



*Quantifying the ICT Needs of
Academic Institutes Using
the Service Category-
Stakeholder Matrix Approach*

By

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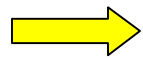
OUTLINE

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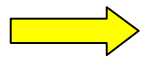
Motivation for Work

□ Information and Communication Technology (ICT) is indispensable for modern education



How to identify/quantify needed ICT?

□ ICT requires considerable investment of resources (financial + human)



How to plan/procure/operate/maintain ICT?



ICTP S&Q and Related Entities (1 of 6)

Historical Background

- In February 2000, the Ministry of Higher Education in Egypt:
 - established a higher education reform strategy
 - the strategy was translated into 25 distinct projects
 - 12 of the 25 projects were bundled into 6 projects, collectively called Higher Education Enhancement Project (**HEEP**)
 - a loan agreement was signed between the Govt. of Egypt and the World Bank to fund the 6 projects



ICTP S&Q and Related Entities (2 of 6)

6 projects are :

ICTP : Information and Communication Technology Project

HEEPF : Higher Education Enhancement Project Fund

QAAP : Quality Assurance and Accreditation Project

FLDP : Faculty-Leadership Development Project

FOEP : Faculties of Education Enhancement Project

ETCP : Egyptian Technical Colleges Project

- Implementation of **HEEP** started in 2003 after legislative approvals were finalized



ICTP S&Q and Related Entities (3 of 6)

- In March 2007, the National Authority for Quality Assurance and Accredit. in Education ([NAQAAE](#)) was established by a presidential decree. Goal:
 - to promote quality assurance in education
 - to encourage improvement in academic standards and the quality of the learning opportunities
 - to facilitate the development and application of national reference standards
 - to support institutions in the development of their internal quality assurance systems



ICTP S&Q and Related Entities (4 of 6)

- In August 2007, the Continuous Improvement and Qualifying for Accreditation Project (**CIQAP**) was initiated. Goal:
 - to offer financial and technical support to higher education institutions working to achieve their strategic plans
 - to build the capacity of these institutions for sustained development and qualifies them for national accreditation



ICTP S&Q and Related Entities (5 of 6)

□ In March 2008, the ICTP Strategy & Qualification

(ICTP S&Q) Committee was formed. Goal:

- to identify the information and communication technology (ICT) requirements that an Egyptian University/Faculty should acquire to meet prospective national accreditation criteria

Members of the Committee are:

Mahmoud EL-HADIDI (Chairman)

