An Inventory of Skills for Entry-level IT Employees

Prof. Arnaldo I. Ramos

Who am I?

Arnaldo I. Ramos-Torres
IS professor at UPR/College of Business/CIS major
Dual career as IS professor/Industry consultant for close to 40 years (in PR, US and Latin America)
Special interest in aligning academia and industry
Presenter in local and international conferences:

ABET (ABET accreditation sets the global standard for programs in … computing, engineering, and engineering technology.)

IACIS: (…one of the leading international academic information systems and technology professional organizations.)

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Importance of Information Technology

"*The Information and Communication Technologies revolution holds the potential of transforming economies and societies and of addressing some of the most pressing global challenges of our time.*"

(2015 edition of *The Global Information Technology Report* by *The World Economic Forum, INSEAD and* Cornell University (www.weforum.org/gitr *)*

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Supply/Demand for IT graduates

Current supply is more than twice the estimated demand!

Supply (2012/13 IT graduates) = approx. 880

Supply (2013/14 IT graduates) = close to the same

Estimated demand = 347/year up to 2022 (PR Labor Department)

There's a clear mismatch between supply & demand for IT graduates!

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Supply/Demand for IT graduates

But, on the other hand, there are many job openings!

Many vacancies, as per IT Cluster First CIO Survey

About 3 vacancies per respondent
(= 189 for 63 respondents)

Several hundred (maybe thousands?), if projected

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What we propose…

To support the positioning of IT as an economic development pillar for PR by…

Defining the characteristics of the supply of entry-level IT professionals through an **IT skills inventory**

Proposing a **methodology** **to** **assess** the extent to which current computing academic programs are supporting these skills

Disseminating these products so that they can be used by interested parties

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Skills inventory: Foundation

Product Development (or Procurement) and Implementation framework…

SDLC (Planning, Analysis, Design, Programming, Implementation, …)

Enclosed within a Governance and Control framework on one side.…

COBIT (Decision Support, IT Management, and Security)

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Skills inventory: Foundation

And also within an Operations/Service framework on the other side…

ITIL/MOF (IT Operations & Maintenance)

Plus, domain independent skills like…

Personal, Entrepreneurship and Industry-related skills

We used well known industry and academic frameworks!

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IT Skills inventory: Validation

We are validating the skills with the market it is intended to serve…

UPR/Computer Information Systems Advisory Board (October 2013)

Puerto Rico Information Technology Cluster focus group (IT vendors, October 2014)

Puerto Rico CIO Survey (IT Clients, March 2015)

Local IT related associations (Planned)

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IT Skills inventory: Validation

And also through international conferences…

International Association for Computer Information Systems 55th Conference (Florida, October 2015)

Accreditation Board for Engineering and Technology 2016 Symposium (Florida, April 2016, Planned)

10th. Quest for Global Competitiveness (San Juan, April 2016, Planned)

Validation increases suitability of inventory!

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IT Skills inventory: Guidelines

Design guidelines

Not a wish list/ nor a list of personal preferences

Not an exhaustive (all inclusive) list

Not a list of skills related to proprietary or vendor related products

Not a final, but a working document

Highly structured/flexible/parameterized!

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IT Skills inventory: Structure

We used a hierarchical/top-down structure consisting of …

Two skill types (white, UPPERCASE, centered)

Ten skill categories (white, lowercase, centered)

Twenty seven skill sets (blue, underlined, left)

142 specific skills (black, indented)

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IT Skills inventory: Structure

Discipline dependent (DD) skills:

7 major skill categories
(IS/IT Management, Analysis & Logical Design, implementation, Physical Design, …)

22 skill sets within the categories
(Big Data, IT Governance, Security, Project Management, …)

122 specific skills within the skill sets
(Data Warehouses, ETL, User interfaces for decision support,…)

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IT Skills inventory: Structure

Plus Discipline-independent (DI) skills:

3 major skill categories
Personal:
    Productivity, Soft, Analytical/Problem solving
Entrepreneurship
Industry-related

5 skill sets within the categories

20 specific skills within the skill sets

Structure facilitates understanding!

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Assessment methodology and tool

The inventory contents is embedded into an integrated curriculum assessment tool…

To facilitate the understanding, adoption and use of the skills inventory

To analyze compliance of an academic program curriculum with the skills inventory

Tool Demo

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Skills inventory: Implementation

Implementation will depend on the type of professional to be developed (Breath vs Depth)	
A "Line-shaped" professional	
An "I-shaped" professional	
A "T-shaped" professional	
A "Cone-shaped" professional	
A "Square-shaped" professional?	
Beware of being too ambitious!	

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Questions/remarks?

More questions and/or remarks:
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Thanks for your attention!

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