# Prioritization and Implementation of ICT Infrastructure in Higher Education Institutions in the Philippines

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1st International Conference on Open and Distance E-Learning: Creating Spaces and Possibilities
22-24 February 2012, Manila, Philippines

# Presentation Outline

- Introduction
- Objectives
- Methodology
- Results
- Conclusion and Recommendation

Introduction

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# Background

- ICT infrastructure may explains the institution’s collection of people, data, processes, hardware and software, interacting with each other to collect, process, store, and provide a common goal for the organization.

Introduction

# Background

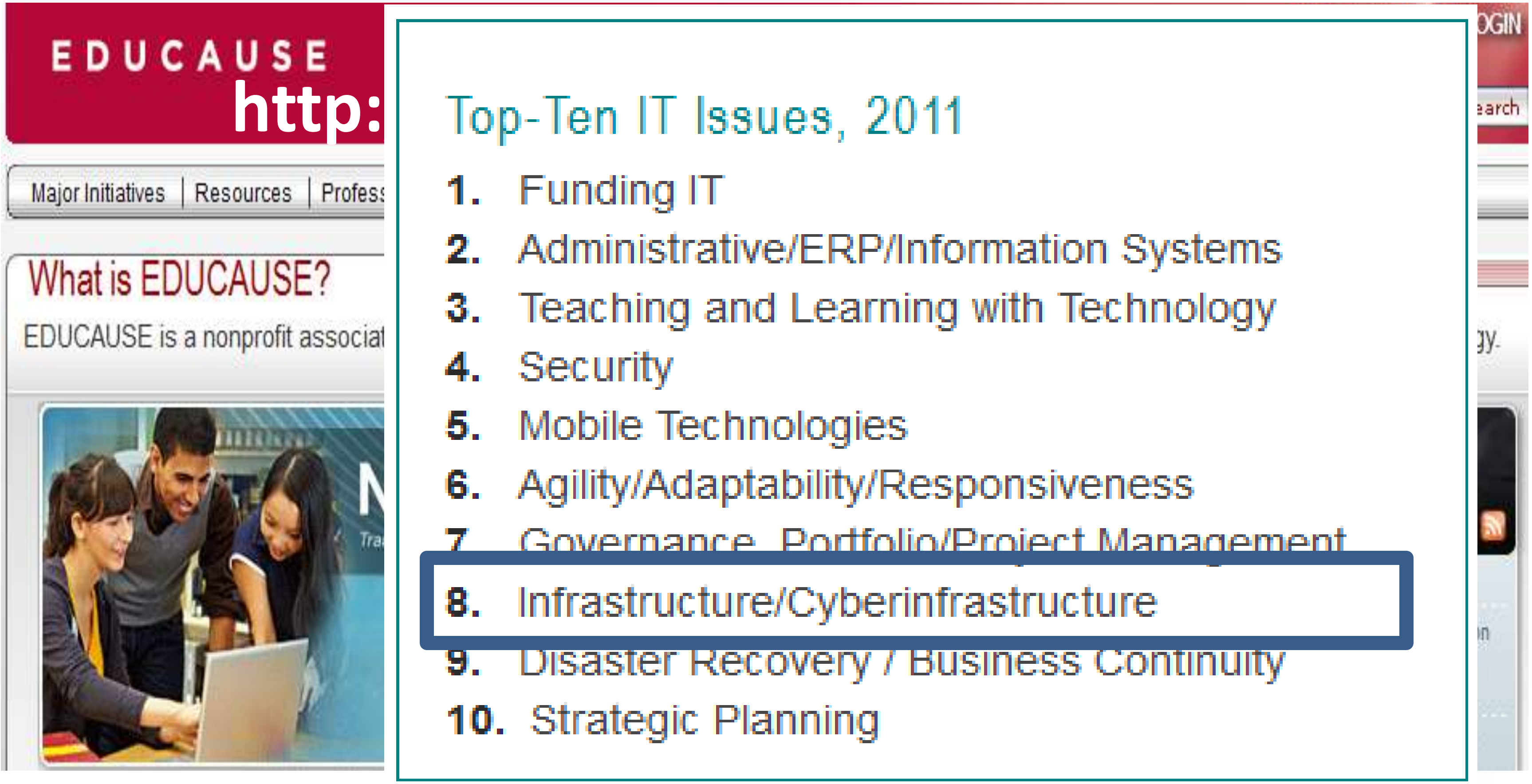
- Advancements in ICT infrastructure includes **deploying** technology that makes easy to ***collaborate*** and ***network*** in the workplace both *internally and externally* (Corporation for National Research Initiatives, 2009).
- **Sufficient** ICT infrastructure is an ***ideal condition for the adaptation of e-learning*** (Lee, 2011).

