Preparing Global Engineers that Can Develop End-to-End Solutions for Real Business Objectives on the Cloud: a Unique Global HP-Academia Partnership

Abstract

This paper describes the HP Institute, a recently launched global program for universities worldwide to enhance engineering and IT undergraduate curricula. Based on the results of a 2011 market research study on current gaps in IT skills, the program aims to develop partnerships to jointly address the needs identified by executives. The HP Institute provides a complete learning system for students and professionals in the workforce — including courseware, hands-on real life experiences and labs, practice tests, and certification exams— that students can goes well beyond simple concepts and product knowledge and ends in the industry's first architect-level certification designed for academia, validating real-world skills and prepares students for employment in small and medium business environments. Since its launch in mid-2012, the program has been adopted by dozens of universities worldwide and continues to expand. Students, industry and university leadership experiences in adopting this program in their undergraduate curricula as well as through their continuous education functions will be shared. Finally, the authors describe and share outcomes of other HP programs for universities that can help universities to develop the global engineer.

Introduction

Universities and industry have different missions and goals in society. Both build their success on developing people and generating new ideas that have a positive impact on societies and economies. Both universities and industry generate and transfer knowledge, continuously educate and develop their people, but they often do so in silos, isolated from each other. Building and sustaining university-industry partnerships entail lots of challenges and opportunities for success for all those involved.

On the other hand, industry and other employers of engineers as/IT professionals are requiring universities to enhance the learning experience so that students develop competencies that go beyond just technical knowledge [by the way, may accreditation criteria nowadays respond to this claim[1]]. Industry and employers want recent graduates to possess the knowledge and skills that allow them to solve real life problems and design solutions with business constraints. Employers need engineers with the IT expertise that translate business objectives into technology strategies and end-to-end solutions.

As the largest IT company in the world, HP has a long history of supporting engineering education. Support and collaboration takes place in many dimensions, from research and development; to recruiting talent, providing students and faculty with opportunities for internships and experiences in the company; to philanthropic grants to assist education in incorporating novel use of technology to enhance learning, influencing science, math and engineering innovation policy for win-win outcomes as well as education sales opportunities for products and services.[2] ,[3,4] ,[5]. HP is member and serves in several national and

international engineering education associations as well as science and technology bodies, including IFEES, ASEE and SEFI, and has helped catalyze key engineering education associations, for example, the establishment of the Global Engineering Deans Council and the Latin America and the European Engineering Deans Councils. At HP we believe that it is our corporate duty to engage in the dialogue that will promote science and engineering for the greater good.

It is because of the company's unique combination of size, scale and global presence that HP can pioneer new markets, make technology accessible and affordable, and invest in the research required to enable the next round of technological breakthroughs.

The HP Institute[6]

Companies of today need IT expertise to translate their business objectives into technology strategies and create end-to-end solutions that help them reach more customers, run more effectively, spur innovation and grow. HP Institute was launched in mid-2012 to address the global IT expertise skills gap—preventing businesses from leveraging IT to create meaningful business results. Figure 1 shows the gaps, thus the needs, of the IT professional.
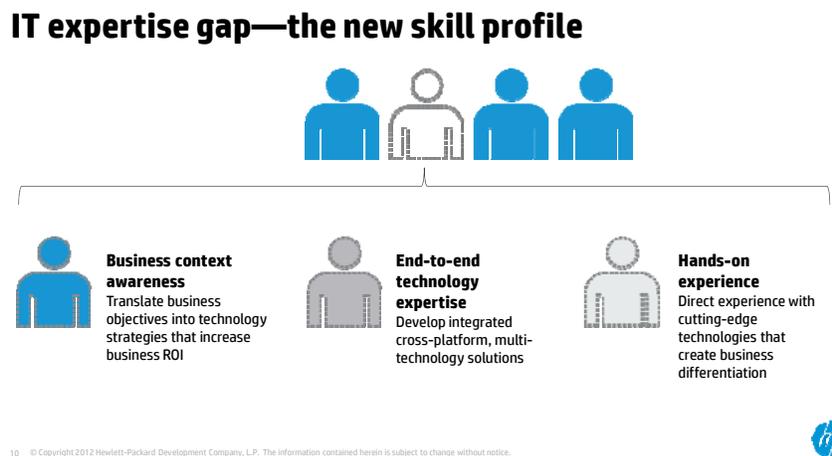

