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PRACTICES AND INTEGRATION OF ICT AT PRIVATE HIGHER SECONDARY LEVEL IN PAKISTAN

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ABSTRACT

The current exploratory study investigates the acquaintance of teachers' information in communication technology (henceforth, ICT) and its integration in teaching-learning process at private higher secondary level in Pakistan. The study adopts a quantitative technique and a variety of variables pertaining to the familiarity with computers in teaching-learning were examined. Subsequently, using a purposive sampling, 200 questionnaires were disseminated to the teachers. Total 169 instruments were returned and 133 were keyed into SPSS after filtering and cleaning the data. Descriptive means, percentages, crosstabs, and rank order were computed to report findings. The study revealed that 75% teachers had been formally trained for ICT, 67% teachers had access to computers and 53% had access to internet at their institution as well as home. Results show that 'use of Email', 'internet browsing', and 'word-processing' were most familiar tools. On the other hand, 'collection of teaching/reference material', 'preparing papers', and 'teaching materials' were being used for teaching purposes.

Key Words: ICT, teaching-learning process, higher secondary level, accessibility of internet, teacher training.

INTRODUCTION

For imparting Intermediate level education in different disciplines, it is a general impression that private sector colleges have a better control on the academic activities over the public sector/government run colleges in the city of Karachi. It is also a general impression that the teachers teaching various subjects at private colleges in Karachi are better trained and for this reason the results in these colleges are better than those of public sector colleges. The private colleges, especially those who bear a good reputation in terms of pass percentage either preferably induct Information Communication Technology (henceforth, ICT) trained teachers or, invest in getting their teachers trained so as to make them better equipped in imparting the Board of Intermediate Education Karachi (henceforth, BIEK) curriculum.

The strategic vision as defined in the National Education Policy (2009) Pakistan clearly states that the "Faculty training in pedagogical, communication and ICT skills is required at all levels". The policy also acknowledge that private sector has been putting up efforts in bridging the gap in certain areas of education including use of Information and Communications Technology. Moreover, the policy acknowledges the need for pre-service and in-service training of ICT. Intermediate colleges are the ultimate feeder institutions for institutions of higher studies in the city of Karachi. A good product of these colleges would result in a better intake for universities/degree awarding institutions and the student thus passing out would be more productive. Whereas government spends negligible portion of its budget on education, there are greater expectations from private colleges since their management invests more for being competitive in the choice of institutions among its

potential students. Although the use of ICT has been at an increase over the past couple of years, it is generally considered that the computer labs are mostly kept as a showpiece rather than being exploited to its true potential. Moreover, the use of ICT in teaching-learning process is more bent towards teaching of science related subjects and not other subjects e.g. Islamiat, Pakistan Studies, Urdu etc.

REVIEW OF RELATED LITERATURE

Why ICT in Teaching and Learning?

Kareem and D'souza (2012) mentioned that although advancements have been made in both information as well as communications technology and, that computers today are being used not only for teaching in classrooms but are also being used in administration, library, students' record keeping, guidance and counseling of educational institutions and even for in-service teacher training, the overall lack of in-depth knowledge, variation in the availability of type of technology available and improper usage of technology, the true potential of ICT is not exploited. They also emphasized on the role of school leadership for providing training opportunities and provision of infrastructure for better utilization of ICT.

Tezci (2010) regards ICT as a good alternative to teacher-centered classrooms and accepts that where ICT has brought changes in learnerning style of learners, it has also brought changes in teaching style of teachers. He suggests that ICT can be used for almost all the subjects taught and the entire curriculum and its effective integration in the classroom activity can enrich the lecture, increase students' participation and shift the focus of classroom activity from teacher to students making it more interactive. He believes that technology itself is of no use rather it is the effective use of technology which makes value in the teaching-learning process and that teacher is the key factor in this process. Similarly, Smeets, Gennip and Rens (2009) point out that at the time when ICT tools were not available, the focus was mainly on transfer of knowledge rather than construction of knowledge but with inclusion of ICT the scenario is reversed and that focus has now been shifted from transfer of knowledge to construction of knowledge.

