Chapter: 6

Findings: ICT Adoption Model
Main objective of the study was to develop a framework and guidelines to enable any higher education institution to adopt ICT. We came up with a framework that talked about parameters involved while adopting technology in teaching in an academia. This led to the development of ICT Adoption Model with specifics as discussed in this chapter.
6.1 Major Challenges in ICT Adoption

While identifying the major challenges was one of our main objectives of the study, it was also crucial to study all sorts of challenges as hurdles faced by educators in general in adopting ICT. Through literature review, we had come up with many challenges that become hurdles in adopting ICT. They included – Training, Funds, External Factors, Infrastructure, Awareness and many more. Pilot questionnaire helped us in freezing upon the major challenges to study further. Thus, Planning – Existing Status – Awareness – Training – Influencers were identified as the top challenges faced by educators in adopting ICT in teaching.

After we identified major challenges to work upon, we started studying them further from the perspective of their effect on implementation of ICT in any academia. We asked respondents about –

- Their understanding of ICT
- Any experiments their carried out with technology in their teaching
- Did they reap any benefits of using ICT in teaching
- Procedures, if any, they followed to implement ICT

Our respondents included not only the heads of the academia but also professors and students.

6.2 ICT Awareness

Expanse of ICT is pervasive and at times subjective. Nevertheless, we tried to keep it very specific in our questionnaire while seeking responses from educators. Awareness being one of major aspects in any change process, we found out that academia needed to work on making their educators aware of ICT in general and its use in specific.
Most of the educators were aware of basic modes of teaching and technology tools. But when it came to using them in teaching process or using any software to make teaching more effective, was quite lacking.

6.3 Need for ICT Adoption Model and its features

Every major challenge identified was weighed against ICT adoption planning process. Here, we thought, we needed to understand if ICT adoption would have been smoother had there been any standard framework or guidelines in place. Every challenge – from Training to Influencers was checked statistically too for correlation and found that Planning in the form of a set of guidelines or a framework was essential for better ICT adoption. This gave birth to ICT Adoption Model that became our last finding of the thesis.

![G-XXV-ICT Adoption Model Framework](image-url)
ICT Adoption Model Framework and Model talk same parameters but Model is more specific to academia. Model talks about every parameter in detail and with the perspective of any academia for ICT Adoption.

Framework is dissected as below –

Parameters on the left side are actions to be taken while on the right side, one can see change evolving after meticulous implementation of these actions. For example, once any academia follows the actions prescribed, it can expect a smoother implementation of technology and eventually expect positive actions from its stakeholders or educators. Of course, Demographics happens to be one of crucial parameters and variables that may affect the overall framework outcome. Nevertheless, Demographic characteristics of educators were not considered for the study in case as we found them to be more relevant while implementing ICT Adoption Model specifically for any academia.

Awareness – talks about basic knowledge about ICT and its use. Every academia needs to familiarize its educators with benefits, trends and need for ICT as well as present success stories in the form of how other academia have benefitted with ICT for more conviction. This forms the first guideline of the framework and hence of the model.

Status-quo Study – is all about understanding where academia stands today as far as its readiness to accept new ICT is concerned. Right from understanding users of ICT to various technologies available in the institution – will help one with this guideline.

Best case scenario – is a popular term used to showcase how academia will be after ICT implementation. One has to have a specific plan with specific technologies recommended for the academia in case.
Facilitate – here means helping educators with various resources in the form of
training programs, one on one mentoring or installation support. There can be various
forms of facilitation that depend upon ICT implemented.
Influencers – are important factors that affect educator’s actions in one way or
another. From peers to government, influencers are necessary to be identified for
successful implementation of any change for that matter.
Track – is the iterative guideline in the framework that requires academia to create
check points where every implementation is consolidated. At times, changes may
happen at such check points.
Reform – talks about creating a knowledge base for future use. During the process of
ICT adoption, academia goes through a lot of learning. All such learnings can form a
knowledge storage that can be used as insight for future action.

While all above guidelines form the framework, ICT Adoption Model expands
on every guidelines to make it more suitable and specific to academia. Hence
while Framework is a generic guideline set for ICT adoption, Model is a specific
guideline set for ICT adoption by Higher Education Academia.
6.4 Application of Model (Use Case)

Given below is a fictitious use case to explain the proposed model in detail. As mentioned earlier, model can be applied to any higher education institution in India that may be at any stage of ICT adoption – early adoption to some advanced stage. At any stage, one can apply the model and come up with a plan for ICT adoption.

Characteristics of Academia in case (assumptions)

- An institution offering management and computer application degrees, which is also affiliated to a state university is considered for the use case.
• It is located in a semi urban area, with student population from middle class category.
• Institution is in existence for past 5 years.
• It has a student intake of 300 every year while teaching staff is 60 in number.
• Proposed model is applied to the institution and study report was presented in a shorter format for the thesis purpose here.

