Chapter 1
Certification–Degree Pathways:
Aligning Undergraduate Curriculum to Industry Credentials and Professions

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ABSTRACT

Degrees from colleges and universities have historically been prerequisites for many good paying jobs. While the value of college degrees has recently been questioned by the American public, legislators, and employers, college is still viewed as an important component to the growth and socialization of learners destined to become future employees. Because they offer industry-recognized credentials, certification bodies already have a foothold in the siloed worlds of work and education and may provide an avenue to address the known gaps between employers and educational institutions. By leveraging their ability to identify the needs of employers as well as assessing knowledge and skills, certification bodies may play an important role in developing new opportunities for learners. Therefore, a pathway offering learners the ability to earn a certification while earning their degree provides individuals the ability to showcase a broad base of knowledge as well as work-relevant skills.

INTRODUCTION

Equipping students with the information and experiences needed to navigate the labor market and avoid underemployment remains a challenge (Vedder, Denhart, & Robe, 2013), especially in the wake of the 2020-2021 global COVID-19 pandemic. One way to address this need is to provide opportunities for students to graduate college with clearly articulated credentials that signal the knowledge, skills, and abilities (KSAs) they possess. Certifications can complement the opaque evidence of learning provided by post-secondary institutions in the form of transcripts and diplomas (Cutler, 2021). In addition, through collaboration and combining different types of credentials, learners can provide employers with a more comprehensive view of their employability.

Post-secondary institutions are not necessarily known for accepting or offering non-degree credentials like certifications within pathways towards degrees, yet integrated and more comprehensive pathways would offer students more opportunities to obtain specific, proven competencies sought by employers. Beyond articulating the skills mastered by learners, such pathways would support lifelong learning and create opportunities for learners to stack credentials in new ways and meet their career goals. Further, by having their skills assessed by a third party in the certification process, student learning would be validated, which might address the concerns of those who question the value of a post-secondary degree (Pettit, 2018). Further, by participating in certification-degree pathways, learners obtain both the broad-based skills acquired in a baccalaureate program with the technical skills demonstrated by obtaining a certification. This chapter will highlight the challenges and opportunities of embedding certifications in degree programs.

Expectations vs. Reality

In 2013, Gallup surveyed 623 U.S. business leaders on behalf of Lumina Foundation and discovered that only 11 percent strongly agree that post-secondary institutions prepared students with the skills and competencies for their business needs. Yet less than 30 percent of the respondents collaborated with higher education institutions on curriculum (Gallup, 2014). Conversely, Inside Higher Ed's *Survey of College and University Chief Academic Officers* conducted around the same timeframe yielded dramatically different results. Overwhelmingly, provosts (96 percent) felt their institution was doing a good job preparing students for the world of work (Jaschik & Lederman, 2014). While this disconnect could be attributed to the absence of a working relationship between business leaders and institutions, this problem seems to have an easy solution – create opportunities for leaders from industry and higher education to collaborate on educational programs and pathways that benefit learners. This seems like a simple and easily achievable solution. But if the solution is that easy, why has it not happened yet, and why does the divide persist? One answer may be that higher education and industry are too siloed, lacking a common language and a failure to understand the other's respective domains.

Exploring the Divide Between Post-secondary Education and Industry

Throughout 2018-2020, Workcred (an affiliate of the American National Standards Institute), the Association of Public and Land-grant Universities (APLU), the Coalition of Urban Serving Universities (USU), and the University Professional Continuing Education Association (UPCEA) engaged in a Lumina Foundation-funded partnership to discover the disconnect between higher education and industry, specifi-

cally exploring if quality certifications may bridge this divide. This novel approach leveraged working relationships most certification bodies have within the sectors and occupations they operate—working closely with employers to identify the need and the scope of a certification, create a job task analysis (JTA), and identify KSAs. Since certification bodies translate JTAs into test blueprints, certification exams, and assessments, they may be more likely to "speak" the language of higher education due to their attention to competencies and assessments. In addition, by bringing their industry perspective and curricular experience to the table, certification bodies could play an important role in negotiating the gaps between business and education.

