

Full Length Research Paper

Application of information and communication technology (ICT) by medical students: A study of Government Medical College, Chandigarh, India

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Today's world is globalized, information and communication technology (ICT) is diffusing its services to diverse domains. Medical and healthcare is intimately associated with human lives, ignoring of ICT in medical and healthcare is not affordable. The study was conducted to ascertain the computer literacy level of medical students. Its results indicated that most medical students have some average or advance knowledge on the basic use of computer software that is microsoft-word, excel, internet, e-mail, etc. The computer awareness among medical students is encouraging but still need to be improved, as most of the students responded that they are computer literate and 12.76% of students indicated that ICT should be incorporated in to the curricula training. More than half of the students responded that total number of personal computers (PCs) should be increased so that maximum use of ICT services can be done. The study found that ICT can be a useful tool in shoving problems in medical education, but the lack of technology and resources is still a serious limitation.

Key words: Information and communication technology (ICT), medical students, computer, internet.

INTRODUCTION

Developments in information and communication technology are occurring at an astonishing rate. In the words of Kofi Annan, speaking at the World Summit on information society, "A technological revolution is transforming society in a profound way. If harnessed and directed properly, information and communication technologies (ICT) have the potential to improve all aspects of our social, economic and cultural life." One of the key developments in health care in the last 25 years is the incursion of ICT (Heath et al., 2003). We believe that ICT in medical education is not only a tool, but a goal; in order to construct a better individual, a better doctor, there have to be a proper aware of the current need to have access to better and more information via electronic way. ICT have changed the ways in which medicine is practiced and taught (Thierry and Bernard, 2008).

Medical colleges, particularly in the developed countries, have invested heavily in ICT, not only to deliver education, but also to improve the quality of services that health professionals provide. Developing countries like India, (with a scarcity of human resources in the health sector is a serious problem), can be a particular

beneficiary of ICT mediated education. Lack of educational institutions and qualified medical educators, poor distribution of facilities and poor access to the latest educational infrastructure are some of the issues to be addressed to improve the quality of medical education in developing countries. Advanced technology can address at least some of this problem (Maharana et al., 2009).

Background

In Chandigarh, there are two government medical colleges situated in two different area of the union territory that is Post graduate institute of medical education and research (PGIMER), Chandigarh and Government Medical College, Chandigarh. The PGIMER, Chandigarh started in 1962, it was originally under the Government of undivided Punjab; after the reorganization of the state, the administrative control of the institute passed on to the union territory of Chandigarh in November 1966.

The institute became an autonomous body functioning under the ministry of health and family welfare,

Government of India. The founders of this institute Prof. Tulsi Das, Prof. Santokh Singh Anand, Prof. PN Chuttani, Prof. BN Aikat, Prof. Sant Ram Dhall and Prof. Bala Krishna laid the path of excellence for the Institute (<http://pgimer.nic.in/code/history.htm>, 2011).

Chandigarh had lacked an undergraduate medical institution since the PGI catered only for postgraduate and post-doctoral courses. This deficiency has been corrected with the start of Government medical college. The Government Medical College, Chandigarh started during the year 1991, and is affiliated to Punjab University. Each year a batch of 50 students, is selected solely on the basis of merit at the combined entrance test conducted by the Panjab University, gets admitted. The College was recognized for the award of MBBS degree by Govt. of India, ministry of health and family welfare w.e.f. 30 December, 1996. It is also offering post graduation in Anesthesiology, Anatomy, Pathology, Obstetrics and Gynecology, Psychiatry, Pulmonary Medicine, ENT, Ophthalmology and Orthopedics (<http://gmch.gov.in/collegetintro.htm>, 2011).

Aims and objectives

The main objective of the current study is the use of ICT (up to date) facilities in library of Government Medical College, Chandigarh. In addition, the study also aims to attain the following objectives:

- 1) To assess computer awareness and attitude of medical students in Government Medical College towards ICT;
- 2) To investigate the role of ICT in medical education and research;
- 3) To evaluate the use of e-resources by medical students;
- 4) To know the ICT infrastructure available in the medical college;
- 5) To know the medical student problems regarding in the use of ICT.

