Effectiveness of Computer Education Management in Selected Public Secondary Schools in the Division of City Schools in Quezon City

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This study aimed to determine the factors that predict the effectiveness of computer education program in schools within the Division of City Schools in Quezon City, with the end in view of providing guidelines to school administrators and teachers for a much improved program implementation.

Thirty-three principals, 52 computer education teachers, and 729 students in 33 schools served as research respondents. Data generated through survey questionnaires and interviews showed that majority of these schools have a student population of 4,000 and below, with inadequate budgetary allocation as perceived by the principals. Most schools, however, have 10 students to one computer ratio, but the computer facilities as a factor was perceived by the principals to be adequate.

The principals were perceived to be very skillful in planning, organizing, leading, and controlling. The computer education teachers, on the other hand, were given a very satisfactory rating in their performance by administrators. Students also commended these teachers' mastery of the subject matter, possession of affective characteristics, utilization of effective teaching strategies, and showing of positive attitude toward computer technology.
Around 50% of the schools got scores above the mean in the computer education achievement test, whereas 61% of the students got a computer grade average of at least 86%. The schools' computer academic contest participation and winning, however, range from 60.6% to 63.6%.

Based on the findings of the study, it can be concluded that better school computer

facilities, a smaller school population, and a higher teaching competence would lead to a higher academic achievement on the part of students. It was also noted that the favorable attitude of computer education teachers toward computer technology, better organizational skills of principals, and enhancement of school computer facilities would increase the chance of winning in computer contests. Furthermore, better school computer facilities and improved leadership skills of the principals would enable students to get a higher grade average in their computer education subject.

Overall, better school computer facilities would lead to a higher academic achievement, an increased winning chance in computer contests, and a higher grade average of students in computer education.

Introduction

The current Revitalized Basic Education Curriculum (RBEC) aims to prepare high school students for college and for the world of work (http://www.innhs. edu.ph/ Flagship%20Programs/RBEC.html, January 21, 2008). Specifically, the integration of Information and Computer Technology (ICT) in high school as a component of Technology and Livelihood Education (TLE) intends to make the students interactive lifelong learners prepared for easy assimilation in the new economy (http://www.logos-net.net/ ilo/150_base/ en/topic_n/t8_phi.htm, September 14, 2006).

To help the education system fulfill the above goals for the students, the Computer Education Act was born with Representative Gilbert C. Remulla and Senator Edgardo J. Angara sponsoring House Bill 181 and Senate Bill 1090 (13th Congress of the Republic of the Philippines), respectively. This Act, however, has posed a problematic situation for administrators since some teachers and staff are not computer literate.

This study attempted to determine the factors that predict the effectiveness of computer education program schools within the Division of City Schools in Quezon City, with the end in view of providing guidelines to school administrators and teachers for improved implementation of the program.

Statement of the Problem

The study focused on the effectiveness of computer education management in selected public secondary schools in the Division of City Schools in Quezon City for School Year 2006-2007. More specifically, it sought answers to the following questions:

1. What is the profile of the schools in terms of size, budget, and computer facilities?
2. What is the administrators' level of management skills in terms of planning, organizing, leading, and controlling?
3. What is the Technology and Livelihood Education (TLE) teachers' profile in terms of instructional competence, performance rating, mastery of subject matter, affective characteristics, teaching strategy, and attitude toward technology?
4. How effective is the computer education program as measured by student performance in the achievement test and computer skills contest, and grades in the computer education subject?
5. Which factors (administrative factors, institutional factors, faculty factors) singly or in combination predict the computer education program effectiveness?

Method

Data were generated through survey questionnaires and interviews. Analysis of these data was both quantitative and qualitative in nature, involving descriptive statistics and regression analysis. In addition, interview notes were analyzed to figure out emerging patterns and significant quotes were integrated into the text.

Discussion

School Size

Table 1 presents the student population of the 33 schools involved in the study.

**Table 1. Distribution of Schools
According to Size of Enrollment**

School Population	*f*	%
100-2000	11	33.3
2001-4000	11	33.3
4001-6000	7	21.2
6001 above	4	12.1

Table 1 shows the distribution of the schools involved in this study based on their size of enrollment. Majority of the schools (66.6%) or 22 schools have populations of about 4,000 and below. One-third (33.3%) of the schools have populations above 4,000.

Budget

Table 2 shows the responses of the principals of the 33 selected high schools in Quezon City with regard to budget allocation.

