Partnership for Computer-Assisted Instruction in Jamaican Schools

Errol Miller


This case study is about introducing computer-assisted instruction (CAI) in primary and secondary schools in Jamaica. The management of the educational system is school-based and, since 1989, the Government has imposed a policy of partnership with the private sector and communities in providing and reforming education in the 1990s. This case represents bottom-up educational reform as both the Government and the international agencies rendering development assistance have placed low priority on computer-assisted instruction in primary and secondary schools. At the same time, the success of the efforts of schools, their communities, and the private sector in implementing this reform on their own initiative has made it impossible for the Government and the international agencies to ignore the energy and the excitement that has been generated.

The first part of the study provides background for analyzing the reform effort in Jamaica and outlines the conceptual framework within which the case can be analyzed. The second part discusses the development and characteristics of the reform as well as the experience of each of the main actors in the implementa-
tion process. The third section interprets the case within the framework of different theoretical perspectives. Finally, the strengths, weaknesses, and lessons learned from the reform effort are presented, along with recommendations and concluding comments. The information for this case study was collected through interviews conducted with key representatives and actors of the reform, group sessions held with teachers and students, visits to educational institutions, and the review of documents related to the reform.

All the available evidence points to charismatic leadership as the main force of the conception and implementation of the reforms at the level of the schools, communities, and other groups involved. Yet, the evolution and implementation of the reform are facing challenges, including the training of teachers to fully use the potential of computer-assisted instruction in their classes, resolving logistical and technical problems related to the use of the computer labs, holding in constructive tension the varying vested interests and alliances among the actors and stakeholders in the reform, and creating a more active role for the Ministry of Education without its assumption of a regulatory role that could dampen enthusiasm and kill initiative.

This case of education reform is best explained in terms of the theoretical perspective of competing and cooperating vested interests and the trade-offs negotiated among them. It is also explained in terms of comparative adjustments as schools and their supports attempt to modernize Jamaican education through the most widely accepted symbol of modernization, the computer.

Purpose

This case study examines educational reform in Jamaica with particular reference to the introduction of computers to support and improve instruction and learning in primary and secondary schools within the context of the policy of partnership in education. This is a case of bottom-up educational reform. Instead of a
centrally planned reform directed by the Ministry of Education, it is a result of initiatives taken outside the formal policy mechanism. This process, initiated in the 1990s, constitutes the most dynamic initiative in Jamaican education in the last twenty years. Given the formative stage of the reform, this study focuses on the dynamics of the relationships and the processes that generated the reform, rather than on products, achievements, and outcomes, although these will not be overlooked. Hopefully, this study itself will contribute to the reform as it further evolves in the Jamaican education system.

**Methodology**

The methodology used in this study involved the following four elements. First, interviews were conducted with representatives from the Ministry of Education (Ministry); the Jamaica Computer Society (JCS) and its Jamaica Computer Society Education Foundation (JCSEF); the Jamaica Teachers’ Association; the business community; the HEART Trust; school communities; and principals, teachers, and students of particular schools. Second, focus group discussions were held with teachers and students. Third, educational institutions were visited and instruction observed. The institutions included two secondary schools, five primary schools, and a teacher training college. In addition, participants of a summer teacher training workshop of the JCSEF were interviewed.

Fourth, documents related to different aspects of the reform were examined, including the Ministry’s Draft Five-Year Development Plan for Education (1990–1995), Ministry Project documents, documents related to donor agencies’ support of the information technology reform, JCSEF Working Documents, and minutes of Business Partners Meetings and Think Tank and Education Technology 20/20 Meetings.
Conceptual Framework

Educational reform can be approached from several different perspectives. First, it can be seen as a rational/technical exercise by experts who are seeking permanent solutions to persistent problems. The nemesis of this perspective is political considerations that compromise technical purity. Second, as a political trade-off between competing groups in society, education reform is the periodic renegotiation of the values guiding policy and practice in education. The shortcomings of this perspective are technical limitations and logical inconsistencies. Third, a reform can be conceived as comparative adjustments or a periodic synchronization of schools with homes, workplaces, and communities or with other school systems of societies with which they compete. The frustration of this perspective is the elusiveness of the diversity that needs to be synchronized within these different contexts. Fourth, a reform can be seen as a set of radical departures from tradition and the past and as a paradigm shift in the basis of its provision and processes. The challenge of this approach is the tendency to promise much more change than can be or is actually delivered.

Education reform on the whole tends to be top-down. This is particularly the case where it is approached and practiced as a rational/technical exercise driven by experts or as a political or radical exercise directed by conventional or radical politicians. Nevertheless, education reform can be bottom-up, especially in instances where it can be explained as a set of comparative adjustments. However, the direction of reform, top-down or bottom-up, is not determined by its explanatory paradigm, but rather by the particular context in which it occurs.

Context

Several contextual factors need to be appreciated in any description and discussion of introducing computers into primary and
secondary schools in the 1990s in Jamaica. The five most pertinent factors follow.

**The Governance of the Jamaican Education System**

The governance of the Jamaican school system is predicated on two concepts: (1) school-based management that allows schools to run their own affairs and (2) a centralized Ministry of Education responsible for educational policy, planning and development, and delivery to schools of services related to employing and paying teachers, financing the schools operations, maintaining school plans, and providing nutritional and other support.

School-based management has existed in Jamaica at the secondary level for more than one hundred years, modeled after the English public school system where each school had its own board of governors. In the early 1950s, the newly created Ministry decided to extend this form of governance to the primary schools. In this system, each school is run by a board that is legally empowered to hire and fire teachers, select and discipline students, manage its own finances, and control the use of its premises. This measure of autonomy means that to get school compliance, the Ministry must persuade boards, principals, and teachers through participatory mechanisms.

The principal is both a member of the school board and its chief executive officer, and, as such, exercises considerable influence over operations at the school level. The quality of a school depends largely on the leadership of the principal. The broad-based composition of the board also ensures that the school is accountable to community interests, as well as to the Ministry. In turn, this relationship generates substantial community support for schools over and beyond government subvention.

Within the last twenty years, the Ministry has established five regional offices to facilitate the delivery of administrative and plant maintenance services to schools. While this has been mistakenly referred to as decentralization, it is really a decongestion
of Ministry services, since no further transfer of power has taken place relative to the schools themselves. Indeed, decentralization and school-based decision-making are not new to the Jamaican education system. Rather, they have been structural features of the system for some time.

Educational Developments
in the Post-independence Period

One could argue that in the independence period, beginning in the 1950s, education and the school systems were mobilized to serve the cause of representative democracy. Elected with a mandate to democratize all the avenues of upward social mobility and to remove discrimination in an effort to address the needs of the previously disadvantaged, the newly empowered representative government embraced education and schooling as the most obvious means of demonstrating its commitment to this mandate. The government’s strategies for achieving equity and equality of opportunity included expanding the provision of education at all levels of the system; increasing access to education through legislative means; restructuring the curriculum to promote Jamaican and Caribbean identity and solidarity; and improving the quality of education through upgraded and expanded teacher training, new mechanisms of assessment, and research capacity building.