Literature review

Nurjahan et al. (2002) obtain a self-reported assessment of the use of ICT by medical students at the International Medical University, Malaysia. The survey revealed that 27 students (5.7%) did not use a computer either in the university or at home. Most students surveyed reported adequate skills at word processing (55%), e-mail (78%) and web searching (67%). The study suggested formal inclusion of ICT instruction in the teaching of undergraduate medicine, to enhance medical students' ability to acquire, appraise, and use information to solve clinical and other problems. Williams (2010) found in his study that ICT infrastructure in Africa lags behind than in other regions; poor download speeds, limit the potential

of internet resources (especially videos, sound and other large downloads) to benefit students, particularly in East and West (including Cameroon) Africa. CD-ROM capability is more widely available, but has not yet gained momentum as a means of distributing materials. Despite infrastructure limitations, ICT is already being used and there is enthusiasm for developing this further. Priority should be given to developing partnerships to improve ICT infrastructure and maximize the potential of existing technology.

METHODOLOGY

The study used a questionnaire; the survey was conducted during October 2011 to collect the data. To facilitate quantification and analysis of data, mainly close-ended questions were used. A random sample of 63 (25.2%) of 250 medical students of Govt. Medical College, Chandigarh, was selected and questionnaires were distributed among them. Of those, 47 (74.60%) questionnaires were returned completed. The data collected were analyzed and presented in the form of tables. Results were reported in percentages.

DATA ANALYSIS AND DISCUSSION

Approach of medical students towards ICT

The survey reveals that most of the students think that ICT is a necessary practice in the field of medical education. The students were asked, 'if medical education would not be effective without use of ICT tools and techniques' to know the student response towards ICT.

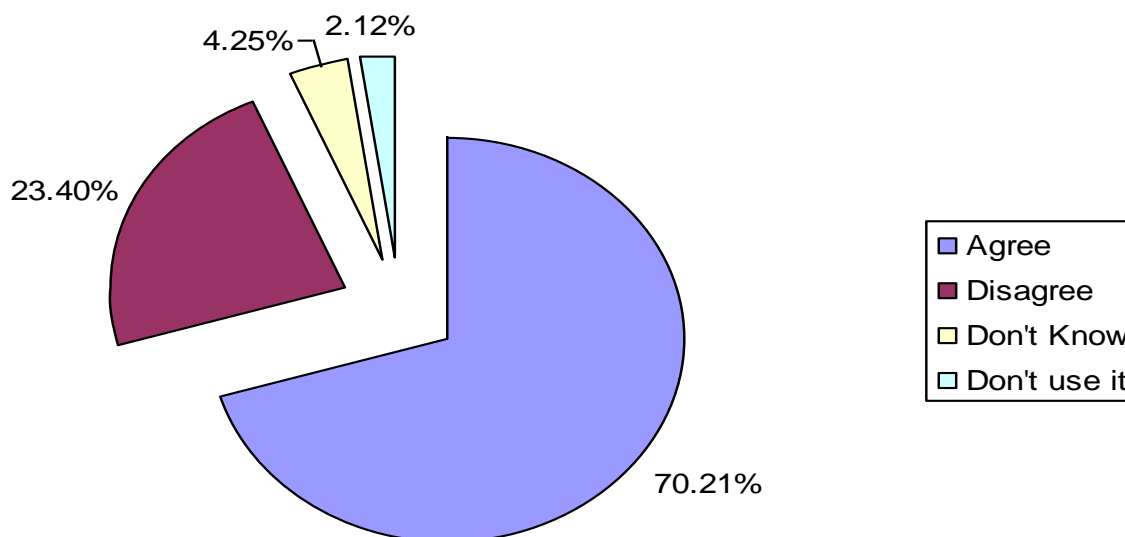
It was shown in Table 1 and Figure 1, that 70.21% of the students were in agreement with the use of ICT in medical education. Furthermore, it is evident from this data that, the students are realizing the important of ICT tools and techniques becoming a part of medical education. Only 23.40% of students disagree with this argument.

