

The Cluster Concept: A Strategy for Delivery and Support of Distance Education*

Avrill Crawford

*Executive director, the Jamaica Computer Society Education Foundation,
Kingston, Jamaica*

Abstract

Technology in education initiatives in Jamaica has been characterized by several novel innovative strategies. One such is the cluster concept, a mechanism used by the Jamaica Computer Society Education Foundation to foster and sustain collaborative efforts and sharing of experiences and know-how within a group of schools in a geographically defined area. This paper describes the concept, its purpose, formation and dynamic development process - highlighting the experiences of the schools in this intervention. Lessons learned will be examined from the perspectives of activities explored, challenges faced, strategies employed to resolve problems and measurable benefits to the schools; and will be presented as examples of possible outcomes and effectiveness of this concept for school/community technology integration. The potential for use of the cluster mechanism as a strategy for supporting distance education is also argued.

Introduction

The Jamaica Computer Society Education Foundation (JCSEF) developed and implemented a pilot project in primary schools between 1995 and 1999, sponsored by the Inter-American Development Bank and the World Bank. The project sought to introduce computer technology into primary schools in Jamaica, in order to determine what benefits, if any, could be obtained from its use in instructional delivery, especially in the areas of improvement in basic literacy and numeracy skills.

The JCSEF was already responsible for raising funds, procuring hardware and training teachers in secondary and tertiary institutions to facilitate students taking Information Technology in CXC

and O'level examinations, and had also begun training in the use of the technology as a tool in instructional delivery. In brainstorming on ways to facilitate the introduction at the primary school level, a mechanism was conceived whereby the primary schools would be '*clustered*' with secondary and tertiary institutions that already had the technology. This was conceived as a strategy to assist the primary schools in a more structured and effective intervention, and to strengthen the existing individual and collective capacity of the schools and the competencies of the teachers, to effectively use the technology in education activities.

This paper examines the structure of the *clusters*, the features of the technology

* © The Jamaica Computer Society Education Foundation

interventions and activities and the instructional strategies employed by these clusters, and summarizes the lessons learned from their experiences, identifying the key factors that contributed to success. The paper also discusses the possible use of the cluster approach as a delivery and support mechanism of a larger distance education system.

The Jamaica Computer Society Education Foundation, its Role and Function

The JCSEF is a nonprofit private sector organization established in 1990 by the Jamaica Computer Society (JCS), the professional body for information technology practitioners in Jamaica. The JCS was concerned that secondary and tertiary students who were sitting CXC or O'level examinations in Computer Science or Information Technology were suitably equipped to perform well in the workplace or to gain entry to pursue further studies in the subject.

The JCSEF got the full support of the government, through funding from the HEART Trust/NTA, a government agency that provides technical and vocational training through a tax on employers. By 1991, the Jamaica 2000 project was implemented, with the aim of placing the technology in all 166 secondary and tertiary institutions by the year 2000. The HEART input provided counterpart funding to contributions from the schools themselves, the school community, school alumnae, businesses, education foundations, and individuals.

Approximately twenty-three of the targeted schools are still to acquire computer labs, whether through the J2000 programme or through their own initiative. In addition, some twenty-two primary schools have also received labs through the JCSEF.

Initially, some 450 teachers were trained by the JCSEF, to teach Information Technology as a subject. However, the universities and teachers colleges are now adequately providing I/T teachers, and the JCSEF is now concentrating on training subject teachers in the use of the technology in instructional delivery and in integrating it into the curriculum. Some sixty are pursuing a certification programme, thirty of whom are expected to become trainers of trainers.

The Edtech 20/20 Project in Primary Schools

In 1995, a Think Tank on Education perceived that Jamaica's literacy problem would only be solved if efforts were made to ensure literacy from the primary level. A pilot project was developed, jointly sponsored by the Inter-American Development Bank and the World Bank, to examine the possible impact of using computer-based materials and technologies on the learning gains of students, and to determine the support systems and feedback mechanisms necessary for successful implementation. The lessons learned were used to influence the policy of the government with respect to information technology in education.

The objectives of the project were, *inter alia*,

- To explore the usefulness and cost-effectiveness of courseware to assist with literacy and numeracy.
- To examine alternative instructional models, such as computers on trolleys which are wheeled to the classroom, and lap-tops which are assigned to teams doing project work.
- To examine how other technology-based material could be used in the development of creative and higher level thinking skills.