Favorable economic circumstances in Jamaica during the post-war period up to the mid-1970s facilitated implementing these strategies. The independence era is, therefore, marked by the unusual coincidence of social demand, political will, and economic means. The resulting achievements are truly impressive by any standards. To summarize, they include a significant increase in enrollment at all levels of the system; the provision in the public system for children with special disabilities; gender equity at the early childhood, primary, and secondary levels; the establishment of colleges and universities serving a variety of needs; more culturally appropriate curricula; expanded teacher training
capacity; successful nonformal program in adult literacy and vocational training; and a more integrated Ministry of Education. Indeed, together the mobilization of considerable financial investments, State support, and popular participation took the education system through both a “paradigm shift” and a “quantum leap.”

Given these remarkable achievements, the intriguing question is why at the end of this period, the late 1980s, was there so little celebration and so much dissatisfaction with the state of education? Despite the apparent contradiction, there are a number of factors that offer at least a partial explanation. These can be summarized briefly as the persistence of barriers of ethnicity, race, and class regarding equity and equality of opportunity; excessive financial borrowing because of declining economic growth leading to setbacks and painful, but necessary, adjustments; and a related and negative impact of structural adjustment policies on the affordability of education, on the gains made thus far, and on the perception of the Government vis-à-vis its commitment and capability. In addition, expansion of the system to achieve universal primary and mass secondary education has led to new problems, such as the practice of promoting illiterate students from the primary to the secondary level. Clearly, this raises concerns about the quality and effectiveness of the education being offered and the threat of declining standards.

The Developmental Imperatives of the 1990s

The developmental imperatives of the 1990s, however, go far beyond disaffection with the outcomes of the reforms of the independence era. They relate to fundamental global changes that have overtaken Jamaica despite the gains of national building reforms. Essentially, the school system, mobilized in the post-independence period to serve the cause of representative democracy, has been summoned in the 1990s to serve the cause of eco-
nomic competitiveness in an increasing global marketplace. This shift has several main features.

The collapse of the ideological polarities that have shaped the world for nearly one hundred years has left in its wake a unipolar world dominated by capitalism and market forces. The burden of resolving all social, ethical, and economic problems, both among and within the countries of the world, has been put on the shoulders of market forces, despite the market’s known ethical weakness and previous failure to resolve these problems in the last century. Wealth is not so much the result of excess capital or cheap labor, but of technology and the quality of the work force. In the information society that is emerging, it is science and technology on the one hand and human resource development on the other that are the critical factors of comparative advantage and, as such, must become endogenous enterprises within countries hoping to compete in the global marketplace.

Like many other populations around the world, the Jamaican population is maturing. This demographic shift implies that increasing attention must be paid to the education of adults, while continuing to provide for education and training of children. The bulge in the age structure of the population (in this case, the generation currently aged twenty-five to thirty) has stretched countries beyond their limits in providing gainful employment. Aggravated by the downsizing of government and a similar contraction in the private sector, the result is a significant increase in at-risk youth in the generation that follows the bulge. If not addressed, at-risk youth and their antisocial behavior could become enduring modern society features that threaten other advances.

Another imperative development is pedagogy in schools, which is generally perceived as outdated in its capacity to address contemporary, ethical, and behavioral issues and as obsolete to the technology used in instruction. The implications of this issue for teachers are significant. While information technology may force some redefinition of the roles and relationships of teachers,
the contemporary social milieu is challenging their management capability. As a critically important factor in the quality of education delivered, teachers must have the assurance, support, and level of remuneration that will enhance their performance and secure their dedication.

Together, these development imperatives have led to strong grassroots demands for educational reform and have assured strong participation in the reforms implemented to address the fundamental changes overtaking all societies, including Jamaica.

Reliance on External Assistance

The resulting decline in public expenditure and the government’s increasing reliance on external funding for development projects have had a negative influence on government planning outside of specific projects. For example, the Ministry’s draft of the National Plan of Education 1990–1995 was never officially ratified by the Cabinet or the Parliament and, therefore, never went beyond the status of a draft. Rather than attempting a comprehensive education reform strategy, the Ministry has adopted a project-driven approach to educational development and reform that is largely dependent upon external funding.

Currently, the Ministry is implementing two major projects that are externally funded: the Primary Education Improvement Project financed by the Inter-American Development Bank, and the ROSE Project funded by the World Bank. Of relevance to this case is that neither project addresses the issue of computer-assisted instruction. Indeed, as expressed by Lockheed and Verspoor, donor agencies appear to view reform strategies of developing countries that involve CAI as blind alleys. While recognizing empirical studies that establish the efficacy of CAI, the argument is that developing countries will not be able to both afford and sustain the costs involved in effectively using CAI in classrooms and that other less costly and equally effective technologies (such as good textbooks and teachers’ guides) are avail-
able. While the Ministry acknowledges the effectiveness of CAI, it does not see embarking on reforms involving CAI as feasible given its current restricted fiscal and financial situation.

**Partnership as Policy**

Faced with these fiscal constraints, the new government elected in 1989 decided to promote private sector partnership in education as a means of mobilizing additional resources for both operating and capitalizing the education system. What follows are some examples of the programs and projects implemented in this context.

First, the Ministry introduced the adopt-a-school program in which businesses were invited to provide support and assistance to a school or group of schools within its location, or based on some criteria related to the company's mission. Then in 1992, the Ministry, with assistance from the U.S. Agency for International Development, launched the School Community Outreach Program for Education (SCOPE). This project, designed to enhance and strengthen school community partnership, had among its objectives reducing vandalism of school buildings, improving fund-raising capabilities of schools, strengthening parent-teacher associations, improving effectiveness of school board members, and expanding community support for schools. The mechanism used to achieve these objectives was providing training for principals, school board members, PTA (Parent Teachers Associations) executives, alumni student associations, and community members.

In 1992, the Ministry also established the National Council on Education as a mechanism to promote participation and partnership in education policy making by including in its composition representatives from all the stakeholder groups in education, including the government and opposition party. Then, in an effort to mobilize more resources for the operation of schools, the Ministry introduced cost sharing at the secondary level and expanded its scope at the tertiary level in 1994. Projects such as these are
linked by the common thread of invited partnership in the financing and support of public education. Thus, expanded financial support was the operative concern in the partnership initiatives that were implemented by the Ministry in the opening years of the 1990s.

The Reform

First Efforts of Schools

Prior to 1990, about 10 of the 143 public secondary schools in Jamaica, acting on their own initiative, had established computer laboratories of some sort to support instruction. These schools were among the most affluent and had strong support from their communities. The computer labs were used mainly to teach computer sciences for the Cambridge General Certificate of Education (GCE) Ordinary Level examinations and to support the teaching of business subjects where computers skills were deemed important. Approximately another 30 schools had one to four donated computers of varied types, although these were used mainly for administrative purposes.

The Intervention of the Jamaica Computer Society

In 1989, JCS, a private nonprofit, professional society, became concerned about the inadequate number of students graduating from the Jamaican school system prepared to fill the growing demand for computer professionals, such as programmers, system analysts, and engineers. The JCS concluded that intervention at the secondary level would be most effective in addressing these economically motivated concerns. Accordingly, meetings were convened with secondary teachers of computer science to identify the existing constraints and to formulate an intervention strategy.