Hussein ANIS

M. Sami EL-AKABAWI

Aly A. FAHMY

Mohamed SALEM

Ahmed TANTAWY

Ahmed S. EL-RAFIE

Mohamed A. SALEH

Tarek AL-AHMADY

Ahmed HASSAN

Ashraf SAAD

Hossam FAHIM

Tarek F. GHARIB

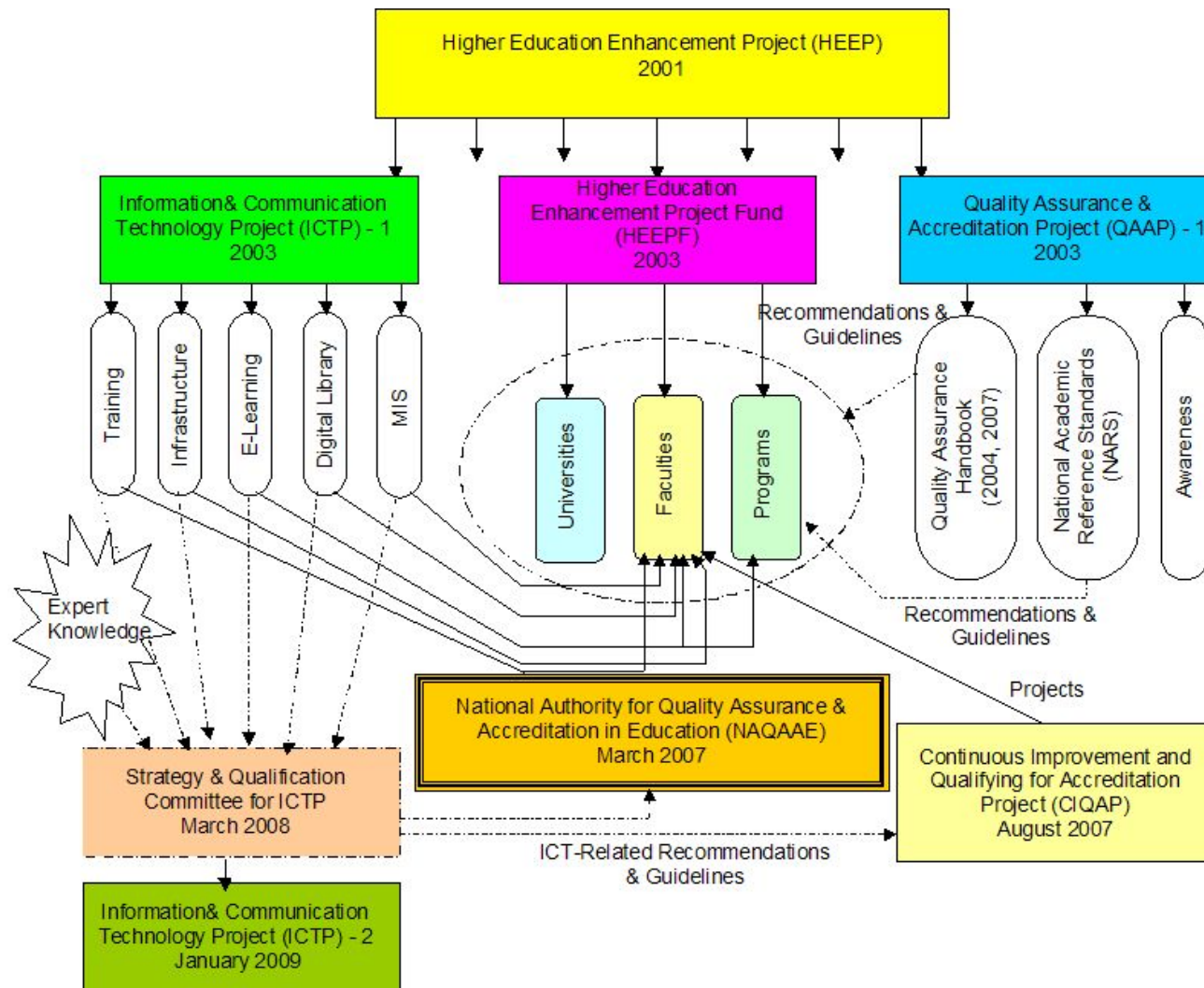
Mohamed SHARAWY

Khaled ABDEL-FATTAH

Hamdy ABDEL-AZIZ

Ibrahim ABDEL-MONIEM

ICTP S&Q and Related Entities (6 of 6)



Organizations, Projects, Committees & Products related to Quality Assurance and Accreditation for Higher Education in Egypt

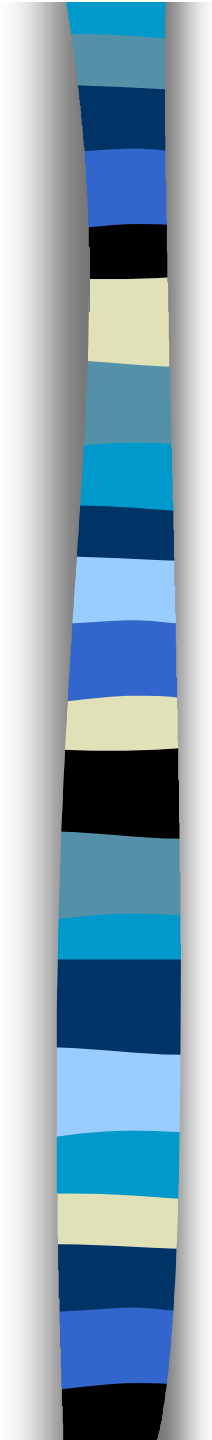
Workspace for Academic Institutions

Input	Activity	Output	
Buildings	Lectures	Government Employee	
	Sections/Exercises		
Equipment	Labs & Experiments & Simulations		
	Projects/Researches/Presentations		
	Theses/Researches/Presentations		
Knowledge Resources	Studies/Applied Researches		Company Employee
	Student Records: Create/Update		
	Staff Records: Create/Update		
Students	Employee Records: Create Update		R & D Employee
	Financial Records: Create Update		
	Purchase Records: Create/Update		
Teaching Staff	Asset Records: Create/Update	Intellectual Products (Art – Literature – Designs – Research Studies – Applied Projects)	
	Medical Services and Records		
Management Staff	Social Services and Records (Trips, Recreation, Support, etc)		
	Engineering Services and Records (Maintenance, Maps, Drawings)		
Administration Staff	Cultural Services (Seminars, Conferences, Exhibits)		
	Housing Services (Dormitories, Staff Housing, etc)		