Table 2. School Profile on Budget Allocation

Statement	Percentage				Mean
	SA	A	D	SD	
1. The budget for the computer hardware and software comes from the School Board.	18.2	27.3	42.4	12.1	2.52
2. The budget allocation for the computer room is sufficient.	6.1	15.2	48.5	30.3	1.97
3. There is enough budget to maintain/repair the computers.	-	12.1	57.6	30.3	1.82
4. There is enough budget allocated for the electrical consumption of the computers.	6.1	30.3	45.5	18.2	2.24
				Mean Average	2.14

Budget allocation for the schools seems to be controversial and there was an apparent disagreement among the principals. Majority of the responses for the four items, however, were concentrated on the disagree and strongly disagree segments of the questionnaire.

Based on the total percentages for strong and simple disagreement, 87.9% of the prin-

cipals believed that there was not enough budget to maintain/repair the computers, 78.8% were convinced that the budget for the computer room is insufficient, and 63.7% were of the opinion that money for the electrical consumption of the computers is not enough. On the contrary, about one-third of the principals agreed that there is enough budget for computer electrical consumption. Apparently, there are schools with better funding that do not find this aspect a problem.

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A little less than 50% of the principals agreed or strongly agreed that the budget for the computer hardware and software comes from the School Board. This implies that in more than 50% of the schools, other agencies provide the budget for the same needs. As mentioned by some principals, schools can obtain their equipment and software from donations of private agencies, non-government organizations (NGOs) or concerned citizens. To qualify for financial assistance, budget request must spell out the program's priorities, which should be attuned with the expectations of the funding agency (Brody, 1995). In fact, the success of the computer education program may depend on the support of parents, experts from the general public, students, and consultants from the university, in addition to the leadership of the administrators and the teachers (Cheever,

1986).

These are what some of the principals said about budget:

"The provisions for maintenance of computers are not mandatory in the school budget, the principal needs to look for funds from other sources. Upgrading and buying of computers are not allowed in MOOE (Maintenance Operation and Other Expenses) fund. There is a need to request for SEF or NCR for new units."

"The budget for the computer hardware/software comes from donations, fund raising and school fund."

The previous quotes indicated the uncertainty of funding for computer facilities and thus, the principals have to actively link with agencies outside of the school to gain financial support.

Furthermore, the means (1.82 – 2.24) for statements 2 to 4 on the last column indicated that the principals disagreed with them. It was only statement 1 (2.52) that they agreed with. With a mean average of 2.14, the overall sentiment of the principals was one of disagreement with the statements.

Computer Facilities

Computer facilities are needed to achieve the goals of the computer education program. These facilities must be adequate to obtain the best results. Table 3 presents the ratio of students to a computer in the various schools.

Table 3. Student-Computer Ratio in the Schools

Student-computer ratio	*f*	%
2 : 1	3	9.1
3 : 1	5	15.2
4 : 1	5	15.2
5 : 1	6	18.2
6 : 1	2	6.1
7 : 1	1	3.0
10 : 1	11	33.3
TOTAL	33	100

It should be noted that among the 33 schools, only three (9%) have one computer for every two students. These are the schools with a sufficient number of computers for student use. A greater percentage (16 or 48.6%) has one computer for every three to five students. Results of the study further showed that one-third (11 or 33.3%) of the schools have 10 students to a computer. Considering that development of computer skills depends on hands-on experiences, much learning opportunity is lost to students who do not have enough share of computer time. According to Konesappilai (1998), Sri Lankan students should be given more time for hands-on experience to improve instruction. This is only possible if there are more computer units available. The same holds true for Filipino high school students in Quezon City.

Table 4 indicates the perception of the principals regarding the computer facilities of the schools.

Table 5. Frequency Distribution of Respondents' Evaluation of the Principal's Skills in Planning

As principal I,	Percentage				Mean
	SA	A	D	SD	
1. communicate to my faculty the importance of the computer education program.	84.8	12.1	-	-	3.88
2. am directly involved in the planning of the computer education program.	69.7	30.3	-	-	3.7
3. give attention to the soundness of building that houses the computer room.	84.8	12.1	3.0	-	3.82
4. give my faculty the opportunity to help in the decision making as regards computer education.	60.6	39.4	-	-	3.61
5. believe that the computer education program is very important.	90.9	3.0	3.0	-	3.91
				Mean Average	3.78

Range   Equivalent

3.51 - 4.0   SA   (Strongly Agree)
2.51 - 3.50   A   (Agree)
1.51 – 2.50   D   (Disagree)
1.00 – 1.50   SD   (Strongly Disagree)

Quezon City principals strongly believed that the computer education program is very important (90.9%) and they communicate this to the faculty (84.8%). Among the 33 principals, 84.8% strongly agreed that the soundness of the structure that houses the computers should be given attention. This would assure safety in terms of electrical wiring and continuous use of the room without delays due to repair of leaking roofs and flaking ceilings.

