CHAPTER - VI

SUMMARY, CONCLUSIONS AND IMPLICATIONS

6.1 Introduction
A detailed discussion on the results has been presented in Chapter V, whereas Chapter VI deals with the summary, conclusions and implications of the findings through the process of research. To facilitate clarity, this chapter has been presented under the captions like: “Rationale, Statement of Problem, Objectives, Hypotheses, Sample, Tools, Procedure of Data Collection, Data Analysis, Findings and Implications”.

6.2 Rationale
As per the constitution of India, it shall be the duty of every citizen of India — ‘to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement’.

To achieve such a goal enshrined in the Constitution, the Government of India has taken up many initiatives including the use of Information Technology as well as Information and Communication Technology in different organizations. The First National Conference of IT Ministers held on 15th July 2000 resolved to set up a ‘Task Force on Human Resource Development (HRD)’ in Information and Technology. Further the Conference resolved to maintain global leadership position in the Knowledge-led business. The recommendations were put forwarded under the title: “National Programme for Human Resource Development in IT (NP_HRDI)”.

This relates to strategic interventions under definite plan of action. Several recommendations, such as setting up of Institutes of Information Technology,
Use of ICT for improving institutional performance for increasing efficiency and productivity, promoting networking of Institutions ‘National Network of Institutions’ and Digitize libraries of original works are made by the Committee. The recommendations also included taking up IT faculty Development Initiatives, early faculty induction programme, Quality improvement programme, conducting sequential PG programme in IT, conducting PG programme in IT dual mode, Adjunct faculty from IT industry, Adopt modular, credit based approach in curriculum design at various levels for enhancing student mobility, ‘National Qualification Framework’ for IT education and encouraging Courseware Development. The Task Force recommendations also make emphasis on web-based forum for facilitating curriculum and course ware development efforts, Promoting Technology-mediated IT education using broadcast media, encouraging teleconferencing, facilitating web-based and other multimedia approach, promoting postgraduate education and research programmes, besides facilitating collaboration between IT and educational institutions.

It is interesting to note that in case of Foreign Universities ICT has been implemented to improve the learning experience of the taught on the campus. To refer to the example of Flinders University, it has the education principle for supporting academic excellence, which also emphasizes that those who teach must strive for excellence in teaching. This principle encompasses a commitment on the part of the teachers to learn, continue to learn the process of teaching and learning and to draw on relevant aspects of research and continuously innovate and relearn on teaching. The University aims at making use of the existing and emerging information and communication technologies (ICT) to support academic staff in their efforts to develop to the fullest as teachers, and thereby improve students’ learning experience. It is also committed to providing support and resources for engaging staff in the scholarship of teaching.

Universities like Griffith known for innovative work are committed to multidisciplinary teaching and research, besides the creation and
communication of knowledge. In the pursuit of excellence in teaching and research, Griffith University is committed to Innovation, bringing disciplines together, Internationalization, Equity and social justice.

Information and Communication Technology in Education has been identified as a tool to undertake several research activities. The present study is a humble and earnest attempt in this direction to know how ICT enables the university education for academic achievement and also how it facilitates the quest for excellence in the journey to achieve excellence. ICT has brought about dramatic changes both in the learning needs and the way learning opportunities are offered. Institutions need to implement the ICT enabled system in the campuses to exploit the multi-pronged offshoots of such innovation. Further, Universities need to develop the capabilities and infrastructure for advanced technological changes.

It can be further observed that there is an absence of specific studies in the context of Indian scenario to look at the use of ICT in the Universities. It is also important to inquire if the intervention made by quality assurance agencies, like, NAAC has any impact on the system of HE in general and on the use of ICT in HE in particular. Thus, it was thought necessary to conduct a research to systematically study the use of ICT in students’ admissions; staff recruitment; teaching and learning; examinations; library and information services; besides administration and finance.

### 6.3 Statement of the Problem

The Statement of the Problem is paraphrased as:
‘Role of Information and Communication Technology in Pursuit of Academic Excellence: A Comparative Study of Indian Universities’

### 6.4 Objectives of the Study

The Objectives of the Study can be summed up as:
- To compare the use of Information and Communication Technology in the admission of students for various courses admitted in State Universities and Other Universities.
• To compare the use of Information and Communication Technology in employment of staff in state Universities and Other Universities.

