EFFECTIVE MANAGEMENT OF ICT AND ITS APPLICATION IN TEACHING AND LEARNING PROCESS IN THE PRIMARY AND SECONDARY SCHOOL SYSTEM

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Abstract

This research is a comprehensive investigation on the effectiveness of managing ICT and Computer Related Learning Application implementation includes computer curriculum management; computer laboratory maintenance; stock and inventory, multimedia software and sharewares in the context of school ICT and CRLA management perspectives. Success or failure of the computer teaching and learning programs were heavily relies on the school managers like principal, senior assistant (academic) and the computer coordinators or facilitators. Further more, there are various initiatives of CRLA run by the Ministry of Education; Parents' Teachers Association (PTA) and private business entities in the national school and national type school or conforming schools are elaborated in this study. Two groups of samples namely twenty principals, senior assistances, computer facilitators and 168 secondary one students were acquired. A management descriptive questionnaire was used on the managers while student samples were exposed to another set of descriptive questionnaire, followed by a computer literacy evaluation pretest-posttest. The descriptive questionnaires determined the level of management achieved in the managing of ICT and CRLA programs while the students were tested on their perception and attitude towards computer application literacy. The data from the questionnaire issued was analyzed by using parametric data treatment Results show that there is a significant difference in the management of ICT and CRLA programs of various initiatives. Apart from these results, there was also a significant difference between students from the various kinds of initiatives participating in the ICT and CRLA programs. In conclusion, there is a urgent need for school principals, senior assistance (Academic affair), computer coordinators and facilitators and teachers who teach Mathematics and Sciences in English should be given tutoring and courses in computer management and maintenance; computer literacy and computer programming on a continuous basis. I also strongly recommend the Curriculum Development Center of MOE develop a comprehensive set of syllabus for ICT and CRLA programs for the present education system to prepare students to face new changes and challenges in ICT age.

Keywords : *Management, Computer Related Learning Applications, initiatives, ICT, effectiveness.*

Introduction

The introduction of computer interactive learning concepts by using the computer technology has prompt educators throughout the world to accept the fact that the importance of ICT and Computer Related Learning Application (CRLA) in the schooling process towards the advancement in the education system. As for Malaysia, the beginning of the seventh Malaysian Plan has brought many changes in our education system namely the introduction of various projects such as Computer-In-Education programs and the usage of ICT in the teaching process at various education levels.

Many teaching staffs were sent for retraining in the in-services courses in this field and their services were upgraded to accommodate the changes.

The introduction of project 'one-off' in 1996 under the Ministry of Education whereby 90 secondary school throughout the country were selected and given the opportunity to conduct Computer-In-Education (CIE) programs and computer curriculum in school. The intention was students should equip themselves with the latest technology and become knowledge workers in the future; Malaysia is heading towards becoming a developed nation by the year 2020.

With the addition of the Ministry of Education's introducing ICT to another 2000 primary and secondary schools in year 2000 and further install computer technology to another 5000 education institutions through MIMOS which will be connected and wired with latest Information Communication Technology (ICT) and Computer Related Learning Application (CRLA) Programs under the Eight Malaysian Economic Plan (2001-2005). It will be the initiation by our government to continuously given priority in realizing vision 2020.

Under the 2020 vision set forth by our former Prime Minister on 28th February 1991 with the main objective of Malaysia being transform to become a developed nation by the year 2020. There are nine challenges in the vision 2020, which we have to accomplish, So that our nation can be part of the current information technological hub and equipped itself to accommodate the challenges. Then we must look at the sixth challenge in the vision 2020 laid out by our Prime Minister.

> *"To form a progressive and scientific society that would change and look forwards by not just become technology end-user but could contribute to the future scientific and technological civilization"*

The setting up of Multimedia Super Corridor (MSC) is based on Information Communication Technology and telecommunication. In addition to that, panels of International Advisory Council to oversee the development of MSC was formed, with the twenty-eight head of executive and specialist in global information technology and multimedia technology organization to advice and supervise Malaysia on the setting up of MSC facilities.

Top priorities were given to the setting up of Cyberjaya Township that will become the hub of international and national specialized Information Communication Technologies companies or organization. With it, we will see the transformation of E-government; E-commerce; Smart-card application; telemedicine and smart schools initiatives. So, we would eventually realize the importance of computers and multimedia and the Malaysians' intellectuality in command of multimedia skills and knowledge like microprocessor; electronic mail; E-Learning; E-Marketing; E- touch, E-recruitment etc.

