



Evaluation of Information Technology Laboratories: Evidence from Pakistan

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Abstract

The purpose of this study is to examine the evaluation of information technology laboratories established by the government of the Punjab in secondary schools. Information Technology Laboratories (IT labs) were established in the Government Secondary Schools (GSS) of the province of the Punjab for the integration of Information and Communication Technology (ICT) in Education. The data were gathered using a checklist for headteachers, a questionnaire for teachers, and a questionnaire for students. The findings indicated that 100 % of facilities were provided in IT labs but unfortunately not functioning properly. For example, 61.1% of schools were without internet connection particularly in rural areas, 27.8 % schools without computer science teachers, and 97.2% schools without lab assistants. It was found that the acceptability of computer technology among urban students was high as compared to their rural counterparts. The extent of teaching support to the students was found insufficient. It was recommended that the vacant posts of computer science teacher should be filled and the number of computers in schools should be increased according to the number of students. The findings may contribute to providing a course of action for policymakers, head-teachers, teachers, parents, and students related to computer science education at the secondary school level.

Disciplinary: Social Sciences, Education (Information Technology in Education).

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1 Introduction

Generally, everyone believes that education is the most powerful tool which changes the lives of people. It is a vigorous mechanism for facial and political changes related to universal

developments of regulations as well as technologies. The main source is education that increases the abilities of people and educates them about their lives through making them skillful to face the challenges that occurred in their lives. It develops creativity in individuals' minds and gives them thoughts of life. In this way, a knowledgeable nation develops who achieve powerful positions and play commanding roles in the globe stated by the American Federation of Teachers (AFT).

It is the requirement in each level of educational institutes in the new age to equip with new techniques and programs to achieve our goals. Blackboard and chalk are being used in the classroom by most of the teachers in these countries. The usage of audio-visual aids is rare in the classrooms during instruction. Libraries are also not functional within the institution for the determination of educating the students in these countries. There are many problems to integrate ICT in schools at the public sector level. Pakistan is facing a shortage of physical facilities to rebuild ICT infrastructure. There are no proper school buildings, sufficient electricity supply, and communication facilities in Government Schools.

Pakistan has faced many problems for the incorporation of ICT in government sector educational institutions. The main problem is the shortage of many physical facilities regarding ICT infrastructure which has to be reconstructed in Pakistan. School buildings are improper, electricity supply and communication facilities in public schools are not an insufficient condition. Inadequate policies of education and lack of sufficient budget are actually the biggest hurdles in developing the capacity in different fields such as teacher's professional developments, scientific sustain skilled development, and content developers development in Pakistan. Financial issues are the main cause for the incorporation of ICT in education. The biggest confront has to supply appropriate ICT facilities in education as per the requirement of teachers and students. Preparation of policies is not an issue but the main problem is implementation. The development of human resources is the key to making progress in ICT in Pakistan.

ICT and its influence on society had been experienced all over the world specifically in the education sector. Keeping this in view, ICT was introduced at the secondary level by all the Education Boards across the province of Punjab. In July 2004, Information Technology/Computer Science Educators, Laboratory Incharge, and Computer Laboratories project was commenced. The main objective of the project was to launch computer laboratories in Government Secondary and Higher Secondary Schools to raise the standard and value of education in computer science at the grassroots level. In 2008, the second phase of the project was started. The project's main purpose was to establish Information Technology laboratories in High/Higher secondary schools consisting of 4286 in Punjab and to teach computer science education/ awareness and ability improvement through giving a supporting atmosphere to the learners of these schools.

Many researchers have conducted studies on ICT and education but there was no study to evaluate the information technology laborites and available ICTs services in organizations that are offering education particularly in Punjab the big province of Pakistan. Therefore, the present

research attempts to evaluate the IT labs established by Govt. of Punjab in secondary schools. In some way, the inspiration in the wake of this study is borne from this to carry out a more definite assessment of the available facilities, difficulties in approachability as well as suitability among students towards ICT, and presence of teaching support to the learners about learning. The following objectives are framed to complete the study to discover the available facilities provided in information technology laboratories in secondary schools. Secondly, to discover the accessibility of computers to the students in schools. Thirdly, to explore computer acceptability among the students in schools. Lastly, to investigate the available teaching support to the students regarding learning.