• To compare the use of Information and Communication Technology in Teaching and Learning Process at different levels in State Universities and Other Universities.

• To compare the use of Information and Communication Technology in Examinations at different levels in State Universities and Other Universities.

• To compare the use of Information and Communication Technology in Management of Library in State Universities and Other Universities.

• To compare the use of ICT in administration of University in state universities and Other Universities.

• To compare the mean scores of responses towards the use of Information and Communication Technology in Higher Education by teachers belonging to State Universities and Other Universities.

• To compare the mean scores of responses towards the use of Information and Communication Technology in Higher Education by administrators belonging to State Universities and Other Universities.

6.5 **Hypothesis**

The hypotheses of the study were resolved to be:

1. There is no significant difference between mean scores of responses towards the use of Information and Communication Technology in Higher Education by teachers belonging to State Universities and Other Universities.

2. There is no significant difference between mean scores of responses towards the use of Information and Communication Technology in Higher Education by administrators belonging to State Universities and Other Universities.
6.6 Sample

The present study was conducted on Universities accredited by National Assessment and Accreditation Council (NAAC), Bangalore. Till March 31, 2007, 140 Universities were accredited. The sample comprised 140 NAAC accredited Universities. It included State, Women’s, Language, Technical, Deemed, Central and Medical Universities. Out of these 140 Universities, there were 100 State Universities, (including Two Women’s, Two Language, and five Technical Universities); 32 Deemed to be Universities (including one Medical, one Agriculture, Seven Technical, Two Language Universities), and Eight (8) Central Universities. There were residential as well as affiliating Universities. Majority of the Universities included in this study were funded by the UGC, New Delhi. In addition to it, the sample consisted of Faculty Members and Administrators. There were 715 respondents from these accredited Universities out of which 520 were the faculty members and 195 were the administrators involving both men and women.

6.7 Tools

The data was collected in respect of use of Information and Communication Technology (ICT) in different aspects of Higher Education. Along with this, the Perception toward the use of ICT in Higher Education was also assessed. The details of tools used are being given in the following captions.

6.7.1 Use of ICT in Higher Education

The ICT can be used in different aspects of Higher Education. The use of ICT in Higher Education was assessed with the help of a questionnaire developed by the investigator. The questionnaire included queries related to use of ICT in students’ admissions; use of ICT for staff recruitment; use of ICT in teaching and learning; use of ICT in examinations; use of ICT in library and information services; and use of ICT in administration and finance.
The questionnaire comprised both open ended and closed type questions. There were 19 questions related to the aspect of use of ICT in admission out of which four were open ended. Use of ICT for staff recruitment was another aspect of higher education where ICT can be used. There were eight questions related to the Use of ICT for staff recruitment. Out of eight questions, only one question was open ended and rest were closed type questions.

With regard to the use of ICT in Teaching and Learning, there were 19 questions out of which 14 were open ended and remaining were closed type questions. The fourth aspect was the use of ICT in examinations in which 22 questions related to different aspects of use of ICT in examinations, five questions were open ended and the remaining questions were closed type.

The fifth aspect was the use of ICT in library and information services. There were 23 questions related to different aspects of use of ICT in library and information services. Out of which six questions were open ended and remaining were closed type questions. The last aspect was ‘Use of ICT in administration and finance’. There were 10 questions related to the use of ICT in administration. Of these, one question was open ended and the rest were closed type questions.

Further, there were four questions related to the use of ICT in finance out of which one was open ended and rest were closed type questions. The top page of the questionnaire contained questions related to general information about the Universities. There was no time limit for filling this questionnaire. The questions were self-explanatory and the respondents required no additional instructions.
6.7.2 Perception toward the use of ICT in Higher Education

This study makes an attempt to study the perception and response of the stakeholders of higher education towards the use of ICT and to measure such perceptions and responses among the members of the faculty and administrators, the investigator developed a scale based on Likert method. There were 32 statements related to different aspects of use of ICT in Higher Education. Some of the aspects were: use of ICT in admission, recruitment of teaching staff, evaluation of teaching staff, instructional material, giving assignments and thought provoking questions on websites, examination of students, etc. There were five choices given against each statement like: Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD). The respondent was required to put tick mark only on one option amongst the given five options as his / her response. Out of 32 statements, there were 16 positive statements and the remaining statements were negative. For positive statements the weightages for SA, A, U, D, and SD were 5, 4, 3, 2 and 1 respectively were given while it was reversed for negative statements.

