



Are you qualified?

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This post is authored by [Peggie Koon](#), president of ISA 2014.

This week hundreds of educators and professionals from government and public and private industry sectors converged on Washington, DC to attend the *US News* STEM Solutions National Conference. The sessions covered an array of topics related to STEM (science, technology, engineering and math); I had the honor of participating on a panel entitled “Customized Credentials Come of Age.”

After a brief introduction by Dr. Endel, Program Director for Jobs of the listened attentively as Dr. Cathy of Education, Attainment, and ACE (the American Council on presented the numbers, confirming that people in the US have sub-BA (bachelor credentials. **30 million!** That’s a large folks.

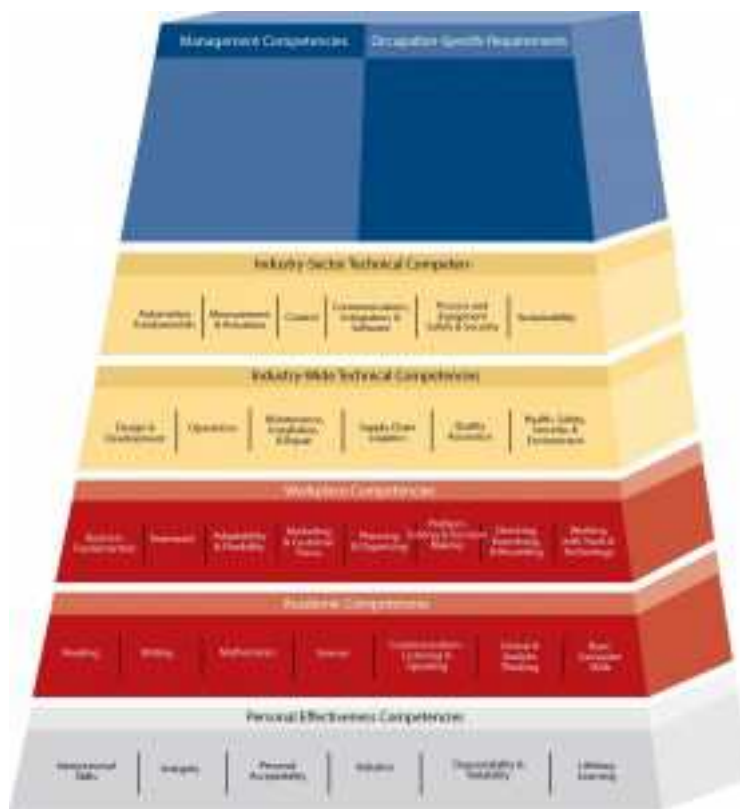
Cathy made the case for the need to gap in the credentialing process so know how credentials stack up against a four-year degree program; educators at universities and technical colleges how to merge sub-BA credentials with collegiate course work; and employers competency/proficiency/skill level the credentials a student might possess. during my trip to DC, Dr. Cora Marrett,

Director of the National Science Foundation described this issue in a discussion of linear versus non-linear paths for STEM degrees.) Credentialing and competency in STEM education and STEM careers were a huge part of the “buzz” at the National Academy of Engineering’s Annual Convocation of Professional Engineering Societies (at which ISA was invited to participate).



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The Automation Federation worked with industry experts and representatives from the Department of Labor to develop the Automation Competency Model, a formal federal guideline that outlines the skills and competencies needed to succeed in the automation field. (click the image to zoom a larger view)

The presentation on credential gaps flowed nicely into a hearty discussion of badges. Dr. Kyle Bowen, Director of Education Technology at Penn State University, explained how badges allow students to maintain digital portfolios that include work experience, education, certificates, certifications, etc. Badges, in effect, allow a student to own and maintain a complete digital profile of both institutional and experiential learning so employers know immediately if she or he (as an applicant) has the specific competency required for a job. Kyle also discussed the need to define standards so employers have levels of confidence that the applicant has specific competency in the areas for which a badge is received.

When it was my turn to speak, I began with the question: “How many of you have heard of ISA?” The audience was silent. An estimated 50 people sat in the room to discuss credentials and not one of them had heard of ISA. Furthermore, even after I explained ISA’s role in providing workforce development/training, professional development, and certificates, as well as certification programs for automation professionals, there were many blank faces in the room. The audience appeared to connect with me more as I related that ISA, in conjunction with the US Department of Labor and industry experts, has developed an **Automation Competency Model**. The model defines requirements for all levels of the automation profession, helping employers better understand what skills they should look for in an applicant.

And students can refer to the model to determine which courses/certificates/certification programs are required for different automation fields/positions. And, finally, colleges and technical institutes can also use the model to build competency-based curricula.

Someone in the audience asked if there were any K-12 schools with competency model-based curricula? ISA’s collaborative effort with Project Lead the Way in the schools in Raleigh and Pennsylvania immediately came to mind. I also mentioned that programs like *FIRST*[®] (For Inspiration and Recognition of Science and

Technology) and Goldie Blox, supported by entrepreneurs, augment the traditional school system curricula while getting students excited and raising awareness of the importance of STEM education and project/competency-based learning.

Finally, I listed five “game changers” that are impacting STEM solutions and the automation profession. The game changers listed were:

Big Data – More than ever before, companies today are relying on big data analytics to make strategic decisions, creating a demand for STEM careers related to the effort.