At the project's inception, the project team hypothesized that higher education institutions and certification bodies lacked sufficient knowledge of how each other's programs operate—and this was proven to be true. In a series of in-person convenings held in multiple locations in the United States throughout 2019, certification bodies and higher education institutions identified and discussed ways to improve collaboration and alignment between related programs; implement new strategies to narrow the post-secondary attainment gap for underrepresented students; send stronger signals to employers about what a student knows and can do; and contribute to better employment outcomes.

The project created an environment where higher education leaders could explore collaborations with certification bodies by examining the value of certifications through current and potential articulation into degree programs. While yet to be proven, providing the opportunity to earn a certification while pursuing a degree may advance the efforts to narrow the post-secondary opportunity and attainment gap for underrepresented students. Another potential long-term benefit for students is the opportunity to earn college credit for a certification obtained before enrolling in college, thereby providing newly matriculated students with additional credits toward graduation. Akin to findings related to prior learning assessment, this could position the student to graduate earlier than expected or afford them benefits (e.g., priority registration, earlier contact with program-specific advisors) that could contribute to their satisfaction and success as a student (Klein-Collins, Taylor, Bishop, Bransberger, Lane, & Leibrandt, 2020). Additionally, circumstances that may result in students stopping out or leaving college without a degree but with a certification, could yield better employment opportunities than if they had only "some college." Finally, with more than three million Americans having some college and no degree, candidate differentiation through a certification could be an important component to career mobility and later degree attainment (National Student Clearinghouse Research Center, 2019).

The strategy of embedding or aligning certifications and bachelor's degrees to create certification-degree pathways offers numerous benefits for students, certification bodies, higher education institutions, and employers. Certification-degree pathways provide students with a broad-based education and industry-specific skills that hiring managers seek in new hires. Certification-degree pathways also provide opportunities for certification bodies, as these pathways can increase awareness and attainment of certifications and articulate how certifications relate to various career and credential pathways. Further, higher education institutions can improve their responsiveness to their regions' needs, recruit new students by developing more opportunities to count certifications for academic credit towards a bachelor's degree, and differentiate their programs from other higher education programs. Essentially, this work provides new opportunities to educate learners to meet the needs of the workforce now and in the future.

This chapter will focus on creating certification-degree pathways as a new and emerging practice for the education-to-work ecosystem and provide insights on this new way of thinking about certifications and their inclusion in post-secondary curriculum. This chapter will address the following elements: an overview of certifications, an analysis of post-secondary curriculum, a detailed framework for embed-

ding certifications into undergraduate degree programs, examples of certification-degree pathways, and future opportunities for research and the development of further pathways.

BACKGROUND

Certification Body Credential Types and Definitions

There are three main non-degree credentials—licenses, certificates, and certifications—each serving different purposes and denoting different learning experiences and learner assessments.

- **Licenses** are credentials that permit the holder to practice in a specified field or occupation. An occupational license can only be awarded by a government licensing agency based on a set of criteria. The criteria may include some combination of degree attainment, certifications, certificates, assessment, apprenticeship programs, and/or work experience. Licenses are time-limited, must be renewed periodically, and can be revoked for a violation of a code of ethics (if applicable) or proven incompetence after due process (Workcred, 2018).
- **Certificates** are generally associated with training or educational courses and usually do not have a time limit or renewal requirement and cannot be revoked for reasons of incompetence or unethical behavior. There are multiple types of certificates (e.g., certificate of participation, certificate of achievement, assessment-based certificate). Only assessment-based certificates measure the knowledge and skills learned in the education or training experience. Certificates are issued by a variety of organizations including higher education institutions, government agencies, employers, and professional associations. Certificates are one of the very few credentials that can be issued by both higher education institutions and professional associations (Workcred, 2018).
- **Certifications**, on the other hand, are typically created for high-stakes areas such as health, safety, and finance where they are often required to obtain a specific job or position. Certifications are based on a job task analysis—a systematic analysis of the job or practice area—and an examination is used as a third party, independent judgement that the individual obtained the competencies required. Certifications are time-limited and can be revoked for incompetence or unethical behavior (Workcred, 2018).