# IT in EDUCATION

IT in education means **implementing** information technology ***equipment***, ***process*** and ***tools*** in the teaching-learning process as *media* and *methodology*.

Introduction

# IT in EDUCATION



EDUCAUSE

http:

What is EDUCAUSE?

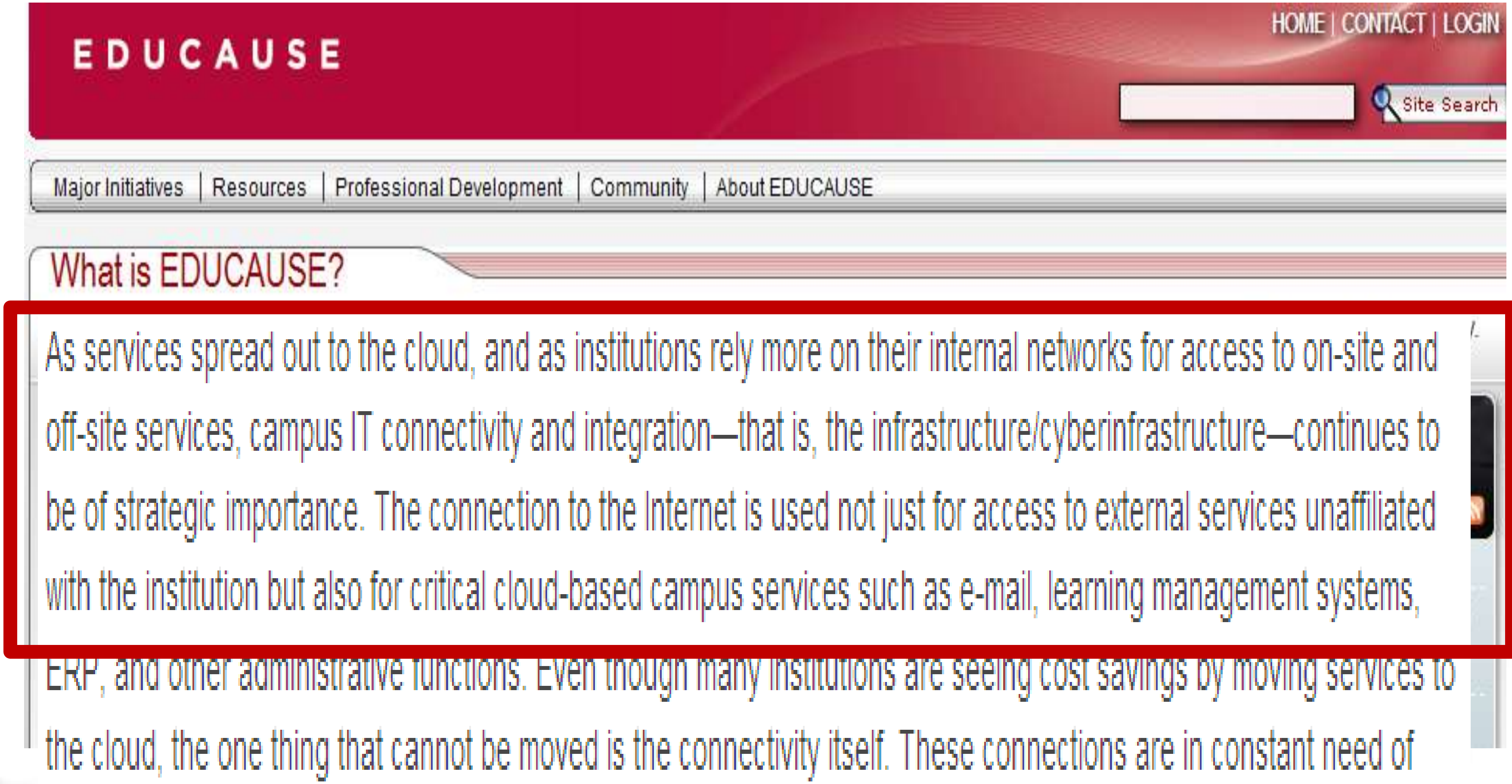
EDUCAUSE is a nonprofit associat

Top-Ten IT Issues, 2011

1. Funding IT
2. Administrative/ERP/Information Systems