ICT 101 (what is, benefits, success stories) –

Here ICT is explained from its characteristics, benefits point of view. Some details on its implementation in other institutions in similar set up are also mentioned here so that the staff can correlate better.

ICT or information and communications technologies is the term used to indicate information technologies, telephone network, technology infrastructure, digital form of content and communication channels. With technologies converging every day, whenever all or part of above is used in education sector, it is referred to as ICT in education. Such technologies are used to –

• Manage educational activities and tasks (automation)
• Facilitate content deliverable (platforms)
• Generate, share, deliver effective content
• Store and reuse educational systems
• Network with each other – peer or institution levels

ICT in education involves software as well as hardware aspects of technology. Simply putting all software and hardware together for any educational institution also can be referred to as ICT for education. For the institution in case, which is a 5-year old higher education academic organization, following are relevant ICT – Digital content in server and CDs media, Use of content development tools by teachers, Games and Simulations based on subject topics, Access to MOOC or online resources, computers
and other equipments used in laboratories, software for operations system and
development environment etc. Other ICT may be in the form of specific software like research software, statistical
programs, multimedia etc. All of above is ICT 101.

College of Management and Computers that was founded in same year and offers
same education programs recently received a grant from the university to implement
central knowledge repository. All educators of the institutions now create their own
learning objects and content using various content development tools. All such
learning objects are stored at a central repository that is accessed by all educators
for their sessions. University found this initiative a novel one and decided to not only
fund for software and hardware but also fund the training programs. Besides, college
also has been subscribing to Mendeley Academic Research application that has
helped its professors write conduct quality research and publish quality research
papers. Professors today have a good online recognition due to usage of software
applications that are cloud based. Many of the professors now also get to
communicate with other like minded professors all over the world and explore joint
research opportunities. Recently, one of its professors also got to travel to Germany
to present a research paper jointly with a German professor who he could connect
through online research application.

With the central knowledge repository initiative already on track, college now is
hoping for better placements of their students in years to come as it hopes to deliver
more effective teaching as educators soon will start using more engaging teaching
content. This certainly is a very inspirational story for many institutions including the
one in case.

Existing Capacity (Users, List technologies, Knowledge Base etc.)
Here we try to understand the current status of the institution when it comes to ICT. This section will assess the capacity in terms of software, hardware available in the institution.

*Institution is only 5 year old. It has the following –*

- **LCD projectors**
- 2 IBM servers
- 35 desktop computers
- 2 laptops (with required configuration)
- Subscription to Inflibnet and Copernicus Database for one year
- 40 Win XP, 40 MS OS paper licenses
- TimesMedia video CDs

- **There is a Technology Support team comprising of Head of Computers Department and two technicians. The team takes a decision on procurement once it receives any requisition from the staff. Head of the Institution is the final approving authority. Technicians are trained on various technologies as and when required. Especially whenever a new technology is procured, they are trained by the vendor.**
- **Technology vendors also offer upgrades as per the terms and maintenance contracts. With every upgrade, training is offered.**
- **Institution does not organize for any training programs exclusively for the technology team and the staff members. Training demand also does not come from the staff members often though some of them do request for training programs.**
- **Most of the teaching content is in the form of powerpoint presentations as far as digitization is concerned. There are some teaching staff members who use transparencies to present the topics in the classroom.**
Institution has a web presence. The website is not frequently updated and the last updated was a year ago.

Every staff member has his / her own email ID with the institution domain. Since internet connectivity is restricted to specific areas inside the institution, members do not access the emails regularly. Some members have hardly used the institution email IDs for any communication.

Most of the staff members use their private email IDs for communication. Teaching content resides on the individual desktop machines and email storage.

Staff members do not get to access research databases from everywhere. They are also not trained on its usage thereby keeping the subscriptions unused.

There are organized programs for discussions and debate on technology usage, trends in education technology etc. Staff members do not get to access any additional knowledge from resources from external sources.

Network in the institution is not available to all desktop machines. All labs are one network but not all staff nodes are in the network yet.

Library has a limited number of desktops. It has infibnet available for students and staff members. It also has access to some online journals.

Institution has a dedicated internet connectivity. It also has Wi-Fi, its transmission is not seamless. Students find it difficult to access it, especially from within the classrooms.

Students do not have their own email IDs with institution’s domain name yet.

Email communications with the students is over private email addresses only.

Institution Specific Proposal (First steps, Timelines etc.)

This stage onward, steps in implementation come into picture. With the help of Technology Team, one can apply this step after current status is assessed for availability of ICT. This part will consist of steps taken based on earlier fact finding
exercise done on the existing status of ICT in the institution. Given below are some steps and outline on how implementation can begin.