Before framing the questionnaire the investigator had interaction with some of the present Vice Chancellors and also former Vice Chancellors for the opinions and views on the ICT and its implementation in Universities. After designing the questionnaire, comments / opinions were obtained regarding the structure and the contents of the questionnaire from Vice Chancellors / Professor (s) of fifteen Universities and the questionnaire was modified accordingly.

6.8 Procedure for Data Collection

As mentioned under the sample, the data was collected from 140 accredited Universities. The Questionnaire for Assessing the Role of ICT in Pursuit of
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Academic Excellence, and Perception towards the use of ICT in Higher Education was sent to the Vice-Chancellors of the accredited Universities by the Director, NAAC, Bangalore. The Vice-Chancellors in turn instructed the appropriate department / person to respond to the Questionnaire. The questionnaire was encompassing on all aspects of higher education institutions, and obviously needed lot of time to carefully fill in the necessary data. The follow-up action was taken up by the investigator through phone and also by e-mail. There were many attempts by the investigator to persuade and motivate the concerned persons to provide the necessary information and fill in the questionnaire and such 60.17% universities (i.e. 85 universities responded to the questionnaire. The perception towards the use of ICT in Higher Education Scale was to be filled in by the Faculty and Administrators. In all 715 responses were received and out of these responses, 520 were from Faculty Members while 195 were from Administrators. The scoring of the scale was done as explained under tools.

6.9 Data Analysis

The data was analyzed by computing percentages and the content analysis technique was also used for analyzing the responses to the open ended questions. The t-test was used for comparing the Perception towards the Use of ICT in Higher Education of Faculty and Administrators.

6.10 Findings

The following were the findings of this study:

1. General

In general, it was found through the study that all the universities have their URL / www / Websites.

- Majority of the State Universities were found to have an edge over other Universities in areas such as –in-house development and maintenance of Websites, updating the websites on dairy/weekly basis and provision of Broadband facility on the campus.
The Study reveals that both State and Other Universities have networked the Departments besides providing Wi-Fi. It was also found out that the Universities have made the use of Dial-up, besides networking the affiliated colleges to the University.

2. In respect of use of ICT in admission of students, the findings were as follows:

- Majority of Other Universities seem to enjoy an edge over State Universities in areas such as, displaying the admission Notice, eligibility criteria for admissions on the Website. It was also found that there was provision for online pre-counselling/guidance, downloading the admission form, and publication of wait listed candidates on the website.

- Majority of State Universities were found to have an edge over Other Universities in redressing grievances Online.

- Majority of both State and Other Universities were putting on Website the address and phone numbers of admission In-charge, publishing the criteria for admission on Website, and publishing rank list of students for admission on Website.

- Less percentage of both State and Other Universities were retaining admission notice on Website for more than two months, putting frequently asked questions on Website, Online filling of admission form, and putting model question papers of admission on Website.

- A few State and Other Universities have started conducting Online entrance examination and accepting Online payment for admission form.

- Only one State University was providing facility to deposit tuition / course fee Online.

- Both State and Other Universities were planning to use ICT for conducting Online admission for some courses, informing wait listed candidates through e-mail, and quick response to students’ queries. On the other hand a few both State and Other Universities were planning to collect fee through credit card / debit card.
3. In respect of use of ICT in staff recruitment process, the findings were as follows:

- Majority of Other Universities were found to have an edge over State Universities in areas such as, publishing the employment notification of permanent teaching as well as non-teaching posts on their Websites, providing facility for downloading application form for permanent teaching as well as non-teaching posts, and communicating the date of interview to the candidates through e-mail.

- More State Universities were found to have an edge over Other Universities in areas, such as, publishing the employment notification of contractual teaching as well as Non-teaching posts on their Websites, planning to publish the announcement of recruitment on the university website, and to inform the eligible candidates through e-mail.