The success of the project solely depends on education. So, we stress much on ICT and CRLA in the current curriculum and education system in our country.

The pilot CIE programs in 90 selected secondary schools throughout Malaysia under the 'One-Off' project in 1996 during the beginning stages of the seventh Malaysian Economic Plan. The project has cost the country RM 2.5 million. Each participative secondary school received 20 workstations and a server, a constant supply of educational software and learning kits. In addition, managers; coordinators; facilitators were sent for further training and advancement in computer literacy and computer education courses at district, state and national level which was organized by the Ministry of Education. On the other hand, those schools without computer laboratories in the country followed their counterparts by inviting PIBG committees and private computer vendors to set up computer laboratories in schools to cater the needs their students to streamline with the introduction of computer curriculum to form four students in 1998.

The implementation of the Eight Malaysian Economic Plan with the announcement by the Ministry of Education to set up ICT and CRLA programs in another 2000 primary and secondary school throughout the country. Another recent announcement of setting up computer interactive facilities and laboratory in another 5000 education institutions has proven to be a catalyst towards ICT and computer application in our education system.

By spending billions of ringgit to facilitate the governmental projects in our education system one must manage well. So the management perspectives in the ICT and CRLA projects should be looked into very carefully to oversee the effectiveness of the implementation of ICT and various computers related learning programs in our education system.

Discussion

A lot of local and foreign researches has been done on Computer-In-Education programs; computer literacy; using computer as teaching tools and teaching programs; Computer Aided Instruction and Computer Aided Learning Process and lately researches has also been done on other effectiveness and feasibilities of CRLA and e-learning in school system.

In 1980's Malaysia has introduced CIE and CAI programs in education, we see that some surveys have been conducted pertaining to this two forms and process of learning in secondary schools. Teachers have been sent to various institutions of higher learning to acquire knowledge of computer usage; literacy and applications. Some even followed in-house and in-service programs initiated by the government or private computer vendors in town.

At least, some of the characteristics of computer application which benefits the education system of the country as suggested by Futrell and Geisert (1984) that by using computer application:-

- It can be manipulated on screens of the monitor and can be animated to suit the teaching and learning process.

- It is interactive.

- It can record sound

- It can keep and retrieve information in words or numerical image.
- Keep times.
- Solves mathematical functions
- Make logical results.

Not only that, research has proved that computer has its advantages especially towards educational application because its effectiveness in Computer Aided Instruction (CAI) in teaching and learning process (Bracey, 1982; Fisher, 1983; Roblyer, 1986; Niemiec and Walberg, 1987).

The computer assisted learning approach is in fact a very useful and effective tool in the student learning process. Researches have been done on this matter (Alderman, 1979; Kulik, Bangert and William, 1980). They have proved that : -

- Learning process became faster.
- Easily remembered.
- Positive attitude towards computer.
- Active responds towards computer.
- Acquired learning flexibility.

Our country has since spend billions of ringgit on these programs by providing:-

- Schools with the latest ICT and CRLA programs.
- Workstations.
- Servers.
- Training of managers; coordinators; facilitators or workforces.
- Basic Computer application and literacy syllabus.
- Computer applications as a subject in the Sijil Peperiksaan Malaysia (SPM) and tertiary level.
- MSC.
- Teaching of Mathematics and Sciences subjects in English by using computer.
- E-learning.

All the facilities provided are of utmost importance in realizing vision 2020 whereby Malaysia will become a developed nation and all its population will become knowledge workers equipped with K-economy perspective.

On the other hand, the management perspectives of ICT and Computer Related Application (CRLA) must be taken into consideration. By doing so, only then we can see the impact and effectiveness of these perspectives towards the implementation of ICT and CRLA programs in the whole education system.

Management Approaches of The ICT and CRLA In School System

Management Models

The Departmental Approach developed by Fayol, Urwick and Brech have designed a top down view of organization. They described organization based upon the grouping of various activities into departments. Organization is a large machine that develop laws and principles which governed the machine's activities (Terry Lucey, 1995) because the general problems addressed by them was how are tasks organized into individual jobs and how are jobs organized into administrative units and how are these combined into departments. The result was the structuring of departments within an organization and each department containing a set of tasks to be performed by people in that department.

From that, the management and structure of organization that serve as the basis for this research will be that of which defined by Henri Fayol.

"Managing is a operational process initially best dissected by analyze the managerial functions of planning, organizing staffing, directing, leading and controlling."