3. Teaching and Learning with Technology
4. Security
5. Mobile Technologies
6. Agility/Adaptability/Responsiveness
7. Governance, Portfolio/Project Management
8. Infrastructure/Cyberinfrastructure
9. Disaster Recovery / Business Continuity
10. Strategic Planning

Introduction

# IT in EDUCATION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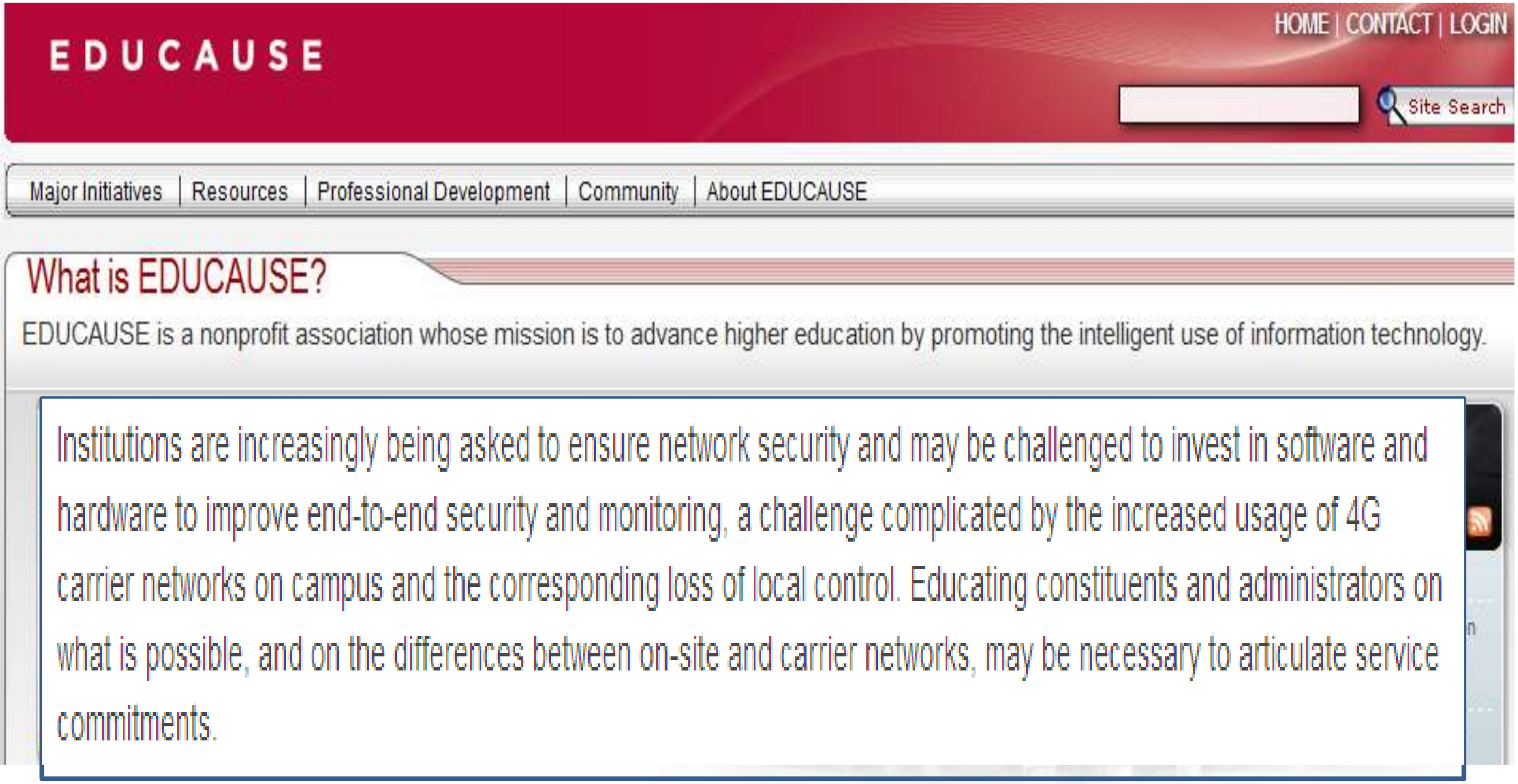
What is EDUCAUSE?

