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eship Training to Skills Gap: r Path to Success

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The electrical training Alliance (etA) conducted a comparative study of its inside wireman apprenticeship curriculum to ensure that its programs are keeping pace with industry demands and better meeting the skill needs of the current workforce. Following the process used by etA may help apprenticeship program leaders strive for continuous improvement of an existing program.

With 2022 officially behind us, Canada and the United States are getting back into a work routine; however, the labour shortages caused by the COVID-19 pandemic continue—wreaking havoc on project timelines and plans (For Construction Pros, 2022). The unemployment-to-job vacancy ratio in Canada is at a historical low amid a record tight labour market. According to Statistics Canada's *Labour Force Survey* and *Job Vacancy and Wage Survey*, employers are having difficulty filling vacant positions. Recruiting skilled employees was expected to be an obstacle over the first quarter of 2023 for nearly two-fifths (36.9%) of all businesses, led by those in construction (49.5%), manufacturing (47.4%), and accommodation and food services (46.3%). In addition, shortage of labour force was expected to be an obstacle for over one-third (35%) of businesses, while retaining skilled employees was expected to be an obstacle for over one-quarter (27.6%) (Statistics Canada, 2022).

There is little question that the past decade has brought a great deal of change to the world. From generational shifts in the workplace to significant technological changes to a pandemic, organizations have had to recognize these changes and adjust strategies that are no longer as effective. In particular, apprenticeship programs have experienced increased pressure not only to address these issues but also to adapt the way they deliver instruction to meet the needs of today's workplace and learners.

The International Brotherhood of Electrical Workers (IBEW) and its 700,000 active members across North America are expected to play a pivotal role in meeting energy demands to keep pace with the rapid expansion of the electric power and light industry. Members will construct about 500,000 charging stations for electric vehicles across the country by 2030 at a cost of $7.5 billion (International, 2022).

In North America, training for these jobs is provided by the five-year inside wireman apprenticeship program. To date, the electrical training Alliance (etA) has provided curriculums for inside wiremen that have trained over 350,000 apprentices to journeyworker status through local affiliate programs. The program consists of 32 core courses delivered via blended learning (classroom and online instruction, hands-on labs and interactive simulations). Apprentices complete a minimum of 900 hours of learning and 8,000 hours of on-the-job training (Boyd, 2017).

What Is etA?

The electrical training Alliance (etA), previously called the National Joint Apprenticeship and Training Committee, was created more than 70 years ago as a joint training program between the National Electrical Contractors Association (NECA) and the International Brotherhood of Electrical Workers (IBEW). The program is aimed at providing the best possible training for electrical workers within the industry and is the largest of its kind (etA, 2019).

Over the past seven years, etA has worked to maintain a world-class apprenticeship program by refocusing its existing programs. Todd Stafford, etA executive director, said that while etA did not need to develop a new program to train apprentices, it did recognize the need for continuous improvement of existing programs. The program also needed to teach some new skills for work associated with solar panels, wind turbines and electric vehicle charging stations. Apprenticeship programs developed by etA have been moving away from more traditional educational techniques (i.e., infusing e-learning), but IBEW and employers have been adamant that the programs remain competency-based. To accomplish this goal, apprenticeship programs have to rethink how they would produce electricians at a higher skill level with less hands-on time and availability. Stafford simply stated, "We needed to find a better way."

Finding a Better Way

Leadership at etA recognized that a clear pathway to ensuring program success was to revisit existing curriculums systematically by conducting a comparative study. While IBEW's apprenticeship program has a well-established curriculum and track record, conducting such a study would help determine where improvements could be made. A *comparative study* identifies the necessary skills and competencies of an occupation and compares them with the existing training curriculum.

It can help determine whether skills are missing in addition to whether the curriculum is properly sequenced. For example, if a program trains an apprentice on a skill during the first year that isn't used until the fourth year, training is less likely to transfer onto the job (Adams, Hogan and Stein-

ke, 2018a). The adage "if you don't use it, you lose it" holds true in apprenticeship training. The comparative study also identifies the minimum acceptable level of work performance for each skill within an occupation (Adams, Hogan and Steinke, 2018b). Knowing the minimum acceptable level of performance expected of a journeyperson allows for a method to standardize evaluations for all workers entering the industry from multiple pathways. Cumulatively, all this data helps ensure that apprentices learn applicable skills and apply them at the right time at the proper skill level. This helps programs avoid overtraining or undertraining.

Taking Action

For its comparative study, etA deployed a form of occupational analysis. In determining what apprentices need to be able to do on the job, etA utilized a group of expert inside wireman electricians representing each region in the U.S. These individuals were the focus of data collection in an occupational analysis because they not only had a high level of competence in the field but were recognized as having some of the highest levels of expertise by their peers (Adams, Hogan and Steinke, 2020). The organization then used highly qualified individuals to coordinate the occupational analysis process. First, the occupational analysis determined all general areas of competence (GACs) for the inside wireman occupation. These GACs represented the logical grouping of skills within the occupation (Adams, Hogan and Steinke, 2020). Sixteen GACs were identified during this phase. Then, the analysis identified the individual skills of each GAC. For example, one GAC for inside wiremen is to fabricate *raceways*, which are the enclosed conduits that create a physical pathway for electrical wiring. A few example skills within the GAC include executing a four-point saddle bend, calculating a conduit shrink, leveling and plumbing the raceway, and executing an offset bend.