- A few of the State as well as Other Universities were found to have provided Online facility for filling up the form for permanent teaching as well as non-teaching posts besides contractual teaching and non-teaching posts. They also had made provision for downloading application form for such posts. It was also found that the date of interview for such posts was displayed on the Website besides informing the short listed candidates through e-mail. The study further revealed that the selected candidates were informed through e-mail and website. The universities also provided separate e-mail IDs to the staff in-charge of recruitments, besides making provision for redressal of grievances through ICT.

4. In respect of use of ICT in Teaching and Learning, the findings were as follows:

- Majority of the State Universities were found to have an edge over Other Universities with regard to provisioning broadband connectivity to all the Departments/Schools on the Campus or Satellite Campus. The study further revealed that they have provided greater number of
terminals. The faculty was tech savvy as most of the teachers were using LCD Projectors and had established Learning Resource Centres.

- Majority of Other Universities were found to have made provision for Internet connectivity in Class Rooms, besides installing LCD Projectors in some of the Classrooms. The faculty was exploiting the facility of Power Point Presentations during day-to-day teaching. Learning Resource Centres included facilities like Internet, Photocopy/Xerox and STD facility, all of which promoted teaching-learning Process.

- Majority of both State and Other Universities teachers were using either LCD or OHP during teaching, encouraging the use of ICT in their affiliated colleges, developing computer aided instructional materials in different subjects, preparing instructional materials in different subjects for putting them Online, preparing Web based instructional materials in different subjects, using ICT for clarifying the doubts of students, created facility to get Online students’ feedback about the learning resource centre, using ICT for developing language skills, such as, listening, speaking, reading and writing, and enhancing skills of faculty in using ICT.

5. In respect of use of ICT in Examination, the findings were as follows:

- Majority of both State and Other Universities were maintaining database of paper setters, putting the examination schedule on their Website one month in advance and retaining it for two weeks, gave the information about “Whom to contact” details in advance to all users in case of problems related to the conduct of examinations, uploading the University examination results on website, retaining the results on the Website for two months and using ICT for grievance redressal.

- A few both State and Other Universities started using ICT in the appointment of paper setters. Putting the Question Bank in different subjects on the University website although more Universities have developed question banks in different subjects, attempting to conduct examination Online, using Online facility available for sending question
papers to the affiliated colleges, having the facility for randomly generating separate question papers for each candidate through the use of computer, issuing e-hall ticket, and having the provision for giving mark sheets electronically.

- Just a State Universities had facility for filling and submission of the examination form Online.
- No State and Other Universities made provision to apply for the revaluation Online or sending the documents by e-mail.
- Both State and Other Universities were planning to use ICT for uploading question banks on their Websites, conduct Online examination in selected subjects, prepare database of paper setter, to use e-mail for grievance redressal, and to use Optical Character Recognition (OCR) technology in the examinations.

6. In respect of use of ICT in Library and Information Services, the findings were as follows:

- Majority of Other Universities were found to have an edge over State Universities in areas, such as, fully computerization of their University library and providing facility to their users to make a request to reserve books Online.
- Most of State Universities were found to have an edge over Other Universities in areas, such as, partial computerization of their libraries, providing the network with satellite / off campus centers, having their library website or home page, having their own server, and providing digital library / institutional repository access to their users.
- Both State and Other Universities had computers with internet connection in their libraries, using bar coding system for issuing the books, having INFLIBNET facility in the library, having UGC Infonet service on the campus for use by students as well as teachers, giving the information about library linkages / network with other libraries through Internet, having connected all the departments of the University for sharing of information, providing ICT enabled library services to the faculty as well as students, subscribing e-journals,
e-books, and Online database, providing electronic document delivery, electronic information notification services, group mail service facility, Online searching facility, provision for displaying information electronically, provided photocopy/ printing / scanning/ CD writing facilities to their users in the university library, and organized training / demo / lecture on e-resources / access to users, Online searching in the University library, Online searching of Journal, facility for reservation of the Journal Online, providing facilities to their users for suggesting the purchase of new books and journals to the librarian through the use of Internet, and providing audio-visual resources access facilities to their users in the library.