Furthermore, most of the management perspective of today like the system perspective, contingency perspectives, contemporary applied perspective and their various models (Griffin, 1999) that will look into and its feasibility could well be use in our environment to determine the success implementation of the governmental and private mega projects in ICT and CRLA initiatives.

So, it is of utmost importance for managers and coordinators in managing ICT and CRLA to have some sort of direct managing experiences and formal training or from time to time, they have to gain some managing expertise by attending in-services courses either conducted by the Ministry of Education or any private or governmental institutions or initiatives.

Good managers and coordinators will do their task by instructional method. So people who are equipped with good leadership qualities will have the edge to be an effective manager and carry out their responsibilities in conducting the ICT and CRLA programs.

With stages by stages of proper planning as seen by Siagian (1982) that every manager needs their subordinates' support and total commitment or involvement in every level of the system.

Managers or coordinators need the support of their subordinates and with the responsibilities in planning, foreseeing the organization and administration. Further by drafting the system and programs. Later implement the drafted program with each phase's success and effectiveness before an evaluation made. In order to determine whether the objectives has to be change. Careful and whole-hearted planning and implementation will brings success in the planning process.

Base on Fayol's general principles of management couple with the contingency approach and models, that we could adopt as a basis for the effective controlling, planning, training, organizing, funding and forming managing styles for the ICT and CRLA that will be carried out in the education system.

Double-ring Learning Organization Model (Garratt, 1987)

The management of ICT and CRLA at various state levels is headed by a state coordinator in the state Education Department whereas the actual management is run by the managers and coordinators or sometime facilitators selected school levels and institution of higher learning.

As the managers of selected school, they played double role as the administrator of the school as well as the administrator of the ICT and CRA programs in the school as well. But most of the time, the managers empower the managerial function of this small unit to his assistant or a coordinator appointed to monitor the programs. So as the appointee will report directly to the manager pertaining to all aspects of managing and maintaining of the LCT and CRLA programs. Whether it is internal or external environment. Success or failures of the managers were determined by the initiative and managerial skill of the whole system.

Contingency Theory in The Management of The Organization

Woodward (1965); Burns and Stalker (1961); Lawrence and Lorsch (1967); Reddin (1971); Parrow (1970) have stated that the management of technology in the contingency model should be differentiate the small organization from the main organization But the structure and function of its management will followed the main organization. Whereby each specific unit should have own specialization in order to achieve its objectives in the organization with which the social functions of all the units will integrate and it will communicate with each other to achieve the organizational goals.

Even the contingency theorist, Fiedler, consider that leadership effectiveness depends on a range of factors; in particular, the task, the work group and the position of the leader within the work group. So manager will adopting a style appropriate to what he termed as 'relative favorableness' of the situation and the manager will characterized as : -

- The leader was liked and trusted by the group
- The task was clearly defined
- The power of the leader in respect of the group was high and where he had organizational backing

Upon the above suggestion, a strong and well-respected leader with a clearly defined task would get best results by fairly directive (Terry, 1995). Fiedler concluded that organizations could do much to help the individual manager by:

- Defining and structuring the task more clearly
- Improving the manager's formal power vis-à-vis his group
- Changing the composition of the group

Fiedler's conclusion was further developed by Adair's suggestion that if the theory recognizes that there will not be a perfect match of the task, group and individual, so that the manager's job is to be aware of the three key variables and to manage each situation by giving suitable priorities to the inter-reacting elements. As well as Maccoby's suggestion of leadership style, namely modern managers exhibit more 'flexibility about people and organizational structure, and a willingness to share power. Thus rather than acting as a traditional boss or decision maker, leaders are becoming more like a coach, teacher and catalyst.

In-fact, starting from Fiedler's contingency model of management and the following modern management theorists and their model of management of the said post contingency perspective of management starting with William ouchi's Theory Z, Thomas peters and Robert Waterman, Terrence Deal and Allen Kennedy suggested the modern practice of management.

More recent management gurus such as Peter Senge, Stephen Covey, Tom Peters, Michael Porter and Michael Hammer also made tremendous impact on effective management practices by effective managers.

Effective and Quality ICT and CRLA Management Model

It consists of 2 main components namely : -

    i)   Effective and quality management

    ii)   ICT and CRLA initiatives

The implementation of ICT curriculum in the education system has started since 1986 with the government initiatives. Since then, the one-off project of 1986, the introduction of ICT to 2000 primary and secondary school throughout the country in the year 2000; Smart schools; additional government grants; the setting of ICT and CRLA facilities in the institution of higher learning have been gearing up our younger generation towards the realization of the flagships planned in vision 2020.