Need for ICT enabled library facilities

The students were asked to present their recommendations about ICT facilities. Table 2 and Figure 2 show that, 25.53% of the students recommended a library website for easy and distant access to library resources and services. While 40.42% of the students recommend that more e-resources should be subscribed in the library, and 38.29% of the students suggested that the college library should be connected with other libraries and information system through networking so that resource sharing among the libraries can be done. The remaining 21.27% of the students responded that the library should be fully automated as they get all their queries rapidly.

Table 1. Effectiveness of medical education and research.

Medical education will not be effective without use of ICT tools and techniques	Frequency	Percentage (%)
Agree	33	70.21
Disagree	11	23.40
Don't know	2	4.25
Don't use it	1	2.12

**Figure 1.** Effectiveness of medical education and research.**Table 2.** ICT facilities recommended by students.

ICT facilities	Frequency	Percentage (%)
Library website	12	25.53
E-resources	19	40.42
Networking with other medical library and information systems	18	38.29
Automation of library	10	21.27
Digital library facilities	9	19.14
Local Area Network for library	14	29.78

Use of ICT by medical students

Table 3 and Figure 3 depict that 70.21% of the students responded that, they use a computer on regular basis, whereas 21.27% of the students responded that, they use computer once in a week and nearly 8.51 % the students respond that, they are using a computer once in a month. The students consider computers a vital part of medical education and this particular field seems

meaningless without ICT.

Use of internet

The Table 4 and Figure 4 reveal the frequency of internet use. 72.34% of the students use the internet at least daily, whereas 17.2% of the students use the internet on weekly basis. Only 4.25% of the students respond that

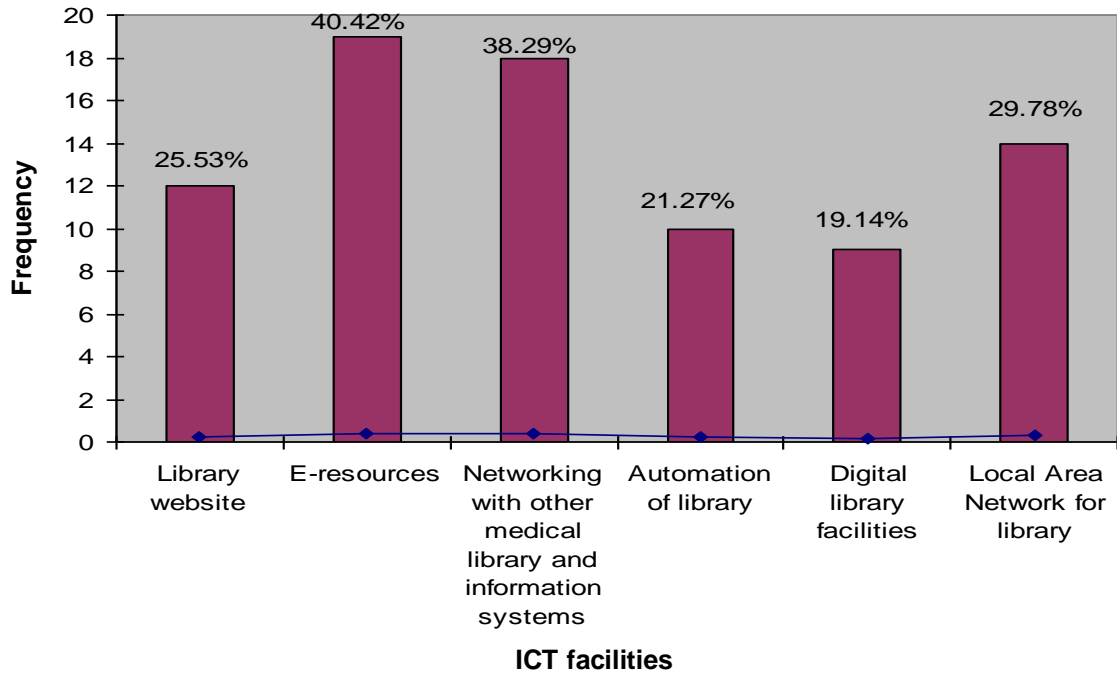


Figure 2. ICT facilities recommended by students.