2 Literature Review

Most of the earlier studies like as Friedman (1998), Kling (2000), Heracleous & Barrett (2001), Mulkeen, (2003) and Senteni, (2006) stated about the main emphasis was that how educators utilize or do not utilize technology for teaching in their institutions because of students discover from technology has missing space in understanding. Undoubtedly technical and social fundamentals are being in a straight line linked with the intertwining of the fruitful usage of technology in diverse executive situations. Another strand of literature including Cuban (2000), Honney, McMilan Culp, & Carrig (2000), Somekh (2003) explored that a significant element in developing actual alteration in schools in the developed countries have to recognize how technology hysteries into the composite realities of classrooms, the developing world however a slight understanding to know concerning the implementation of educational technology.

Kozma and Anderson (2002) elaborated that no country can improve the education system without the considerable role of ICT. Most of the countries have spent seriously to increase the ICT facilities within their educational institutions. According to the thinking of researchers, the status of technology in the classroom will remain to grow the quality and standard of education. It is very difficult for the countries for the incorporation of ICT technology in the school curriculum and yet it is very complicated and testing practice and the faultless addition of PCs in educating and training was actually difficult to achieve. According to Gibson, O'Reilly, and Hughes (2002) it is very important to prepare students with appropriate and excellent ICT knowledge before students come out into the professional field. Campbell (2001) also argued that the economic development of a country depends upon the integration of Information technologies. Economic development and employment opportunities are enhanced with the use of ICT's. Students can get help by using ICT's in every field of life.

As Kashorda (2007) stated that the practices of information communication technology in schooling have the prospective to improve the worth of instruction and knowledge, the exploration efficiency of instructors plus learners, and the efficiency of the organizations. But it is very hard to integrate ICT in education in under-developing countries. Thus, ICT facilities are rare in under-developing countries. The under-developing countries are also facing the problems of connectivity

to obtain new technologies. It is very important to adopt computer science technology to achieve the goals of a developing country. Teachers are using chalk and Blackboard in most of the developing countries. ICT technology like AV aid is rare while teaching students.

Isman et al. (2010) and Ojo et al. (2007) explored that the major hurdles to using ICT in education are the lack of facilities and infrastructure at the workplace. Many of the problems of the incorporation of computers in education have been pointed out by endeavors. The studies showed that policymakers and teachers can play a crucial role to integrate ICT in education. If teachers show their responsibility to implement the policies effectively framed by the policymakers then a strong ICT infrastructure can be planted. According to Erkunt (2010) integrating ICT in education, we are required proper financing, adequate training, suspicious scheduling, improving the teaching method, and a controlled way of execution. Proper use of computers is still alarming in the education sector while Pakistan has made development in the utilization of mobile equipment.

Teaching and learning through the use of technological tools like information and communication technology is known as information and communication technologies (ICT). The modern invention of information and communication technology provides countless chances of development as well as the advancement of coaching and learning inside the classrooms (Blurton, 1999). In this era, information and communication technology is a group of actions that help through electronic ways the processing, communication, and demonstration of facts (Rodriguez and Wilson, 2000). ICT such as tools inside the school atmosphere comprise usage aimed at college or school's management and supervision, instruction and education of ICT linked expertise for developing the demonstration of classroom activities, educating and learning respective everyday jobs, rational, intellectual and problematic solutions expertise, motivating creativeness and thoughts, for investigation through instructors and learners.

3 Method

This study is descriptive in natural surroundings and the topic demanded a survey regarding ICT facilities. The data were collected through a checklist and questionnaires to examine prevailing situations in arranged and organized manner. Frequency, percentages, mean and standard deviation (SD) were computed using (SPSS- version 21) to conclude the existing facilities and their access to the students, the computer acceptability among students, and the teaching support being provided to the students. This study focused on all headteachers, secondary school teachers, and students of the 9th & 10th Classes session (2019-2020) of public secondary schools. It is a descriptive investigation and a survey method considered suitable.

An opinion scale in the form of a questionnaire consisting of five points Likert scale was considered best and used to obtain the decision as well as results. As Baker (1999) indicated as an opinion scale is a measuring tool formed on some indicators which have certain interrelationships to one another. A check comprising of 15 items for headteachers, a questionnaire comprising of 32

items for teachers, and a questionnaire for students comprising of 32 items were prepared. Tables 1, 2, 3, and 4 show sampling details.