In this regard, the following project components were designed and implemented:

- Installation of computer laboratories in the sixteen primary schools in the project.
- Training and professional development of teachers in all thirty-two project schools to ensure effective implementation of the technology, and to determine best practices in the training of teachers and education officers.
- Implementation of a programme utilizing Integrated Learning System (ILS) courseware in Language Arts and Mathematics among selected students in each primary school.
- Establishment of a Teacher Training Resource Centre at the Ministry of Education and Culture (MOEC) to facilitate continuity.
- Establishment of Software Resource Centres, which operate as software libraries, allowing schools to explore the use of various software and other technology-based material.
- Implementation of a computer on trolley project to examine the effectiveness of utilizing the computer in the classroom as support for the blackboard.
- Implementation of a lap-top project where computers were used by a science project to collect data, produce charts, produce reports, etc.
- Development of a plan for an extranet among the project schools which would be used to determine the feasibility of intranets /extranets as a resource/teaching tool.

The project benefited also from the employment of a technical and professional

development consultant and a research and development consulting team, which carried out a number of studies on the various components and on the overall project.

The Cluster Concept

The planners of the project, in determining how best to introduce the technology, felt it would be beneficial to the primary schools, if they could work with schools that had already been exposed to the technology. Primary schools were therefore chosen in *four clusters* in geographic proximity to secondary and tertiary schools that had already been introduced to the technology through the J2000 programme. The clusters varied in size, location and mix of primary, secondary and tertiary level institutions (with four, six, seven, and thirteen institutions in each cluster, respectively).

From the outset, the schools in each cluster were involved in its development, with principals, teachers, lab technicians, technology coordinators, and students meeting regularly at various levels. Training was done with participants from all clusters together, as well as in individual clusters, and a few teachers were selected to be trained as trainers to train other teachers in their schools and elsewhere.

Community members were encouraged to participate in the construction and development of the laboratory infrastructure, giving sweat equity and know-how as well as monetary contributions. Businesses were encouraged to work with the schools in developing projects and in providing work study programmes and summer employment. Community members continue to take advantage of the evening classes offered by the schools to upgrade their own knowledge and skills in the technology, and the schools are

providing the communities with their publishing needs – birthday cards, wedding invitations, flyers, programmes, etc. These activities provide the schools with much-needed funds to help in the maintenance and operation of the laboratories.

Cluster leaders also formed part of the project implementation team, which, lead by the JCSEF, included representatives from the Ministry of Education and Culture (MOEC), and the consultants assigned to the project, meeting regularly and reporting on the developments in the clusters and sharing ideas on enhancement possibilities. The leaders also provided a conduit for disseminating information to the cluster schools, and for bringing burning issues and concerns to the attention of the MOEC and the JCSEF.

Each cluster cooperated and collaborated in determining the site of the Cluster Software Resource Centre, in selecting the software, and in raising funds for the purchase of the computers. The clusters have also sought to conduct joint fundraising activities, to share resources, such as lab technicians, and to stage cluster exhibitions to showcase their achievements.

Impact of the Cluster

The performance (Institute of Education/Joint Board of Teacher Education, 1999) of these clusters was evaluated in terms of eight distinctive elements of cluster development, for which performance criteria were established:

- i. Technology leadership (personality, drive, motivation, creativity, involvement)
- ii. Technology intervention (quality and quantity of project activities, including training)

- iii. Cluster activities (efforts to use, improve, upgrade and maintain the technology)
- iv. Resources and support (quantity and quality of resources and support systems developed)
- v. Collaboration and networking (evidence of meetings, and other interchanges, joint projects)
- vi. Curriculum integration (level of integration of the technology in the school curriculum)
- vii. Adult education and training (number of technology trained persons in schools and communities)
- viii. Transfer of knowledge and expertise (the multiplier effect that the training provided)

The results varied overall from a low of 61 percent to a high of 89 percent, showing fairly good performance in terms of the expected output. There is also strong evidence to support the perception that the cluster concept has great potential for being effective as a mechanism for organizing, managing, and collaborating in technology interventions and in the delivery of technology-based instruction.

