u>	<u>RESULTS OBTAINED</u>
1. Sanctioning of the study.	<ul style="list-style-type: none"> - Oral presentation of study to the school's upper management. 	<ul style="list-style-type: none"> - Approval of study by upper management. 	<ul style="list-style-type: none"> - NONE 	<ul style="list-style-type: none"> - Approval of study by upper management
Identification of research site.	<ul style="list-style-type: none"> - Criteria to be used to identify the research site: <ul style="list-style-type: none"> 1) school located in the North-east region; 2) school in operation for at least three years; 3) medium or high community participation in the institution's activities. 	<ul style="list-style-type: none"> - Identification of the research site. 	<ul style="list-style-type: none"> - Criteria used to identify the research site: <ul style="list-style-type: none"> 1) school located in the North-east region; 2) school in operation for two years; 3) medium or high community participation in the institution's activities. 	<ul style="list-style-type: none"> - Identification of the research site.
Identification of participating team	<ul style="list-style-type: none"> - Selection of fourteen people based on the types of tasks they perform: Group 1: seven operational staff members; Group 2: seven management staff members. 	<ul style="list-style-type: none"> - Selection of fourteen participants divided into two groups of seven. 	<ul style="list-style-type: none"> - Selection of thirteen people based on the types of tasks they perform: Group 1: seven operational staff members; Group 2: six management staff members. 	<ul style="list-style-type: none"> - Selection of thirteen participants divided into one group of seven (for V.C.A.) and six (for deliberations).
2. Initial scanning and training	<ul style="list-style-type: none"> - Discussion based analysis of the center leading to the identification of problem areas; - One-day training session of group 1 in the use of V.C.A.; - One-day training session of group 2 in the use of deliberations; - Testing of training in each group. 	<ul style="list-style-type: none"> - Identification of problem areas by participants prior to training; - Participants trained in the use of the tools; - Participants trained in the use of the tools; - Correct use of tools to analyse case study. 	<ul style="list-style-type: none"> - NONE - Individual, and training of groups of 2 or 3 for participants in V.C.A. - Individual training of each participant in deliberations. - Testing of training in each group. 	<ul style="list-style-type: none"> - Identification of 14 problem areas by V.C.A. participants prior to training; - Participants trained in V.C.A. - Participants trained in deliberations. - Male V.C.A. participants analyze a soccer game using the tool, female participants analyzed the organization of a party. Male deliberations

- 3. Environmental scanning**
- Discussions within each group regarding internal and external forces of importance for the delivery of the school's services.
 - Identification of transactional and contextual environmental forces affecting the school under study.
 - Individual and small group discussions with V.C.A. participants; individual discussions with deliberations participants.
 - Identification of transactional and contextual environmental forces affecting the school under study.
- 4. Technical subsystem analysis**
- Variance control analysis;
 - Identification of key operational variances;
 - Identification of major information gaps and component office activities.
- 5. Social subsystem analysis**
- Deliberations.
 - Unstructured observation of participants at work;
 - Collection of data regarding employee satisfaction and fulfillment of needs.
 - Analysis of company records for data on productivity, absenteeism, turnover, etc.;
 - Unstructured interviews.
- 6. Analysis of results**
- Comparison of the quantity and quality of information obtained during initial scanning and after use of V.C.A. and deliberations;
 - Confirmation of the applicability of V.C.A. In assessing technical needs; the applicability of deliberations was not confirmed.
 - Participants' assessment of the use of the tools in qualitatively identifying problem areas;
 - Participants confirm applicability of V.C.A.; the applicability of deliberations was not confirmed.
 - Conclusions
 - Confirmation of the applicability of V.C.A. In assessing technical needs; the applicability of deliberations was not confirmed.
 - Participants confirm applicability of V.C.A.; the applicability of deliberations was not confirmed.
 - Writing of theses.