Table 1: Organization of Sampling

Population	Percentage	Sample size
Head Teachers	100%	72
Teachers(CS)	100%	47
Teachers(SCI)	45%	97
Students	05%	432

Table 2: Reliability of Teacher's Questionnaire

Dimensions	Coefficient Alpha	No. of Items
Overall	.89	32
Support in the usage of computers.	.76	05
Teacher's competence & Content delivery	.75	05
Teacher's support in the selection of ICT as a subject	.75	05
Support in learning during practical work	.76	05
Support in assessment	.77	06
Maintenance of IT lab & Technical support	.78	06

Table 3: Reliability of student's questionnaire

Dimensions	Coefficient Alpha	No. of Items
Overall	.87	32
Accessibility of computer to the students	.68	7
Computer acceptability of the students	.67	9
Teaching support available to the students	.79	16

Table 4: Questionnaires return

Sample	Distributed	Returned	Return
Head Teachers	72	72	100%
Teachers	144	132	91.67%
Students	432	370	85.65%

4 Result and Discussion

The main aim of the existing chapter was to describe the analysis and interpretation of data concerning to evaluation of information technology laboratories established by the Government of the Punjab in secondary schools. The information gotten from various methods was examined statistically by using Descriptive Statistics.

Table 5: Classification of respondents demographically.

Item	Frequency	Percent
Female	26	36
Male	46	64
Rural	58	81
Urban	14	19
Principal	04	05
Senior Headmaster	13	18
Headmaster	23	32
In-charge Head master	32	45

Information in Table 5 frequencies and percentage shows the demographical information about head teachers' gender-wise. The male respondents were 46 (64%) and females were 26 (36%).

In this way, male respondents were higher in numbers. The headteachers belonging to rural areas were 58 (81%). The respondents belonging to urban areas were 14 (19%). In this way, rural respondents were higher in numbers as compared to urban. The results indicated that there were 4 (05%) respondents having designation Principals, 13 (18%) Senior Headmasters, 23 (32%) Headmasters, and 32 (45%) In-charge and Headmasters. The first research question is about the What is the level of available facilities in information and technology (IT) Laboratories established in public secondary schools?

Table 6: Detail of facilities provided in IT Labs responded by Head-teachers

Facility Provided	No. of Respondents	Provision status		Functional status	
		Yes %	No%	Yes%	No%
Computer lab	72	100	0	100	0
Desktop computer	72	100	0	100	0
Server	72	100	0	100	0
Terminal pc's	72	100	0	100	0
Printer	72	100	0	87.5	12.5
Software	72	100	0	0	100
Internet connection	72	38.9	61.1	38.9	61.1
UPS	72	100	0	88.9	11.1
Stabilizer	72	100	0	94.4	5.6
Air conditioner	72	100	0	88.9	11.1
Computer room	72	100	0	100	0
Safety door	72	100	0	100	0
Computer Chairs for students	72	100	0	100	0
Computer Tables	72	100	0	100	0
Computer Teacher	72	72.2	27.8	72.2	27.8
Lab Assistant	72	2.8	97.2	2.8	97.2

Information presented in Table 6 shows the details of facilities delivered in IT Labs answered by Headteachers. These outcomes computed from responses confirm that the institutions having the computer science teachers were 47(72.2%) whereas the institutions running without the facility of computer science teachers were 25(27.8%). Results also indicated that the institutions that have the facilities of Lab assistants were only 2.8 % and 97.2 % of schools have no such facility. Printings facility was provided to all of the schools but (87.5%) schools having printers were in working conditions and (12.5%) were non-functional. The institutes that have internet link facilities were (38.9%) and (61.1%) were without a Digital Subscriber Line (DSL) connection. The UPS's working conditions were (88.9%) and (11.1%) were not working. The schools with working Air conditioners were (95.9%) and (04.1%) were nonfunctional. The second research question is about the level of the accessibility of computers to the students.

The results from Table 7 indicate the variable-wise analysis of the Student's questionnaire. The variable accessibility of computers to the students when they need overall mean was 3.60 with an SD of 0.626. The variable computer acceptability of the students in schools with the largest arithmetic mean was 3.67 with the smallest standard deviation of 0.469. The Variable extent of teaching support available to the students regarding the mean was 3.66 with SD 0.474.

Table 7: Variable wise analysis of Students' Questionnaires

Variables	Mean	SD	Percentage %				
			SDA	DA	UD	A	SA
Accessibility of computers to the students when they need them.	3.60	0.626	05	02	21	45	27
Computer acceptability of the students in schools.	3.67	0.469	04	05	11	60	20
The teaching support is available to the students regarding learning.	3.66	0.474	05	06	10	61	18

