Competency Models In Action:

Community College Partnership Develops Occupational Competency Model Based on Automation Industry Model

February 2010

Introduction

As part of the Industry Competency Model Initiative, the Employment and Training Administration (ETA) collaborates with industry partners to develop competency models for economically vital industries. The goal is to promote an understanding of the knowledge, skills, and abilities needed to maintain a globally competitive workforce.

In 2008, ETA collaborated with the Automation Federation to create a competency model for careers in automation. Industry competency models, like the Automation Competency Model, can serve as the foundation for occupational competency models for the jobs within that industry.

An analyzer technician is a specialized type of instrumentation technician within the automation profession. Analyzer technicians install, troubleshoot, and repair online analyzers used to automate and control industrial processes and monitor air and water emissions.

The Analyzer Technician Opportunities Project (ATOP) is a National Science Foundation-sponsored partnership of two Texas community colleges tasked with developing national skill standards for analyzer technicians. Working with stakeholders throughout the nation, ATOP modified and augmented the Automation Competency Model to create the Analyzer Technician Competency Model. The model will function as skill standards for analyzer technicians and serve as the basis for the development of specialized courses and new curricula leading to an Advanced Technical Certificate. This *Competency Models In Action* describes why ATOP was formed, how the Analyzer Technician Competency Model was developed, and how it is being used.

The Workforce Need

The analyzer technician workforce is aging—many technicians are retiring or nearing retirement. These retirees are leaving gaps in the workforce and taking their expertise with them. At the same time, the total number of analyzer technicians needed is increasing. As a result, employers cannot find enough qualified workers.

Most analyzer technicians are instrumentation technicians who learned analyzer skills on the job or received analyzer training from their employers. Until recently, community colleges did not offer dedicated analyzer technician training programs. With the demand for analyzer technicians increasing, too few are being trained to fill the pipeline.

In 2007, several companies operating near Baytown, Texas could not find enough qualified analyzer technicians. A group of plant managers from these companies contacted Dr. Martha Ellis, then president of Lee College, to explain this workforce challenge. They suggested that Lee College create an analyzer technician certificate program to train the needed workers. Seeing an opportunity to support the workforce needs of local industry, Lee College started the certificate program using instrumentation technology resources and advice from faculty and industry experts. However, the program's leadership quickly realized that their curriculum needed to be updated and specialized. To develop an effective curriculum, they needed a tool to communicate with industry about its skill needs. Consequently, they planned for the creation of the Analyzer Technician Opportunities Project, which would develop national skill standards for analyzer technicians. The skill standards would be used to develop curricula, assessments, and other materials to support analyzer technician training programs.

Solution: Development of the Analyzer Technician Competency Model

In 2008, Richard Tunstall, Lead Instructor of the Instrumentation Technology Program at Lee College, applied for a National Science Foundation Advanced Technological Education grant to implement ATOP. The grant was awarded to Lee College in partnership with San Jacinto College. ATOP leadership recognized that, if colleges are to produce individuals qualified to be analyzer technicians, they must use a competency-based curriculum that incorporates the knowledge and skills necessary to perform effectively on the job. The curriculum must have a strong foundation built on personal effectiveness, workplace, and academic competencies, especially emphasizing chemistry and physics. In addition, training programs must provide opportunities for hands-on experience and have a sufficient level of detail. With these goals in mind, ATOP began developing the analyzer technician skill standards.

Lee College personnel began the process by analyzing existing resources and DACUM[1] reports and gathering input from professional organizations, industry partners, and college faculty. On April 10, 2007, Lee College hosted its own DACUM sessions for analyzer technicians at its Fieldbus Center. A panel of eight subject matter experts attended from the refining, petrochemical, chemical, and equipment suppliers industries. Representing companies such as Lyondell Refining, Bayer Corporation, DuPont, ExxonMobil Plastics, ExxonMobil Refinery and Chemical, GE Sensing, and Valero, the panel provided data to identify job tasks, skills, and educational requirements for analyzer technicians.