		TEACHERS' LACK TRAINING																																																
Unit Operation 1:	PLANNING OF CLASSES	1	2	LACK OF GUIDELINES/ORIENTATION/TERMS OF REFERENCE																																														
		2	3	TEACHERS' LACK OF KNOWLEDGE OF SUBJECT MATTER																																														
		2	3	4	LACK OF STAFF INPUT INTO DECISIONS AFFECTING THEIR WORK																																													
		2	3	4	5	INAPPROPRIATE ADMINISTRATIVE CONTROLS																																												
		2	3	4	5	6	LACK OF FUNDS																																											
		2	3	4	5	7	HEAVY TEACHER WORKLOAD																																											
		2	3	4	5	7	8	POOR SECRETARIAL SUPPORT																																										
		1	3	4	5	9	NO EXCHANGE OF INFORMATION WITH OTHER AGRI-SCHOOLS																																											
		2	3	4	5	7	8	10	SECRETARIAL OVERLOAD																																									
		2	3	4	5	6	8	9	10	POOR PLANNING/ALLOCATION OF SECRETARIAL TIME																																								
Unit Operation 2:	TEACHING IN CLASS & FIELD	2	3	4	5	6	8	9	10	LACK OF OPPORTUNITIES FOR STAFF UPGRADING																																								
		1	3	6	POOR SUPPLY OF ACADEMIC MATERIAL (FOR TEACHERS)																																													
		2	3	6	POOR SUPPLY OF ACADEMIC MATERIAL (FOR STUDENTS)																																													
		2	5	6	8	10	13	14	15	HIGH COST OF OPERATING AVAILABLE EQUIPMENT (E.G., DITTO)																																								
		1	6	12	13	14	15	16	LACK OF ACADEMIC MATERIAL IN LIBRARY																																									
		2	3	5	9	LACK OF PHYSICAL EDUCATION FACILITIES																																												
		1	2	3	9	13	16	18	19	SCANT INFORMATION ON STUDENTS' ACADEMIC & SOCIO-ECONOMIC BACKGROUND																																								
		1	2	3	9	13	16	18	19	CLASSES COMPOSED OF STUDENTS OF DIFFERENT AGE GROUPS																																								
		2	5	7	14	HIGH TEACHER ABSENTEEISM																																												
		2	5	8	10	FREQUENT CHANGES IN CLASS SCHEDULE																																												
Unit Operation 3:	SUPPORT SERVICES FOR STAFF & STUDENTS	2	5	6	7	14	16	LACK OF TEACHING STAFF																																										
		2	4	5	7	20	21	22	CONFLICTS BETWEEN TEACHING & OTHER ORGANIZATIONAL																																									
		1	3	9	12	13	14	16	18	19	INABILITY TO CATER TO DIVERSE LEARNER ATTITUDES																																							
		1	2	3	7	9	12	13	14	15	16	18	19	INABILITY TO ADAPT MATERIAL TO STUDENTS' LEVEL																																				
		1	2	9	19	STUDENTS' LACK OF DISCIPLINE																																												
		2	5	6	10	11	19	NEED FOR A "STUDENT INSPECTOR"																																										
		1	3	9	12	14	18	19	24	26	LACK OF SUSTAINED ATTENTION IN CLASS																																							
		1	2	3	9	12	14	18	19	24	25	26	28	29	LACK OF STUDENT MOTIVATION																																			
		1	2	9	12	13	14	15	16	18	19	24	26	28	29	30	STUDENTS' POOR ACADEMIC PERFORMANCE																																	
		1	2	3	5	13	18	19	21	23	24	25	26	28	29	31	POOR EXCHANGE OF INFORMATION																																	
Unit Operation 4:	EXTRA-CURRICULAR SERVICES	1	3	5	6	13	14	15	16	18	19	24	25	26	28	29	30	32	NO TIME FOR INDIVIDUAL																															
		2	6	13	14	15	16	17	18	24	25	28	30	33	LACK OF TEACHER SUPERVISION																																			
		1	2	3	4	5	9	12	13	16	NO GUIDELINES																																							
		1	2	3	4	5	9	NO TEACHER PRESENCE																																										
		2	5	7	8	10	11	ABSENCE																																										
		2	5	16	26	30	32	34	UNTRAINED																																									
		1	2	3	6	13	14	15	16	24	25	30	32	33	34	INADEQUATE																																		
		2	6	17	19	26	27	33	34	INADEQUATE																																								
		2	5	8	10	11	20	21	23	26	27	33	35	38	INADEQUATE																																			
		2	5	15	20	21	23	26	27	38	39	INADEQUATE																																						
Unit Operation 5:	EXTRA-CURRICULAR SERVICES	2	5	10	20	37	INADEQUATE																																											
		1	2	5	7	12	23	37	INADEQUATE																																									
		1	2	5	7	10	12	23	35	INADEQUATE																																								
		1	2	5	6	7	10	23	32	INADEQUATE																																								
		1	2	5	6	7	8	10	12	23	38	INADEQUATE																																						
		2	5	8	12	13	17	20	21	22	23	37	IN																																					
		2	6	18	19	24	25	26	28	29	30	32	IN																																					
		2	6	26	IN																																													
		2	5	8	10	26	IN																																											
		2	6	37	IN																																													
Unit Operation 6:	EXTRA-CURRICULAR SERVICES	2	6	37	IN																																													
		2	6	37	IN																																													
		2	6	37	IN																																													
		2	6	37	IN																																													
		2	6	37	IN																																													
		2	6	37	IN																																													
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		2	6	37	IN																																													
		2	6	37	IN																																													
		2	6	37	IN																																													