Table 3. Frequency of computer use.

Period	Frequency	Percentage (%)
Daily	33	70.21
Weekly	10	21.27
Monthly	4	8.51

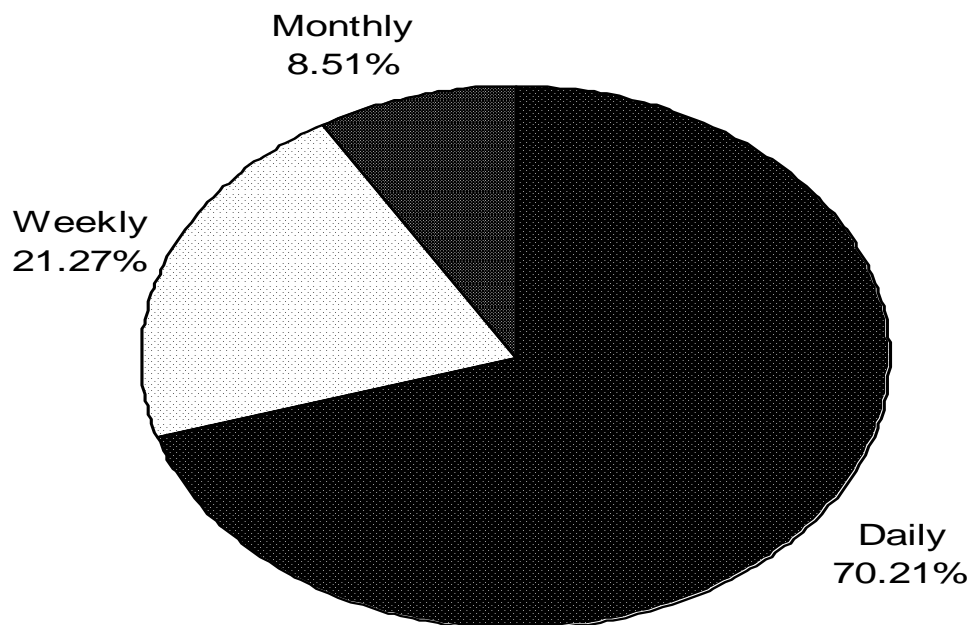
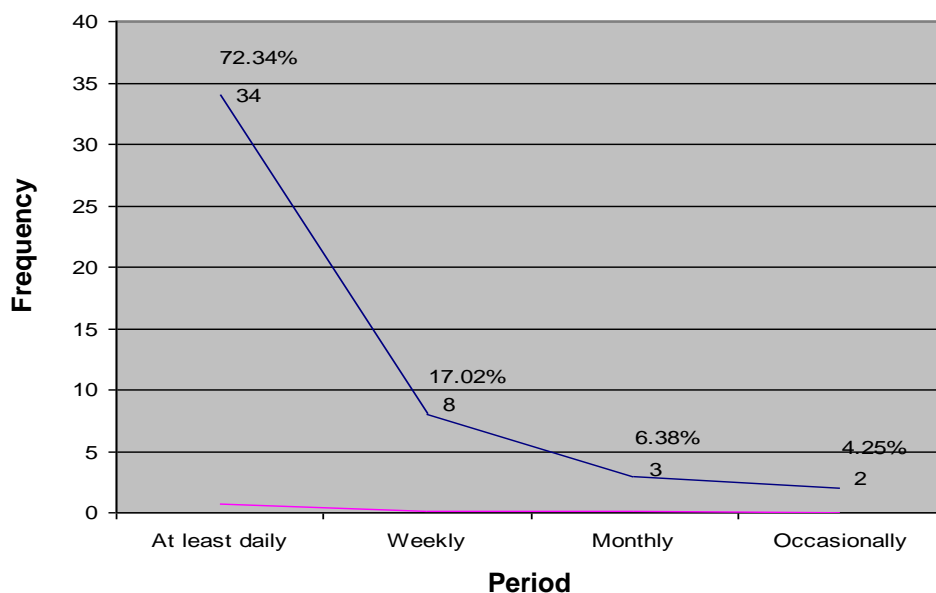


Figure 3. Frequency of computer use.