- **Institution has a basic website with no updates in last one year. Technology team can take care of updating the same immediately.**
- **Institution should organize sessions on – Best practices in ICT in education, use of technology in knowledge creation, contemporary hardware use in education – by industry experts as well as colleagues from other institutions. Staff members can correlate better and get the knowledge about ICT.**
- **A team of tech savvy staff members can be formed to communicate with others and seek requisitions.**
- **Since it is a privately funded institution, timelines for deliverables can be made for every 2 months. First deliverable can be the updated website.**
- **Newly formed team will also work on funding and grants schemes by the university and other authority bodies.**

**Training and Mentoring**

- **Based on above steps taken, institution needs to conduct training on – hardware configuration, effective use of office applications, email management etc. on priority. One on one mentoring is needed especially for those who have never used technology in teaching. One-on-one mentoring will help reduce the resistance to change.**
- **Training programs should be in the form of workshops lasting for days. On-hands training must be given to each of the members. Only when staff members try out technologies on their own, they will not trust the potential of ICT.**
- **Every training program should have assessment at the end of it. Assessments will depend upon the type of training and subject matter. But it will help in**
assessing the knowledge acquisition by the members as well as track completion of overall training program planned.

- All training programs can be specified with various ICT tools implemented. Details like trainers, duration, assessments, pre-requisite etc. can be part of the programs. Training programs can be preceded with mentoring if needed on individual basis.

Influencer Factors

Internal and external factors that are closely associated with the institution form the influencers. Let us see which all can influence the institution in ICT adoption –

- **University** – Since the institution is associated with the state university, it is mandatory to abide by the norms set up for every program. There are also certain mandates about pedagogy and teaching technologies for every program. Institution must abide by the same. Any initiative by the university will certainly be considered by the institution. Such initiatives can be in the form of grants for technology usage.

- **Parents** – Another external influencer, Parent is an important factor as institution in case runs technology programs that require use of contemporary technologies at least in the laboratories. While students are focused on technology programs, parents are too aware about the technology program and hence more aware about the teaching. Due to their exposure to outside factors, parents too get to know about education technologies and hence their pressure acts as an influencer for the institution in ICT adoption.

- **Peers** – As mentioned in one of above steps, some of the staff members do take initiatives in using ICT for academic research and teaching. They take such initiatives owing to their exposure to such practices adopted in competing institutions. Such a peer pressure too acts as an influencer for the institution as well as other staff members.
Competing Institutions – There has been a recent exodus of institutions offering similar programs in the region, thereby creating a great competition. Many institutions are striving to create an edge over other institutions to attract more students and sustain. One such differentiator has been use of technology. Thanks to technology, even international institutions offering such programs and their best practices are inspiring to the institution in case.

Monitor Implementation
Once ICT implementation begins, institution has to have check points to track the progress. Such check points are set up as per the timelines and requirements. They should also combine readiness on fronts like – infrastructure, installations, training, deliverables, results as give below –

- **LAN** – All desktops for staff members are connected over one network. All nodes are tested and working. Most contemporary media are used for connectivity over LAN. (date)
- **Server and Switch Set-ups** – All servers are also demarcated along with desktops.
- **Installations base software** – Institution has purchased license copies of mandatory software applications like – operating system, office applications, editors, multimedia, office application. Anti-virus etc. And have all maintained and installed. Every application is upgraded to the latest version. (By date)
- **Installation of other software** – As planned, ten of desktops have Content4U software installed, which is used by professors to create their own content. Same can be extended to other desktops as required. Statistical software like PSPS and LabMat are installed inside the lab on every desktop. (by date)
Training – First training on PSPS will be a one day workshop and should be planned within a month of its installation. Professors should create their own study cases and data for workshop. (By date)

Software Training – Email management and office application training should be extended to every member including non-teaching staff. It should take place three times a year starting on date. Every workshop will have pre and post assessments taken by trainers.

Official Emails – By date, all staff and students should have created their own email addresses on official domain of the institution. All other private email clients will be banned. Communication over official emails only will be treated formal from date.

Digital Content by professors – Every staff member will present to peers his / her teaching content in digital format. It can be a power point output or content created using any of the tools procured. As per schedule, every teaching member will make the content ready and also store it at centralized server as mentioned. (by date)

Update Knowledge-base

There are various ways institution can keep abreast of the trends in education technologies. It can plan its calendar for events, FDPs, programs by other agencies, internal presentations, meetings and many more. There are many conferences organized on teacher technologies that can be attended by the staff members. There are many online events in the form of webinars that too can be included in the calendar. The outcome of all can be stored at one place and keep increasing the knowledge base on ICT. This is a continuous process and begins right from day one of the implementation. Institution in case too is recommended to work on the same guideline.