About 70% of the principals strongly agreed that they should be involved in the planning of the computer education program. This is but proper according to the Office of Technology Assessment (1995) as cited by Geer (2002) because educational administrators pave the way for the success of technology planning and integration in the classroom. Only 60.6% of the principals strongly agreed that the faculty should be given the chance to help decide for the program. These lower percentages and means compared to those of the previous statements (1, 3, and 5) suggested that planning of the computer education program is apparently delegated to some key personnel and that the regular faculty, in general, is not burdened by such concerns.

The mean average of 3.78 for the five statements underscored strong agreement by the principals.

Encouraging faculty professional growth, scheduling training programs, and designating personnel for certain tasks were some of the organizing tasks of the principals as shown in Table 6.

Table 6. Frequency Distribution of Respondents' Evaluation of the Principal's Skills in Organizing

As principal I,	Percentage				Mean
	SA	A	D	SD	
1. give my faculty the chance to attend computer training programs.	90.9	9.1	-	-	3.91
2. am sensitive to the needs of my computer education teachers.	84.8	12.1	3.0	-	3.82
3. discourage attendance to computer trainings due to lack of funds.	-	3.0	27.3	69.7	3.67
4. schedule in-service training for our teachers.	57.6	42.4	-	-	3.58
5. provide funds for my computer teachers to attend local computer trainings and conferences.	39.4	57.6	-	3.0	3.33
6. hire a technician to maintain our computers.	30.3	60.6	6.1	3.0	3.18
7. designate a key personnel to coordinate the computer education program.	66.7	21.2	-	6.1	3.58
				Mean Average	3.58

About 85% of the principals were very sensitive to the needs of their computer education teachers and thus, the latter are given the choice to attend the computer trainings that they need (90.9%) in spite of the scarcity of funds.

Generally, the principals strongly agreed that key personnel should be designated to coordinate the computer education program (66.7%). It should be noted, however, that in items requiring funding like scheduling of in-service training for teachers (57.6%), provision of funds for local computer trainings and conferences (39.4%), and hiring of a technician to maintain the computers (30.3%), there were lower percentages for strong agreement. Agreement, however, for these three items were either higher or comparable to the previous. These data simply suggested that funding for training of teachers is a basic problem in relation to computer education program management in Quezon City public high schools. Nevertheless, the principals are very supportive of their teachers.

Statements 5 and 6 which were about the provision of fund for computer training of teachers (3.33) and hiring a technician (3.18), respectively, had means corresponding to agreement while the rest of the statements (3.58 – 3.91) had means corresponding to strong agreement. An average mean of 3.58 for the seven statements still suggested strong agreement.

Leadership in the implementation of the computer education program, personally attending workshops, and providing incentives to teachers who utilize Information Technology were some of the roles included in **leading**.

Table 7. Frequency Distribution of Respondents' Evaluation of the Principal's Skills in Leading

As Principal I,	Percentage				Mean
	SA	A	D	SD	
1. attend training workshops to show my commitment to the computer education program.	60.0	39.4	-	-	3.61
2. initiate computer trainings for teachers.	69.7	27.3	3.0	-	3.67
3. secure the computer hardware with the help of a funding agency.	57.6	36.4	3.0	-	3.56
4. lead the implementation of the computer education program.	72.7	24.2	3.0	-	3.70
5. choose the computer programs which are compatible with the teacher's teaching strategies.	54.5	45.5	-	-	3.54
6. provide incentives to teachers who utilize Information Technology.	45.5	51.5	3.0	-	3.42
				Mean Average	3.58

About 73% of the principals strongly agreed that they should lead in the implementation of the computer education program and that they should initiate the computer trainings for teachers (69.7%).

Sixty percent of the principals strongly believed that they should personally attend computer training workshops to show their commitment to the computer education program. Securing the computer hardware with the help of a funding agency got a 57.6% strong agreement which seemed to indicate that acquisition of the equipment could possibly vary from one school to another. Though strong agreement (54.5%) and simple agreement (45.5%) answers totaled to 100% for the choice of computer programs compatible with the teacher's training strategies, it appeared that the principals are not directly involved in the process. Again, due to financial constraints, the strength of agreement to the provision of incentives for teachers who utilize Information Technology was only 45.5%. Thus, this last statement had a mean of 3.42 which was equivalent to agreement while the other statements with mean values of 3.52 to 3.70 corresponded to strong agreement. Overall, the mean average of 3.58 suggested strong agreement

The principals exercise control over the computer education program by visiting the computer room and observing classes, conferring with computer education teachers and getting feedback from students. Table 8 provides the details.