But why do some government or private initiatives in ICT projects gain tremendous success yet some face failure? The answer lies on 'Effective and quality management'.

There are many factors in management that we have to look into in order to enrich and enlarge the success implementation initiative and correct the defective one.

The main concern in this model is effective and quality management with the managers equipped with knowledge in management science. The fact that management science is considered as vital, yet the success or failure depends on the managerial skill and other human factors.

Factors That Influence the Effectiveness and Impacts of Management of ICT and CRLA Programs in the Education System

There are a few factors that we have to take into account in the management of ICT and CRLA by managers and the front line implementers, namely:

i)   Planning and Planning Cycle

    In this respect, the effectiveness of managing ICT and CRLA programs need certain planning and planning cycle by the managers and coordinators or facilitators at all levels with a proactive approach to attain organizational goals.

ii) Leadership style

The managers and front line implementers need some kind of leadership qualities in order to influence their subordinates to perform their very best and possess adequate resources to achieve their goals.

According to Stodgill (1974), the meaning of leadership is a phenomenon process of a person who has the ability to direct, encourage, control and influence over his subordinates. So that the managers and front line implementers for ICT and CRLA programs should used it to achieve their objective and organizational goals.

iii) Financial Allocations and Its Disbursement

The project which was carry out by the Ministry of Education has its own allocation of 20 workstation and a server coupled with all the necessary software. Only certain school received the facilities whereas other schools have to invite private initiatives to conduct ICT and CRLA programs either their own premises or at the private computer centers.

iv) Training

The training done by the Ministry of Education has its own planning and upgrading of knowledge and agendas whereas private computer initiatives have its own agendas too.

v) Management Styles

Management is the process, which takes place at all levels in the organization. In fact, the management was carry out by managers, section leaders, supervisor, coordinator and facilitators.etc. All are of equal importance. For example, Mintzberg has put up a list of key roles, which shows the consistency in managerial jobs, and the key roles were: -

- Entrepreneur (planner and risk take).
- Resource allocator (organizer and coordinator).
- Liaisons or Disseminator (coordinator and communicator).
- Monitor (controller).
- Spokesman or Negotiator (motivator and communicator).
- Disturbance-handler (motivator and coordinator.)

There, a manager is concerned not only with physical processes, organization structure and task; he has to deal with people or must take into account their attitudes, beliefs, values and reactions.

According to Terry Lucey (1995), there are three levels of management, namely:

- Strategic management.
- Tactical management.
- Operational management.

The three levels of management are interrelated and must not be thought of as self-contained and separate bands. Information flows from direction, discussions, instruction, advice, results and so on. There should be a continuous flow between the levels in order to achieve coordinated activities and hence generate better decisions making.

For instance, material and inventory control. If it is at the operational level, then, material or inventory control is dependent; physical movement and storage, clear parts or materials identification, prompt and accurate recording of transactions, clear guideline on stock level and order quantities of stock in the laboratory.

If it is at the tactical level, material or inventory control is dependent on, accurate summarization of all operational matters affecting materials and inventory, the setting of key decision values (stock levels, re-order quantities etc.), setting of materials budgets within policy guidelines, order, price, negotiation and so on. On the other hand, material or inventory is dependent on; correct summarization of activities at the tactical and operational levels, gathering and analysis of environmental information (price trends, competitors actions political factors and so on), setting of long term price agreements and contracts perhaps involving exchange deals or barter.

vi) Hardware

The latest microprocessor with multimedia and DVD-Rom were selected. All workstation throughout the selected school by the Ministry of Education will be connected with Internet facilities with the memory and bytes that could facilitate the sophisticated up-to-date software especially the connection to LAN and WAN network.

vii) Software

Domestic software from the Ministry of Education or software companies have been distributed to selected schools prior to the effectiveness and suitability of the software which suit the, religious, culture, education and environment perspectives which has been screened at the ministry level.

viii) Student's Prior Knowledge.

The school authorities have screened the target groups whether they have possessed any prior knowledge of ICT and CRLA outside the school or at home before they are admitted to the program.

ix) Managers and Coordinators Prior Knowledge.

Managers and coordinators or facilitators must have acquired some basic knowledge of computer and literacy before they are selected to follow elementary courses whereby they have the edge over the other. Facilitators with prior elementary programming knowledge would be selected to run the programs at the implementation level.

Management and Maintenances of Computer Laboratory.

Ahmad Atori (1985), Daniel S. Cheever, Jr Et.al (1986) have suggested that management of computer laboratory is a process of planning, organizing, directing and controlling of all members of the organization to achieve organizational goals.