Integration of ICT in Classroom

Downes suggest that since integration of ICT in education has a great impact on classroom environment, the process of integration is complex and thus be seen in four stages/levels. The first level is to introduce ICT as an additional subject in the school curriculum without making any change in the teaching methodology of the other subjects being taught. The second level would be to introduce ICT in teachers' day to day tasks other than classroom teaching. The third level would be to include ICT in classroom teaching so that both teachers and students know as to what and how to teach and learn. After when these levels are achieved, the fourth one would be the level where the ICT would be integrated at the systems level making an impact on the overall organization of the school (as cited in Yousuf & Dhamani, 2008).

Gal and Greitz (as cited in Buda, 2010) point out that integrating ICT in classroom should be looked at from different point of views, an important one is the provision of ICT equipment and availability of right environment and infra structure. Buda (2010) highlights the importance of attitudes of teachers towards use of ICT and their own willingness as mere provision of ICT equipment and infrastructure will not help. He adds that whereas teachers are not supposed to be expert of the technology, they must at least know the relevance of ICT with the subject they teach as according to him, the pedagogy and methodology varies from subject being taught and the teacher's own perception about how much ICT be included for teaching of that subject.

Challenges in Integrating ICT in Classroom

Alazam, Bakar, Hamah and Asmiran (2012a) analysed various studies to conclude that use of ICT in classroom is a dynamic process and that it depends on various factors which include teachers' willingness, their attitudes, support from administration, availability of appropriate hardware, software, allied equipment and infrastructure. Teachers' qualifications, level and type of ICT training provided to teachers, their gender, age and teaching experience with ICT. Alazam et al. (2012a) pointed out that whether being taught as a separate subject or integrated directly in classroom teaching of different subjects, ICT has become an important

component of education in various countries of the world as it enhances students' motivation level in understanding difficult topics of various subjects which are made easy to understand through use of ICT.

Almakani and Williams (2012) pointed out various factors of teachers e.g. lack of competence and confidence, negative attitudes and institutional/administrative factors e.g. lack of time, efficient training, local technical support and leadership as important among intrinsic factors as barriers in implementing a good ICT strategy. Improper planning, lack of funding and local culture is among major extrinsic factors which hinders ICT in classroom teaching.

Teachers' Training in ICT

Oguzor (2011) is of the opinion that only a few students like the traditional way of classroom teaching and that majority of students prefer to learn using innovative ways. He adds that the traditional classroom teaching methods may overlook essential factors in the process of learning. He further adds that if used properly, computers can prove to be tremendous teaching resource but at the same time he admits that no matter how effective computers are, they can never replace teachers inside the classroom. He therefore suggests that in order to use the computers in an efficient way, teachers must first learn how to use software already available and in the mean while they must also learn how to customize software for their specific teaching needs. He further suggests that software being used should be customized and rightly chosen for the prescribed curriculum so that it could compensate for the teachers' weaknesses in certain areas and that it could standardize the teaching methodology in a school.

Administrative and Technical Support

It is seen that only proper training is not sufficient for proper integration of ICT in classrooms until teachers are provided with the right hardware, software and technical support. Bauer and Kenton (2005) found that even the teachers who are good in using computers do not use ICT in their classrooms on a regular basis. One of the main reason pointed out for this was that teachers needed extra time for class preparation. Lack of suitable software and technical assistance and out dated hardware were found among other reasons taken as barriers for using ICT in classrooms. Almekhlafi and Almeqdadi (2010) are of the opinion that non-supportive administration, lack of ample technical support and non availability of computers inside the classrooms are among the major hindernaces in integration of ICT in classrooms.

Teachers' Attitude and their Use of ICT

Tezci (2010) is of the opinion that it is not just the deployment of equipment in the classroom purchase of software, and teacher training, rather the effective use of ICT has a lot to do with teachers' attitude towards using ICT in teaching-learning process. He further adds that the computer hardware, software and allied equipment itself has no value for education until they are used in an effective, efficient and innovative way. Tondeur, Van Braak and Valcke (2007) mention that teachers' views about whether or not the teachers use ICT mainly depend upon their attitudes, in addition to other factors e.g. their level of information and experience with ICT and their knowledge on how to utilize their ICT knowledge in their teaching process (as cited in Tezci, 2010).