Table 8. Frequency Distribution of Respondents' Evaluation of the Principal's Skills in Controlling

As principal I,	Percentage				Mean
	SA	A	D	SD	
1. observe classes in computer education to assess the quality of computer education instruction.	63.6	36.4	-	-	3.64
2. visit the computer room regularly.	45.5	51.5	3.0	-	3.42
3. ask the computer technician about problems encountered in the computer room.	45.5	54.5	-	-	3.45
4. confer with computer education teachers to find out their teaching concerns.	60.6	36.4	3.0	-	3.58
5. consult other principals to compare the status of my school with theirs in terms of the computer education program.	54.5	42.4	3.0	-	3.52
6. get feedback from students about the computer education program.	54.5	42.4	3.0	-	3.52
				Mean Average	3.52

As shown in the table above, more than 50% of the principals strongly agreed that computer education classes should be observed and feedback must be obtained from students to directly assess the quality of instruction. In the same manner, teachers in the school and principals of other schools should be consulted regarding common concerns in the program. About 46% of the principals, however, visit the computer room and personally confer with the technician regarding computer problems.

Visiting the computer room regularly ($\bar{X}$ = 3.42) and asking the computer technician about problems encountered in the computer room ($\bar{X}$ =3.45) had means corresponding to agreement while the rest of the statements with means from 3.52 to 3.64 indicate strong agreement.

Table 9 shows the efficiency rating of teachers handling the computer education sub-ject.

**Table 9. Distribution of Performance Ratings of
Computer Education Teachers**

Rating	F	%
Outstanding	21	42
Very Satisfactory	26	52
Satisfactory	3	6
No Data	2	
Total	52	100

Legend:
9.0 – 10 = Outstanding
7.0 – 8.9 = Excellent
5.0 - 6.9 = Very satisfactory
3.0 – 4.9 = Satisfactory
1.0 – 2.9 = Fair

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Twenty-one out of 50 (42%) teachers obtained a rating of outstanding and 26 (52%) got a very satisfactory rating.

The data in the following table were obtained from the survey questionnaire filled out by the students. Specifically, Table 10 presents the students' perception of the computer edu-cation teachers' mastery of the subject matter.

Table 10. Frequency Distribution of Students' Responses on Computer Education Teachers' Mastery of Subject Matter

My computer education teacher…	Percentage				Mean
	SA	A	D	SD	
1. knows our computer lessons very well.	49.4	49.8	0.7	0.1	3.48
2. explains our computer lessons very clearly.	49.1	49.1	1.6	0.1	3.47
3. explains again the part of the computer lessons we did not understand.	42.4	49.0	7.8	0.8	3.33
4. helps us solve problems related to the use of the computer.	50.1	49.7	0.1	0.1	3.47
5. answers our questions completely.	44.5	50.7	3.7	1.1	3.39
6. communicates his ideas very well.	45.3	51.0	3.0	0.7	3.41
7. speaks clearly in a loud voice.	52.8	40.9	6.6	0.7	3.46
				Mean Average	3.43

Range		Equivalent	Interpretation
3.51 - 4.0	SA	(Strongly Agree)	Outstanding
2.51 - 3.50	A	(Agree)	Very Satisfactory
1.51 – 2.50	D	(Disagree)	Unsatisfactory
1.00 – 1.50	SD	(Strongly Disagree	Poor

In all the seven statements in Table 10, it can be noted that more than 90% of the computer education students agreed and strongly agreed that their computer education teachers exhibit mastery of subject matter. The mean average of 3.43 suggested that the computer education teachers' mastery of subject matter was very satisfactory.

Here are some of the student's comments about their computer education teachers:

"Our computer teacher helps us solve our computer problems and improve our computer skills."

"He is a good teacher. He knows almost everything about computers."
"She is always ready to explain things we don't understand."

"She teaches us how to operate the com-

puter correctly especially the LINUX."

"She is a very nice and professional teacher–very accurate in giving ideas, a well-rounded person, and of course, undeniably smart."

The above quotes indicated the expertise of the computer education teachers– knowledge of software, accuracy of information and problem-solving ability. These were the teacher qualities that encouraged positive responses from the students. In addition, these qualities of the teachers suggested that they went through appropriate training to prepare them for the task. Raymond (1988) underscores that computer training or education is highly correlated with better user comprehension and this redounds to the benefit of their students.

Table 11 introduces the affective qualities of the computer education teachers.