Table 8: Accessibility of computer to the students

Statements	Mean	SD	Percentage %				
			SDA	A	D	A	SA
I use a computer in schools.	3.381	1.278	6.8	28.1	6.8	37.0	21.4
I easily access to computers in school.	3.394	1.403	3.0	19.5	10.5	29.2	27.8
Enough computers are available for students' use in school.	3.954	0.940	1.6	8.9	10.0	51.4	28.1
I usually find the learning resources regarding computers I need.	3.564	1.132	4.6	4.6	23.8	33.8	23.2
The instructional support regarding the uses of computers in my school is adequate.	4.097	0.827	.8	6.2	6.2	55.9	30.8
Computers in my school are networked.	3.956	1.019	1.9	11.9	7.0	47.0	32.2
I have internet access in my school.	2.859	1.383	8.4	36.6	14.0	20.8	10.8

According to the results presented in Table 8 displays that 58% of respondents approved the statement that I use a computer in school, 35% of participants were not decided although 7% were unclear. It was also noticeable that the score for mean was 3.38 which was acceptable to the question. SD of the question was 1.278. As per results shown in Table 8 that 57% of participants approved the question that "I easily access to computers in school" 33% of participants disagreed whereas 10% of participants remained unclear. It was also noticeable that the mean value was 3.39 that was optimistic to the statement. SD of the item was 1.403. The above table expresses that 11% of respondents approved the question that enough computers are available for student's use in school, 80% of participants showed disagreement although 9% of respondents remained unclear. It was also evident that mean total was 3.95 was satisfactory but the results showed disagreement with the question. SD of the item was 0.940.

Table 9: Computer acceptability among students in schools

Statements	Mean	SD	Percentage				
			SDA	DA	UD	A	SA
I find computers easy to use.	3.746	1.094	3.0	14.1	15.7	40.0	27.3
My interaction with computers is clear and understandable.	3.895	0.994	1.4	10.5	15.4	42.7	30.0
Working with computers makes learning more interesting.	4.232	0.729	.5	2.7	6.2	54.1	36.5
Learning with computers is fun.	3.681	1.197	6.8	12.4	14.6	38.4	27.8
I feel fairly confident when working with computers.	3.783	1.075	2.2	13.8	16.5	38.6	28.9
I would like to know more about computers.	4.138	0.896	1.6	5.1	8.9	46.5	37.8
I think that ICTs can improve my learning.	4.119	0.878	1.4	5.4	8.9	48.6	35.7
I often unsure what to do when using a computer	2.754	1.257	17.3	31.4	20.8	19.7	10.8
In general learning with ICT is very time-consuming.	2.714	1.290	20.8	29.7	15.9	24.3	9.2

The third research question is about what is the level of computer acceptability among students in schools? Table 9 confirmed that respondents 67% agreed with the question that I find

computers easy to use, 17% of participants showed disagreement whereas 16% were unclear, with a mean value of 3.746 and SD 1.094. Respondents 72% showed their views towards agreed about the question that “My interaction with computers is clear and understandable”, 13% participants showed disagreement while 15% were no clearance. Whereas, a score of mean, comes to 3.895 and is very auspicious to the said question. The SD of the item was 0.994.

5 Conclusion

The focus of the study was the evaluation of information technology laboratories established by the Government of the Punjab in secondary schools. Exploration aimed to discover out the view of head educators, educators, and pupils about the facilities of IT labs. The results show that the access to computers was not according to the number of students. Acceptability of computer technology among urban students was high as compared to rural students. The results showed the extent of teaching support to the students regarding learning was insufficient. It was visible that most of the respondents agreed about the available facilities provided in IT labs in secondary schools. It was concluded that ICT facilities such as desktop computer, server, printer, software, were available whereas internet connection, IT teacher, IT Lab Assistant / Technician was not available in some of the institutions. It was clear from outcomes that the mainstream of the participant was agreed to the view of the accessibility of computers in IT labs. Based on these findings, we recommend the following suggestions to the policymakers, educationists, and Govt. of the Punjab. The study recommends that computers must be provided considering the strength of the enrolled students. During the study, it was noticed that some schools are without computer teachers. Therefore it is recommended that computer teachers must be appointed against vacant posts. There is a deficiency of computer technicians as well as computer laboratory assistants that are the basic need for smooth functioning of computer labs. So, the study recommends that computer technicians, as well as lab attendants for computer laboratories, must be appointed. In this study investigation was made at the schools level, it is recommended that same kind of research should be carried out at all levels like intermediate, university level. Secondly, this study was completed in District Chiniot only; therefore it is recommended that similar types of studies should be conducted in other parts of the country.

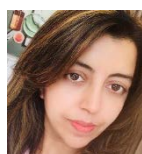
6 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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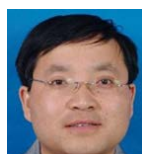
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