↑
ICT
 Humanware – Hardware – Software – Applications - Training

Stakeholders
 Students – Teaching Staff – Management Staff – Administrative Staff – Alumni
 Government Agencies – Private Companies – Society @ Large

Academic Workspace Environment, ICT Interaction, and Stakeholders





Systematic Approach for Determining ICT Needs in Academic Institutions (1 of 10)

Step1 – Define a matrix whose rows correspond to the stakeholders and whose columns identify the range of service category each stakeholder may receive or expect from the academic institution. For the purpose of this study 8 stakeholders and 5 service categories have been identified. (Table 1).

Systematic Approach for Determining ICT Needs in Academic Institutions (2 of 10)

Table 1 – Service Category – Stakeholder Matrix proposed by the ICTP S&Q Committee to deduce needed ICT components

A	B	C	D	E	F	G
Stakeholders	Service Category	Teaching	Research	Community Service	Admin & Operation	Professional Development
Staff	Teaching	C1	D1	E1	F1	G1
	Governance	C2	D2	E2	F2	G2
	Administration	C3	D3	E3	F3	G3
Learners	Current Students	C4	D4	E4	F4	G4
	Prospective Students	C5	D5	E5	F5	G5
	Alumni	C6	D6	E6	F6	G6
	Transient and Community	C7	D7	E7	F7	G7
Society @ Large	Municipalities/ Companies/ Layman	C8	D8	E8	F8	G8



Systematic Approach for Determining ICT Needs in Academic Institutions (3 of 10)

Step 2 – Consider each row (i.e. stakeholder) separately, and analyze the typical activities it usually performs in relation to the academic institution.

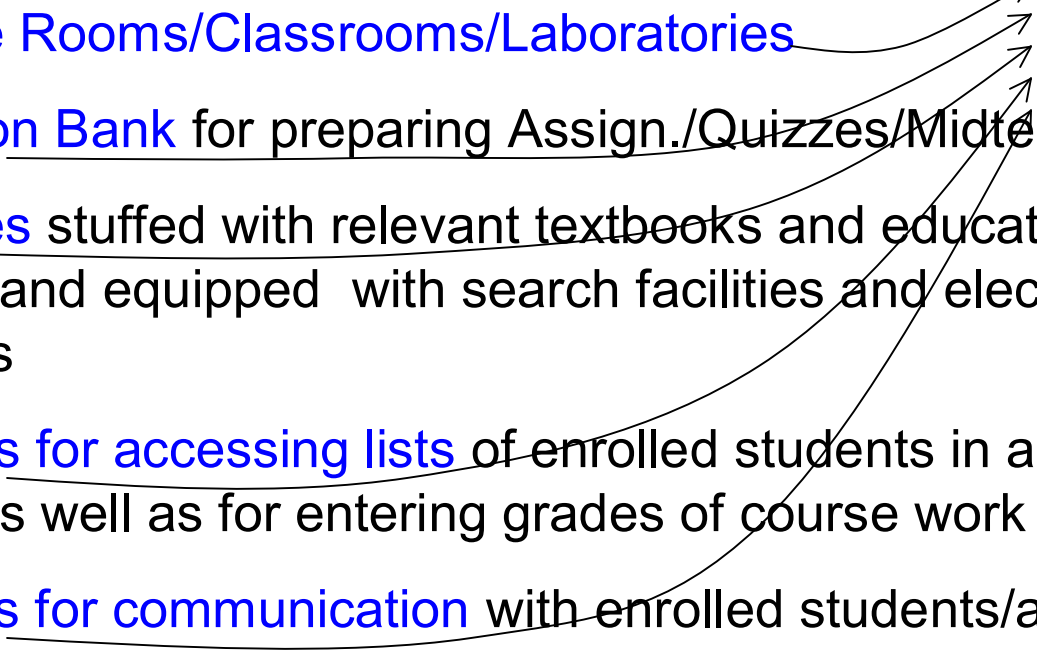
Depending on the type of stakeholder, some or all of the 5 service categories identified in Step 1 may be relevant.