Coollest Delivery – The next generation of STEM and automation professionals is techno savvy and technology enabled – a group that will expect STEM projects (content, data, and tools) to be available via the coolest delivery/technology available. Without the “cool factor,” the disparity that exists between the demand for STEM careers and the supply of STEM professionals will continue to expand.

Cybersecurity – The cyber threat is real and there is a concomitant requirement for STEM professionals in cybersecurity – people who understand how to mitigate and respond to the threat both in traditional IT and from the emerging operational technology (OT) perspectives that are affecting our nation’s critical infrastructure.

Aging Workforce – The current STEM workforce is aging. Many of the nation’s critical STEM jobs are filled by folks who are nearing retirement. There is a skills gap between retirees and those who are entering the STEM career workforce, creating a significant need for workforce development in this area.

MOOC and other new credentialing programs – In addition, I talked about the impact of massively open online courses (MOOC) and other emerging credentials and badges. These innovations will change the way students choose to learn and will trigger changes in college curricula and requirements for STEM and automation degrees. And these new innovative credentialing systems will challenge the way employers define “qualifications” for STEM jobs.

This last game-changing theme about credentialing made me feel that ISA should become more engaged in this conversation – to better understand and to be able to adequately respond to the changes that are occurring in this space.

The conversation that followed the panel discussion confirmed my feelings. You see, I heard over and over again folks talking about how difficult it is to properly convey a person’s work experience, his/her collegiate degree/coursework, plus certificates, licenses, certifications, and/or any badges to determine appropriate paths for continuing STEM education and acquiring STEM careers.

What if every STEM career and STEM field had a competency model? Would that help solve the problem? Or would it create a new set of problems? At the American Association of Engineering Societies (AAES) Board Meeting, Jerry Carter, CEO of the National Council for Examiners of Engineering and Surveying (NCEES) shared that he, Cathy Leslie, CEO of Engineers Without Borders (EWB), and Mike Marlowe, Managing Director of the Automation Federation, recently visited with a team at the Employment and Training Agency (ETA) of the Department of Labor to discuss a project to develop an engineering competency model.

It’s anticipated that this will be a year-long project, but Jerry told the AAES Board that he thinks “this competency model will be a tool that will be useful to all of our organizations.” Jerry credited ISA with having made him aware of the model. Once the engineering competency model is developed, all of the engineering societies will be able to follow ISA’s lead and use it as a template for more targeted competency models – so engineers will know if they are qualified-for their respective areas of engineering.

This effort is not just relegated to engineering societies, but is extended to community colleges and universities as well. ISA and the Automation Federation are working with Cleveland Community College (CCC) and the government to develop Mission Critical Operations training programs that encompass STEM education for those who support mission critical operations of a company, including industrial/operational and information technology. This government funded program will be piloted at CCC, the University of North Carolina at Charlotte, and other colleges to develop a template/competency model for this type of STEM education at technical, community, and four-year colleges across America.

What should be the response from academia? Should the Accreditation Board for Engineering and Technology (ABET) look at developing competency based-degrees that encompass both applied/experiential learning and specific course work?

How early in the learning/development process should project/competency-based learning occur?

If badges are adopted, how would badges be verified and standardized?

What else might industry, government, entrepreneurs, and professional organizations partner to address this very important issue?

Advocacy, Innovation, Partnership, Competency Models

The STEM problem in the US is a complex, multi-faceted issue, one that can only be solved by a very concerted and congruent effort from the four pillars of our nation – ***education, government, industry, and the private sector (entrepreneurs)***. And there are so many questions related to STEM. Those listed above are just a few.

“There is far more opportunity than ability.” —————Thomas Edison

After listening to the various speakers at the convocation and those at the United Engineering Foundation’s (UEF) Engineering Public Policy Symposium, I am very hopeful about the future of STEM education and STEM careers. Significant advances have been made in Shale gas using new micro seismic and geo thermal technologies. Are there specific courses or certification programs to be developed for perhaps a new set of STEM careers that will evolve from innovations in shale gas and unconventional energy resources?

The discussions about the manufacturing renaissance, the “Maker initiative,” and cool new innovations in manufacturing, such as 3D printing, provide new avenues for entrepreneurs to engage and to promote innovation. Who will develop standards for the products made by these new STEM entrepreneurs? And if grants are given for these new “manufacturing” hubs, how will applicants “qualify”?

What will competency look like tomorrow, next year, five years from now?

Are you qualified?

About the Author



[Peggie Koon](#), Ph.D., is vice president of audience at Chronicle Media and The Augusta Chronicle, which are part of [Morris Publishing Group, LLC](#), a privately held media company based in Augusta, Ga. Prior to joining Morris, [Peggie](#) spent more than 25 years developing IT systems for process automation and process control in a variety of industries, including automotive, nuclear defense, aerospace, nuclear reprocessing, thermal ceramics and textiles. Peggie assumed her first ISA leadership position in 1996 as membership chair of the Management Division and has held a variety of prominent leadership roles in the Society. She earned a bachelor’s degree in mathematics from Smith College in Northampton, Mass. and completed graduate studies in industrial and

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A version of this article also has been published in [ISA Insights](#).



About ISA President

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