As services spread out to the cloud, and as institutions rely more on their internal networks for access to on-site and off-site services, campus IT connectivity and integration—that is, the infrastructure/cyberinfrastructure—continues to be of strategic importance. The connection to the Internet is used not just for access to external services unaffiliated with the institution but also for critical cloud-based campus services such as e-mail, learning management systems, ERP, and other administrative functions. Even though many institutions are seeing cost savings by moving services to the cloud, the one thing that cannot be moved is the connectivity itself. These connections are in constant need of

Introduction

# IT in EDUCATION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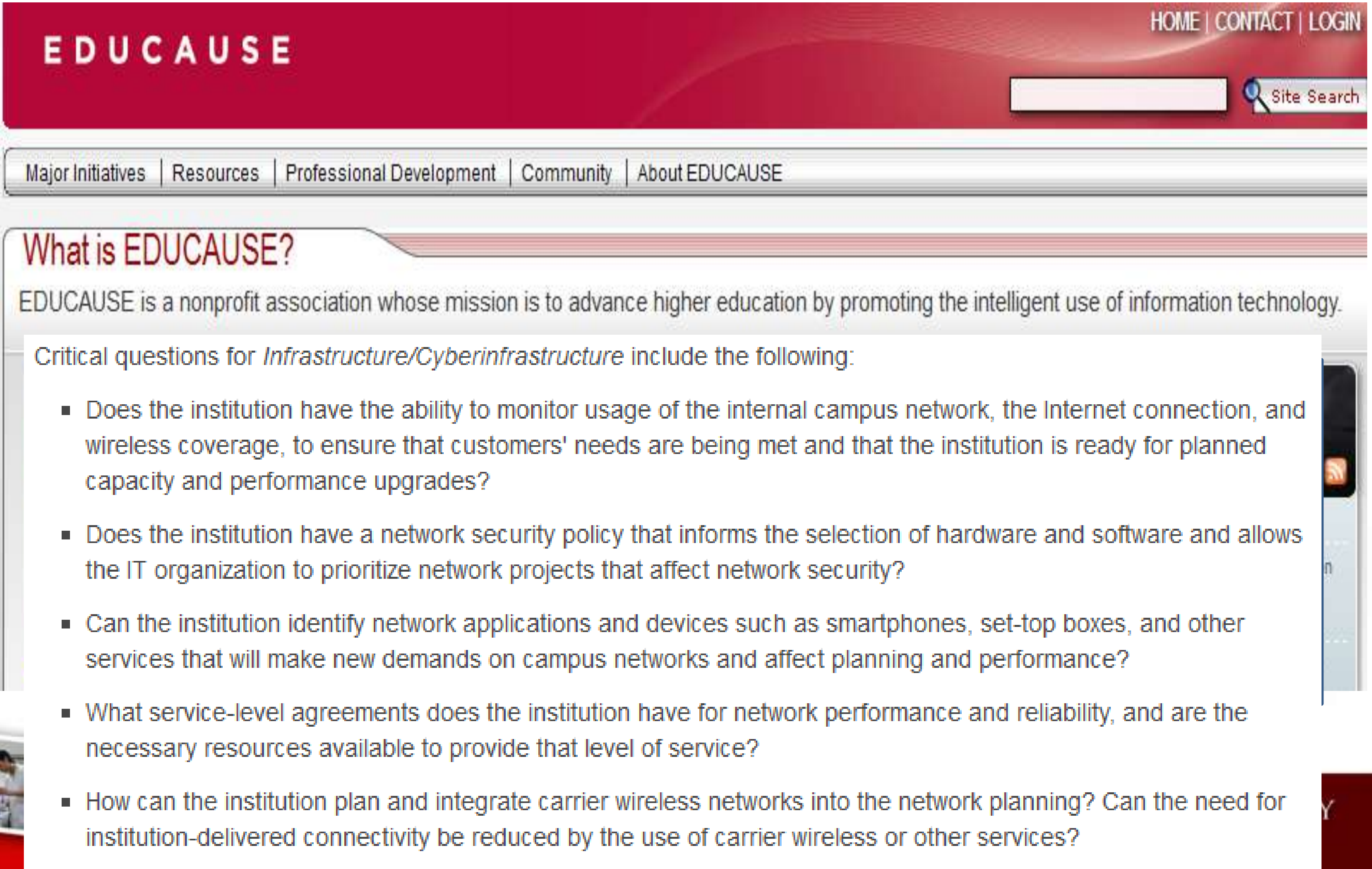
What is EDUCAUSE?