APPENDIX 5

VARIANCE MATRIX

IES

NCE

WITH OTHER TEACHERS WITHIN SCHOOL

ENTION TO STUDENTS

T MATERIALS

ORD BOOKS & OTHER MATERIALS

GARDING CONTENT & DEADLINES FOR FIELD REPORTS

CHNICIAN INPUT IN ECONOMICS OF FIELD RESEARCH

FIELD STAFF

ED LIBRARIAN

PROPRIATE USE OF LIBRARY

EQUIPPED LIBRARY

LACK OF RECREATIONAL EQUIPMENT

42) SPORADIC/CONFLICTING/UNCLEAR COMMUNICATION FROM ADMINISTRATION

42 43) UNSPECIFIED SCHOOL POLICIES

44) DISTANCE OF SCHOOL FROM NEAREST TOWN

42 43 44 45) NO TIME ALLOCATED FOR ATTENDING TO PRIVATE MATTERS (E.G., BANKING)

43 46) NO STANDARDS FOR PROMOTION

43 46 47) UNSPECIFIED STAFF EVALUATION PROCEDURES

42 44 45 46 47 48) NO INCENTIVES FOR OVERTIME WORK

43 45 46 48 49) LOW, NON-STANDARDIZED SALARY LEVELS

43 46 48 49 50) AD HOC FORMAL RECOGNITION OF STAFF (CARTEIRA ASSIGNADA)

42 44 45 48 51) INFLEXIBLE TRANSPORTATION ARRANGEMENTS

52) LACK OF SANITARY INFRASTRUCTURE

53) NEED FOR QUALIFIED STUDENT PSYCHOLOGIST/COUNSELOR

52 54) LACK OF WATER

42 43 51 55) UNCLEAR ALLOCATION OF SUPPORT STAFF DUTIES

44 48 51 56) UNAVAILABLE REST AREAS FOR STAFF

42 43 52 54 55 57) POOR MAINTENANCE OF PREMISES (INCLUDING CAFETERIA)

43 44 51 57 58) POOR QUALITY OF FOOD IN CAFETERIA

43 45 49 50 51 59) LACK OF MEDICAL CARE

49 50 51 59 60) LACK OF MEDICAL EQUIPMENT FOR PEOPLE & ANIMALS

44 45 48 51 61) POOR ACCESS TO SCHOOL (BAD ROAD CONDITIONS)

43 51 55 61 62) LACK OF PLANNED EXTRA-CURRICULAR ACTIVITIES

43 44 48 49 53 55 59 60 61 62 63) LACK OF QUALIFIED OVERNIGHT SUPERVISORY STAFF

43 53 61 64) LACK OF PARENTAL INVOLVEMENT IN SCHOOL ACTIVITIES

43 44 48 51 59 60 61 65) LACK OF TRANSPORTATION IN CASE OF EMERGENCY

66) POORLY EQUIPPED DORMS

43 48 51 55 57 62 63 65 67) LACK OF PLANNING/COORDINATION OF STAFF ACTIVITIES

KEY VARIANCE	WHERE IT OCCURS*	WHERE IT IS OBSERVED *	WHERE CONTROLLED *	BY WH
TEACHERS LACK TRAINING	1, 2, 3	1, 2, 3	OUTSIDE BOUNDARY	UPPER TRAIN
LACK OF GUIDELINES, ORIENTATION/TERMS OF REFERENCE	1, 2, 3, 4	1, 2, 3, 4	OUTSIDE	CENTR SCHOL
INAPPROPRIATE ADMINISTRATIVE CONTROLS	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	SCHOL
LACK OF FUNDS	1, 2, 3, 4	1, 2, 3, 4	OUTSIDE BOUNDARY	UPPER MINIS BRAZ FUNDI
LACK OF ACADEMIC MATERIAL IN THE LIBRARY	1, 2, 3, 4	1, 2, 3, 4	OUTSIDE BOUNDARY	CENTR SCHOL
SCANT INFORMATION ON STUDENTS' ACADEMIC AND SOCIO-ECONOMIC BACKGROUNDS	1, 2, 3, 4	2, 3	1, 2	SCHOL TEACH TECHI
STUDENTS LACK DISCIPLINE	2, 3, 4	2, 4	2, 3, 4	SCHOL STUD TEAC SUPP