The main constraints identified were inadequate preservice and in-service training for teachers of computer science (who
were most often math or business teachers), limited equipment for teaching and hands-on experience, and the absence of computer science as a subject in the Caribbean Examinations Council (CXC), which was being phased in to replace the Cambridge-based exam. Based on these discussions, the JCS decided to adopt a four-prong strategy to address the identified constraints.

First, it would establish the JCSEF, a nonprofit organization whose mission is to support secondary schools in teaching computer science by training teachers and providing adequately equipped computer labs. Second, JCSEF would approach the CXC with a proposal to establish computer science as a subject and to offer technical assistance in its creation through the voluntary expertise of JCS members. Third, JCSEF would implement in-service training for teachers of computer science in secondary schools and approach the teachers’ colleges about establishing appropriate preservice training for teachers interested in teaching computer science. And fourth, JCSEF would promote and provide secondary schools with adequately equipped computer labs and invite the public and private sectors to become partners in these endeavors.

Through contributions solicited from some members of the JCS, the JCSEF was launched in 1990. The Foundation’s first efforts were directed towards implementing in-service training for secondary school teachers of computer science. The Foundation also had almost instant success with CXC, which accepted its proposal to establish and develop technical assistance for computer studies at both the General Proficiency and Technical Proficiency levels. Similar success was also experienced with the teacher training colleges, several of which now offer computer studies as a subject that trainees can specialize in.

What proved to be a more difficult proposition was providing computer labs to secondary schools because neither the JCS nor the JCSEF had the resources to place more than a few computers in schools that already possessed some computer capacity. Addi-
tionally, the private sector offered little support at that time for this effort, and the Ministry of Education had not established any priority in this area.

Notwithstanding these difficulties, the JCSEF did find receptive responses from two sources. First, the HEART Trust, a statutory corporation reporting to the Ministry of Education, concluded that it could support the mission of the JCSEF as part of its mandate to promote vocational training for young people. Second, the JCSEF found support from a very influential chief executive officer (CEO) of one the largest insurance companies in Jamaica. Having had positive experience with the company's involvement in a project to develop videos to support the teaching of mathematics in secondary schools, this CEO was convinced of the potential the JCSEF had of making a dramatic impact on secondary education. She volunteered to become the chairman of the Business Partners, a group that the JCSEF welcomed as its ally in supporting and providing funds for introducing computers into schools.

The point of departure, however, was that both HEART and the Business Partners had wider interests than just providing computer labs to train secondary school students specialising in computer studies to become computer professionals. HEART and the Business Partners were also interested in the potential of computers to improve learning efficiency in schools, as well as increasing students’ familiarity with computers as an indispensable tool of work and production.

After nearly a decade of experience providing vocational training to school graduates and young adults, HEART has found that while they were successful in providing high-quality specific vocational training, the general education of many secondary school graduates left much to be desired. In fact, the feedback from employers noted general weaknesses, particularly in English and mathematics, which detracted from or limited the effectiveness of the trainees, despite their mastery of specific
vocational skills. The Business Partners shared HEART’s obser-
vations and concerns.

Therefore, HEART and the Business Partners indicated to the
JCSEF that they wanted the use of the computer labs to be
expanded to include CAI that strengthened students’ basic Eng-
lish and mathematics skills. As a result, the mission of the JCSEF
was revised to include improving the quality of learning in secon-
dary education by applying computer technology. Thus, the
Jamaica 2000 Project was launched as the means of accomplishing
this mission.

The Jamaica 2000 Project

In May 1992, the Jamaica 2000 Project was launched as a
public/private partnership between the Government, repre-
sented by the HEART Trust; the private sector, represented by
the Business Partners; and the secondary school communities.
With its mission to improve the quality of secondary education,
particularly in English and mathematics, by using CAI, the Pro-
ject set as a target the placement of at least one fully equipped
fifteen-station lab in each of Jamaica's 143 secondary schools, 7
community colleges, and 10 teacher training colleges by the
year 2000.

Through the Project, the JCSEF would assist the schools in
installing the lab and providing in-service training for the teach-
ers using the facility. A formula for sharing the cost of establish-
ing the labs was worked out: the computer room would be
provided by the schools and the cost of the equipment would be
split, with HEART covering 40 percent, the Business Partners
matching this 40 percent, and the school community contributing
20 percent.

In the first two years of implementation, the JCSEF stuck
closely to the Project’s mandate to improve learning efficiency in
English and mathematics. However, several schools and colleges
found this limitation highly restrictive and advocated for wider
use of computers to maximize their potential. The rapid development of multimedia and Internet capabilities also supported the advocacy of those who wished wider application of the technology to learning needs.

In the summer of 1995, the JCSEF responded again by expanding the Project's goal to encompass the entire range of the secondary school curriculum. As a result, using CAI to enhance learning in all subject areas has been added by some principals and teachers in schools where labs have been established. These principals and teachers are not only knowledgeable about CAI, but also eager to maximize the potential of information technology at their disposal. Accordingly, workshops for developing appropriate strategies towards achieving such an objective were offered to teachers.

**The Extension to Primary Education**

In 1994, the Business Partners invited a group of business people, principals of schools and colleges, representatives of the National Council on Education, academics from the University of the West Indies, and members of the JCSEF and the Ministry of Education to compose a Think Tank to explore using educational technology to reengineer the education system. The group first met at a three-day seminar in May 1994 with CAI specialists from the United States, Israel, and Singapore to discuss the ways these countries have successfully used information technology to improve their education systems.

Following this initial exercise and other meetings, the Think Tank concluded that, while the Jamaica 2000 Project had made substantial progress in introducing CAI in public secondary and tertiary institutions, fundamental changes were needed at the primary level for the long-term improvement of learning. Even though the country enjoyed universal primary education and low dropout and high primary schooling completion rates, 30 percent of twelve-year-olds were functionally illiterate and many stu-
dents had very poor mathematics skills. The Think Tank recognized that the challenge of basic education in Jamaica was to qualitatively improve learning efficiency and school attendance and that education technology used to reengineer primary education could be the key to improved quality.

Finding that the small primary schools in rural communities and in depressed urban communities needed the most urgent attention, the Think Tank decided to use mobile units and fixed labs to address these needs. The group agreed that a program should be implemented to reengineer all 790 primary schools in Jamaica by the year 2020. The program, “Education Technology 2020,” involved approaching the business community and the international donor agencies for assistance in implementing pilot projects.

Under the dynamic leadership of the Chairman of the Business Partners and with support from the JCSEF, assistance was obtained from the Inter-American Development Bank (IDB) to introduce computer technology and CAI into twenty primary schools in four different rural clusters. Implementing this project began in September 1995. Thus, the objectives and content of the reform had again been redefined in the process of implementation.

A subsequent phase in the reform involved teachers and students using productivity tools to write, publish, solve problems, and create databases for others; multimedia for research and enrichment; and network capabilities to research and share information. This objective and related content are emerging among the more proficient users of the computer labs in the schools and is given full expression in the Information Development Project funded by the World Bank.