Overview of Certifications

To understand the applicability and inclusion of certifications in post-secondary education, one must understand the nature of these credentials and their quality measures. Certifications are distinct from other credentials primarily because they are awarded after an individual proves he/she has a set of skills relevant to a professional setting—generally by passing an assessment and meeting required qualifications. Certifications are awarded by certification bodies—typically nonprofit organizations, professional associations, industry/trade organizations, or employers—and are monitored through recertification processes. There are more than 8,000 certifications offered across numerous industry sectors including health care, education, finance, information technology (IT), cybersecurity, manufacturing, and retail and hospitality (Credential Engine, 2021).

Certifications, like other types of credentials, vary significantly among themselves in the breadth and levels of knowledge, skills, and experiences they represent, and in the prerequisites and other requirements that people seeking the credential may need to meet. While some certifications can be obtained without any prerequisites, many require education or experience prerequisites to take the exam, such as for nurse practitioners, occupational therapists, architects, and engineers. In fact, even state occupational licensing for some professions requires the licensee to also have a related certification.

Most certifications are issued by industry and professional associations. For example, two common certifications in IT are the Certified Ethical Hacker, offered by EC-Council, a member based-organization, and A+, offered by Computing Technology Industry Association (CompTIA). The IT industry also has many company-specific certifications such as those offered by Microsoft, Amazon Web Services, and Cisco (O'Donnell, 2021). In manufacturing, companies such as Siemens and Autodesk also offer company-specific certifications (Good, Ganzglass, Crawford, Albert, Swift, Elzey, & Cardenas-Navia, 2019). Certifications offered by companies can be either broad-based to cover a range of skills, or specific to using a company's products and proprietary systems.

High-quality certifications are:

- **Based on third-party assessment.** This oral, written, or performance-based assessment is based on a set of competency standards (minimum performance expectations) set through a defensible, industry- or profession-wide job analysis process, which is reviewed/revised regularly.
- **Time-limited and renewable.** Requiring recertification to retain the credential ensures the holder's knowledge and skills are current and reflect changing needs within an industry and occupational area.
- **Revocable.** Similar to an occupational license, some certifications can be revoked for a violation of a code of ethics (if applicable) or proven incompetence after due process. (Good, Ganzglass, Crawford, Albert, Swift, Elzey, & Cardenas-Navia, 2019).

Certification Creation

To understand the potential for embedding certifications in degree programs, one must understand the development and quality measures used by certification bodies in the creation of certifications. These processes, while not an exact match to the degree and curriculum development found at most postsecondary institutions, have parallels to degree-granting institutions. The processes listed below are for those certifications that are accredited. Similar to higher education, there is an accreditation process for certifications. Even though many certifications are not accredited, they may follow some of the same processes without pursuing accreditation.

Scope of Certifications

Certification bodies need to define the scope or purpose of the certification.

Management Structure

Certification bodies need to develop an organizational structure to ensure the impartiality of all certification activities. For example, the certification activities should be separate from other parts of the organization that may develop training materials for the certification.

Certification Schema

The certification schema is composed of all of the elements involved in developing and administering the certification exam. This includes developing a JTA; identifying prerequisites that must be met to take the certification exam; determining whether there will be a code of conduct associated with the certification exam; developing assessment methods for the initial certification and recertification; and creating policies for suspending or revoking the certification (Workcred, 2018).