Several technology-related project ideas, teaching/learning interventions and community-focused programmes have been initiated in these clusters, with varying degrees of success. In particular, the business sector is being encouraged to work with the schools in providing curriculum guidance, work-study activity and summer work for students. This fosters the development of a curriculum geared towards the economic activity of the community.

The clusters have provided an avenue for distributing the workload of the central administration. Regular meetings are held with

cluster leaders to monitor progress and identify areas of support required. The clusters have already found creative and varied ways to ensure steady growth in the central cluster fund, thus ensuring sustainability of the programme.

Centres of excellence have developed with the natural propensity to expand outward to encompass the entire island over time. Thus the clusters, under a general operating framework, have evolved into viable community-based and -supported entities, through collaborative activities initiated and managed by a localized team of cluster leaders and other participants.

Significant Factors Influencing Cluster Development and Success

Factors found to be *positive* contributors to the success of the clusters include:

- i. The quality of instructional/technology leadership and collaboration efforts encouraged
- ii. The level of involvement of the school principal, and other administrators
- iii. Involvement of the community and contributions secured in cash and kind
- iv. Frequency of student access to the computer
- v. Creative uses and curriculum integration with the technology by the teachers and students
- vi. Training of the teachers and other adults in the community
- vii. Sharing of knowledge and capabilities by the technology resource persons

Factors found to *negatively* affect the programme development include:

- i. Lack of the factors (i) to (vii) above
- ii. Low level and quality of supervision and monitoring
- iii. Lack of a cost-effective maintenance system, or self-help capability
- iv. Wide dispersion of schools in cluster and poor communication

Such has been the impact of the positive experience, however, that a fifth cluster has been formed in an inner-city community, and steps are being taken to identify and form clusters in each of the parishes island-wide.

The Cluster as a Delivery and Support Mechanism

The strategic components of distance education, whether in synchronous mode (distance teaching), or asynchronous mode (distance learning), are

- i. Development of educational packages
- ii. Delivery of these packages to the targeted groups
- iii. Provision of support services
- iv. A performance management mechanism

The *cluster* supports and sustains distance education strategies through the following elements, *inter alia*:

- i. Schools in close proximity working together, sharing resources and collaborating
- ii. Localized technology leadership and development of centres of excellence
- iii. Decentralization of the administration
- iv. Existence of performance criteria and a mechanism for feedback

- v. Curriculum geared toward the economic activity of the community
- vi. Community integration fostering sustainability

However, to be properly developed and sustained, there needs to exist a supportive framework, which provides project management, technical support, ongoing teacher training strategies, and assessment of interventions and impact, ensuring that the technical as well as the pedagogical standards are maintained. The cluster mechanism will also depend heavily on the ability of the cluster schools to develop strategic plans that include technology, and to manage the successful implementation of the technology. This suggests a significant amount of management training and exposure for school principals and senior teachers.

It will also be important to ensure identification of sound leadership at the local level, and a strategy for ensuring continuation of the community work.

Of particular concern is the introduction of new technologies for delivery of the educational packages, such as INTRANETS, Education Portals, to level the playing field and foster equity and education for all.

The nature of the cluster provides ready avenues for funding. The involvement of the community and access of the technical facilities to adults is of interest to donor agencies that see life-long learning and knowledge-based citizens as being critical to alleviating the poverty of developing nations. Thus community-based projects will be entertained. However, it will also be

important that the cluster has the capability to take full advantage of monies earned through local entrepreneurial initiatives, thus suggesting the need for training in money management.

Conclusion

Given the dynamic structure of clusters and their immediate linkage and relationship with the respective communities; and given the established potentials for creative uses of computer technology to deliver instruction to a wide cross section of participants such as in these schools and communities, the cluster mechanism presents itself as an ideal delivery and support subsystem for distance education, providing:

- i. localized technology leadership
- ii. decentralized administration
- iii. an easy mechanism for planning, monitoring, information distribution and sharing
- iv. community access, integration and support
- v. curriculum geared towards the communities' needs
- vi. sustainability

The challenge will be to give it the kind of support and monitoring required in the early stages of its development.

Bibliography

Institute of Education/Joint Board of Teacher Education (1999). *Research and Evaluation Studies*. World Bank/Infodev Partnership in Education Project. Mona, Jamaica: University of the West Indies.