For example, cell D1 relates to research services resulting from the activities conducted by the Teaching Staff within the institution. Likewise, cell E1 relates to community services contributed by the Teaching Staff resulting from his/her activities in the institution, and so on.



Systematic Approach for Determining ICT Needs in Academic Institutions (4 of 10)

Step 3 – Based on the outcome of Step 2, one may next postulate the ICT-related resources that are needed to fulfill the activities performed by the stakeholder in question. Such ICT-related resources may include:

- **Lecture Rooms/Classrooms/Laboratories**
 - **Question Bank** for preparing Assign./Quizzes/Midterms/ Exams
 - **Libraries** stuffed with relevant textbooks and educational material, and equipped with search facilities and electronic resources
 - **Facilities for accessing lists** of enrolled students in a particular course, as well as for entering grades of course work
 - **Facilities for communication** with enrolled students/alumni/society at large
- Layer 1**
- 



Systematic Approach for Determining ICT Needs in Academic Institutions (5 of 10)

Step 4 – Select the ICT technologies that are effective in the operation of the resource.

Examples of relevant ICT technologies include:

- Presentation Technologies
- E-Learning Technologies
- Electronic Resources Technologies
- Library Information System Technologies
- Collaboration Technologies
- Virtual Classroom Technologies
- Management Information System (MIS) Technologies
- Web Portal Technologies
- Basic Information Technologies.

Layer 2



Systematic Approach for Determining ICT Needs in Academic Institutions (6 of 10)

Step 5 – Translate the ICT technologies identified in Step 4 into ICT components. The latter can be broadly divided into the following main categories:

Hardware – Software – Networks – Contents –
Humanware – Methodologies & Policies –
Applications

Each main category needs to be further specified.

In the case of hardware, one may select from:

*Servers – Workstations – Personal Computers – Printers –
Scanners – Whiteboard – Video Cameras - ... - etc*

In the case of humanware, one may consider the deployment of:

*Network Engineer – Software Engineer – Graphics Specialist –
Hardware Specialist – Instructional Designer - ... - etc.*

Layer 3



Systematic Approach for Determining ICT Needs in Academic Institutions (7 of 10)

Hardware	Software	Networks	Contents	Humanware	Methodologies & Policies	Applications
<ul style="list-style-type: none"> * Application Servers * Firewalls * IPS * Antivirus * Web Content Filtering * PCs * Printers * Scanners * Plotters 	<ul style="list-style-type: none"> * Windows OS * LINUX OS * MS Office * Autocad * GIS * NM SW * LMS * CMS * E-Archive * E-Publishing * Video Conferencing * Virtual Labs * Discipline specific packages 	<ul style="list-style-type: none"> * Link to University HQ * Link to EUN * Link to Internet * Link to PSTN * Link to ISDN * VOIP * NW inside Labs * NW inside Central Library * NW inside Department Building * NW inside Admin Building * NW bet. Buildings * Wireless Access Points 	<ul style="list-style-type: none"> * Digital Libraries * E-Books * Question Banks 	<ul style="list-style-type: none"> * NW Admin/Engineer * SW Admin/Engineer * Graphics Specialist * Instructional Designer * Servers Admin * Web Admin * E-Learning Admin * Lib Information Specialist * System Admin * PC & Peripherals Specialist 	<ul style="list-style-type: none"> * Technology Code of Conduct * Internet Etiquette * E-Library policy * Circulation Policy * Help Desk Policy 	<ul style="list-style-type: none"> * Student IS * Employee IS * Financial IS * Purchase IS * Inventory IS * Web Site/Portal * Hospital IS * Housing IS * Open University IS



Systematic Approach for Determining ICT Needs in Academic Institutions (8 of 10)

To help the decision-making entity - in charge of ICT components acquisition - give priority to some components or to consider its deployment on a broader scale (e.g. at University Level rather than at Faculty level), a 4- element code is introduced to measure the priority, the urgency, the scope of deployment, and the dependency on the specific academic field, for each ICT component.