Progress to Date in Quantitative Terms

As of May 1996, the JCSEF had placed computer labs into 71 of the 160 public secondary and tertiary institutions in Jamaica. A Ministry of Education survey in April 1996 shows that 84 of the 143 secondary schools had computer labs and all 17 tertiary insti-
tutions had labs, although the lab in one college was only partially equipped. Hence, with four years still to go there are only 59 institutions that still need to be equipped in order to achieve the target of introducing CAI into all secondary and tertiary institutions in Jamaica by the year 2000.

The survey’s finding that 101 secondary and tertiary institutions possessed computer labs in April 1996 proves that 30 institutions acquired labs without the assistance of the JCSEF and the Jamaica 2000 Project. In addition, since 10 institutions acquired labs prior to the creation of the Jamaica 2000 Project, then at least 20 institutions have acquired labs on their own during its existence. Thus, approximately 30 percent of the secondary and tertiary institutions with computer labs, and using CAI in the delivery of instruction, are outside of the JCSEF initiative. This highlights the reality that the JCSEF is providing leadership and coordination in the reform but is not the sole source of its implementation.

Eighteen of the remaining 59 schools have already raised their contribution and are projected to receive their labs in the coming school year. Equipping the last 41 schools with computer labs over the next three years appears feasible, given the rate at which schools have acquired and been equipped with labs since 1991. Therefore, the confidence of the leadership of the JCSEF in stating that the target will be met does not appear to be either overly optimistic or misplaced.

As of May 1996, fifteen of the twenty-one labs had been installed in public primary schools included in the IDB project. The remaining six schools are expected to receive their labs in the coming school year. The Ministry survey of April 1996 revealed that seventeen public primary schools had computer labs. This indicates that two public primary schools had acquired labs outside of the framework of the JCSEF/IDB initiative.
The JCSEF and the Implementation of the Reform

The JCSEF is governed by a seventeen-member Board of Directors comprised of representatives of the Jamaica Computer Society, the private sector, the Ministry of Education, HEART, and the Jamaica Teachers’ Association. While the composition of the Board is broad and inclusive of both the private and public sectors, the membership is heavily skewed in favor of the Computer Society and the private sector in that only three of the seventeen members are from the Ministry, HEART, and the Teachers’ Association.

The day-to-day affairs of the Foundation are carried out by a secretariat, comprising a full-time executive director, an administrative assistant, and a part-time public relations officer. The policy of the Foundation has been to contract services related to operations, including the installation of computer labs, the initial orientation and in-service training of teachers when labs are installed in schools, and the maintenance of the computer labs.

The activities currently carried out by the secretariat in implementing the reform include managing the three projects in process (the Jamaica 2000, IDB, and World Bank Projects); supporting the marketing and fund-raising efforts of the Business Partners; managing funds raised from the private sector, schools, and HEART; reporting periodically to the contributors and to the Board of the Foundation; procuring and distributing computer equipment; implementing an annual Exposition on CAI; and offering annual summer workshops for teachers.

Over the five years of its existence, the Foundation has attracted an overall investment in support of the reform of over U.S.$5,000,000; has placed computer labs into seventy-one secondary and tertiary institutions; and has trained more than five hundred teachers in CAI.

In understanding the early successes of the Foundation in implementing the reform, it has to be acknowledged that these accomplishments have been a result of the charismatic energy of
the members of the secretariat and the Business Partners, rather than of the adequacy of organizational structures and staffing. Indeed, the current responsibilities of the secretariat are outside what could be reasonably expected of a staff of two full-time members and one part-time member. The structural constraint creating this situation is that while attracting funding support for the purchase of computers and for training has been possible, obtaining funding for core administrative support has been much more difficult.

The importance of charismatic energy in accounting for some of the early success in implementing the reform is also underscored by the noticeable decline in the fund-raising activities by the Foundation within the private sector since April 1996, when the chairman of the Business Partners retired as the CEO. Therefore, from the perspective of its central administration at the Foundation, the reform is still at the stage where it is charismatic leadership of paid staff and volunteers that is assuring its success more than organizational arrangements, systematic programs, and adequate staffing levels. In other words, the transition to the latter is still to be made.

In addition, the scope of the reform has been enlarged far beyond the original vision upon which the Foundation was established. From its starting point of seeking to enhance the development of the computer professions, the reform has become a national exercise to transform instruction and learning outcomes in the school system. This transformation over the last five years has been the source of tension and concern within the JCS, where some would prefer the more modest and manageable goals that were first enunciated.

The essence of the unease in this endeavor is that, on the one hand, computer professionals are collaborating with persons outside their profession who often possess little technical knowledge and, on the other hand, they are operating in pedagogical areas within the school system that are not within their competence. Faced with this existential situation, some would rather retreat to
more familiar territory related to their profession. The majority, however, are enamored with the prospect of breaking new ground and of making a national contribution in an area that commands significant public and popular attention—that of improving the quality of learning and of modernizing the education system.

Another feature to note is that in the absence of state authority driving the reform, vested interest is the glue that keeps the partners collaborating. The interest of the JCS is advancing the computer profession. HEART is not only pursuing its main mission of promoting vocational training, but is also seeking to ensure that it enrolls better prepared graduates into its programs. The Ministry is supportive of activities to advance education that do not demand budget support at the present time. The Business Partners are interested in employees with a higher level of general education. The schools are keen to modernize and acquire resources that will enhance their efficiency and efficacy and raise their prestige in the communities in which they operate. Teachers are interested in training and resources (even with very limited ones) that will improve their effectiveness in circumstances in which there is considerable public pressure to perform. The international banks that lend to the Jamaican Government are interested in developing their loan portfolio for the future, and, therefore, are engaged in enlightened business development at the pre-feasibility stage of project cycle management.

While the vested interests of these partners and collaborators are clear, other interests are not as obvious. These include the interest of hardware and software suppliers in creating markets for their products in the long term and in securing supply contracts in the shorter term. These interests are embedded in the JCS itself and reflected in the Foundation. And although not dishonorable in and of themselves, these interests are potential sources of suspicion in deliberations related to the conduct of the business of the Foundation, and, therefore, in the administration of the reform.
In any enterprise driven by vested interest, at least partial satisfaction of the interests of all collaborators and partners is essential if the enterprise is to be sustained. Further, there is the challenge of balancing interests in the decision-making processes. Either adroit leadership from parties without any known or suspected vested interest, the willingness of parties to compromise, or some combination of both is critical if coherent and coordinated actions are to be sustained. While the Foundation has been able to overcome most challenges, the work of the Board has not been without tensions and fallout, including the resignation of at least one Board member.

Although the private sector has enjoyed high visibility for its participation and financial contribution to the reform, public sector and school community support has been just as substantial and more reliable. To date, HEART has contributed approximately JM$60 million (just under U.S.$2 million) to the reform. Since school communities bear the total cost of the physical accommodation plus 20 percent of the cost of the equipment, their contribution is at least equal to that of the other partners. While the HEART contribution is included in its annual budget, the contribution of the private sector is ad hoc and less than timely, resulting in delays in the delivery of lab equipment to schools. Given the time available and manageable number of schools that still need to be equipped with computer labs, it would be possible for the Business Partners to devise a marketing strategy for the private sector in an effort to ensure obtaining pledged contributions to the end of the decade.