EDUCAUSE is a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology.

Institutions are increasingly being asked to ensure network security and may be challenged to invest in software and hardware to improve end-to-end security and monitoring, a challenge complicated by the increased usage of 4G carrier networks on campus and the corresponding loss of local control. Educating constituents and administrators on what is possible, and on the differences between on-site and carrier networks, may be necessary to articulate service commitments.

**Introduction**

# IT in EDUCATION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Critical questions for *Infrastructure/Cyberinfrastructure* include the following:

- Does the institution have the ability to monitor usage of the internal campus network, the Internet connection, and wireless coverage, to ensure that customers' needs are being met and that the institution is ready for planned capacity and performance upgrades?
- Does the institution have a network security policy that informs the selection of hardware and software and allows the IT organization to prioritize network projects that affect network security?
- Can the institution identify network applications and devices such as smartphones, set-top boxes, and other services that will make new demands on campus networks and affect planning and performance?
- What service-level agreements does the institution have for network performance and reliability, and are the necessary resources available to provide that level of service?
- How can the institution plan and integrate carrier wireless networks into the network planning? Can the need for institution-delivered connectivity be reduced by the use of carrier wireless or other services?

**Introduction**

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# IT in EDUCATION

**Philippines is ranked last among Asian countries in terms of IT usage.**

- Singapore = 23%
- Malaysia = 19%
- Hong Kong = 15%
- Indonesia = 14%
- Thailand = 12%
- **Philippines = 10%**

Yap (2005)

# PROBLEM

1. What is the **level of prioritization** of the ICT Infrastructure in higher education institutions in the Philippines?

# PROBLEM

## 2.

What is the **degree of implementation** of the ICT Infrastructure in higher education institutions in the Philippines?

# PROBLEM 3.

What is the **relationship** between the level of **p**rioritization and **d**egree of implementation of the ICT Infrastructure in higher education institutions in the Philippines?

# PROBLEM 4.

Is there a **significant difference** between the level of prioritization and degree of implementation of the ICT Infrastructure in higher education institutions in the Philippines in terms of the:

- annual IT expenditures of the HEIs;
- total Internet bandwidth of the HEIs;
- level of proficiency of the respondent’s technical skills;
- rating of the respondents’ human skills;
- rating of the respondent’s conceptual skills; and
- extent of participation in decision-making of the respondents.

# METHODOLOGY

- Descriptive (survey method)
- 95 IT Heads in HEIs
- stratified sampling
- Infrastructure components are based from the critical questions of the EDUCAUSE Top 10 IT Issues in Higher Education
- February 4 - April 30, 2011

# METHODOLOGY

- **Prioritization refers to the level of importance or urgency of IT Infrastructure HEIs**

5 – Essential

(Component needs to be done in the current year)

4 – High priority

(Component needs to be done in the next 3 years )

3 – Medium priority

(Component needs to be done in the next 6 years)

2 – Low priority

(Component needs to be done in the next 9 years)

1 – Not a priority

(Component is never been considered)

- **Implementation refers to the degree of realization or execution of IT infrastructure in HEIs**

5 – Very Highly Implemented

(Component is performed and done with careful review and evaluation)

4 – Highly Implemented

(Component is performed but continuing and on-going)

3 – Moderately Implemented

(Component is in the strategic plan but no action yet)

2 – Fairly Implemented

(Component is discussed and considered for inclusion in the next strategic plan)

1 – Not Implemented

(Component is never been considered)