Even though, managing small a unit of computer laboratory in a larger organization but it is as the same as managing a set of planning for a special task with a systematic way of management.

So, the main functions of implementation of ICT and CRLA depend on the management perspectives in the organization. In terms of soliciting the managers and coordinators who can rely upon the responsibility, programs should be given top priority by the Ministry of Education because most of the managers and coordinators selected neither have very little knowledge of computer literacy or management skills. They only possess very basic skills and far from adequate to implement the ICT and CRLA programs at all levels. Moreover, the management of ICT and CRLA are relatively new to them and it is utmost priority to them as they are responsible for the overall running of day-to-day managing works.

Abdul Aziz (1993) has drawn a few guidelines on the characteristics of a good manager or coordinator, namely:

- Able to identify good hardware and software in order that there will be no wastage.
- Able to administer the implementation of ICT and CRLA programs.
- Aware of the new changes in technology and ICT in the country.
- Equip with a wide knowledge of hardware and software.

The selection of the location for the computer laboratories should be given due importance for safety reason besides being easy accessible to any personnel.

Before starting any class or program, an inventory or record should be made so that the facilities will be well maintained by the coordinators and certain regulation pertaining to the usage and maintenance of computer should bet put-up in the notice board of computer laboratories or circulated to students and the staff involved.

In addition, the safety of students should also be taken into consideration that is by identifying the safety of wiring and electrical plugs or electrical circuits in the computer laboratory. If found any faulty, immediate action or remedial steps should be carried out. Fire extinguishers and first-aid kits should be prepared and these items are a must in all computer laboratories.

All the windows or doors should be protected with iron grills in order to keep the computers or workstations and server safe and sound. This includes the air conditioning units that are to be fixed in the computer laboratory to keep out the dust.

Zuraini Wati Abas (1993) gives her opinions on the safety aspects of database in the hard-disk drive of the workstation in the laboratory. Precautionary actions should be taken like fixing the microprocessor to stabilizer or UPS to stabilize the constant flows of electricity to the workstations and it will deter the electrical surge or shocks and prevent from lightning strike.

In the course of CRLA classes, students should not bring in their discs. This step is taken to deter them from copying the original programs from the hard-disc drives or condemning the existing computers with unwanted viruses. So the managers or coordinators should be always alert and take the preventive measures with scanning discs.

The workstations must be maintained well, so that it could last a longer life span. To do that, a maintenance roster must be put up in the computer laboratory. As Yahya Hamid (1989) puts it the functions of maintenance work on computers laboratory are activities carried out to ensure the facilities are well maintained for the effectiveness of ICT and CRLA classes.

The Importance of Basic ICT and CRLA Knowledge in the Education System

The government's annual allocation of funds in this respective field is enormous. The fund has been channeled through the Ministry of Education. Our nation has since moved towards becoming a high technology country and a high information communication technology country with the setting up of MSC, Cyberjaya, Putrajaya, smart-card, smart schools, telemedicine, E-government, tele-marketing, E-commerce, E-Leaning etc. So, it is no wonder that why the government's allocation is so huge (Rabiah Sidin, 1998).

The main agendas in the MSC are the smart school with which the Ministry of Education has put a high priority on ICT and CRLA in schools. Only with ICT can our nation aspire to be an informative nation and realizing vision 2020.

ICT and CRLA are the technology related to the usage of transferring of information, data keeping, data processing and transfer of information through the Internet and modem, intranet and broadband technology and connected to networking. It also can control the operation of machines and other gargets (Rasida Mohammad and Wan Rohana Endut, 1991). They also listed the importance of ICT in the Malaysian Education systems: -

- To enrich and further strengthen teaching and learning by using ICT to encourage students' cooperation and learning process.

- To help and convince students the joy in ICT applications.

- To train students to use these modern technology and to look at their potentials by helping students cope with the sophisticated technology in learning.

- To encourage open thinking and to suit students in the modernization of technology process. So that they will realize the effects of ICT on individuals and nation.

- The usage of technology in students' learning and their learning processes.

- Computer and ICT will be the basic for students who are interested in mathematics or design field and the usage of software in languages, mathematics and science to be the mainstreams in smart school in the year 2000.

The Ministry of Education introduced Computer-In-Education (CIE) programs in 90 schools throughout the country in 1992 under the pilot project with the teaching and learning processes assisted by computer (CAI) in 1993. Teachers and facilitators have been sent for courses in computer literacy programs conducted by the Ministry of Education.