Overall, initial steps are being taken at the Foundation level to transition from the stage where implementation is largely the result of charismatic leadership to a more systematic organizational framework and a more programmatic approach to the various aspects of the reforms.
The Ministry of Education and the Implementation of the Reform

The posture of the Ministry of Education with respect to the reform has been one of benign support. Policy makers and officials of the Ministry have publicly endorsed the reform and the work of the JCSEF, the Business Partners, and the schools. Indirectly, the Ministry has supported the reform through HEART, which could not have been such a substantial partner had the Ministry not consented. Officially, however, the Ministry is not a partner, and the reform is not rooted in its policy, projects, or programs, although the Ministry maintains good fraternal relations with the partners implementing the reforms and is informed of the objectives, content, and progress being made.

While Ministry personnel are generally in favor of the reform, some concerns exist:

- The Ministry’s responsibilities are being increased without its knowledge or consent. To house the computer labs, several schools have constructed or added to buildings without informing the Ministry, whose responsibility it is to maintain school plants including these new additions.
- The national curriculum could be undermined by some of the software packages being used in CAI in terms of content as well as the lack of uniformity engendered by the plurality of software package used by schools.
- The market-driven approach to educational policymaking could become the norm.
- The Ministry of Education is not playing a regulatory role to ensure at least minimum standards.

These are muted concerns expressed by only a few, given the Ministry’s stated policy of promoting and supporting partnership in education and the fiscal and financial circumstances of the Ministry, which constrains capital development from the public
purse. To decline developmental assistance that the Ministry is unable to provide and that is in an area where partnership was originally invited would totally destroy the Ministry’s credibility. Therefore, the Ministry has taken the safer role of supporting the initiatives led by a professional body and supported by the private sector and school communities. The center of policymaking has accepted a marginal role in this reform as it follows the leadership of the people.

**Schools and the Implementation of the Reform**

The information on implementing the reform at the school level was collected from several schools in three clusters in different sections of the island: (1) St. Mary’s College, a high school in Above Rocks, a rural community close to Kingston; (2) the Bethlehem Moravian College and three of the five primary schools in the parish of St. Elizabeth in the southwest; and (3) the Oracabessa Foundation, the Oracabessa Secondary School, and two of the four primary schools in the northeast. For this summary, the first cluster will be discussed in greatest detail.

**Above Rocks**

Above Rocks is a community in the hills of St. Catherine, about an hour from Kingston. Like most small farming communities in Jamaica, the people are by no means wealthy, education is prized as a means of escaping the trap of persistent poverty, and the church is a mainstay of community life. The Catholic church runs the only secondary school in the area, St. Mary’s College; the primary school; and a vocational training center.

The chairman of the Board, the priest of the St. Mary’s Church, has been working assiduously to improve and expand the school, which has 770 students and thirty teachers. Early in 1992, the chairman was successful in securing a donation of twenty used IBM and Apple computers from benefactors in Minneapolis, Minnesota. Subsequently, funds were raised to con-
struct a large lab. In November, the executive director of the JCSEF met the chairman, learned of the school’s computer project, and saw the lab, which was then under construction. Both leaders realized the common ground for cooperation between the school and the JCSEF, and in January 1995, a thirty-station model lab pilot project with educational software, including math and English, as its basis was launched.

Initially, the program had four separate elements. (1) Students in grades ten and eleven were prepared for computer studies in the GCE/CXC examinations. (2) For those students who needed it, Auto-Skills, the reading and math program supplied by the Foundation, was used to promote the upgrading of these basic skills. (3) Teachers could also sign up for one class per week in the lab to review software in their subject area. Teachers were to preview software programs, select relevant elements, and then bring their students to the lab to use these materials. (4) After-school courses were offered for a fee to teachers and interested members of the community.

After two years, the model was reviewed and the following conclusions were reached. The CXC program was successful—students were obtaining reasonably good results in the external examinations and demand among the student body for computer studies was strong. The evening program was successful, with ten to twenty persons enrolled per session (including St. Mary’s teachers, teachers from the neighboring educational institutions, policemen from the local station, some shopkeepers in the district, and school dropouts). The Auto-Skills reading program was found to be too teacher intensive and not teacher friendly. After about three weeks, the program became increasingly boring to both teacher and students, since much of its content could not be related to real-life circumstances of the students. The program was discontinued.

For the 1995–1996 academic year, the school adopted a new approach in CAI of using computers with all students of grades seven to nine as a tool for productive, creative research, commu-
nication, and problem-solving purposes. Instruction in the first year centered around teaching the students word processing, desktop publishing, and research skills related to using encyclopedias and search engines. During the year, students were required to develop a creative writing portfolio of five projects. From all accounts, the response of the students to this new model has been tremendous. There was high attendance, no disciplinary problems, completion of the portfolio by the vast majority of students, and great pride in the finished printed product. In addition, over the course of the year the quantity of student writing increased and the quality improved as they gained confidence.

Based on this experience, the second-year course would center specifically around the computer as a problem-solving tool. Students would be taught some statistical and charting concepts and techniques, and the portfolio would focus on using their techniques to develop a product. The print and radio advertising program would be used to promote the product by applying the multimedia skills capabilities of the labs and the skills learned in the previous year. In this new model, the remaining hours of instruction would be used for grades ten and eleven students specializing in computer studies for CXC. As such, there would now be no integration between computers and the rest of the curriculum. This lack of integration is highlighted by the creative writing portfolio being developed without English teachers as an exercise solely related to using computers.

Those teachers who used the computer lab to teach their subject have thus been virtually excluded because of the intensity of lab use required by this model. And since one-third of the teachers have attended the evening classes to the advanced level, they constitute a developed resource in CAI in the school that is not being used by the new model. Given the success of the new model, one could argue that additional computer facilities should be put in place to tap this potential. Another observation is the need for the lab capacity and the class size to be more in sync. For example, at Saint Mary’s a lab size of thirty stations is inadequate
for classes that run as large as fifty students. This lack of stations has often led teachers and students who have raised expectations of the facilities and their potential to be frustrated.

Notwithstanding these observations, through a process of trial and error, St. Mary’s College has worked out for itself an eminently rational approach to using their computer resources. Indeed, the local effort at Above Rocks did not slavishly follow the prescription of the JCSEF in using Auto-Skills as the basis of CAI and as the means of improving English and mathematics competence. Having tried the Auto-Skills and having found it wanting, they have devised their own program for achieving the broad objectives of CAI and English and mathematics competence.

A mutually supportive relationship has evolved between St. Mary’s and its neighboring institutions. For example, some teachers of the two primary schools and the vocational training center took advantage of the opportunities of the evening classes, and teachers have made use of the trainings now that the IDB Project is being implemented in the Above Rocks cluster. Further, graduates of the St. Mary’s College Computer Studies CXC course are now the lab assistants in the primary schools and at the vocational training center.