Table 4. Frequency of internet use.

Period	Frequency	Percentage (%)
At least daily	34	72.34
Weekly	8	17.02
Monthly	3	6.38
Occasionally	2	4.25

**Figure 4.** Frequency of internet use.**Table 5.** Purpose of internet use.

Other means	Frequency	Percentage (%)
Literature searching	31	65.95
E-mail	30	63.82
Information for patient	6	12.76
Reading recommended course work	15	31.91
Chat	16	34.04
Other	5	10.63

they use internet occasionally. All this data shows the rising involvement of medical students in the area of ICT, and it is quite encouraging.

Purpose of internet use

Table 5 and Figure 5 show that 65.95% of the students use the internet for scanning the available literature, while 31.91% for accessing reading material recommended by their teachers, and 63.82% use it for the purposes of sending and receiving e-mail. Only 12.76% of the students respond that they use the internet to get

information for patient, 34.04% use it for online chatting with their friends. This shows the rising numbers of internet users in this area.

Constraints in use of ICT

Some of the limitations also been observed regarding the daily use of ICT in the given study. Table 6 and Figure 6 illustrated that 12.76% of the students' respond that application of ICT are not includes in their course syllabus. Whereas 8.51% students respond that the IT staff cooperation was not in a satisfactory level, 40.42%

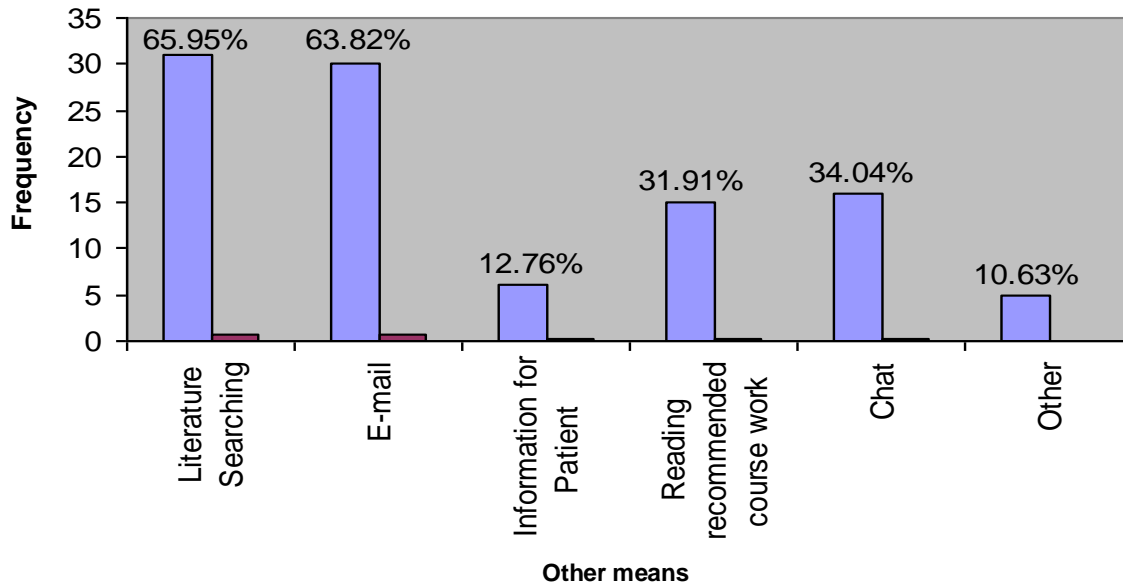


Figure 5. Purpose of internet use.

Table 6. Problems accessing electronic information.