Gender and other Differences

Morley (2010) found that there was no substantial difference in the use of ICT while using in the classroom, however, he hints that there is a slightly lesser tendency among male teachers to use computers in classroom than females. Alazam, Bakar, Hamzah, and Asmiran (2012b) maintain the same, but they do point out that gender does make some impact on the teachers' readiness towards use of ICT in teaching but their study could not find the effect of teachers' educational background on their readiness for using computers in classroom teaching. Likewise, Elsaadani (2012) in his study could not find any significant relationship between the gender of the teachers and their attitude towards making use of ICT in classroom teaching.

Use of ICT and Students' Achievement

Chandra and Lloyed (2008) in their study found that use of ICT can increase students' academic achievements and performance. They however added that there can be different opinions about the same in different settings. Youssef and Dhamani (2008) are of the opinion that ICT can make a good impact on the process of teaching learning as it provides many options for teachers and students. They also endorsed that there are different views about the relation between the use of ICT and students' achievements. Aristovnik (2012) found that the ICT has varied impact on academic achievements, concluding that most of the Euoropean countries have a great potential for increasing academic achievements and outcomes through better and efficient use of ICT in teaching learning process.

STATEMENT OF THE PROBLEM

ICT is being used in teaching-learning process at varied levels. Due to limited training, unavailability of computers and internet and/or lack of training/motivation among teachers, the students fail to receive the ultimate benefits of use of ICT in the teaching-learning process. Whereas the administration generally attribute this problem to the lack of interest and inactive attitude of teachers, teachers attribute the same to lack of availability/accessibility of right equipment and training. Syllabus of BIEK and textboks which have not been revised for decades also do not encourage the use of ICT in classrooms.

Objectives Of The Study

The objectives of the study were to investigate:

1. The accessibility of computers and internet of private higher secondary school teachers.
2. ii. The knowledge and familiarity of computer programs and tools by private higher secondary school teachers.
3. iii. The usage of ICT in teaching and learning process by private higher secondary school teachers.
4. iv. The usage of computers in teaching specific subjects by private higher secondary school teachers.
5. v. The usage of internet in teaching and learning process by private higher secondary school teachers.

Research Methodology And Sampling Technique

The study employs a dewscriptive survey design. The plan of study involves collection of data about level of knowledge about ICT and its use in teaching-learning process by teachers of private colleges of Karachi. All teachers of private colleges of Karachi city were taken as a target population. In this context, purposive sampling was assumed fit to investigate the phenomena. There were total 133 teachers of different subjects who participated in this study. All teachers i.e 133 of 119 private colleges were affiliated with the Board of Intermediate Education Karachi situated in the city of Karachi. Intermediate colleges having good reputation both in terms of discipline and top academic performance in Board were selected for optimal results. Teachers working in colleges having less than 50% pass percentage were not included in this study. Moreover, visiting faculty members were also excluded from the study. The colleges were so selected as to cover different areas of the city so as to get an even distribution of respondents.

Research Instrument And Reliability

For the current study, research instrument was adopted from Kareem and D'souza (2012). There were total 57 items in the questionnaire, however, 10 items were deleted for the conformity in a regional Pakistani context. Consequently, total 47 items were taken and was used to answer research questions. Reliability is the quality of the instrument to produce the same and consistent results when the instrument is administered more than once. In this study, the reliability for the instrument was found out by calculating Cronbach Alpha using SPSS over pilot data of 30 records. Cronbach Alpha's value was found significant i.e. 0.964 which is considered acceptable as suggested by (Black, 1999; George & Mallery, 2003; Nunnaly, 1978; & Riazi, 1999).