In order to see the success of the implementation of the ICT and CRLA program initiation, the organization structures, environment and places to conduct the learning and teaching processes, syllabus, lesson plan, management styles and strategies, school administration has been restructured. (Paridah, 1993).

So, the main issue here is the efficiency in the management style demonstrated by the managers, coordinators, facilitators and their qualification. How good is the school organization or the suitability of software produced in this juncture? Hartley and Lovell (1978) said that by using computer in education, one would overlook the psychological aspect of teaching and learning process. Students' motivation is neglected in computer classes because Chambers and Sprecher (1985) have stated the programs are stereotyped and less motivating, so it will be a failure when introduced it in the education system.

In addition, Jonesson (1985) has already proven that the maintenance of teaching and learning situation aided by computer application will make students the passive receiver of information. They will feel bored and leave the laboratory. To improve the situation, new and exciting software should be introduced to enhance students' learning process.

The success of Malaysian Educational system for years to come will be based on the introduction of ICT and CRLA in education with the theme 'World Class Education'. For the time being, we are the users of ICT products but in years to come, we will be the exporter of ICT products and multimedia applications.

The focus now is the management of ICT and CRLA in our educational system, particularly in schools and institution of higher learning throughout the country. The efficiency in the management of ICT and CRLA in the education system will spur the students in all levels to understand computer system, engineering mathematics, science and technology (Yasekyler, 1984); (Cosden, 1992); (Deborah McLaurin, 1994). They have suggested that microprocessor technology should be part of the curriculum in school as well as in the institution of higher learning and be offered as a subject for every secondary student.

Computer technology and ICT application in the education system is considered, as a tool to E-Learning and it will be a change to motivate students and encourage their achievement in the education system, such as computer managed instructional (CMI).

Even in the Cognitive Evaluation Theory, Steve Terell (1992) conveyed that by using computer in learning process, we still lack behind in the usage of latest technology in the teaching and learning processes especially its potential in conducting curriculum (Papert, 1993). Computer is only used as an integrated learning system with focus on training (Wilburg and Carter, 1994). So, there maybe some outside disturbances and they emphasize on time management, teachers' perceptions towards individuals and managers or coordinators' lesser support and the impacts towards changes in education system are minimal (Terell, Dringus and Rendulic, 1995).

Many researchers have optimistic foresight on the usage of computer as a tool in teaching and learning in the education system as suggested by (Simonson and Thompson (1994) who propose that we will see the vast development towards modern technology application and emphasis is on telecommunication, networking, interactive video and other sophisticated technology.

In another research done by (Topper and Hodell, 1989), it has been discovered that there is a positive correlation between students' motivation and academic qualification. This has resulted in the need for the usage of technology application in education system.

As far as the management of ICT and CRLA are concern, the management and the maintenance of computer laboratory and hardware is of utmost important, not only to the students but managers, coordinators and facilitators should also be motivated. Then the teaching and learning processes either intrinsically or extrinsically will spur the E-Learning process in our education system (Biehler, 1974).

Reinking, 1984 in (Sandra Neal, 1993) has suggested that some of the computer learning programs may bring shortcoming to students if they are not motivated and later they will misuse computers..

As to determine the effectiveness of ICT and CRLA in the educational system, Balajathy (1984) has listed seven factors which will hinder research on the management of ICT and CRLA programs and to overcome the weakness in the teaching and learning of the ICT programs, namely: -

- Almost all types of computer teaching are based on basic teaching.

- Microcomputer can not be used effectively as tools in education.

- Students, managers, coordinators have some kind of phobias towards using a computer and this will lead to under-usage of the facilities (Kulik, Banger and William, 1983).

- Almost none of the researches has been done on programming management and writing of computer software.

- There is a shortage of quality software (Scandura, 1981).

- Researches must be carried out on the students pertaining to the effectiveness and impacts of ICT and CRLA on the implementation of E-Learning process (Kulik, Kulik and Cohen, 1980).

So, the effectiveness of the implementation of computer program must be planed with care and follow schedule systems in order to determine its development and this will require a contingency plan as to what had been planed and carried out in the earlier implementation stages (Skinner, 1983).

The effectiveness in the management of ICT and CRLA programs in the educational system especially at the ground level with managers, coordinators and facilitators and the students at school level entails everyone's full cooperation and the right learning styles and approaches so as to achieve the government's organizational goals (Moersch, 1989).