St. Mary’s also provided technical assistance for installing the labs in the primary schools and subsequently offered some training to the teachers who had not had previous exposure to computers. Students entering St. Mary’s from these primary schools in another two to three years will have already been exposed to some of the CAI now being offered at the secondary school. This will require St. Mary’s to rethink its current model. A dynamic and interactive relationship, which will require constant adjustment and change, is being established among the educational institutions in Above Rocks.
St. Elizabeth

In the parish of St. Elizabeth, implementing the reform is led locally by Bethlehem Moravian College, which became part of Jamaica 2000 Project in 1993. The original understanding was that the college would be supported in its program of training secondary school teachers in computer studies and the JCSEF would have access to the lab for the in-service training of teachers in the summer. There was no requirement for the college to undertake any outreach activities in support of the Project, yet through the efforts of the principal and some teachers, the Project has extended to five primary schools and six secondary schools in the area.

At the college, the lab is being used to train teachers of computer studies, to teach computer literacy skills to other college students, and to offer evening courses in computer applications to members of the community. During the summer, the lab is used by the JSCEF for teacher in-service training. The college has offered in-service training to teachers of six secondary schools and leadership and training in implementing the IDB Project in the primary schools. In addition, to link national strategies with realities in the field, the college principal participated in the Think Tank.

The three primary schools visited in this cluster included the Red Bank School, Seaview School, and the Bethlehem All Age School. At Red Bank, the school board, SCOPE, and the PTA succeeded in raising sufficient funds to construct a new facility for the lab. In November 1995, a six-station lab was installed in the new facility and is being used for remedial math and reading instruction, computer applications classes for older students, evening access for district secondary school and college students, and evening remedial instruction classes for dropout students. Beyond the enthusiasm of the students and teachers, the benefit of the program is evidenced by exam papers that teachers now produce on computers, the annual reports prepared and sent to
parents, and the income generated for reinvestment through market services provided to the community in desktop publishing.

For its computer lab, Seaview School constructed an extension of an existing building. This addition was made possible by fund-raising and free labor from school and community members. There was, however, a delay in the start of the Project because of the length of time it took to secure contributions from the community. One reason for this lack of contributions may be that the relative economic prosperity of the farming community has meant that its members have not had to rely on education for their well-being and advancement in society. Accordingly, they do not value education as much as their less well-off peers and were not as willing to contribute. Despite the delay, the computer lab was installed and, beginning in September 1996, programs similar to those at Red Bank were used.

At Bethlehem All Age School, the library was converted into a resource center to house the computer lab. Funds raised and free labor made the renovation and 20 percent contribution to the equipment possible. In the summer of 1995, a ten-station lab was installed and two teachers who were trained at Bethlehem Moravian College were assigned to the lab and CAI. Initially, the lab was used for remedial math and reading instruction, but later was available to older students for research. In addition, the scope, it was planned, was to be expanded to include teacher training in computer applications and evening classes for community members. Some motivated teachers have independently pursued summer training at the college and are using their acquired skills to produce printed papers and report cards for their students.

Implementing the reform is not wholly without tension among the various actors. For example, the JCSEF, in keeping with the remedial education mandate on which the contributions from the Business Partners and HEART were predicated, insisted on schools using the Auto-Skills software supplied with the labs. Finding that over the longer term the software was stultifying, the
Bethlehem Moravian College encouraged the schools to go beyond the remedial use of computers and develop their own instructional programs. After a while, the Foundation heeded the recommendations of the college and was less prescriptive in its requirements of schools. What this and other problems encountered highlight is that the Foundation, in seeking to implement a reform without State authority, is at times called upon to trespass on territory it does not and cannot control. On the other hand, schools and colleges can interpret and determine broader interests, and implement actions that are consistent with their views.

**Oracabessa**

Oracabessa was once a famous seaport town in Jamaica. The Oracabessa Foundation, established as a vehicle to enhance human resource development and community education, has, among its projects, the upgrading of school facilities. Thus, a partnership with JCSEF was established. The first venture was installing a computer lab at the Oracabessa Secondary School. The next step was extending its support by installing labs in the five primary schools.

In September 1993, the Oracabessa Secondary School received a fifteen-station lab. In addition to remedial math and reading instruction, the lab was used by students enrolled in business classes to learn computer studies. While the remedial classes have produced largely positive results, the Oracabessa experience highlights some factors that can materially affect implementing the reform. For example, the school has 1,171 students and operates on a double shift system, which can present logistical problems in scheduling lab use, instruction, and support. Likewise, Oracabessa is an example of the organizational problems imposed on schools where lab size is much smaller than class size.

The Jacks River Primary School was included in the JCSEF/IDB Project in 1995. Located two miles outside Oracabessa, this small rural school enrolls just over 150 students. In
the summer of 1995, the principal and some teachers attended the JCSEF workshop in Montego Bay. Following this, the principal assumed leadership of the reform at her school, reorganizing the timetable, and integrating CAI in the instructional program of the school. Improvements in student performance have been dramatic—the percentage of functionally literate students leaving school increased from 50 to 80. The transformation and psychological impact of the Project on the school and community cannot be overestimated.

This description of the experience of schools in implementing the reform is selective in nature and can only hope to do justice to the rich and relevant detailed account provided in the more lengthy publication of the Jamaican Case Study. However, the main features and relevant experiences of individual schools have been highlighted.

Interpreting the Case: Theoretical Perspectives

As was previously pointed out, educational reform can be interpreted from at least four different theoretical perspectives. Indeed, aspects of this case study relate to each theoretical perspective. The question then becomes: which of these theoretical perspectives best accounts for and explains this case?

The Radical Explanation

Although the use of computers and CAI in schools represent a radical departure from the past, situating the explanation of the Jamaica case in the radical paradigm would be difficult. Certainly, those implementing the change are not part of a wider all-inclusive movement with the stated intention of fundamentally transforming the Jamaican society or the education system. If this were the end result, it would be an unintended outcome. The goals and objectives of the reform are more modest, seeking to work within the existing social parameters. Thus, educational
reform as a radical break with the past has very limited explanatory power.

The Technical Rational Explanation

One of the main driving forces for forming the partnership through which computers were put into schools, as well as one of the main ends to which CAI was directed, was improving learning efficiency and, in particular, remedying learning deficits in literacy and numeracy. The level of learning efficiency possible in any mass system of education in part depends upon the state of knowledge about learning and the technology used to effect it. Computers and CAI used by teachers to support class teaching allow for structured individual attention to the multilevel needs of students, which teachers could never appropriately address with the previous technology at their disposal. Furthermore, by increasing time on task for individual students and providing immediate feedback, computers and CAI represent a substantial technical advance in promoting learning.

From this perspective, the main challenges and operations of the reform are rational logistical determinations related to (1) selecting or developing the most appropriate software packages to address the learning needs of children in the various subject areas, (2) synchronizing lab size and class size, (3) establishing the number of labs appropriate in relationship to the varying enrollments of schools, (4) training teachers to ensure maximum use of the learning packages and computer facilities, (5) scheduling the use of the facilities so that students across the different grades and subject areas receive optimal benefit from the technology, and (6) providing effective maintenance of hardware and software to keep the labs functioning.