**Table 11. Frequency Distribution of Students' Responses
on Computer Education Teachers' Affective Aspect**

My computer education teacher…	Percentage				Mean
	SA	A	D	SD	
1. motivates us to do our work well.	52.5	44.6	2.3	0.6	3.49
2. respects our ideas.	57.6	40.9	0.6	0.6	3.66
3. gets angry when we commit mistakes.	8.9	26.7	42.6	22.7	2.79
4. praises us when we do our work well.	34.6	58.6	5.4	1.4	3.26
5. listens to our problems and difficulties in different computer activities.	55.8	43.9	-	0.3	3.62
6. is somebody I respect.	62.0	36.1	1.1	0.8	3.59
7. makes us realize the value of being computer literate.	57.5	40.6	1.5	0.4	3.55
Average Mean					3.42

The teachers' affective dimension included the way they motivate their students in class, their attitude toward the students, the reinforcement they give, as well as their reactions to the students' behavior.

Out of the seven statements included in the table, only number 3 was stated in the negative and thus, 65% disagreement was noted among the responses. About 27% agreement for the same statement is noteworthy. This goes to show that no matter how competent the teachers are, there are times that they would probably lose their temper/get angry when students commit the same mistake all over again.

The following comments show how the students perceive their computer education teachers:

"She is a good model to us and a good mentor. She motivates us to do our work properly."

"She explains our lesson clearly and knows how to respect our ideas."

"She is so patient with our attitudes even if we are sarcastic when we talk   to her. She is so kind to her students."

"He treats us like his friends or peers. He is respectable."
"No time is wasted in his class. He is fair to all and is very easy to be with."

"When he starts to discuss our lessons, our class becomes lively. He knows what he is doing and he lets us know more about it."

These quotes underscored the teachers' positive effect toward the students, marked by good motivation, respect, patience, and dynamic classroom management.

Table 12 introduces some of the strategies of the computer education teachers.

Table 12. Computer Education Teachers' Teaching Strategy

My computer education teacher…	Percentage				Mean
	SA	A	D	SD	
1. informs us of how well we are performing in class.	36.0	58.1	5.1	0.7	3.30
2. gives us enough hands-on computer work.	47.7	47.8	4.0	0.5	3.43
3. does not give us the result of our tests in computer education subject.	4.1	12.1	47.3	36.2	3.16
4. tells us frankly what he/she expects from us.	24.3	59.0	13.5	3.0	3.05
5. gives grades we truly deserve.	61.5	36.4	1.1	1.0	3.58
6. does not follow a standard set of criteria in grading our activities and projects.	5.2	11.3	48.9	34.6	3.13
7. allows us to express ourselves freely.	36.2	57.3	6.1	0.4	3.29
8. considers our suggestions to improve some activities.	40.6	56.8	2.3	0.3	3.38
9. gives us objective comments to improve our performance.	44.3	51.6	4.0	0.1	3.40
10. makes us use our computer time wisely.	51.1	44.7	3.7	0.4	3.47
				Average Mean	3.32

The computer education students agreed and strongly agreed with all the positive statements in the table above. They actually perceived their teachers to be good at stating their expectations of the students, open to suggestions, fair in giving hands-on computer work and grades that students deserve, and alert in giving feedback.

Specifically, these are some of the comments of the students about the teaching strategies of their computer education teachers:

"He lets us give suggestions and comments if needed."

"She follows a standard set of criteria in grading our activities and projects. She assists us during our hands-on."

"He corrects us to improve our performance."

"She discusses her lessons step by step."

"She uses modern technology and other visual aids."

"She always checks our computers so we can use them well."
"I like the style of his teaching and every time I hear him, I am amazed. He also teaches us how we can use computer education in our daily lives. He is a master."

Through the above quotes, the students pointed out the salient aspects of good pedagogy–relevance, interaction, clarity of instruction, use of instructional aids, evaluation guided by standards, and feedback.

Table 13 presents the attitude of computer education teachers toward technology.