IT expertise gap—the new skill profile

Business context awareness
Translate business objectives into technology strategies that increase business ROI

End-to-end technology expertise
Develop integrated cross-platform, multi-technology solutions

Hands-on experience
Direct experience with cutting-edge technologies that create business differentiation

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Figure 1 IT Expertise Gap/Needs

In order to respond to these gaps, HP Institute provides a complete learning solution for academic institutions, including courseware, hands-on labs, practice tests, and certification exams—that goes well beyond simple concepts and product knowledge—and is the industry's first architect-level certification designed for academia. The achievement of the HP Accredited Technical Associate (ATA) certifications validates the acquisition of real-world skills and prepares students for employment in small and medium business environments.

Through the comprehensive study program, students in engineering and IT programs can take four semester long courses (Connected Devices Solutions; Network Solutions; Server and Storage Solutions; and Cloud Solutions), hands-on labs with real-life projects, take practice

tests and complete certification exams to earn HP ATA certifications. Universities can offer these courses through its regular curriculum (as electives), or, if preferred, as a separate offering. In addition, select universities can offer the entire professional HP ExpertOne certification program as part of their continuous education portfolio to help professionals in the workforce expand their career opportunities with validated skills in the latest technologies, including cloud solutions.

Integral to the program is the HP Certified Educator component which validates professors are qualified to teach these courses. HP Institute students may also spend internship periods at companies and have access to HP's vast community of IT experts. HP Institute is one way of preparing the global engineer through a very unique industry-university partnership that incorporates innovative use of technology, online techniques, efficient curricula and real, business challenges.

The HP Institute objective is to inject business relevance and practical experience into education, ensuring that graduates entering the workforce will be ready for the emerging IT environment. The key benefit of the HP Institute program, and accompanying HP ATA (Accredited Technical Associate) certifications, is employability. The objective is to provide the practical experience that will enable a graduate to set up a complete, end-to-end IT solution in an SME (small to medium-sized enterprises) environment. These SME environments are more and more likely to be multi-vendor inclusive which is why HP Institute provides learning experiences based on industry standard, not proprietary technology. HP has been focused on creating a learning skill set that is valuable regardless of whose products the student's ultimate employer is using. By providing this new skills profile that HPs customers and partners are looking to hire, academic institutions can differentiate themselves through placement of employable graduates, allowing institutions to quickly meet their recruitment goals.

In addition to HP Institute graduates having increase job prospects, they also have a higher earning potential. The US Bureau of Labor Statistics has indicated that industry certification holders earn 115% more than those that did not. [7]

Working with higher education allows HP to broaden the talent pool of experts and meet HP customer and partner needs for hiring, outsourcing, and acquiring expertise through service providers. By providing valuable learning experiences through business context awareness, end-to-end technology expertise and hands-on experience, HP and academic institutions can create a continuous funnel of graduates able to supply the industry with the attributes that business and IT leaders are looking for in order to close the IT expertise gap.

In brief, the HP Institute makes it easy for academic institutions worldwide to build, deliver and differentiate their technology education offerings through a simple, convenient and affordable suite of technology education solutions. For educational institutions, HP Institute provides access to the latest HP technologies, high quality learning solutions, faculty training and enablement.

This brief youtube video shows http://www.youtube.com/watch?v=gwIHncvmLJs the goals of the HP Institute and students' testimonials.