RESPONDENTS

# Regional Distribution

| Region | Public | Private | Total HEI-respondents |
|---|---|---|---|
| 1 (locos Region) | 1 | 3 | 4 |
| 2 (Cagayan Valley) | 0 | 5 | 5 |
| 3 (Central Luzon) | 1 | 4 | 5 |
| 4 (Calabarzon) | 1 | 3 | 4 |
| 5 (Bicol Region) | 3 | 3 | 6 |
| 6 (Western Visayas) | 1 | 11 | 12 |
| 7 (Central Visayas) | 1 | 17 | 18 |
| 8 (Eastern Visayas) | 2 | 4 | 6 |
| 9 (Zamboanga Peninsula) | 0 | 5 | 5 |
| 10 (Northern Mindanao) | 1 | 1 | 2 |
| 11 (Davao Region) | 2 | 6 | 8 |
| 12 (Soccsksargen) | 0 | 4 | 4 |
| 13 (National Capital Region) | 0 | 9 | 9 |
| 14 (Cordillera Administrative Region) | 0 | 2 | 2 |
| 15 (Autonomous Region of Muslim Mindanao) | 0 | 1 | 1 |
| 16 (Caraga) | 0 | 2 | 2 |
| 17 (MIMAROPA) | 2 | 0 | 2 |
| TOTAL | 15 | 80 | 95 |

# Prioritization and Implementation of ICT Infrastructure in HEIs

RESULTS

| Infrastructure Component | Prioritization | | Implementation | |
|---|---|---|---|---|
| | Mean | Description | Mean | Description |
| 1. ICT infrastructure should be addressed in the institution's strategic plan | 4.39 | Essential | 3.61 | Highly Implemented |
| 2. A "green computing" program should be initiated at the institution | 3.85 | High Priority | 2.90 | Moderately Implemented |
| 3. The technical network staff should be up-to-date on emerging technologies and standards | 4.19 | High Priority | 3.43 | Highly Implemented |

# Prioritization and Implementation of ICT Infrastructure in HEIs

RESULTS

| Infrastructure Component | Prioritization | | Implementation | |
|---|---|---|---|---|
| | Mean | Description | Mean | Description |
| 4. The infrastructure should have a built-in redundancy to provide continuous service | 4.08 | High Priority | 3.21 | Moderately Implemented |
| 5. Deans, chairs, faculty, and administrators should periodically be consulted about the adequacy of the ICT infrastructure | 4.35 | Essential | 3.52 | Highly Implemented |
| 6. Students' satisfaction with the ICT infrastructure should be measured | 4.20 | Essential | 3.48 | Highly Implemented |

RESULTS

# Prioritization and Implementation of ICT Infrastructure in HEIs

| Infrastructure Component | Prioritization | | Implementation | |
|---|---|---|---|---|
| | Mean | Description | Mean | Description |
| 7. The institution should have a replacement plan for servers, appliances, network devices, and other hardware | **4.14** | **Essential** | **3.33** | **Moderately Implemented** |
| 8. The institution should compare lease and purchase options | **3.97** | **High Priority** | **3.31** | **Moderately Implemented** |
| 9. The institution should have good monitoring and benchmarking practices | **4.02** | **High Priority** | **3.18** | **Moderately Implemented** |

# Prioritization and Implementation of ICT Infrastructure in HEIs

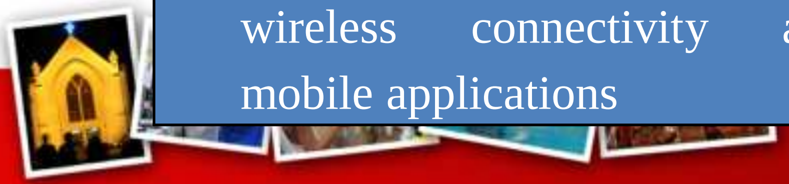
RESULTS

| Infrastructure Component | Prioritization | | Implementation | |
|---|---|---|---|---|
| | Mean | Description | Mean | Description |
| 10. Network and systems administrators should have the tools and training to automate problem detection and notification | 4.06 | High Priority | 3.23 | Moderately Implemented |
| 11. The institution should have an information life-cycle management plan to ensure the continued availability and usability of information | 3.96 | High Priority | 3.02 | Moderately Implemented |
| 12. The institution should evaluate or deploy virtualization techniques for storage, network, or server consolidation | 3.78 | High Priority | 3.01 | Moderately Implemented |