Table 13. Computer Teachers' Attitude toward Computer Technology

Statement	Percentage				Mean
	SA	A	D	SD	
1. I always want to know more new information in computer technology.	80.8	19.2	-	-	3.81
2. I enjoy my job as a computer education teacher.	73.1	26.9	-	-	3.73
3. I intend to be a computer education teacher until I retire.	33.3	33.3	29.4	3.9	2.96
4. Computer technology gives students a better future.	78.8	21.2	-	-	3.79
5. Everyone needs to know how to use a computer.	88.5	11.5	-	-	3.88
6. Computers make our job easier.	82.7	17.3	-	-	3.83
7. I am challenged by new computer applications.	84.3	15.7	-	-	3.84
8. TV programs focusing on computers interest me.	-	38.5	-	61.5	3.62
9. I find it easy to handle computer education classes.	53.8	42.3	1.9	1.9	3.48
10. I enjoy teaching computer education classes.	-	23.1	-	76.9	3.77
Mean Average					3.67

As shown by statements 1, 4, 5, 6, and 7, computer education teachers of selected high schools in Quezon City have high positive attitude toward computer technology. They recognize the importance of the technology in everyone's life. Their eagerness to learn new computer applications is a great indicator of such an affirmative outlook. Attitude toward computer technology influences future behaviors in the classroom (Fauri, 1984; Anderson, *et al.*, 1979).

Apparently, the teachers also enjoy their teaching as indicated by statements 2 and 10. On the contrary, statement 9 implies that it is not very easy to handle computer education classes, probably because of big class sizes. It was evident, however, that 3.9% and 29.4% of the teachers, respectively, strongly disagreed and disagreed with the statement "I *intend to be a computer education teacher until I retire.*"

This is one of the comments made by the teachers regarding computer education:

> "*It would be easy to teach the computer subject if we will be provided with modules to follow. I have to buy books on other applications to be able to teach the subject effectively. We need more trainings/seminars to widen our knowledge and teach effectively not only application/software but also hardware troubleshooting.*"

Measures of Student Performance

Student Performance in Computer Education

In this study, performance in the computer education achievement test, success in computer academic competitions, and the average grade in the computer education subject were considered as measures of the

effectiveness of computer education program.

Table 14 shows the names of the 33 schools in acronym, the distribution of the 662 students who took the achievement test, mean score of every school, standard deviation, lowest score, highest score, and the rank of each school.

Table 14. Achievement Test Results in 33 Respondent Schools

School	No. of Examinees	Mean	Standard Deviation	Min	Max	Rank
FYHS	30	39.93	3.11	28	42	1
LAGRO	25	37.92	3.67	29	45	2
CPGHS	13	37.85	1.91	34	40	3
Nova HS	17	37.59	5.17	21	43	4
NEraHS	20	35.90	2.15	30	40	5
Comm HS	12	35.25	2.73	31	38	6
CCHS	9	34.11	7.42	22	41	7
M Roxas HS	19	33.89	4.82	23	40	8
JSHS	18	33.83	5.97	22	40	9
CGEAHS	33	33.70	4.58	20	42	10
ERHS	19	33.16	4.69	24	41	11
SBHS	29	33.00	5.68	23	41	12
SFHS	24	32.96	4.76	19	39	13
SOSHS	20	32.50	4.62	19	40	14
PBHS	20	32.00	4.59	25	44	16
DJJVHS	20	32.00	4.88	24	40	16
QHS	10	32.00	4.90	23	41	16
R Magsaysay HS	20	31.50	5.42	22	44	18
ERJHS	23	31.48	4.76	23	40	19
SJHS	19	31.26	5.16	22	40	20
TSNHS	28	31.11	4.12	23	38	21
Culiat HS	30	30.73	4.23	22	38	22
JCMPHS	20	30.70	4.44	22	38	23
QCHS	16	30.13	5.62	20	42	24
NFHS	24	30.04	4.63	22	39	25
CAHS	14	29.79	4.44	22	41	26
BHNHS	19	29.74	5.53	20	39	27
KNLHS	25	28.80	4.76	19	39	28
I Mathay HS	15	27.80	3.65	21	33	29
A Roces STHS	18	26.83	9.28	13	39	30
DQPHS	8	26.63	5.60	20	33	31
Balara HS	29	26.24	5.25	16	36	32
BSHS	16	22.31	1.49	20	25	33
Total	662					
Average		31.8994	3.7066			

The overall mean of the computer education students was 31.9 with a standard deviation of 3.7. The succeeding Table 15 indicates participation in academic computer contests.

Table 15. School Participation in Computer Skills Contest

Prizes Won	Frequency (*f*)	Percentage
Number of 1st prize	21	63.6%
Number of 2nd prize	20	60.6%
Number of 3rd prize	21	63.6%

The table above shows the rate of winning in computer contests of the computer education students. Notice that not all the schools are actively involved in computer academic contests.

Table 16 shows the average grades students obtained in their computer education subject.

Table 16. Students' Grade Average in Computer Education

Grade Interval	*F*	%
96-100	14	1.9
91-95	168	23
86-90	263	36.1
81-85	215	29.5
75-80	69	19.5
65-70	0	0
Total	729	100%

Two hundred fifteen students obtained grades ranging from 81-85 represented by 29.5 % of the respondents while 263 received grades ranging from 86-90 which represents 36.1% of the respondents.