Job Task Analysis to Examination Cycle

The certification exam is based on a JTA—an analysis of the KSAs required to do the job (Workcred, 2018). This process of gathering input about KSAs can be done through a combination of activities including focus groups of subject matter experts (SMEs), a DACUM (Developing a Curriculum), shadowing, literature review, or interviews. The main purpose of a JTA is to develop the blueprint for the certification exam, but it can also be useful in developing educational content and offerings and professional development activities.

One of the key elements of certification is the development of the certification examination by a psychometrician, an expert in test and measurement. The psychometrician, with input from SMEs, develops a test bank of questions. Each question or test item is reviewed for bias related to such things as culture, gender, sexual orientation, and geography. In addition, psychometricians review each question or test item to see how it is performing. The initial exam form is usually pilot-tested and a passing score (or cut-score) is established. Certification bodies also develop a process for the frequency that the certification exam should be revised to keep up with changing knowledge (Workcred, 2018).

Policies and Procedures

The certification body also develops a set of policies and procedures, ranging from determining prerequisites for the certification to the assessment and examination processes to policies for filing appeals and complaints. These policies and procedures provide transparency to the individual who is seeking the certification.

Recertification Process

Certifications should include a recertification or renewal component, which have specific requirements for when a person must update his/her certification. Recertification requirements vary by certification and can range from completing continuing education, attending a seminar, taking an exam, or earning another certification. Recertification requirements should be based on the initial JTA and should be used as a signal to the employer of continued competence. In an ideal situation, an individual having obtained

his/her certification in 2011 (and has maintained their certified status through recertification) should have the same base of knowledge as a person who obtained a certification in 2021.

Management System for Continuous Quality Improvement

Certification should also implement a system for continuous quality. For example, if a certification body seeks accreditation by the ANSI National Accreditation Board (ANAB), the certification body would have to provide that its management system is consistent with the requirements of International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC): 17024:2012, *Conformity assessment – General requirements for bodies operating certification of persons.* These requirements cover such areas as identifying the critical functional areas, determining the criteria for quality for each, the type of data that should be collected, the frequency of the data collection, and the frequency of when an internal audit should be conducted to determine preventive or corrective actions. Once corrective actions are taken, the corrective action is assessed to determine its effectiveness.

Understanding Certification Quality

The challenge with understanding the quality of a certification is that different stakeholders are looking at quality differently (Everhart, Ganzglass, Casilli, Hickey, & Muramatsu, 2016). One indication of quality is through accreditation, though it is not the only indication. It is estimated that approximately 10 percent of the certification bodies in the United States are accredited to meet a nationally recognized standard.[1] Like accreditation for higher education institutions, the certification body accreditation process consists of a third-party review that assures the public, employers, and government that the competencies identified by the certification body have been appropriately evaluated using psychometrically sound and legally defensible assessment practices, and that certification holders demonstrate competencies as advertised. The two main accreditation bodies for certifications are ANAB and the National Commission for Certifying Agencies.

In addition, a myriad of organizations have embarked on developing frameworks and rubrics to assess the quality of non-degree credentials, including certifications. The American Council of Education, the National Skills Coalition, and the Rutgers Education and Employment Research Center have all published strategies to determine the quality of certifications (Duke-Benfield, Wilson, Kaleba, & Lenentoff, 2019; Everhart, Ganzglass, Casilli, Hickey, & Muramatsu, 2016).

Overview of Post-secondary Education Credentials

The applicability and inclusion of certifications in undergraduate programs are best understood after learning how post-secondary credentials are developed. In post-secondary education, the culmination of a learner's academic achievement is most often awarded in the form of a degree, which is earned through the completion of a program of study consisting of required experiences, courses, and activities. These credentials are awarded and tracked by post-secondary institutions.

Degrees (e.g., associate, bachelor's, master's, doctorates) do not require renewal once awarded. Most are time-limited whereby a student is required to finish a program of study within a certain timeframe. Failure to do so could lead to a loss of credit or the institution requiring the learner to re-enroll and meet new admission and degree requirements. While some licenses achieved as a result of the knowledge

learned in an academic program may have continuing education requirements (an example of this would be teachers needing continuing education credits to keep their subject-matter endorsements), the degree itself does not require further courses to maintain a learner's degree or alumni status.