Table 1: Reliability Analysis of Pilot Study

Sr. #	Variables	No. of Items	Cronbach's Coefficient Alpha	Overall Reliability Statistics (Cronbach Alpha) for 47 Items
1.	Familiarity with Computers and Tools	22	0.950	
2.	Use of Computers in Teaching-Learning Process	16	0.932	0.964
3.	Use of Internet in Teaching-Learning Process	09	0.848	

Ethical Consideration

As recommended by Polonsky and Waller (2010), the letter of consent was sent to the respective principals of the colleges from where the data was collected in order to get their consent before visiting their institutions. Before the start of survey, the respondents were informed in person about the purpose of study and the anonymity of data. The participation in the survey was voluntary.

Research Procedure And Data Analysis

The research involved purposive sampling as it involved judgemental sampling. A total of 200 questionaires were sent to selected private colleges of Karachi having good record in terms of Board results for the past five years. The researcher himself briefed the respective principals about the purpose/intented outcomes of the research. The data was piloted on first 30 forms in order to find out the reliability of the instrument. Out of 200 questionnaires sent, a total of 136 were received back among 6 forms were rejected. The researcher computed descriptive statistics, means, frequency, percentages, crosstabs, and rank to report findings by using SPSS version 20.

KEY FINDINGS

Table 2: Demographic factors of Higher Secondary Teachers

Demographics		*f*	%
Gender	Male	53	39.8
	Female	80	60.2
Age	24-27 years	16	12.0
	28-31 years	16	12.0
	32-35 years	40	30.1
	36 years and above	61	45.9
Teaching Experience	Less than 1 Year	3	2.3
	1-2 years	6	4.5
	2-5 years	17	12.8
	5-8 years	13	9.8
	8-10 years	19	14.3
	More than 10 years	75	56.4
Access to Computer	Home	37	27.8
	School (Office)	1	0.8
	School (Lab)	5	3.8
	Other Places	1	0.8

	More than 1 place	89	66.9
Access to Internet	Home	51	38.3
	School (Office)	4	3.0
	School (Lab)	5	3.8
	Other Places	2	1.5
	More than 1 place	71	53.4
Formal Training for ICT	Trained	100	75.2
	Un Trained	33	24.8
N = 133			

The demographic data reveals that 56.4% teachers have a teaching experience of more than 10 years, which means that private colleges usually keep well experienced faculty in order to create a good reputation and better academic results. It was also found that 66.9% teachers have access to computers at more than one place and 53.4% teachers have access to internet at more than one place. It was further revealed that more than 75% of the teachers have been formally trained for using ICT in their classrooms and teaching-learning process.

Table 3: Mean Ratings of Teachers' Familiarity with Computers and Tools

Sr. #	Familiarity with Computers and Tools	Mean		Overall Mean
		Male	Female	
1	Word-Processing	4.47	4.83	4.6
2	Spreadsheets	3.74	4.00	3.9
3	Presentation Tools	4.55	4.79	4.7
4	E-Mailing	5.17	5.14	5.2
5	Internet Browsing	5.25	5.14	5.2
6	Statistical Tools	3.64	3.45	3.5
7	Graphics	3.09	3.15	3.1
8	Web Page Designing	2.60	2.56	2.6
9	Programming	2.57	2.59	2.6
10	Database Management	2.70	2.70	2.7
11	Project Management	2.92	2.83	2.9
12	Computer Games	3.83	4.39	4.1
13	Multimedia Presentations	4.09	4.44	4.3
14	Desktop Publishing	2.81	2.80	2.8
15	Simulations	2.47	2.25	2.4
16	Math Related Software	2.98	2.73	2.9
17	Problem Solving Software	2.75	2.71	2.7
18	Tutorials	3.19	3.16	3.2
19	Operating a CD Rom Device	4.11	4.11	4.1
20	Operating an Optical Scanner	3.68	3.34	3.5
21	Operating an Lased disk Player	3.28	2.80	3.0
22	Operating a Projetion Device through Computer	3.38	3.20	3.3

Table 3 shows the mean rating of teachers' familiarity about computers and tools on a seven point Likert scale. It is evident from the data that for items like Internet Browsing, Statistical Tools, Project Management, Simulations and Math Related Software, male teachers have a slightly higher mean in comparison to female teachers. For itmes like Web Page Designing, Programming, Database Management, Problem Solving Software, Tutorials and Operating a CD ROM, both male and female teachers have almost equal mean. For rest of the items, i.e. Wordprocessing, Spreadsheets, Presentation Tools, E-Mailing, Computer Games and Multimedia

Presentations, female teachers have a higher mean rating. It is also evident from the table above that the mean rating for both the genders are close to their mean and do not have a huge disparity.