The identified skills represent behaviours that enable someone to competently perform within the occupation or what inside wiremen electricians must "do" on the job. Study participants identified more than 350 skills within the occupation. Participants then sequenced skills in relation to when they would be required to be performed on the job. Next, the sequence was dissected into year 1, year 2, year 3, year 4 and year 5 expectations. Finally, study participants identified the minimally acceptable level of performance for each skill.

The product of the occupational analysis resulted in a competency model chart. This chart, also known as a Developing a Curriculum (DACUM) chart, is a graphical representation of all competencies and skills within the inside wireman occupation. The chart is a one-page skill profile that can serve as both a curriculum plan and an evaluation instrument for an apprenticeship program. Further, this chart can be utilized for comparison with an existing training program.

With a DACUM chart in hand, etA had a clearly defined pathway for improving its apprenticeship program. To effectively connect the occupational analysis to the redesign of the curriculum, etA utilized a curriculum planning activity featuring program development grids.

These program development grids guided developers through the process of reviewing the established curriculum in relation to each skill identified during the analysis process. A key first phase determining the appropriate learning activities to allow apprentices to practise skills versus simply assessing their knowledge of skills. This was of particular importance to etA members. "The focus of these learning activities needed to be on what apprentices were expected to do, instead of selecting the

Takeaways

- The electrical training Alliance (etA), a labour-management organization of the International Brotherhood of Electrical Workers (IBEW) and the National Electrical Contractors Association (NECA), recently conducted a comparative study of its inside wireman apprenticeship program.
- A comparative study identifies the necessary skills and competencies of an occupation and compares them with existing training curriculum. It can help programs determine whether skills are missing from a curriculum and whether instruction is properly sequenced.
- etA used an occupational analysis to determine all general areas of competence for the inside wireman position. The occupational analysis was compared with the current curriculum to determine where improvements could be made and curriculum could be redesigned.
- The study was also used to compare existing program resources with the skills identified in the occupational analysis to help determine where gaps existed.

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correct multiple-choice response," Stafford explained. Doing so allowed for a clear comparison of current instructional activities methods. Moreover, by determining skill-based learning activities for each skill, instructors are allowed to focus less on knowledge presentation and more on skill development. Skill-based learning activities allow apprentices to practise skills they would be expected to perform on the job. For example, activities for a skill such as executing an offset bend are designed to enable an apprentice to practise various offset bends. While instructors still have a strong influence on the overall program, a competency-based focus allows for a greater emphasis on facilitating versus presenting.

This program development process also helps establish the different and potential learning locations for skills. For example, developers can determine whether online, lab or hybrid training is the best fit for developing skills. This phase of program development was critical for etA and allowed it to effectively address multiple learning styles in a variety of ways. The program has successfully used both hybrid and blended learning opportunities. As an illustration, apprentices may learn a skill online but still demonstrate their skill performance on site.

Another part of the program development phase allowed etA to compare existing program resources with each skill identified during the occupational analysis. Within this phase of the program development process, printed and audiovisual (A/V) resources, as well as human resources, are reviewed for each skill. Training programs often find that they are providing more training than is required for a given skill set or area of competence, therefore overtraining on skills. It is also common to find that programs are missing various resources for certain skills or that resources are out of date. They also may discover that they need additional staff due to the limited expertise of instructors within a specific skill set. For example, a program might call upon an exceptional journeyperson whose skills are far above average to help train apprentices on individual skills, thereby taking pressure off traditional instructors. This process is greatly beneficial as a means of not only identifying potential resources to include in learning a skill but also where an overage of resources might be hindering learning.

Time and Resources

Some may view continuous improvement activities as taking considerable time and resources to complete while producing limited value. However, this comparative study approach for reviewing apprenticeship curriculums requires fewer resources, time and manpower than one might expect. On average, the occupational analysis activity takes less than three weeks to complete. The approach typi-

cally includes roughly one week for occupational analysis and one week for the program development review. An additional week of planning activities for both phases can also be required depending on the organization's size and overall structure.

Within these three weeks, the biggest challenge for the organization tends to be the one-week commitment from the expert workers who help identify the skills required. Yet organizations such as etA have found that the benefits of a comparative study far outweigh any perceived loss of work time from these experts. Not only do these experts identify what is expected of someone on the job, but an often-unanticipated benefit for the organization is the buy-in for program improvement that these experts help create. As DACUM originator Robert Adams used to say, "When your most respected workers buy into the change, you create a bottom-up wave of enthusiasm for improvement." IBEW found that the experts were not only passionate about participating in the occupational analysis but have been a positive voice for revisions to the inside wireman apprenticeship program.

Once the comparative study work is completed, most organizations have found that the turnaround time for the implementation of its results is less than six months, with some able to implement improvement as soon as a few weeks. NECA, IBEW and etA were able to quickly review and begin implementing revisions to their existing programs.

Conclusion

Continuous improvement efforts like that of etA have the potential to become a model for Canadian apprenticeship programs. While most apprenticeship programs have a well-established track record of success in producing high-quality, skilled tradespeople, they may need to undertake a continuous improvement program to help them meet the needs of the current workforce and overcome ongoing challenges in closing skill gaps. Using a systematic approach, such as a comparative study or occupational analysis, can elevate any continuous improvement project, resulting in valuable program updates that are completed quickly with limited resources. &

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