Hearing of the Automation Competency Model's release in December 2008, ATOP leadership decided to use it as a foundation for the analyzer technician skill standards. The Automation Competency Model would provide a recently validated set of critical work functions and technical content areas to use as a framework. This base would include foundation levels such as personal effectiveness, academic, and workplace competencies. In addition, it would give analyzer technology trainees a perspective that reflects the profession as a whole. For these

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[1] DACUM is an abbreviation for developing a curriculum. The DACUM process is an occupational analysis performed by expert workers in the occupation. Workers are recruited directly from business and industry. These workers collectively and cooperatively use the language of the occupation to describe the occupation in terms of its duties, tasks, knowledge, skills, traits, and tools. The information is presented in graphic or chart form and can include information on critical and frequently performed tasks and the training needs of workers.

reasons, ATOP decided to develop the analyzer technician skill standards using the ETA competency model format and graphic as the Analyzer Technician Competency Model.

Next, ATOP leadership used the Build a Model Tool on the Competency Model Clearinghouse[2] to create a draft model. Using the existing Automation Competency Model as their starting point, they selected and added appropriate competencies based on all the previous research and DACUM reports. ATOP made light revisions on Tiers 1-4 and heavy revisions on Tier 5. Throughout the process, ATOP continued to work with industry partners and the International Society of Automation's (ISA) Analysis Division to improve the model.

ATOP now needed a method to validate the draft. They chose to convert the draft to a survey, which would be given to practicing analyzer technicians. ATOP invited input from analyzer technicians employed at large and small companies from the refining, petrochemical, pulp and paper, chemical, power generation, and equipment manufacturing industries. On February 19, 2009, more than 25 analyzer technicians completed the validation survey at a section meeting of ISA's Analysis Division. ATOP also hosted the survey on its Web site. More than 40 analyzer technicians provided input to the online survey, which remained open until May 1, 2009.

ATOP leadership assembled all the information and comments collected from the survey in a database. They analyzed the comments and revisions for commonalities, and revised the model based on the frequency of the recommended changes.

The final Analyzer Technician Competency Model was completed in July 2009 and published on the ATOP Web site. It uses an organization of five Tiers:
- Personal Effectiveness Competencies
- Academic Competencies
- Workplace Competencies
- Industry-Wide Technical Competencies
- Process Analyzer Technical Competencies

Using the Competency Model

ATOP has used the model to create a specialized health and safety course for analyzer technicians and to define four more analyzer technology courses. In addition, ATOP has successfully applied to the Texas Skill Standards Board (TSSB) to have the competency model formally recognized throughout Texas and provide a path for other Texas colleges to enhance their curricula to address industry needs for analyzer technicians.

Lee College and San Jacinto College will use the model to develop curricula, assessments, and other supporting materials for analyzer technician education programs. Lee College will revise its advanced certificate to conform to the model as course development is completed.

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[2] The Competency Model Clearinghouse is a Web site sponsored by the Employment and Training Administration that showcases industry competency models. The Build a Model Tool was designed to help businesses, educators, and workforce professionals achieve their talent development goals. It allows users to choose one of the existing Industry Competency Models as a framework and select appropriate boxes to add competencies and key behaviors to the model being created.

In cooperation with local industry clusters, educational institutions throughout the country can use the Analyzer Technician Competency Model. Colleges can customize the model and use it as a resource to create their own programs. The model will help individuals prepare for job opportunities as analyzer technicians, help academic institutions update curricula, and provide a common language for dialogue between educators and industry as they collaborate to build the workforce pipeline.

As ATOP leadership worked through the development process, they took note of what methods worked effectively to inform future efforts. They recognized that educational programs need a well-defined set of skill standards as early as possible. They also found that face-to-face validation meetings were critical for gathering the necessary information to build the model.

The Analyzer Technician Competency Model and the Automation Competency Model are now available. To view these resources and find more information about these topics, visit the Related Links below.

Related Links

Analyzer Technician Competency Model
http://www.tssb.org/sites/default/files/wwwpages/repos/pdfiles/AnalyzerTechnicianCompetencyModel.pdf

TSSB: Rationale for Recognition of Analyzer Technician
http://www.tssb.org/repos/rationale/analyzer

TSSB: Analyzer Technician – Skill Standards to Competency Model Equivalencies
http://www.tssb.org/sites/default/files/wwwpages/repos/pdfiles/SkillStandardstoCompetencyModelEquivalencies.pdf

Analyzer Technician Opportunities Project (ATOP)
http://www.adsymposium.org/ATOP/atop.htm

Automation Competency Model
http://www.careeronestop.org/competencymodel/pyramid.aspx?AT=Y