



## USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN HIGHER EDUCATION: A CASE OF PARTICIPANTS IN A REFRESHER COURSE

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### Abstract

Information and communication technologies (ICTs) are a diverse set of technological tools and resources used for creating, storing, managing and communicating information. The present study attempts to find the current usage level of ICT for teaching and research and about perceived barriers in the effective use of ICT among participants of an interdisciplinary refresher course on information technology at Academic Staff College, Himachal Pradesh University, Shimla. A brief questionnaire was administered to a sample of 37 teachers teaching in different colleges/universities in the country. Majority of the respondents use ICT in both teaching and research. Those who use ICT in teaching use it for collecting material the most and for delivering lectures the least. Majority of the researchers use IT during the entire research process. Lack of time and peer supports were considered least important barriers, while lack of infrastructure and training were rated most important ones. Areas of future investigations have also been pointed out.

**Keywords:** ICT, Teaching, Research, Technology adoption, Teacher Training.

### 1. Introduction: Information and Communication Technology (ICT)

*"Computers are fast, accurate and stupid. Humans are slow, inaccurate and brilliant. Together they are powerful beyond belief."* Albert Einstein

These perceptive words by the legendary scientist chart out a revolutionary relationship which is changing the world beyond comprehension. Computer has become such an integral part of human existence that one cannot conceive a world without computer and associated technologies which are now collectively known as Information and Communication Technologies (ICT). ICT has been defined as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information (Tinio, 2003). These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. National Policy on ICT in school education (MHRD, 2010), defines ICT as "all devices, tools, content, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realising the goals of teaching learning, enhancing access to and reach of resources, building of capacities, as well as management of the educational system. They will not only include hardware devices connected to computers, and software applications, but also interactive digital content, internet and other satellite communication devices, radio and television services, web based content repositories, interactive forums, learning management systems, and management information systems. They will also include processes for digitization, deployment and management of content, development and deployment of platforms and processes for capacity development, and creation of forums for interaction and exchange."(p.5)

### 2. Literature Review

#### 2.1 ICT in Teaching and Learning

Based on their research on the teaching-learning process spanned over 50 years, Chickering and Gamson (1987) have identified 7 key attributes of teaching. They believe that: good practice in undergraduate education should: encourage student-faculty contact; encourage cooperation among students; encourage active learning; give prompt feedback, emphasize time on task; communicate high expectations and respect diverse talents and ways of learning. Klassen (2001) proposes that IT in teaching can involve all seven attributes of good practice. At the same time, there is growing acknowledgement among policy makers around the world regarding use of ICT in education sector, be it at the secondary or higher education level. Government of India has announced a National Policy on ICT in school education and launched National Mission on Education through ICT (NMEICT). ICTs have been found to help expand access, prepare individuals better for the workplace, improve the quality of education and transform the learning environment in to one that is learner centered (Tinio, 2003). For educational purposes, ICTs can be used to support teaching and learning as well as research activities including collaborative learning and inquiring.

In the eighties, education technologists used to talk about Computer based Training (CBT), Computer based Instruction (CBI), Computer Assisted Instruction (CAI), Computer Assisted Learning (CAL), Computer Supported Instruction (CSI), and Computer Managed Instruction (CMI). But, as Sansanwal (2009) observes, these terms take the computer as a starting point in thinking about the use of the computer in education and refer to the old educational paradigm of instruction – memorization – testing. As Sansanwal (2009) further observes, ICTs in the current sense of the term, have opened new avenues, like Online learning, e-learning, Virtual University, e-coaching, e-education, e-journal, etc. ICT can be used in education in the following areas: Teaching, Diagnostic Testing, Remedial Teaching, Evaluation, Psychological Testing, Development of Virtual Laboratory, Online Tutoring, Development of Reasoning and Thinking and Instructional Material Development.

#### 2.2 ICT and Research

Pushing the frontiers of knowledge through research is one of the key mandates of Higher Education. Since ICTs make data manipulation, storage, dissemination, publication, and retrieval processing, analysis and presentation easier, the use of these technologies for research is obvious. Ahmad and Fatima (2009) reported findings of a study of the social sciences researchers' use of ICT in Aligarh Muslim University (AMU). The study shows that researchers use a variety of ICT products and services for their research work as these products prove very helpful in finding needed information quickly and easily and also help the researchers to access, manage, integrate, evaluate, create, and communicate information more easily.

### 2.3 Perceived barriers in effective use of ICT

Integration of ICT in education is a complex process and a number of difficulties may be encountered in the process which is known as 'barriers' (Schoepp, 2005). In a comprehensive review of literature on barriers related to education, particularly science education, Bingimlas (2009) lists a number of barriers including: lack of teachers' confidence and competence, resistance to change, negative attitude from the teachers side; from the institution side lack of time, accessibility, technical support and training.

In the study cited earlier. Ahmad and Fatima (2009), identify lack of training and technical knowledge to use ICTs as the major hindrances faced by the researchers in AMU. In other study Vajargah, Jahani and Azademnesh (2010) found a number of barriers in the context of ICT in higher education including: lack of adequate investments, cultural obstacles, financial challenges, lack of continuity in ICT use, and lack of systematic training and development programs.