Table 4: Mean Ratings of Teachers' Use of Computers in Teaching-Learning Process

Sr. #	Use of Computers in Teaching-Learning Process	Mean		Overall Mean
		Male	Female	
1	Teaching-learning for specific subjects	3.83	4.25	4.0
2	Teaching Computer skills	3.72	4.03	3.9
3	Finding/accessing information/educational materials	4.75	5.19	5.0
4	Making presentations / lectures	4.45	4.55	4.5
5	Remedial classes	2.98	3.21	3.1
6	Enrichment classes	3.02	3.45	3.2
7	Drill and practice	3.04	3.38	3.2
8	As a vital part of regular instruction	3.42	3.55	3.5
9	Preparing lessons / Lesson Plans	4.25	4.51	4.4
10	Communicating with students (Homework, Testing)	3.53	3.83	3.7
11	Communicating with other teachers	3.85	4.01	3.9
12	Communicating with parents	2.62	2.69	2.7
13	Monitoring/evaluating/record keeping	3.57	3.94	3.8
14	Preparing Reports	4.15	4.28	4.2
15	Further personal development	4.11	4.75	4.4
16	Test/Quiz	4.47	4.70	4.6

Table 4 shows the mean ratings of Teachers' Use of Computers in Teaching-Learning Process. It is interesting to note that Finding/Accessing Information/Educational Material is the only item which has a mean rating for male teachers is higher than that of female teachers. For items i.e. Making Presentations/Lectures and Communicating with parents, the mean rating for both the genders is equal. For all the rest of items, the mean rating for female teachers is higher.

Table 5: Mean Ratings of Teachers' Use of Internet in Teaching-Learning Process

Sr. #	Use of Internet in Teaching-Learning Process	Mean		Overall Mean
		Male	Female	
1	Teaching specific lessons in various subjects	4.30	4.63	4.5
2	Making presentations/lectures	4.40	4.71	4.6
3	Preparing Lessons / Lesson Plans	4.08	4.50	4.3
4	Communicating with students	3.58	3.51	3.5
5	Communicating with teachers	3.64	3.60	3.6
6	Communicating with parents	2.68	2.66	2.7
7	Accessing and using online assessment tools	3.30	3.44	3.4
8	Preparing papers and teaching materials	4.58	5.23	4.9
9	Collecting teaching and reference material	4.66	5.44	5.0

Table 5 shows the mean ratings of Teachers' Use of Internet in Teaching-Learning Process. It is interesting to note that Preparing Papers and Teaching Materials is the only item for male teachers which has a mean rating higher than that of female teachers. For items i.e. Communicating with Students, Communicating with Teachers and Communicating with parents, the mean rating is the same for both male and female teachers. For rest of the items, female teachers have slightly higher mean rating on the seven point Likert scale.

Table 6: Mean Ratings of Teachers' Familiarity with Computers and Tools in Rank Order

Familiarity with Computers and Tools	Mean
Internet Browsing	5.18
E-Mailing	5.15
Presentation Tools	4.69
Word-Processing	4.68
Multimedia Presentations	4.30
Computer Games	4.17
Operating a CD Rom Device	4.11
Spreadsheets	3.89
Statistical Tools	3.53
Operating an Optical Scanner	3.47
Operating a Projection Device thru Computer	3.27
Tutorials	3.17
Graphics	3.13
Operating an Laseddisk Player	2.99
Project Management	2.86
Math Related Software	2.83
Desktop Publishing	2.80
Problem Solving Software	2.73
Database Management	2.70
Programming	2.58
Web Page Designing	2.58
Simulations	2.34