Most degrees are not based on third-party assessments but may be designed to prepare students for them. Examples of this would be Bachelor of Science in Nursing programs preparing students for the National Council Licensure Examination (NCLEX®) and a Bachelor of Science in Accounting preparing students for the Uniform Certified Public Accountant (CPA) Examination®.

Similar to licenses and certifications, degrees can be revoked. Most commonly, this is done when an institution has found evidence of an alum engaging in a violation of a student or academic code of conduct while enrolled. While most institutions have a process for revoking degrees, this is often reserved, in practice, for those that have earned terminal degrees such as a Doctor of Philosophy (Ph.D.) or a Doctor of Medicine (M.D.) and are later found to have engaged in some misconduct during their academic careers (Hesse, 2017).

Nearly four million credentials (associate's and bachelor's degrees, as well as certificates) were awarded by degree-granting institutions through 2017-2018, and more than half of those were baccalaureate degrees (Hussar et al., 2020). A baccalaureate or bachelor's degree is "granted for the successful completion of a baccalaureate program of studies, usually requiring at least four years (or equivalent) of full-time college-level study. This includes degrees granted in a cooperative or work-study program" (Hussar et al., 2020). Bachelor's degrees require at least 120 credit hours, and most programs of study are designed to allow students to complete bachelor's degrees in four years but both the number of credit hours and the time to degree can vary by program and the individual (Moody, 2018).

Post-secondary Curriculum Development Process

While the potential exists for certifications to be embedded in various post-secondary credentials, this section will focus on the development of four-year bachelor's degrees as explored during the aforementioned project funded by Lumina Foundation. Bachelor's degrees traditionally offer two different types of courses: general education courses and major-specific courses. General education courses emphasize many of the skills valued by employers, often referred to as soft skills (e.g., verbal and written communication, critical thinking skills, creativity, adaptability, etc.), and imbue the skills of being a lifelong learner—one that can understand contexts, seek information, and interact in environments in which they have received no formalized training. General education curricula can include courses from many different academic departments and are sometimes termed "interdisciplinary programs" for this reason. Some individual courses can themselves also be interdisciplinary, including content from multiple academic disciplines in one course. Courses in a major are specific to the program of study/degree a student pursues. Major-specific courses, which are usually a part of the second and later half of a learner's program of study, may include requirements tied to specialized accreditation or focus on areas of expertise by faculty members at the institution.

Curriculum and course content can be influenced by a variety of factors. Faculty interests/research, industry relationships, departmental requirements, school/college/institutional requirements, and the requirements of outside entities (e.g., state boards, national and regional accrediting bodies, etc.) can all influence individual course content and the curricula of programs. Courses that count towards a bachelor's degree must not exceed a certain number of credit hours (typically 120). This limit is put in place due to the costs and time students incur to complete their degree programs, as well as state and

federal accountability measures and financial aid requirements. Students sometimes take additional courses that exceed the credit hour cap in cases of double majors (e.g., Bachelor of Science in Biology and Chemistry), or multi-degree programs (e.g., Bachelor of Science in Nursing and Bachelor of Arts in Political Science).

In general, new programs and courses—and significant course revisions—must be reviewed and approved at many levels of an institution's governance structure before they can be delivered, such as an academic department, college/school governing body, dean of the college/school, provost, president, and the institutions' governing body (e.g., boards of governors, directors, trustees, etc.). Once these approvals have been granted, the institution is often required to seek approval from a state entity, the institutions' accreditor, and any professional associations or accrediting bodies that exist relevant to the major. Depending on the complexity of the approval process, it can take years from inception to the first course offerings of a new program. However, the processes for reviewing and approving new courses and significant course content revisions typically occur over a shorter timeline than the academic program approval process. As a result, many course content revisions can be executed by instructors and faculty without additional approval.