Reasons	Frequency	Percentage (%)
Inadequate number of PCs	26	55.31
Lack of support from IT staff	4	8.51
ICT not present in syllabus	6	12.76
Lack of time to use	19	40.42
No computer lab	2	4.25
E-resources not available in library	9	19.14
No campus computer network	13	27.65
No Internet connectivity	1	2.12

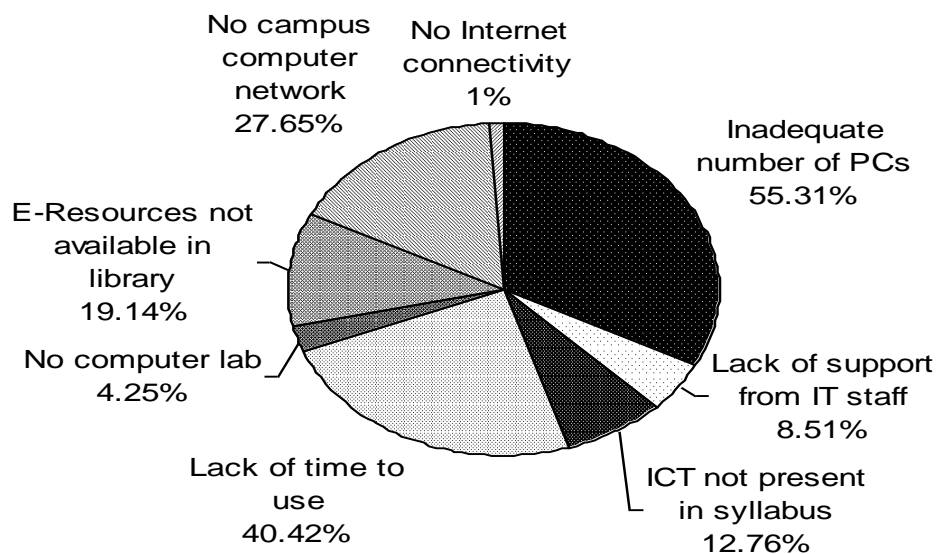


Figure 6. Problems accessing electronic information.

Table 7. Students' knowledge of computers and IT.

ICT tools and applications	Frequency	Percentage (%)
MS-Word	44	93.61
Excel	40	85.10
Internet	46	97.87
E-mail	46	97.87
Computerized patient record	23	48.93

of the students indicated because of their busy schedule they have no time to use the existing ICT facilities. More than half of the students respond that total number of computers should be increased so that they can spend their spare time in the use of ICT. Also, 19.14% of the students demanded more e-resources in the library, while 27.65% of them stated that there is no computer network facility in the campus.

ICT literacy of medical students

Table 7 shows that, most of the students stated that they have the basic knowledge of ICT tools and applications and it seems that this data is moving positively ahead in the particular area of medical education.

Major findings

After a careful analysis and interpretation of the data, the following findings have been observed:

- 1) Most of the students explained that, they have basic knowledge of ICT tools and applications.
- 2) 38.29% of the students recommended that library should be connected with other medical library and information systems through networking.
- 3) 70.21% of the students used the computer regularly.
- 4) 65.95% of the students used the internet for literature search, whereas only 12.76% students used the internet to get information for patient.
- 5) 40.42% of the students recommended that the medical college library subscribe more e-resources for effective study and research.
- 6) 70.21% of the students gave the opinion that medical education will not be effective without ICT-based study and teaching.
- 7) 55.31% of the students demanded more PCs should be installed in the college library.
- 8) 40.42% of the students respond that, they do not have the time to get the maximum benefit of ICT facilities.
- 8) 12.76% of the students respond that ICT should be included in their present syllabus.

Conclusion

The study was focused on the acquired computer skills by medical students. A high percentage of students (72.34%) were comfortable and confident with the use of the internet. Students had to visit the internet quite often for their academic work; most of the users are deprived of access of vast medical literature available in the electronic format. The medical college library has not been able to use the services available at a national and international level. The present study suggests that appropriate computer training may be necessary in future medical curricula. There should be a Wi-Fi technology in the whole campus so that the users can access the internet facility in the whole campus. Provision of structured computer and information technology training for medical students would equip them with the skills they need to practice up to date and evidence based medicine in future, which are essential to improving the quality of medical care. Computer assisted medical education will help them to become independent learners, information seekers, information managers, and proficient user of computer technology in their future practice as well as in their ever-continuing education.

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