# Prioritization and Implementation of ICT Infrastructure in HEIs

RESULTS

| **Infrastructure Component** | **Prioritization** | | **Implementation** | |
|---|---|---|---|---|
| | **Mean** | **Description** | **Mean** | **Description** |
| 13. The institution should have adequate planning, staff and infrastructure resources, and funding to support research computing | **3.88** | **High Priority** | **3.16** | **Moderately Implemented** |
| 14. The institution should account for the dynamic change and pace of policy, security, and compliance requirements | **3.82** | **High Priority** | **3.13** | **Moderately Implemented** |
| 15. The institution should effectively meet the current demand for both wired and wireless connectivity and mobile applications | **4.25** | **Essential** | **3.48** | **Highly Implemented** |



# Prioritization and Implementation of ICT Infrastructure in HEIs

**RESULTS**

| Infrastructure | Prioritization | | Implementation | |
|---|---|---|---|---|
| | Mean | Description | Mean | Description |
| Aggregate Mean | 4.06 | High Priority | 3.27 | Moderately Implemented |

## PRIORITIZATION

- *… high priority*
- … *highly prioritized* and need to be done in the next 3 years.

## IMPLEMENTATION

- ….*moderately implemented*
- … that this component is already in the strategic plan of the HEI; however, action is still to be done.

**RESULTS**

# RELATIONSHIP BETWEEN PRIORITIZATION AND IMPLEMENTATION

| | ρ-value | p-value (two-tailed test) | Remarks |
|---|---|---|---|
| **PRIORITIZATION & IMPLEMENTATION** | 0.949 | 0.000 | Significant at 0.01 level |

# SIGNIFICANT DIFFERENCES

RESULTS

- …a *significant difference* between the prioritization and implementation in terms of:
  - annual IT expenditures of the HEIs,
  - total Internet bandwidth of the HEIs,
  - level of proficiency of the respondent's technical skills,
  - rating of the respondents' human skills,
  - rating of the respondent's conceptual skills,
  - and extent of participation in decision-making of the respondents.

# SIGNIFICANT DIFFERENCES

| Variables | F-value | p-value | t-value | p-value | Remarks |
|---|---|---|---|---|---|
| Annual ICT Expenditures, Prioritization, Implementation | 13.16172 | 4.00134E-06 | 6.122542 | 8.09E-09 | Significant |
| Total Internet Bandwidth, Prioritization, Implementation | 11.61308 | 1.88802E-05 | 5.556795 | 1.88E-07 | Significant |
| Level of Proficiency of Technical Skills, Prioritization, Implementation | 21.95239 | 1.44351E-09 | 5.427072 | 1.81E-07 | Significant |
| Rating of Human Skills, Prioritization, Implementation | 68.68906 | 6.86371E-25 | 6.776571 | 1.65E-10 | Significant |
| Rating of Conceptual Skills, Prioritization, Implementation | 47.76102 | 1.63659E-18 | 5.108236 | 8.16E-07 | Significant |
| Extent of Participation in Decision-making, Prioritization, Implementation | 47.76102 | 1.63659E-18 | 5.108236 | 8.16E-07 | Significant |

*Legend: t-values indicate the difference between prioritization and implementation of IT*

# CONCLUSION & RECOMMENDATIONS

- HEIs in the Philippines are challenged technologically.
- ICT infrastructure is more than just an investment.
- HEIs should review its strategic plans to identify the gap between the priorities and implementation of ICT infrastructure as determined by the management of information systems.
- HEIs should elevate its infrastructure into collaboration, networking and other emerging trends such as virtualization and cloud computing.
- School Administrators should consider identifying the strength, weaknesses, opportunities and threats of infrastructure to facilitate sufficient e-Learning infrastructure.

# ACKNOWLEDGEMENTS

- HEIs through their School Heads, MIS Heads and Directors,
- Philippine Society of IT Educators,
- Computing Society of the Philippines,
- Philippine e-Learning Society,
- Cebu Educational Foundation for Information Technology, and the
- ICT Association in Dumaguete and Negros Oriental, for sharing their database of members;
- Silliman University through the Faculty Development Committee

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# Thank You!