The code details are listed below:

Level of importance : 1 (lowest) – 5 (highest)

Urgency : M (Mandatory) – O (Optional)

Scope : U (University) – F (Faculty)

Field Dependency : D (Dependent) – I (Independent)

Systematic Approach for Determining ICT Needs in Academic Institutions (9 of 10)

A representative outcome of Step 5 for the Stakeholder “Teaching Staff” with regard to the Service Category “Teaching” - Cell C1

Technology Type	Hardware	Software	Networks	Contents	Human ware	Methodologies & Policies
Presentation	Video Projector (5,M,F,I) Whiteboard (5,M,F,I)	Recording Software (2,O,F,I)	Wired Connectivity (5,M,F,I) Wireless Connectivity (3,M,F,I)		Equipment Specialist	
E-Learning	Server (5,M,U-F,I)	LMS (5,M,U-F,I) CMS (5,M,U,I) Quizzes Bank (5,M,U,I)	Wired Connectivity (5,M,F,I) Wireless Connectivity (3,M,F,I)	E-Courses (5,M,U-F,I) E-Books (2,O,U-F,S)	Instructional Designer (5,M,U-F,I) Multimedia Specialist (5,M,U-F,I)	
Electronic Resources			Wired Connectivity (5,M,F,I) Wireless Connectivity (3,M,F,I)	ScienceDirect, Medline, ASP, (5,M,U,I)	Electronic Resource Specialist (5,M,F,I)	E-Library policy (5,M,U,I)
Library Information System (LIS)	Server (5,M,U,I)	LIS Software (5,M,U-F,I)	Wired Connectivity (5,M,F,I) Wireless Connectivity (3,M,F,I)	Bibliographic, Item, Patron Records (5,M,F,I)	Cataloging, Circulation, Serials Specialists (5,M,F,I)	Circulation Policy (5,M,U,I)
Collaboration	Server (5,M,U-F,I)	E-Mail (5,M,U,I) Call Manager (2,O,F,I)	Wired Connectivity (5,M,F,I) Wireless Connectivity (3,M,F,I)		E-Mail Specialist (5,M,U,I) VOIP Specialist (2,O,F,I)	