In addition, the instructional content of four-year degree programs and courses is reviewed at some interval determined by the institution and/or its accrediting bodies. In many cases, this is every three to five years. Faculty members also regularly update their course materials between formal reviews to keep with the course's learning objectives.

Post-secondary Accreditation

Accreditation serves many functions within higher education. Not only does it speak to the quality of the credentials and content delivered by institutions, but it is also the mechanism used by federal agencies, such as the U.S. Department of Education and the U.S. Department of Defense, to determine the award of funding—both to institutions and individual students. Most public institutions are reviewed by an accreditor who looks at all aspects of an institution and accredits the entire entity. There are eight regional accreditors recognized by the U.S. Department of Education: Accrediting Commission for Community and Junior Colleges (ACCJC), Western Association of Schools and Colleges, Higher Learning Commission (HLC), Middle States Commission on Higher Education (MSCHE), New England Commission of Higher Education (NECHE), Northwest Commission on Colleges and Universities (NWCCU), Southern Association of Colleges and Schools Commission on Colleges (SACSCOC), and WASC Senior College and University Commission (WSCUC). These accreditors have historically focused on accrediting institutions in specific regions, but recent changes in regulations allow these accrediting bodies to accredit institutions outside their previously designated regional area (Council for Higher Education Accreditation., n.d., Eaton, 2020).

While national accreditors can also accredit an entire institution, most national accreditors only focus on a program, subject, or specific area. For example, the Distance Education Accrediting Commission (DEAC) is a national accreditor that specializes in accrediting institutions that operate distance education-only courses and degrees, while the Association to Advance Collegiate Schools of Business (AACSB) accredits post-secondary schools of business (AACSB International, n.d., Distance Education Accrediting Commission, n.d.).

Regardless of the accrediting body and their scope, each has a documented process for accreditation. Initially, accreditation can take many years to achieve. Once accredited, institutions are often required

to submit documents on student outcomes, changes in curriculum, changes in degree requirements, or changes in the institutional governance process for review by accrediting bodies. Accreditation is often renewed or reviewed every five to ten years and institutions can receive warnings from their accreditors, be put on probation, or have their accreditation revoked if the institution is not adhering to accreditation standards.

SOLUTIONS AND RECOMMENDATIONS

Many post-secondary institutional leaders as well as learners have observed a critical gap: "traditional" post-secondary institutions do not serve "nontraditional" learners well. The distinction between traditional and nontraditional students is important for several reasons. First, many would agree that the dominant post-secondary institutional model is designed to serve 18–24-year-olds enrolling directly after high school (i.e., traditional learners). For non-traditional students, the following characteristics seem to act as barriers and can impede their enrollment or lengthen their time to a degree:

- Delayed enrollment (a gap between high school and college);
- Part-time enrollment status;
- Financially independent (not claimed as a financial dependent by anyone);
- Full-time employment while enrolled;
- Having dependents;
- Being a single parent;
- Did not receive a standard high school diploma (Horn & Carroll, 1996).

Secondly, these characteristics may mean that learners exhibiting one or more of the above may require different support structures to assist them as they pursue a post-secondary credential. As most institutions orient most activities, policies, and programs around traditional or young adult residential learners, there is a tension between the traditional student biases of institutions and the realities of the student population. As recently as 2011-2012, students with at least one nontraditional characteristic accounted for 74 percent of students enrolled in all higher education (National Center for Education Statistics, 2015). We know that in a 2003 National Center for Education Statistics report, most nontraditional students saw themselves as workers first and students second, and only 18 percent of nontraditional students were not working while enrolled (Berker, Horn, & Carroll, 2003). This employment mindset of students enrolled in post-secondary education allows institutions to orient more of the undergraduate curriculum to the needs of working students—ones likely to seek additional credentials as another means to differentiate themselves in a highly competitive job market—through the development and implementation of certification-degree pathways.