Table 6 shows the mean ratings of Teachers' Familiarity with Computers and Tools in rank order. It is evident from the table that Internet Browsing, E-Mailing, Presentation Tools, Wordprocessing and Multimedia Presentations are the tools which are most widely known among teachers followed by Computer Games, Operating a CD Rom Device, Spreadsheets and other tools. However, tools like Simulations, Web Page Designing, Programming, Database Management and Problem Solving Software are among the tools which are least known to teachers at higher secondary level.

Table 7: Mean Ratings of Teachers' Use of Computers in Teaching-Learning Process in Rank Order

Use of Computers in Teaching-Learning Process	Mean
Finding/accessing information and educational materials	5.02
Test/Quiz	4.61
Making presentations / lectures	4.51
Further personal development	4.50
Preparing lessons / Lesson Plans	4.41
Preparing Reports	4.23
Teaching-learning for specific subjects	4.08
Communicating with other teachers	3.95
Teaching Computer skills	3.90
Monitoring and evaluating students' progress or keeping the track record of student' performance	3.79
Communicating with students (Homework, Testing)	3.71
As a vital part of regular instruction	3.50
Enrichment classes	3.28
Drill and practice	3.24
Remedial classes	3.12
Communicating with parents	2.66

Table 7 shows the mean ratings of Teachers' Use of Computers in Teaching-Learning Process in Rank Order. It is evident from the table that Finding/Accessing Information and Educational Material, Test/Quizes and Making Presentations/Lectures are the most commonly used items among teachers followed by Preparing Lesson Plans, Preparing Reports and Teaching-Learning of Specific Subjects. However, communicating with parents, Remedial Classes, Enrichment Clsses and Drill and Practice are the items which are least used by the teachers.

Table 8: Mean Ratings of Teachers' Use of Internet in Teaching-Learning Process in Rank Order

Use of Internet in Teaching-Learning Process	Mean
Collecting teaching and reference material	5.13
Preparing papers and teaching materials	4.97
Making presentations/lectures	4.59
Teaching specific lessons in various subjects	4.50
Preparing Lessons / Lesson Plans	4.33
Communicating with teachers	3.62
Communicating with students	3.54
Accessing and using online assessment tools	3.38
Communicating with parents	2.67

Table 8 shows the mean ratings of Teachers' Use of Internet in Teaching-Learning Process in Rank Order. The table shows that Collecting Teaching and Reference Material, Preparing Papers and Teaching Materials, Making Presentations/Lectures and Prepareing Lesson/Lesson Plans are the items for which Internet is being used most widely by the teachers. However, Communicating with parents, teachers and students and Using Online Assessment Tools, Internet is least used by the teachers.

DISCUSSION AND CONCLUSION

The study revealed that a large portion of teachers (75%) had been formally trained for ICT. Moreover, a significantly large proportion of teachers (67%) had access to computers and 53% teachers had access to internet at their institution as well as home. Despite a large proportion of teachers being formally trained in ICT and having access to computers and internet, results show that 'use of Email', 'internet browsing', and 'word-processing' were most familiar tools. On the other hand, 'collection of teaching/reference material', 'preparing papers', and 'teaching materials' were being used for teaching purposes. Moreover, variables such as 'finding information', 'educational material', 'test/quizzes', and 'preparing lectures/presentation' were found to be significant factors in teaching at higher secondary level. ICT is being used in teaching-learning process using generic and general purpose tools for example wordprocesor, spreadsheets, email and internet. This is attributed to the reason that when teachers are sent for formal training, they are sent for programs of short duration (not more than a week) so that the teaching process is not is not affected due to their absence. The training is thus focused on general handling (Windows, in particular), wordprocessors, spreadsheets and presentation software (MS Word, MS Excel and MS Power Point in particular as they are being widely used. Thus the 'formal training' does not train the teachers as how to integrate the ICT in classroom teaching. Thus, whereas ICT tools support the teachers in lecture preparation, the teachers are reluctant in using computer as a direct teaching aid within the classroom. Moreover, teachers are trained to use computers and internet but not trained how to teach making use of ICT. It was found that 'Communicating with parents' and 'Communicating with Students' were significant factors in using inter in teaching-learning process. Teachers seldom make use of internet for online tests tools. Although internet is used for collecting teaching information and communicating among themselves, communications technology is not being directly used in teaching-learning process.