*In the backdrop of this review, the present study aims at finding out level of usage of ICT and perceived barriers in their usage in teaching and research among a group of college and university teachers.*

## 3. The Study

### 3.1 Operationalization of terms for the current study

- **ICT:** Use of computer and/or Internet
- **Teaching :** A process involving Planning and Preparing a session, Delivering contents and Evaluation
- **Research:** A process involving literature review, determination of objectives, development of tool, data collection, analysis and presentation.

### 3.2 Objectives

- To find the current usage level of ICT for teaching and research
- To find about perceived barriers in the effective use of ICT in Indian higher education.

### 3.3 Methodology

#### 3.3.1 Data Collection:

In order to use Survey method to collect data, a Questionnaire with 4 Sections was constructed based on literature review and empirical observations (See Appendix1). Section A had items related to demographics, Section B and C consisted items related to usage level in the process of Teaching and Research respectively. While Section D looked in to finding degree of importance attributed to different perceived barriers for successful usage of ICT by the faculty members.

#### 3.3.2 Sample details:

There were 46 participants in the refresher course including 6 librarians. They were excluded from the sample and the Questionnaire was distributed to 40 faculty members. 37 respondents returned the completed tool. The respondent's profile is being presented in the table below:

Table 1: Respondents' Profile

Sex-wise distribution (%)		Faculty-wise distribution (%)		Teaching experience (%)		Qualifications (%)	
Male :	76	Science	40	Less than 5 years	19	PG	22
Female	24	Arts	49	5-10 years	24	M Phil	27
		Commerce	11	More than 10 years	57	Ph.D	51

#### 3.3.3 Data Analysis:

Findings were converted in to frequencies and then in to percentages.

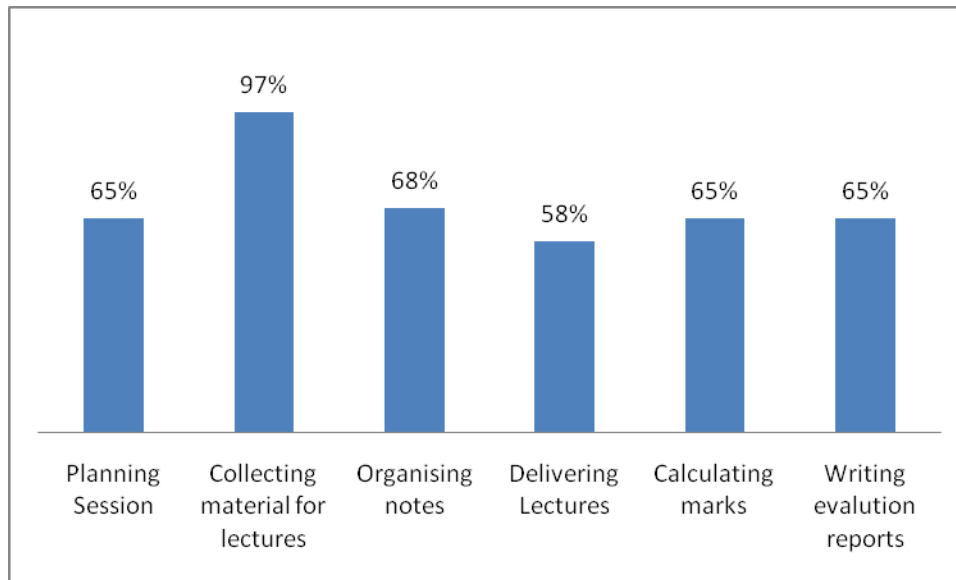
## 4 Results

### 4.1 Result 1: Comparative usage level

Nearly 78% of the respondents use ICT for teaching and research, while 14% of the sample, neither use ICT for teaching nor for research.3% only for research and 5% only for teaching.

### 4.2 Result 2: Usage level across teaching Process

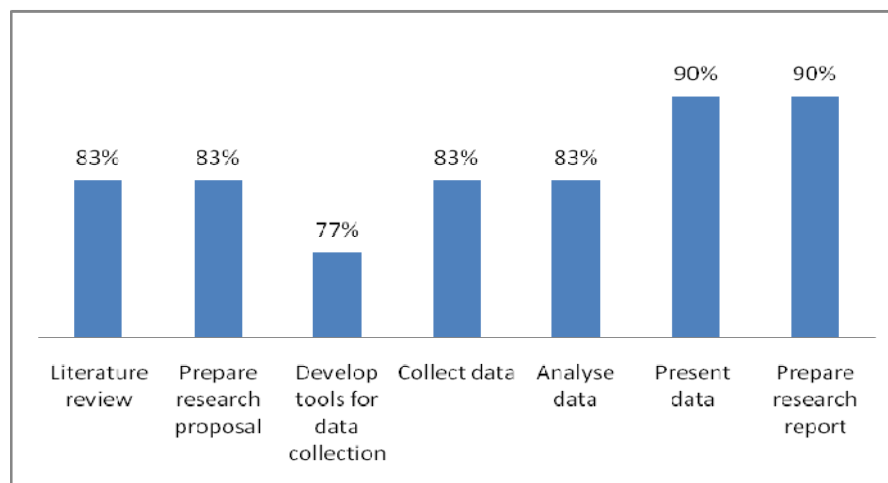
As shown in Figure 1 below, ICT were used mostly for collecting material for the lectures and least for delivering lectures.