As for the class size that has been recommended by Kagan (1986), a smaller class size will encourage better interpersonal relationship and class control by managers. It all depends on the number of workstations and servers to be supplied by the Ministry of Education. The managers and coordinators need to facilitate the structure and class size so that students will perform better prestige and this will reduce wastage and further improve the effectiveness in managing the teaching and learning process of ICT and CRLA programs (Acher, 1986).

Almost 60 % of the schools in Malaysia possess computer and internet facilities regardless of whether it is a computer laboratory set up by the Ministry of Education or private initiatives or at least a computer club donated by the parent-teacher association or a computer used by the clerical staff in the administrative office or networking.

The question is how they manage it, how about the hardware, software or who is in-charge or are there any appointees to manage it? Maybe the computer laboratory has many sets of workstation for teaching and learning process but does the software have the latest memory chips equipped with multimedia CD-Rom or DVD-Rom and modem or is it connected to LAN and WAN network (Westbrook and Kerr, 1996) or is it still in the deplorable state without computer mouse, or the outdated Pentium 286 etc.

The managers and coordinators must think of ways to integrate, renew and upgrade the workstation. According to Schwartz (1991), the micro computer will bring a new mechanism to the higher learning institutions and it utilizes the basic of teaching and learning process in ICT and CRLA concepts, to increase students' potential and awareness with the help of the increase in technical learning skill, effective and interesting and stimulating tools in learning. That also supplement new information. (Kay, 1991).

Students' learning hours as shown in the time table should be increased because the computer aided instruction is dependent on the time frame given in the teaching and learning process. Further more the ICT and CRLA introduced to school are comparatively new to us in Malaysia, whereas in USA or Britain, they are 15 to 20 years ahead of us.

With the recession and economic downturn in the ASEAN region, the Ministry of Education must give careful thought in the planning stage and the implementation. In whatever consideration taken, benefits to students must be prioritized. Even with certain difficulties faced by them to realized as a developing country, the smart school concepts should be carry out to meet the challenges of the information age. (Zollman, 1982) as cited in Karen A. Barber, 1994 has suggested that the research in respect is a must to evaluate the weakness and rectified that the transformation of ICT and CRLA programs will be the key of the E-Learning concepts in our education system.

Deborah McLaurin (1994) has listed a few factors, which influence students' teaching and learning process in ICT and CRLA programs and its impacts on computer education in the education system.

Even students themselves should be introduced to the management skills of LCT and CRLA programs in the school level of our educational system, so as to induce them to acquire new challenges, new knowledge in decision making, problem solving, data processing skills and communication skill, all the required survival tools in the information age.

Research Methodology

The research methodology used in this research consist of: - The Descriptive Survey Method and Analytical Survey Method.

These two survey methods of research will be used simultaneously as it will allow for a more specific understanding towards the main managing perspectives in the application level of the government or private funded ICT and CRLA in Malaysian education system as well as in addressing the issues pertaining to the impact of managing and how effective and significant it is in relation to the applications by the end-users. It will also enable me to use existing theories and management model to carry out the investigation for the research. Also I would be able to put up or suggest a few new models of management in this respect.

Hypotheses Testing

Below are the hypotheses and the results obtained through the findings. Statistical hypotheses were formulated in accordance to the significant level of 0.05.

i) Using ANOVA tested Hypothesis Null 1- There is no significant different in the management of ICT in various initiatives of the Schools.

The F Ratio between groups was 4.059 whereas F Probable was 0.025, which is below the significant level of 0.05 Therefore it shows there is a significant different in the management of ICT and CRLA in various initiatives of the schools.

Management of ICT	Sum of squares	df	Mean square	F Ratio	F Prob.
Between group	109.637	3	63.546	.059	0.025
Within group	250.500	16	15.656		
Total	441.137	19			

ii) Using ANOVA tested Hypothesis Null 2 - There is no significant different in the effectiveness of conducting CRLA program among the facilitators from the various initiatives.

The F Ratio between groups was 20.313 whereas F probable was 0.000, which is below the significant level of 0.05. Therefore it shows there is a significant different in the effectiveness of conducting CRLA among the facilitators from the various initiatives.

Effectiveness of CRLA	Sum of squares	df	Mean square	F Ratio	F Prob.
Between group	11.886	3	3.962	20.313	.000
Within group	31.989	164	.195		
Total	43.875	167			

iii) Using ANOVA tested Hypothesis Null 3- There is no significant different in the management of Computer in Education program and its curriculum in various initiatives.

The F Ratio between groups was 4.059 whereas F probable was 0.025, which is below the significant level of 0.05. Therefore it shows there is a significant different in school administrators' management of Computer in Education program in school.