- A few State and Other Universities have provided linkages with libraries of affiliated colleges, libraries of other Universities, and other important libraries of Government / Private Organizations, having electronic surveillance system in their library, and providing mechanism for mining / logins facilities to their users.

7. In respect of use of ICT in administration and finance of departments in the Universities, the findings were as follows:

- Majority of Other Universities were found to have an edge over State Universities in areas, such as, maintaining database of admitted students, having computerized the evaluation, issuing computerized transfer certificate and giving information about the convocation through the use of ICT, given training to Non-teaching staff in using ICT, doing in-house maintenance of hardware and software, developing database of alumni using ICT, creating e-forum on their website which can be used by alumni for forming discussion groups, providing Online facility for registration of their alumni, computerizing the finance section, non-plan grants and grants for researches, computerizing the reconciliation of accounts process, and using computers for issuing utilization certificate.

- Both State and Other Universities have computerized the fee collection, and results of students, were having awards and special events as a
separate section, faculty member and system analyst were the nodal person for updating the University website, had networked their off campuses, were having the EDUSAT facility, ICT was used for budget proposals and allotment of plan grants, computerized the auditing section, and were maintaining computerized cash register.

- Majority of State Universities were found to have an edge over Other Universities in areas, such as, having curriculum division and co-curricular division, giving annual maintenance contract for maintaining hardware and software which they were using, fee collection and salary and budgeting were computerized.
- Only a few State and Other Universities had created facility for payment of fee through credit cards.

8. Teachers working in both the State and Other Universities were found to have positive perception about the use of ICT in Higher Education.

9. Administrators working in both the State and Other Universities were found to have positive perception about the use of ICT in Higher Education.

6.11 Implications

The findings of this study allow certain inferences and there seem to be certain possible Implications, which can facilitate the Vice Chancellors and University Administrators, University Grants Commission, All State Governments, and Teachers.

6.11.1 Vice Chancellor/University Administrations

Universities are challenged to integrate the technologies into their strategies, organization and educational structures. The global trends that are leading to change are fairly easy to grasp and analyze, it is difficult for Higher Education Institutions (HEI's) to respond to the challenges they are confronted with at local as well as international levels. There is a gap between the expression about information society and knowledge economy on the one hand, and the
practical approach to ICT and its implementation at institutional level on the other hand. Most universities have by now – either on their own, or more often under the impulse of a national / state plan of action are engaged in an analysis of the status, and have invested funds for the implementation of ICT networks and systems. Their approach many a times is more defensive – i.e., to keep up with the competition and avoid being left behind in the ICT race – rather than positive – i.e. acquire a clear vision of the role about ICT that could play in the development of the university’s missions with all its constituents (students, staff, administration etc.). Universities seem to be confronted with problems both within and without; the problems that are contributed by the environment and problems that arise because of their own structure and culture.

Wide ranging discussion and interaction by the investigator with the Vice-Chancellors and retired Vice-Chancellors reveals wide ranging views and opinions on the use of ICT, roadblocks and problems in its implementation and the range of its use. Keeping in view, the diversity of higher education institutions, their locale and individual requirements of the system, ICT can be best exploited by properly understanding the nuances of the intriguing technology. Undoubtedly it can be used to the best of advantage only by properly understanding it. Such analysis reveals that there is a need for taking up these issues:

- Development of proper networking and use of ICT in Universities;
- Development of pool of human structures in the system and their training for effectiveness;
- Stimulation of innovation in teaching-learning, research, and examination process;
- Recognition of the academic and support staff for the research work and contribution in the ICT implementation;
- Support for partnership among institutions; public and private partnership for the community engagement;
- Institutional arrangement for quality enhancement and use of ICT for improvements and
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- Development of packages / software like Management Information System / Student Management System (SIS) to enable the Universities to compete globally and efficient locally.