Explained within this rational technical framework, the Jamaican case of using CAI would be nothing but the replication of similar cases of reform implemented in other countries and settings. Accordingly, the strengths and weaknesses of the reform
would be judged in relation to the resolution of the various technical and logistical matters listed above. However, the reform has not developed in a rational manner with attention to logistical contingencies and technical details. Indeed, demand for the reform has outstripped the supply of technical and logistical answers. Following strictly technical requirements (as outlined by Lockheed and Verspoor in setting out the World Bank's policy position), the Jamaican case should not have taken place. But it has, and therefore an explanation other than the rational technical one must be found without overlooking the technical issues inherent in implementing the reforms.

The Comparative Adjustment Explanation

The comparative perspective begins to offer some satisfying explanation for implementing reforms in the Jamaican school system. From this perspective, the computer, above all other technological devices, has become the symbol of modernity and, therefore, of progress. In the emerging global marketplace, comparative advantage is seen to rest with information technology. Small countries, such as Jamaica, with open economies that are perennially vulnerable to external influences have no choice but to modernize and to keep pace with the development in information technology.

Two additional factors are critical to understanding the Jamaica case from a comparative perspective. First, the Jamaican school system has never been related solely to the Jamaican economy, but has always accepted the imperative to prepare its products to compete in the international marketplace of job opportunities. Without modernizing its school system, the Jamaican society would lose or seriously jeopardize the channel of mobility through migration. A related second factor is that Jamaican students have always had to access tertiary education opportunities in other metropolitan countries. This is because, while its primary and secondary school systems are broad based, only 6
percent of the eighteen- to twenty-four-year-old age cohort can be accommodated by the indigenous tertiary education capacity. As many students access tertiary education opportunities in North America, as do those in Jamaica. Without information technology exposure and skills, Jamaican students could possibly be undermining their competitiveness in gaining access to these tertiary education opportunities abroad.

Particular groups within the Jamaican society concluded that the modernization of the country’s education system by incorporating computer technology was mandatory in securing the future of the society. The alternative was further descent into poverty and obscurity. In this comparative context, the various technical requirements for ensuring the feasibility of the reform were not seen by proponents of the reform as disqualifying prerequisites, but rather as practical obstacles that would need to be overcome along the way.

While the comparative explanation adequately addresses the modernizing imperative that is so obvious in the communities and schools in which the reform has been implemented, as well as the continuing strong demand even in light of known technical and logistical weaknesses, it does not give an equally satisfying explanation for the development of the partnerships. That is, the comparative explanation can readily account for the reform being driven more by charismatic energy and missionary zeal than by sound organizational and logistical arrangements, but it cannot as readily account for the partnerships having made the reform possible.

**The Political Trade-off Explanation**

The Jamaican case can be explained in terms of political trade-off. Limited by its fiscal constraints and debt-service obligations, the Jamaican State traded policy space for development assistance first to international lending and donor agencies and more recently to nongovernmental organizations (NGOs), the private
sector, and communities inside the country. This gesture has been encoded as partnership in policy language, and those moving into the yielded policy space are seeking to advance vested interests of different kinds. In the absence of State authority, the various groups have had to form alliances and coalitions that invariably negotiate and renegotiate compromises and accommodation between the various interests. In doing so, they are constructing the values, creating the social demand, and shaping the political will by which they will seek to mobilize the State in support of their interests in the future.

It is within this framework that one must seek to understand the collective and cooperative actions of the Jamaica Computer Society, the private sector, HEART, the government, schools, communities, suppliers of computer hardware and software, and international banks. As groups with their different interests joined the alliance and coalition, the scope of the reform has broadened and the content redefined. This interactive element has been the dynamic of the reform process that has constructed the reform beyond the intention of any single group. The interaction of these various interests has given the reform its bottom-up character and its attractiveness.

From this perspective, the extent to which the reform succeeds depends upon the continued satisfaction of the various interests that engages their continued support. At the same time, the open and voluntary process is creating widespread ownership at different levels and subsequent commitment for continued involvement. The strength of the political trade-off explanation is the formation and operation of the partnership, not the modernization that is manifest in the schools and communities. Indeed, the most comprehensive explanation combines the comparative and the political trade-off explanations.
Strengths, Weaknesses, and Lessons Learned

Strengths

A major strength of the reform has been the role of leadership at its various stages of formulation and implementation, including conceptualizing the initiative; renegotiating its objectives and content as new groups bought into the venture; mobilizing public sector funds, private sector resources, and community support; mobilizing school communities; and devising innovative and creative solutions to challenges faced at different levels of implementation. From the process, a leadership network that stretches from the national to the school level has emerged.

A second strength is the broad-based ownership of the reform at the different levels of both its structure and implementation. The Jamaica Computer Society, HEART, the Business Partners, and the school communities can each stake strong claims and feel a deep sense of ownership of the reform. Likewise, one can sense the pride, excitement, and energy that is associated with the reform at all levels of implementation, but particularly in the primary schools.

The strength of the reform is also evident by the strong demand for inclusion from almost all schools. This reform has definitely captured the imagination of schools, communities, teachers, and students. In addition, the speed with which issues are resolved and decisions made with respect to the interests and concerns of the partners is significant. The loosely organized partnership, predicated on the pragmatic criterion of what works in the schools, has fostered both flexibility and responsiveness.

Weaknesses

The main weaknesses of the reform are organizational and logistical. For example, 30 percent of the schools with computer facilities have independently embarked upon the reform and are not integrated into the activities and exercises sponsored by the
JCSEF. In addition, the project implementation capacity of the JCSEF is grossly inadequate compared to the demands and imperatives of the situation (such as the rapid pace of the reform and its redefinition as partners join the partnership). Likewise, delivery of technical support to the schools is yet to be reliably systematized. One effect is that some teachers trying to use this new tool are tempted either to not invest in the new learning required or to lapse into old ways if reliable use of the facilities is not assured.

The provisions of computer labs and instruction are still grossly inadequate for the goals that have been set. Teachers and students who have participated in fund-raising activities and who have high expectations are often disappointed. Fifteen-station labs in large schools do not have the capacity to allow access to all students or teachers.

In addition, although teachers are being offered some orientation and training in using technology and a few are receiving more comprehensive training, the current provisions are very inadequate compared to the needs. The money that is contributed goes mainly to providing hardware and software. Also, while the use of pre-packaged software is understandable, developing software from the wealth of teaching and learning experience generated in the Jamaican and Caribbean setting is still a far way off.

**Lessons Learned**

First, leadership is essential to educational reform. Imaginative, bold, and committed leadership at all levels is underscored in this case as the most critical ingredient of fundamental change in the education system. Second, in the paradigm of partnership, the private sector, professional bodies, communities, and schools all have different priorities and agendas from those set out in the policy prescriptions and priorities of governments and international donors. Governments and the international donors invite partnership with these groups with the expectation that they will
help bear the cost of educational development and operations. From the perspective of the international donor, conditionalities will be much harder to apply to these groups than to governments. In this case, the international community yielded to the agenda of the private sector, professional bodies, communities, and schools, not the other way around. At the same time, in a decentralized system where autonomy is practiced and partnership is the policy, the opportunity for expressing and implementing the people’s vision of themselves is greater.