School administrators management of CIE	Sum of square	df	Mean square	F Ratio	F Prob.
Between group	190.673	3	63.546	4.059	0.025
Within group	250.500	16	15.656		
Total	441.137	19			

iv) Using ANOVA tested Hypothesis Null 4- There is no significant different in the management and maintenance of computer laboratory in various initiatives.

The F ratio between groups was 4.059 whereas F probable was 0.025.which is below the significant level of 0.05. Therefore it shows there is a significant different in the management and maintenance of computer laboratory in the various initiatives.

Management and maintenance of ICT laboratory	Sum of square	df	Mean square	F Ratio	F Prob.
Between group	11.886	3	3.962	20.313	.000
Within group	31.989	164	.195		
Total	43.875	167			

v) Using ANOVA tested Hypothesis Null 4- There is no significant different in students who followed CRLA programs in various initiatives.

The F Ratio between groups was 5.887 whereas F Probable was 0.000, which is below the significant level of 0.05. Therefore it shows there is a significant different in students who follow CRLA programs in various initiatives.

Student of various initiatives	Sum of squares	df.	Mean square	F Ratio	F Prob.
Between group	24.141	3	.811	5.887	.000
Within group	18.734	164	.138		
Total	43.875	167			

vi) Using Pearson 'r' Coefficient Correlation tested Hypothesis Null 4 - There is no significant in relation between the maintenances perspective and the effectiveness in managing ICT.

The significant value of P was 0.000 which is lower than 0.01 (Two-tailed) whereas the correlation value of 'r' = 0.940. Therefore there is strong relationship between maintenance perspective and the effectiveness in managing ICT in school.

Maintenance of ICT Laboratory and the effectiveness in managing ICT program	Correlation Value	Level of Significant P	Total Respondent N
	0.940	0.000	20

vii) Using Pearson 'r' Coefficient Correlation tested Hypothesis Null 5 - proper planning and feasibility study does not enhance the success of managing ICT and CRLA programs.

The significant value of P was 0.000 which is lower than 0.01 (Two-tailed) whereas the correlation value of 'r' = 0.841. Therefore there is strong relationship between proper planning and feasibility study and the managing of ICT and CRLA programs.

Proper planning and feasibility study and the managing of ICT and CRLA program	Correlation Value	Level of Significant P	Total Respondent N
	0.841	0.000	20

Conclusion and Implication

The descriptive analysis shows 60% of the school ICT and CRLA coordinators or facilitators only have had 0 to 3 years of experiences in teaching these subjects. And the school principal appointed them based on the minimal knowledge in management science. Those facilitators appointed have no experiences in teaching and guiding students and only given a brief exposure on the computer application

The other academic duties or burdens in school also affected the CRLA programs. Software and hardware in the school computer laboratory has to be coordinated and distributed throughout the country.

The private ICT and CRLA initiatives in the government schools have to be synchronized to be in line with the syllabus set forth by MOE. The charges must be minimal which every student can afford.

Curriculum Development Center of the MOE has to scrutinized the running of CRLA in every school in the education system and a special task force must set up to supervise the program. PCs and Laptop must increase and connected to the whole education system.

A special task force should be form at various levels of the Education system in order to supervise the implementation of MOE's mega ICT project in the education system especially the effectiveness in the managing of the project.

Suggestions

i. All ICT and CRLA coordinator and facilitators must be given further courses in management and maintenance of computers.

ii. The facilitators must be given pedagogical and methodological courses in teaching and learning of computer with incentive like scholarships from MOE.

iii. All teaching staff in school must be given managerial courses and courses pertaining to ICT and CRLA methodology.

iv. Coordinators and facilitators of ICT and CRLA program are made a full time job.

v. Those teachers with potentials must send for further degree courses in ICT and CRLA management.

vi. The PCs and Laptops in school computer laboratory or office are use by the whole staff of the school irrespective of their level of office.

vii. The ICT sector of school requires ISO 9000 certification in management.

viii. All the teachers be given critical incentive if they could acquire basic computer literacy and programming or writing software plans.

ix. The application of CRLA is use throughout the education system.

x. Computer literacy, programming, maintenances of computer, software designing and digital imaging to be made as an elective subject in the school system.

xi. All examination subjects taught in school must use ICT and CRLA as platform in delivering the lessons.

xii. Teachers who have gone through the using of ICT to teach subjects courses need to be supervised in term of their English and ICT usage in the curriculum.

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