**Figure 1: Usage level across Teaching Process**

#### 4.3 Results 3: Usage level across Research Process

Teachers seem to use ICT across almost all the stages of the research process. As evident from the Figure 2, 77% used ICT for developing tools for data collection while for all other components, the user percentages range from 83% to 90%.



**Figure 2: Usage level across Research Process**

#### 4.4 Result 4: Perceived barrier: Not important at all

When respondents were asked which barriers they consider not important at all for integration of ICT in teaching and research, lack of time and lack of peer support were reported the least important barriers.

#### 4.5 Result 5: Perceived barrier: Slightly important

In the category of Slightly important barriers, lack of time, training, administrative and peer support were chosen by approximately 27%, 30%, 30% and 32% respondents respectively.

#### 4.6 Result 6: Perceived barrier: Important

Lack of adequate funds was voted by nearly 50% respondents as the most important barrier in successful integration of ICT in teaching and research. Other barriers such as lack of infrastructure, time, training, administrative support and peer support received the vote of almost equal percentage of respondents.

#### 4.7 Result 7: Perceived barrier: Very Important

When asked to rate most important barriers, lack of infrastructure, training and administrative support were chosen by 46%, 32% and 32% respondents respectively. Lack of time was chosen by only 5% respondents.

## 5. Discussions

### 5.1 Usage level

A UNESCO study points to four broad stages in the way students and teachers learn about and gain confidence in the use of ICT: These are discovering, learning how, understanding how and when, and specializing in the use of ICT tools. A look at the usage level in the current study suggests that while some of the respondents are at Level 1, where they are perhaps discovering, while some seems to be specializing in the use of ICT tools. It is

important to devise training programmes keeping in mind various levels of faculties in higher education. The fact that most of the teachers are not using ICT for delivering lectures, gets corroborated by lack of infrastructure as most important perceived barrier. One surprise finding is related to the higher use of ICT for data collection compared to use of ICT for developing tools for data collection. This finding goes against empirical experiences.

### 5.2 Perceived barrier

Findings related to perceived barriers are consistent with earlier studies cited in the section on Literature Review. The only aberration is lack of time and peer support considered least importance for the sample which is not consistent with other studies.

## 6. Areas for future investigations

It would be interesting to see if usage levels and perceived barriers vary according to stream (Science/Languages/Humanities/Commerce), years of experience, age, management type of the institution. It would also be useful to explore antecedents of beliefs related to the determinants of behavioural intentions (Venkatesh, Morris, Davis & Davis, 2003) to use ICT in Teaching and Research.

## 7. Conclusion

Majority of participants use ICT in both teaching and research. Those who use in teaching use for collecting material the most, for delivering lecture the least. Majority of the researchers use IT during the entire research process. Lack of time and peer support were considered least important barriers, while lack of infrastructure and training were rated most important barriers in the successful integration of ICT in the process of teaching and research.

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**Appendix 1: Draft tool**  
**Use of ICT in Teaching and Research: A survey of actual usage**

Teaching subject:

Sex: Male/Female

Teaching location (City/State):

Education Qualification: Graduation/Post Graduation/ M.Phil. /Ph.D

Teaching experience: Less than 3 years/ 3-5 years /5-10 years / more than 10 years

Note:

1. If you use computer and/or Internet in both Teaching and Research, please respond to items in Sections A, B and C.
2. If you use Computer and/or Internet for Teaching ONLY, please go to Section A and C ONLY.
3. If you use Computer and/or Internet for Research ONLY, Please go to Section B and C ONLY.
4. If you use Computer and/or Internet NEITHER for Teaching NOR for Research , please go to section C ONLY.

**Section A**

I use Computer and/or Internet to....	
-plan my teaching sessions	Yes/No
-collect material for my lectures	Yes/No
-organize my notes	Yes/No
-deliver my lectures	Yes/No
-calculate assessment/marks	Yes/No
-prepare assessment/evaluation reports	Yes/No

**Section B**

I use Computer/Internet to	
-do literature review to develop research	Yes/No
- prepare research proposal	Yes/No
- develop tools for data collection	Yes/No
-collect data	Yes/No
- analyse data	Yes/No
-present data through charts/tables	Yes/No
-prepare research report	Yes/No

**Section C**

Table below gives a list of possible barriers for using Computer and/or Internet for teaching and/or research in your specific context. Please rate the following barriers according to the degree of importance on a four point scale according to following scheme:

1: Not important at all; 2: Slightly important; 3: Important; 4: Very Important

Barriers	Your ranking
Lack of infrastructure	
Lack of funds	
Lack of Time	
Lack of Training	
Lack of the support of the	
Lack of peer support	