Other HP Programs for Higher Education

<u>HP Laboratories Interns and PostDocs Opportunities[8] [9]</u>

While HP corporate laboratories (HP Labs) has a long tradition of hosting postdocs and interns (e.g., every year, HP Labs hosts about 100 interns at its Palo Alto facility), during the last few years it has been providing postdocs, MS/PhD students and recently graduated engineers opportunities to collaborate in R&D projects with our scientists sponsored by government programs. These programs are providing research experiences to these students at a location where research turns inventions into products and services and where innovation results in more than a paper and a theses. Some of these programs are: in the US, the CNSF-CRA-CCC Computing Innovation Fellows Program and the NSF-ASEE Graduate Innovation Fellowship Program and at the international level, HP partners with the EU for internships opportunities at the UK HP Labs facilities and with COETCYJAL, a Jalisco, Mexico Government talent development program for advanced development projects at HP Labs in Palo Alto.

<u>HP LIFE eEntrepreneurship[10]</u>

To employ more people and create more jobs, the world needs more entrepreneurs. The HP Learning Initiative for Entrepreneurs (HP LIFE) is a global program that trains students, entrepreneurs, and small business owners to apply IT and business skills, so they can establish and grow a business, build successful companies and create jobs. The program offers face-to-face trainings, tools and e-Learning through a cloud platform to address educational needs, improve and strengthen skills and enable you to move forward.

HP's corporate office, through its Social Innovation Division developed this program in partnership t educational organizations like the Education Development Center (EDC)[1], ORT[2] and UNIDO[3], and, local training partners in 49 countries continue to support the program worldwide. Since its creation, HP LIFE has already touched over 1.2 million entrepreneurs and social innovators, with face-to-face training, online activities and access to IT, many of whom are transforming their lives with training and has helped create or retain almost 43,000 jobs and 20,000 businesses worldwide.

Outcomes and several success stories can be reviewed in the program webpage[11].

<u>Curriculum Innovation and Learning Ecosystems Workshops</u>

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[1] EDC (www.edc.org) is a global nonprofit organization that designs, delivers and evaluates innovative programs to address some of the world's most urgent challenges in education, health, and international development. Working with public-sector and private partners, they harness the power of people and systems to improve education, health promotion and care, workforce preparation, communications technologies, and civic engagement.

[2] ORT (www.ort.org) is the world's largest Jewish education and vocational training non-governmental organization.

[3] UNIDO (www.unido.org) is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability

For almost a decade now the author of this paper has offered workshops worldwide on curriculum innovation and learning ecosystems development in partnership with Penn State University and University of Puerto Rico Mayagüez colleagues[12]. These workshops are tailored for engineering faculty and engineering deans interested in renovating their engineering programs to better serve their country/region's needs. Faculty from related disciplines and graduate students interested in pursuing academic careers are encouraged to attend. The workshops provide a space and time for faculty and deans to learn about engineering education issues, revamping its curricula, effective teaching/learning methods and become aware of best practices so they can become more effective educators.

During the last two years, HP has partnered with IIDEA, the International Institute for Developing Engineering Academics[13], to not only sponsor, but also participate in the workshops, by sharing curriculum and technologies available at HP to enhance the learning experience and bridge the gap between industry and academia needs[14].

Conclusions

We believe that the HP Institute and the other HP programs highlighted in this paper are win-win-win examples of how HP is responding to the need to develop the global engineer and help address the needs of knowledge economies. For universities, innovating the curricula to better respond to their stakeholders and country's needs, educating the engineering and IT professors in new learning paradigms, using technologies, and having access to state of the art technologies and lab experiences is of primary concern. For students, they are able to learn from their professors more effectively, gaining the critical, validated IT skills and practical experience with the business context employers need. Through the innovative use of technology, online techniques and labs, efficient curricula and real, business challenges, these HP's programs are exemplar of industry-academia-government partnerships that could be models to other companies and regions who wish to establish similar collaborations to advance innovation and capacity building in science and technology.

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14 A session/paper is being held at ASEE 2013 titled: *A Multi-Stakeholder, Multi-National Partnership to Enhance Engineering Education in China*, which describes an HP partnership initiative where HP, IIDEA and other partners are assisting through workshops Chinese engineering education leadership with their transformation.