* Numbers refer to unit operations listed in 2

APPENDIX 6

VARIANCE CONTROL TABLE

	ACTIVITIES	ADMINISTRATIVE IMPLICATIONS
MANAGEMENT SCHOOLS	<ul style="list-style-type: none"> TAKE COURSES SHARE INFORMATION WITH OTHER AGRICULTURAL SCHOOL TEACHERS 	SET-UP AGREEMENTS WITH TRAINING INSTITUTIONS FOR TRAINING OF TEACHERS, AND DEVELOP INCENTIVES FOR STAFF TO TAKE COURSES.
COORDINATOR RECTOR	<ul style="list-style-type: none"> PROVIDE ORIENTATION TO NEW STAFF MEMBERS REGARDING THE INSTITUTION'S PHILOSOPHY, MISSION, ETC. BASED ON THE MINISTRY OF EDUCATION'S GUIDELINES, DEVELOP RULES FOR AGRICULTURAL SCHOOL PROVIDE EACH TEACHER WITH A DESCRIPTION OF TASKS 	SCHOOL'S RULES AND REGULATIONS NEED TO BE WRITTEN AND DISSEMINATED TO STAFF.
RECTOR	<ul style="list-style-type: none"> COMMUNICATE THROUGH WRITTEN MEMOS TRAIN SUPPORT STAFF KEEP TRACK OF CONFLICTS IN SCHEDULES 	ALLOCATION OF TASKS AND RESPONSIBILITY FOR THEIR COMPLETION NEED TO BE DEFINED, ESPECIALLY IN THE CASE OF SUPPORT STAFF; MANAGEMENT SHOULD DELEGATE SOME WORK TO THE SECRETARY AND/OR ASSISTANT SECRETARY.
MANAGEMENT OF EDUCATION AND FOREIGN AGENCIES	<ul style="list-style-type: none"> SUBMISSION OF PROPOSALS FOR FUNDING FUNDRAISING EVENTS LOBBY GOVERNMENT OFFICIALS 	MANAGEMENT NEEDS TO DEDICATE MORE TIME TO FUNDING ACTIVITIES OR HIRE QUALIFIED PERSONNEL TO DO IT ON A FULL-TIME BASIS.
COORDINATOR RECTOR	<ul style="list-style-type: none"> PURCHASE APPROPRIATE BOOKS AND MATERIALS 	PRIORITY SHOULD BE GIVEN TO EQUIPPING THE LIBRARY
RECTOR	<ul style="list-style-type: none"> DEVELOP AN ACADEMIC PROFILE OF EACH STUDENT CONDUCT RESEARCH ON LOCAL FARMING COMMUNITY MEET WITH PARENTS 	A STRATEGY NEEDS TO BE DEVELOPED TO COLLECT INFORMATION ABOUT THE SCHOOL'S CLIENTELE AND TO ADAPT TEACHINGS TO THEIR NEEDS.
RECTOR INSPECTOR, TECHNICIANS STAFF	<ul style="list-style-type: none"> DEVELOP A COHESIVE METHOD OF DISCIPLINING STUDENTS INVOLVE PARENTS DEVELOP RULES ABOUT BEHAVIOUR ENCOURAGE STAFF TO ENFORCE DISCIPLINE 	MANAGEMENT NEEDS TO ENSURE THAT DISCIPLINE IS ADHERED TO WITHIN THE SCHOOL'S PREMISES

APPENDIX 7

CRITERIOS PSICOLOGICOS PARA AVALIAR A SUA SATISFAÇÃO COM O SEU TRABALHO*

Para cada critério psicológico numerado embaixo, por favor colocar um valor de 1 a 6, correspondendo a importância daquele critério para você no âmbito do trabalho. Nessa escala, o número 1 corresponde ao valor "nenhuma importância" e o número 6 a "de importância fundamental". Assim, por exemplo, para o critério "Autonomia e discricão", um 3 ao lado quer dizer que é um critério importante, mas não crítico.

Depois daquilo, responder a pergunta, descrevendo em poucas palavras no espaço em branco, a maneira em que o trabalho que desempenha agora satisfaz o deixo de satisfazer o critério psicológico correspondente.

1. Autonomia e discricão ()

O seu trabalho lhe dá a oportunidade de tomar decisões e de supervisionar a sua execução? Claras diretrizes existem para guiar o seu trabalho?

2. Oportunidade para se desenvolver ()

O trabalho desempenhado é acompanhado de um processo de aprendizagem? Existem mecanismos de apoio para lhe ajudar si for necessário? A seus chefes avaliam o seu trabalho?

3. Variedade ()

Desempenha varias atividades no seu trabalho?

4. Intercambio com os colegas e respeito profissional ()

A troca de idéias com as colegas é um fato comum? A sua experiencia, a suas sugestões e a sua pessoa como profissional são respeitadas?

5. Contribuição significativa ()

Tem o sentimento de estar contribuindo de maneira significativa ao desempenho de objectivos comuns?

6. Perspectiva para um futuro assegurado ()

O desempenho do trabalho de maneira honesta significa que você tera promoções e aumentos de salario progressivos? Si a resposta é negativa, por que não?

MUITO OBRIGADA.

END

25/02/91

FIN