About 66% of the 729 students got grade averages ranging from 81% to 90% in computer education. Twenty-three percent of them got grades of 91% to 95% and around 2% got 96% to 100%. No one failed in the subject and only 19.5% obtained grades of 75% to 80%. These data indeed indicate that they have achieved a lot in the subject in terms of knowledge and hands-on skills.

Predictors of Student Achievement

A good number of predictors of student achievement in computer education are registered in Table 17. As indicated, the managerial skills of principals had both negative and positive effects on student achievement as measured by their performance in the achievement test.

Table 17. Regression of Student Achievement on Independent Variables

Predictors	Beta	T	Significance
Planning	-.202	-2.832	.005
Organizing	.116	2.018	.044
Controlling	-.723	-18.877	.000
Budget	-.328	-8.611	.000
Facilities	.656	13.051	.000
School Population	.228	6.487	.000
Teaching Competence	.118	3.803	.000

Adjusted R Square = 0.463
F-value for ANOVA = 51.021
Significance = 0.000

The statistical result shows that the higher the planning skill of the principals, the lower was the achievement of the students in computer education. For every standard deviation unit increase in the planning skills of

the principals, there was an equivalent of .202 standard deviation unit decrease in the score of the students in the achievement test. The same result was seen in the controlling **(β = - .723)** and budgeting **(β = -.328)** skills of the principals, showing the impact of these skills on student achievement. This simply means that principals who rated themselves higher in planning, controlling, and budgeting indicated lower student achievement scores in computer education. While these skills were expected to have a positive effect on student achievement in computer education, this expectation can be reversed when the focus of planning and budgeting, as well as controlling, is not on computer education but on other needs and problems of the school, thus, leaving computer education at a lower rank in the priorities for expenditure. It is a sad fact that maintaining computer laboratories is expensive the moment the computers begin to bug down–especially if these are older-generation computers acquired years ago through donations.

On the contrary, school computer facilities **(β = .656)** had a great impact on the achievement of the students. This means that as computer facilities improved by a standard deviation of .656 unit, there was a corresponding increase in student achievement in computer education. School population **(β = .228)**, teaching competence **(β = .118)**, as well as the organizational skill of the principal **(β = .116)** also had their positive effects on student achievement, but these effects decrease with the decrease in the numerical value of beta.

Predictors of Computer Contest Participation

Table 18 summarizes the effect of various administrative, institutional, and faculty variables on computer contest participation.

Table 18. Regression of Computer Contest Participation on Independent Variables

Predictors	Beta	T	Significance
Planning	-.377	-4.987	.000
Organizing	.327	5.305	.000
Leading	-.272	-5.384	.000
Controlling	-.615	-10.712	.000
Budget	-.188	-4.121	.000
Facilities	.123	1.942	.053
School population	.092	2.184	.030
Educational Attainment	-.133	-3.215	.001
Attitude toward computer technology	.452	9.828	.000

Adjusted R Square = 0.642
F-value = 54.283
Significance = 0.000

Success in computer contests seemed to be dependent on the attitude of the computer education teacher toward computer technology **(β = .452),** organizational skill of the principal **(β = .327),** and the efficiency of computer facilities in the school **(β = .123).** The data previously mentioned indicated that as the attitude of the computer education teacher becomes more positive, the more interested he/she is in enabling the students to join the contest through his/her review intervention. Thus, success in computer contests is more or less assured. The organizational skill of the principal, which includes his/her initiative in organizing seminar-workshops for the computer education teachers and encouragement for the professional growth of teachers, also boost the computer contest participation of teachers in an indirect manner. Logically, if the computer education teachers are highly motivated, the computer

education students are likewise inspired to do their best. Moreover, if the computer facilities of the school are sufficient, the students are more than prepared to meet the challenge of contest participation.

On the other hand, beta values for planning, leading, and controlling skills of the principals were negative. These data imply that as these skills of the principals' increased, contest participation and possible success of students decreased by the same value. The same case was observed for the data on budget. It should also be noted that teacher factors like teaching competence and educational attainment had negative beta values. These could be interpreted to mean that the more competent and senior faculty members who have higher educational attainment tend to delegate the responsibility of coaching and chaperoning computer student contestants to new faculty members.

Predictors of Computer Grade Average

Table 19 presents the independent variables which predict computer grade average and their respective beta values.