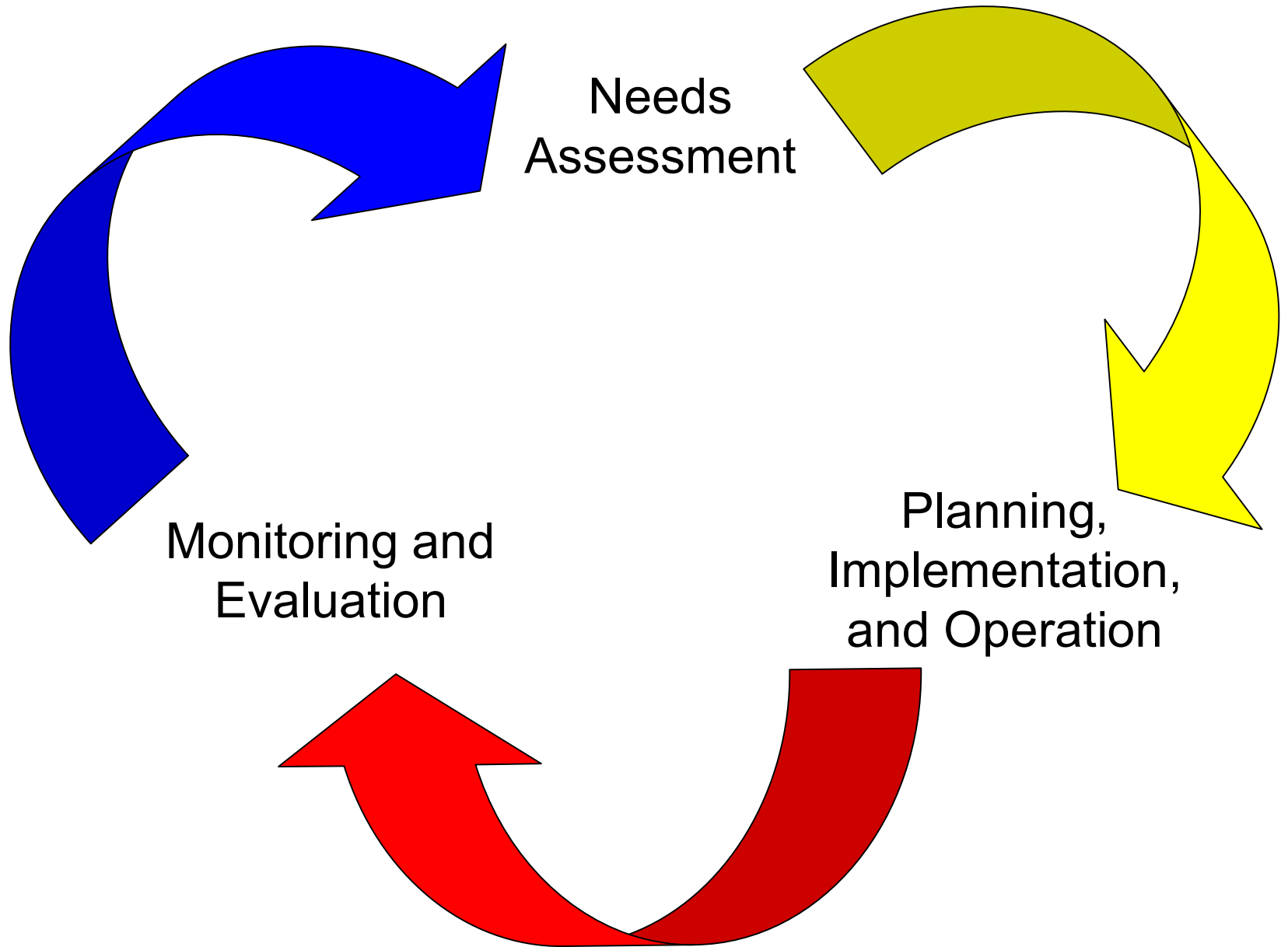


Systematic Approach for Determining ICT Needs in Academic Institutions (10 of 10)

Step 6 – Once Steps 3, 4, and 5 are undertaken for each stakeholder, the next step is for the academic institution to review the obtained outcomes with the following objectives in mind:

- Integrate the needed ICT components identified within each cell.
- Remove repetitions/redundancies among the ICT components that belong to the same service category (same column in the Service Category – Stakeholder Matrix) but contribute to the activities of all stakeholders.
- Deduce a unified list that contains the union of all ICT components needed for the academic institution, and which covers all the service categories for all stakeholders.

The Complete Cycle





Recommendations (1 of 6)

For successful integration of ICT into the Academic Institute, the following issues needs attention:

a) A Clearly Defined ICT Strategy

Does the institution has a clear strategy for its ICT goals?

Who has prepared it?

When it was prepared?

Is it available or at least can it be accessed upon request?

If it was revised, when was it last updated?



Recommendations (2 of 6)

b) Formal Body for Planning, Monitoring and Evaluation of the Institution's ICT

Does the institution has a formal body responsible for the planning, monitoring, and evaluation of its ICT activities? If so, at what level? Are all the stakeholders represented in such formal body?

Does this body has the necessary resources (including financial resources) to conduct its responsibilities and sustain its activities?

Do members of such body have enough time for the planning, monitoring and evaluation tasks (taking into consideration that these members are not full timers)? How frequent do they meet?



Recommendations (3 of 6)

c) Qualified ICT Department

Does the institution has a qualified ICT department at the same hierarchical level as other institution departments?



Recommendations (4 of 6)

d) The Security Issue

Does the institution have a documented, accessible, detailed and prioritized ICT security policy? What is the status of its implementation?

Does the institution has a clear procedure for reporting and handling security problems? Does the institution has a detailed backlog of security breaches? How frequent are they? How frequent are security related equipment and software being updated?

Does the ICT Department has skillful software engineers or ones who can analyze and handle the security problems? Are they available all the time to troubleshoot hacking problems if they occur?



Recommendations (5 of 6)

e) The Performance and Quality of Service Issue

Does the implemented ICT policy satisfy the needs of its stakeholders?

Is the quality of the implemented ICT services tested during high load times?

Does the institution has a clear metrics for measuring the satisfaction of the system users? Is there any online (web-based) service available to the users to report the problems related to the ICT service quality?

Does the institution has - in a documented form - a study of the average/maximum anticipated user loads? Is this load study taken into consideration when sizing the needed ICT system processing and communication powers?



Recommendations (6 of 6)

f) ICT Documentation

A system (in paper, electronic or mix between paper and electronic form) is needed that archives all related documentation of the institution's ICT.

Examples of important documents include:

- The institution's ICT strategy (and its different versions)*
- ICT policies including the ICT security policy/policies*
- ICT acquisition documents (RFQ, RFP, LCDs, Pos, Warrantee Letters , etc)*
- Software media, licenses, and manuals*
- ICT infrastructure diagrams (summary and detailed diagrams)*