

Development of a Web-Based Energy Industry Fundamentals Curriculum Supporting Workforce Development

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INTRODUCTION

Based on prior experiences in development of web-based curricula using a problem-based approach [1 - 4], the University of Missouri (MU) developed a partnership with the national Center for Energy Workforce Development (CEWD) to develop a web-based version of CEWD's Energy Industry Fundamentals (EIF) Curriculum.

With the print and web-based versions of the EIF curriculum having gone through pilot beta testing, the curriculum is being evaluated for implementation in learning environments of interest not only to the general utility industry, but also to help address nuclear industry workforce needs. MU researchers are in discussions with a secondary school in the Callaway Nuclear Plant service territory for piloting the EIF course to help develop local workforce needs of the utility and vendors in the area.

As an employer driven initiative, the EIF curriculum is designed for compatibility with and nuclear industry needs. The availability of a web-delivered version of the curriculum helps extend the reach of the content to traditional and non-traditional learning environments.

BACKGROUND

CEWD is a non-profit consortium of electrical, natural gas, and nuclear utilities and their associations, including the Nuclear Energy Institute as one of the founding member associations. The organization was formed to help utilities work collaboratively in leveraging industry-

wide resources to develop solutions to address national and regional workforce shortages. The EIF curriculum is a key component of CEWD's national strategy.

Developed to be in alignment with the Nuclear Uniform Curriculum Program guidelines [5, 6], the Energy Industry Fundamentals curriculum was created based on the utility industry's comprehensive job task analysis (JTA). The JTA identified the skill and knowledge backgrounds of interest to utilities for entry-level employment with a utility (generation and transmission/distribution). The resulting EIF content provides the fundamental knowledge common to the major technical utility jobs, and also includes information on career pathways and stackable credentials in specific technical and professional utility careers (Fig. 1), including nuclear occupation specific degrees in the Nuclear Uniform Curriculum Program (Fig. 2). The course covers broad understandings of the overall utility industry; nuclear and non-nuclear electricity generation technologies; electric and gas transmission and distribution systems; regulatory structure; and utility business models.

Career awareness regarding utility industry jobs is an integral component of the curriculum, emphasizing craft and technical occupations at Tiers 6 – 8 of the ECM, which

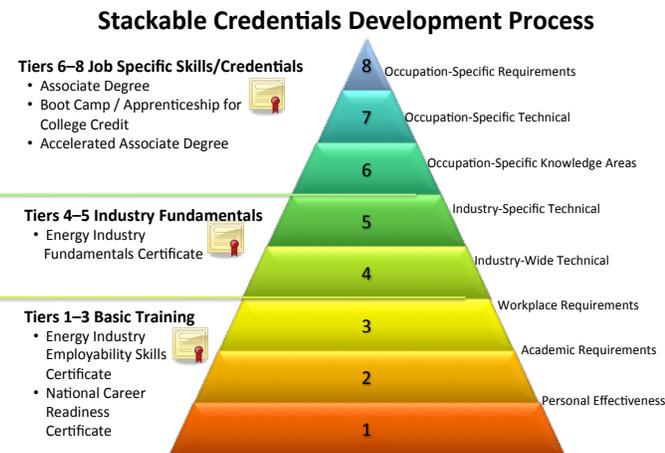


Fig. 1: CEWD's Stackable Credential Pathway Model

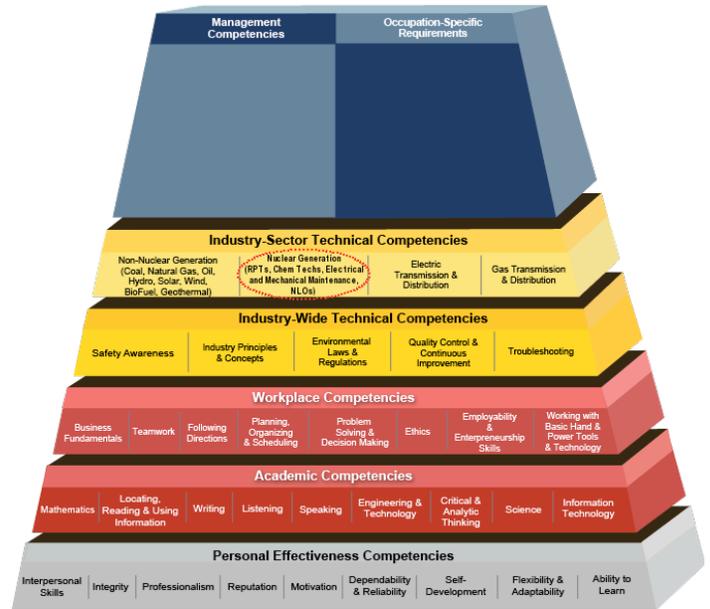


Fig. 2: Energy Industry Competency Model, illustrating EIF Curriculum Alignment with NUCP Criteria

include the nuclear-specific occupations covered in the NUCP program: radiation protection technicians, chemistry techs, instrumentation and controls technicians, non-licensed operators, and QC inspectors [5, 6].

As a pathway to targeted nuclear education, the EIF curriculum has been approved by the American National Standards Institute (ANSI) as an industry-recognized credential. Learners who participate in a CEWD-approved EIF course and who then pass the national ANSI exam are issued an “Energy Industry Fundamentals Certificate” (Fig. 1, Tier 4-5). This credential can be an advantage for entry-level job applications, or for applications for continued education in utility-related training. For learners interested in pursuing continued education for targeted nuclear industry occupations, they would enroll in one of the 38 schools in the U.S. that offer NUCP-approved associate degree programs [7], or they would pursue a 4-year bachelor’s degree in an relevant discipline (e.g., health physics, or nuclear / electrical / mechanical engineering).

Redevelopment of the EIF curriculum to a web-based delivery and blended approach to learning [8] was a major initiative. Using the DOE National Training and Education Resource servers, the web-delivered format of the EIF curriculum was of interest in order to facilitate wider deployment of the curriculum content, thus providing additional entry points for learners who might not otherwise consider employment in the utility industry. Implementing the EIF regionally or locally as part of an overall utility industry career pathway approach can stimulate interest in recruiting learners to NUCP associate’s degree and/or 4-year degree programs.

SUMMARY

The availability of the EIF as an instructor-led, web-based set of curriculum materials and the associated ANSI credential provides an emerging set of resources for use in nuclear workforce development. Inclusion of problem-based scenarios to the base EIF curriculum is anticipated to help address a wider range of student cognitive learning styles and to provide more flexible learning environments, thus helping increase workforce diversity.

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