Table 19. Regression of Computer Grade Average on Independent Variables

Predictors	Beta	T	Significance
Leading	.186	3.649	.000
Controlling	-.356	-7.359	.000
Budget	-.311	-6.472	.000
Facilities	.251	3.958	.000
Teaching competence	.110	2.792	.005

The table above shows that the school computer facilities had a greater impact on the computer grade average of the students than the other independent variables. The leadership skills of the principals had an effect as well on their performance. Budget, which is an institutional factor, had a negative beta value (-.311), meaning that as budget increased less attention was given to the computer education program and thus may lead to lower grade average of students. Maybe one of the basic reasons was the fact the MOOE did not include the purchase of computers and their software. Generally, public high schools are dependent on donation and the goodwill of non-government organizations.

Table 20 summarizes all the predictors of the various dependent variables.

Table 20. Predictors of Student Performance in Computer Education

Independent Variables	Beta	T	Significance
Regression of Student Achievement on Independent Variables			
Organizing	.116	2.018	.044
Computer Facilities	.656	13.051	.000
School Population	.228	6.487	.000
Teaching Competence	.118	3.803	.000
Regression of Computer Contest Participation on Independent Variables			
Organizing	.327	5.305	.000
Computer Facilities	.123	1.942	.053
Attitude toward computer technology	.452	9.828	.000
Regression of Computer Grade Average on Independent Variables			
Leading	.186	3.649	.000
Computer Facilities	.251	3.958	.000

Table 20 reveals that the organizational skill of the principal, computer facilities of the school, school population and computer education teacher's teaching competence predict student achievement in computer education. Likewise, the organizational skills of the school principal, the efficiency of school computer facilities, as well as the attitude of the computer teacher toward computer technology predicted computer contest success. Finally, the leadership skill of the principal and efficiency of school computer facilities accounted for the computer grade average of the students. Overall, however, it was the computer facilities that predicted the computer education program effectiveness of the schools.

Summary of Findings

Majority of the schools (66.6%) have a student population of 4,000 and below, with inadequate budgetary allocation as perceived by the principals. About one-third of the schools have ten students to one computer ratio and these students do not have enough time for hands-on activities. The adequacy of computer facilities as a factor, however, was perceived by the principals to be adequate. The principals were perceived to be very skillful in management functions such as planning, organizing, leading, and controlling.

Forty-two percent of the computer education teachers were rated outstanding by the principals and 52% got very satisfactory scores. More than 90% of the students agreed that their teachers have a mastery of the subject matter. They also agreed that their teachers possessed commendable affective characteristics and adopted appropriate teaching strategies. The teachers likewise exhibited outstanding attitude toward computer technology.

Around 50% of the schools got scores

above the mean (31.90) in the computer education achievement test, while 61% of the students got a computer grade average of at least 86%. Computer academic contest participation and winning, however, ranged from 60.6% to 63.6%.

School computer facilities, school population, teaching competence, and the organizational skills of the principal were predictors of academic achievement of the students. The computer education teacher's attitude toward computer technology and organizational skills of the principal, in addition to efficiency of school facilities, were considered as predictors of school participation in computer skills contest. The leadership skills of the principal, as well as the efficiency of school computer facilities, were seen as predictors of the computer grade average of the students.

The School Board provides less than half the budget for the computer facilities. The rest of the expenses is provided by other agencies (NGOs, concerned citizens, government officials).

Conclusions and Recommendations

Based on the findings of the study, the following conclusions were drawn:

Better school computer facilities, smaller school population, and higher teaching competence promote higher academic achievement of students.

Favorable attitude of computer education teachers toward computer technology, better organizational skills of the principal, and efficiency of school computer facilities increase the chance of winning in computer contests.

Better school computer facilities and leadership skills of the principals enable students to get a higher grade average in their computer education subject.

Better school computer facilities lead to a higher academic achievement, increased winning chance in computer contests, and raised grade average of students in computer education.

School computer facilities, an institutional factor, singly predict the effectiveness of the computer education program in terms of student performance.

Considering the findings and conclusions of the study, the following are recommended:

The principal can probably link with other agencies to procure additional computers or replace old ones to reduce the student-computer ratio. He/she can focus on improving the school computer facilities to enhance all aspects of student performance.

Training should be provided to principals who lack skills in planning, organizing, leading, and controlling that predict student achievement in computer education.

Computer education teachers should continuously be provided with the chance to go through various types of computer training for the benefit of the students. The teachers, in turn, should pay more attention to their professional growth. They should develop innovations and strategies that can further improve their teaching competence in computer education.

Further study should be conducted and focused on other factors not dealt with in this study. Computer education management in the countryside, which has the greater majority of secondary students who come to the urban tertiary institutions for their college education, should also be given attention.

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