The study revealed that a large number of both male and female teachers have been formally trained for using ICT and a significant proportion of teachers have access to both computer equipment and internet in both their workplace as well as their home. Despite the aforesaid, the knowledge of teachers in ICT is shallow and

revolves around basic use of computers and internet e.g. email, wordprocessing, spreadsheets and browsing over internet for enriching their content knowledge which may have indirect benefit in their teaching practice but there is a lot more to be done for integrating ICT directly in classroom activity.

In addition to integrating computers in classroom teaching, teachers must also be encouraged to exploit the potential of communications technology (internet) so as to maintain a close liason with the parents for regular feedback. This could also be used for arranging reinforcement/enrichement of content taught inside the classroom and for those students who could not attend the class for some reason. Use of online assessment tools, simulations, programming and web page designing may also included in the teachers' training content so that they could become self sufficient in producing tailor made solutions for their specific teaching needs. The management of educational institutions must also understand that only the provision of equipment and internet is not sufficient until the provision of righ software is not ensured. Since computers are supposed to be used in teaching of all type of subjects and teachers have calculated time when the classes are in progress, supporting staff must also be provided for maintenance of the equipment and making it ready in advance for use during class. Allied accessories such a multimedia projectors, smart boards, printers and their consumables are also required for getting the desired outcomes. Provision of all these resources may seem costly, but it eventually recovers the same in terms of academic achievement of the students.

The training program for teachers in ICT must be done in a progressive way. Those who are already aware of using general purpose software must be trained to further polish their skills in use of training software. Focus of training should be, in addition to general use of computers and internet, the subject specific utilization in teaching learing process. Teachers should be given ample time to share their views in better utilization of ICT among themselves.

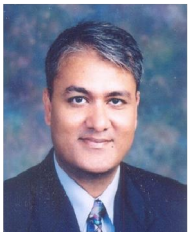
RECOMMENDATIONS BASED ON THE FINDINGS

There should be increased emphasis on ICT in education at higher secondary level. The emphasis on ICT should be irrespective of gender of both teachers as well as the students. Moreover, the focus of the teachers' ICT training should be on the use of ICT in classroom and integration of ICT in the delivery of curriculum. The solutions should be tailor made according to the cognitive level of the students in various topics being taught and the nature of the topic being taught itself. In addition to ICT training of teachers, some supporting staff must also be hired so as to make necessary equipment ready for the teachers. Communication through emails and blogs may also be used to increase interaction with parents/guardians for the feedback about their son/ward and further coaching of students who need extra coaching time or may have missed their lecture due to some unavoidable circumstances. In addition to motivating teachers, they should be facilitated as well accordingly in provision of right hardware, software, maintenance and technical support. It is recommended that the study may be further extended so as to find out the relation of teachers' experience, the type of subjects they teach, students' academic achievement pertaing to effective use of ICT in classroom and teaching/learning process. Teachers' subject oriented training needs are also needed to be identified so that teachers of different subjects trained accordingly.

The outcome of this research will benefit the administration and decision makers of private colleges in particular and other institutions in general about the ICT training needs of their newly inducted and in-service teachers and chalking out teachers' ICT training strategy. The study will also help in determining various areas of teaching-learning process which are mostly neglected while making effective use of ICT.

The study at this point can not be done across the country due to varied demographic conditions. Moreover, due to odd nature of the organizational structure and administration, public sector colleges are not being taken into account. Thus the study is limited only to the colleges which are affiliated with the Board of Intermediate Education Karachi and are run under private administration.

BIODATA AND CONTACT ADDRESSES OF AUTHORS



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