The present research has many success stories to tell to Vice-Chancellors. The ICT is successfully being used in Indian Universities in managing different aspects of Higher Education. The Vice-Chancellor is the academic and administrative leader of the University. He should encourage academic and administrative staff to start using ICT in different aspects of Higher Education. He should develop proper infrastructure for the use of ICT. The hardware and software should be procured and training for teachers and supportive staffs should be organized. The grant should be arranged for implementation of ICT. All these Vice-Chancellor can do integrate the use of ICT in different aspects of Higher Education. Adequate provision for fund support should be made for the ICT to yield complete result. The Vice-Chancellors need to integrate the use of ICT in different aspects of academic, administrative, research and teaching-learning issues.

6.11.2 University Grants Commission

The study reveals that various Universities have already started using ICT in managing different aspects of Higher Education. Paucity of funds seems to be a major obstacle in the complete integration of ICT with the University day –to-day business. Universities feel the pinch when it comes to fund the purchase of the necessary hardware and software. There seems to be a grave gap between the necessity and requirement; as there is a dearth of trained resource. Besides the necessary software and hardware, trained human resource is the biggest challenge that bogs down the ICT system. Providing the inputs and trained manpower is possible with the ample resources and change of mindset. There seems to be a role for the funding agencies like the UGC.

Thus, the University Grants Commission may provide funds to Universities for ICT creating facilities. For common utility, the UGC may get the software developed centrally and distribute to Universities for use. The Universities
may ask their own Computer Science / Information Technology staff and students to develop the required software. This in house development will be of great use and for this UGC can provide grant. Universities can identify and customize areas where there is necessity for software and mutually help each other. The UGC may develop ICT Consortium, which can provide all technical support for integrating ICT in different aspects of Higher Education. The UGC may encourage public and private partnership to facilitate smooth conduct of the courses and promote industry-institutions interaction for implementation of relevant course content. The UGC may make accreditation mandatory for all types of Universities. This will motivate Universities to keep the records in a systematic manner and use ICT. The UGC may link fund allocation to the use of ICT to effectively manage the system for the benefit of all the stakeholders.

6.11.3 All State Governments
It goes without saying that there is a huge presence of State Universities in the higher education sector, which are funded by the State Governments. Though UGC provides the financial assistance, these universities heavily depend on the State Funds. It is true that many State Governments have opted for e-governance and have started using ICT in different Departments. They already have first hand benefits of the use of ICT. The State Governments may provide special funds to the Universities and College for creating ICT related facilities. They should be asked to use ICT in managing different aspects of Higher Education. The Universities may be encouraged to share the available software and other ICT related facilities. The State Governments may take initiative in the appointment of faculty as well as supportive staff for smooth functioning of the Universities. The State Government may reward the academic and support staff for research work and contribution in the ICT implementation in the University or College. The State Government may make NAAC accreditation mandatory and motivate Universities and Colleges to use ICT. The State Governments may also link funding to the use of ICT, which can bring more effectiveness to the system as a whole.


6.11.4 Teachers
This research study has shown that the teachers are using ICT in teaching, evaluation and research. The teachers are also engaged in developing Computer Aided Instruction, Web Based Instruction, Computer Based Testing, Online testing, Online Counselling, etc, which has improved the quality of Higher Education. It is a fact that Universities and College do not get well-qualified staff and many positions are lying vacant. In the light of such deficiency, ICT can be exploited to supplement such paucity of teachers. Students as well as teachers can access the experienced and enlightening lectures delivered through EDUSAT. It can go a long way in improving the quality of teaching in the colleges and Universities. The teachers can share their notes, assignments, power point presentations, etc with other teachers and students of the same discipline. The teachers can collaborate in the areas of research with the help of ICT. The teachers can use different websites for searching relevant instructional material, e-journals, information about the conferences, etc. It is undeniably true that the use of ICT requires training in the proper handling of ICT facilities and their optimal use. The teachers can seek such training themselves or even seek the assistance of the University to arrange for such a training programme. Thus the findings of the study also hint at the role of teachers in the effective use of ICT.

6.12 Suggestion for Future Work
Suggestions for further research are as follows:
1. A study of problem in the use of ICT for Excellence in Higher Education.
2. Use of ICT in Jawaharlal Nehru Technological University – A case study.
3. Comparative study of reaction towards use of ICT in Higher Education of Teachers of Different Disciplines.
5. Need Assessment of Functionaries of Higher Education in the use of ICT in Higher Education.