The organizational, logistical, and technical problems faced by Third World countries in using information technology in their school systems to expand access and improve quality are probably better worked out in impulsive application than by long-term central planning. If factors such as appropriate software packages and reliable technical support systems were treated as pre-qualifying prerequisites in a centrally planned scenario, the reform may not yet have been implemented. Furthermore, it would take enormous perspicacity and foresight to anticipate and configure the systems that are most appropriate prior to implementation. The school experience is necessary, and the impulsive character of the reform in the context of limited resources has turned the early stages of the implementation process into a pilot-testing phase.

The study has also shown the structural constraint resulting from the expanded scope of the project and the corresponding difficulty to raise funds for core administrative support. In the case of the JCSEF, this situation has led to a new arrangement in implementing the project, which involves a modest expansion of the executive staff and a redistribution of responsibilities.

In the absence of Government authority and policy direction, the vested interests of the partners are brought to the forefront. At the same time, the partners are forced to negotiate the mutual satisfaction of interests, while ownership of the process is broadened because of the high level of participation and deep involvement in decision-making of the various actors and stakeholders.
Where professional bodies, the private sector, and communities take the lead in reform, in this case not only is the State made almost invisible, but also its role and financial contribution is grossly underestimated. The substantial contribution of HEART has only been possible because the Ministry of Education, under whose portfolio HEART falls, has permitted it. If the benign posture of the Ministry of Education is projected in a negative light by the partners, the Ministry may not be able to maintain its enlightened restraint in the reform process.

Placing high value on education by communities is more advantageous for schooling than having greater resources. Clearly, a high value on education combined with wealth can offer significant support to schooling. However, a high value on education combined with poor circumstances could produce greater support for schooling than wealth combined with a low value on education. Emphasis on community possession of resources is misplaced if it is not backed by a high value on education.

**Recommendations**

Issues that have been recognized and for which plans and strategies are already being developed will not be addressed. For example, through the Information Development Project sponsored by the World Bank, attempts will be made to experiment with other configurations for using computers in schools outside the labs. Also, provisions have been made for elements of evaluation and research to be added to the enterprise. Further, steps are being taken to develop a more reliable and effective technical support delivery system.

Rather, suggestions include those concerning areas that may need to be addressed in the near future. First, the reform must at some time be integrated into the general policy matrix of the Ministry of Education. For example, the ROSE Project (funded by the World Bank) does not include any reference to computer-
assisted instruction, although its goals of promoting cooperative learning, multilevel teaching, integration across subject areas, and self-direction by students are entirely consistent with those promoted by CAI. The same can be said of the IDB project to improve primary education. Any extension of these projects, which are due before the year 2000, cannot ignore the reform taking place through the Jamaica 2000 Project. The suggestion here is that the National Council of Education be a channel through which this integration could begin.

Second, the JCSEF needs to establish operational linkages with those schools and colleges that obtained their computer capacity independently, so that they are included in programs of training, technical support, and all other operational matters related to implementing the reform. The JCSEF would also benefit from strengthening the representation of educators on the Foundation's board and operational committees and from establishing ongoing relationships and links with the various associations of school and college principals.

To strengthen its capacity to support implementing the reform, the JCSEF needs to expand its core administrative functions. It should also consider altering its marketing strategy for obtaining private sector support to one that is more programmatic, systematic, and consistent with its projected targets. In addition, it would benefit the JCSEF to establish a broad-based consultative group mandated to advise it on the technical issues related to the reforms, such as the relationship between lab size and class size, teacher training strategies, and software development approaches. To report developments and future events, the JCSEF should also consider publishing a newsletter each term featuring schools, communities, and donors.

The Ministry of Education needs to become an active partner in the reform and play a substantive role, possibly in an area such as teacher training (in-service and pre-service), since sustainability of the reform will be highly dependent on the scope and the comprehensiveness of the teacher training. Fora should be
created outside of the training to allow principals and teachers from different schools and clusters to share information on their experiences and innovations.

**Concluding Comments**

One of the remarkable features of the Jamaican case is the emergence of an NGO, the JCSEF, as an actor in education policy at the national level in the short space of six years and with a staff of only three persons. Apart from the charisma of the persons involved and the vision of the Computer Society in establishing the Foundation, it would appear that timing was of the essence. A new government in 1989 had enunciated a policy of partnership. The technology itself had become more affordable and more easily adapted to the learning processes in schools. Secondary schools under public pressure, as a result of poor performance in external examinations, were actively seeking ways to improve their effectiveness and efficiency. A statutory body was concerned about the quality of general education of school graduates entering its vocational programs. An influential CEO in the private sector had recently completed a successful project in secondary education using modern media and was available for recruitment in this new venture. These circumstances all concatenated to produce the reform.

The question is how readily can the Jamaican experience be replicated without these attendant circumstances? The answer may well be that they do not need to be replicated, since each case will arise from its own imperatives and happenstance, even if the outcomes are similar.

A second observation is the excitement, pride, enterprise, and energy that surround the introduction of CAI in small rural primary schools, and the quick transformation that has taken place in some cannot be ignored as a potential of this reform to reduce the migration from small rural schools to large urban schools. Overcrowded urban schools with a multitude of problems and
rural schools with ample space and low enrollment are current features of Jamaican education. Indeed, as more resources are invested in relieving and solving the problems of urban schools and communities, they increasingly become magnets attracting people and students from rural communities. This further aggravates the urban problems and often nullifies the most recent measures to alleviate the conditions.

Modernizing small rural schools has the potential of contributing to resolving some of the problems of large urban schools and of helping rural youths recognize the prospect of making progress while remaining in their communities. While this prospect is still speculative, it is a latent potential of the reform that merits the closest monitoring and speedy generalization of its application, should its feasibility be established.

NOTES

1. This document is a summary of a case study conducted and written by Dr. Errol Miller, the results of which were presented at the workshop “The Implementation of Educational Reforms in Latin America and the Caribbean” held in Washington, DC in September 1996. The workshop was organized by the Advancing Basic Education and Literacy Project with funding and guidance from the United States Agency for International Development

2. In addition, the researcher has been a member of the Think Tank on Education Technology in Schools and was project director for the In-Service Teacher Education Component of the Reform of Secondary Education (ROSE) Project. Both experiences provided an opportunity to gain personal insight and knowledge of the reform. The fieldwork was conducted during two months in the summer of 1996.

4. JCS was created in 1974 to promote the professional competence, ethics, and social responsibility in all areas concerned with applying computers to commercial, scientific, and administration matters in Jamaica. The JCS is modeled on the British Computer Society, of which it is an affiliate. Membership is open to computer professionals and affiliates in the industry. The society is managed by annually elected officers, who offer their services on a voluntary basis. The day-to-day affairs of JCS are carried out by a full-time manager and staff of three.

5. The mission of the HEART Trust is to promote and provide vocational training to school graduates and young adults. It is supported by a payroll deduction tax paid by all businesses over a particular size as specified by the law upon which the Trust is established.