Many nontraditional learners are enrolled at community colleges and private, for-profit institutions, which are more likely to offer a more flexible curriculum aligned with workforce demands that nontraditional students seek (Radford, 2015). Course flexibility consistently ranks as a top priority for nontraditional learners, as does the relevance of the degree program to career goals (Berling, 2013). This priority can affect their ability to enroll in many highly sought-after programs at "traditional" post-secondary institutions, many of which have limited online or other flexible degree options.

In addition, nontraditional learners could benefit from high-impact educational practices; however, the design of support models which emphasize undergraduate research, summer bridge programs, or learning communities still focus on traditional students and largely excludes most nontraditional learners. The learning processes of these practices ignore the fact that the nontraditional learners' work experiences and informal learning in the workplace can be used to enhance the learning processes in these courses, and even enrich the learning experiences of traditional students as well.

Rationale for Certification-Degree Pathways

Opportunities exist that can address both post-secondary credential attainment and achievement of certifications valued by employers. Specifically, by embedding certifications into baccalaureate degree programs and creating certification-degree pathways, many nontraditional learners with significant work experience and clear career advancement goals could benefit.

The practice of embedding credentials into degrees (i.e., referring to the practice of aligning degree curriculum with another non-degree credential attainment, also referred to as "stackable credentials" although stacking credentials does not always equate to certification-degree pathways) is already common practice at community colleges (Prebil & McCarthy, 2017). For example, CompTIA certifications are often embedded in associate degrees in IT. A few models also exist within baccalaureate programs, although they are much less common. One example is the Association of Technology, Management, and Applied Engineering's (ATMAE) Certified Manufacturing Specialist (CMS) examination that is embedded in Ohio University's Bachelor of Science in Engineering Technology and Management degree program. All seniors in the program are required to take the CMS exam, which covers 16 areas of manufacturing.

Particularly at the community college level, there have been multiple research efforts to understand the impacts of embedded or stackable credentials on persistence and retention for career and technical education. One study, which examined short-term credentials embedded in associate degree programs, found that these credentials had positive impacts on retention and degree completion. However, it also showed noticeable racial disparities in those impacts, likely due to some learners earning short-term credentials with low labor-market value. The authors acknowledged that the length of the study might have resulted in an underreporting of the impact of earning short-term credentials, as many students were still enrolled and seeking their degree when the study period ended (Giani & Fox, 2017).

Innovative universities such as Western Governors University (WGU) and Brigham Young University (BYU) have each launched multiple programs where learners can earn certificates or certifications as part of their four-year degree. WGU lists the certifications that align with various IT degrees offered by the institution and claims increased persistence toward graduation for learners in their IT program who have first earned a certification (Western Governors University, n.d.). Similarly, BYU Pathway Worldwide states that a similar approach has increased student retention by 20 percent (Marcus, 2020). In addition, the BYU Certificate First program provides students the opportunity to complete three certificates and an associate degree on their way to a baccalaureate degree (Brigham Young University, n.d.). Both institutions credit the "early win" of the short-term credential as critical to the positive impact of these pathways on persistence, retention, and graduation.

A 2017 study among 149 U.S. colleges and four-year institutions by New America found the most commonly cited benefit of certification-degree pathways was that it enabled students to earn valuable industry and academic credentials at the same time. This study also showed that certification-degree pathways also helped colleges and universities align their curricula with prevailing industry standards

(Prebil & McCarthy, 2017). However, colleges reported a common set of challenges to implementing certification-degree pathways, including the cost of the certification exam, the difficulty in selecting a certification with labor-market value, and lack of employment and earnings outcomes data for learners who had completed certification-degree pathways.

More broadly, there is a significant body of research suggesting that certifications enhance the labor-market outcomes of those who earn them (Ewert, 2014; Gittleman, 2014; Albert, 2017; Cronen, 2018). However, certifications have also been shown to have less-tangible benefits, including markers that likely impact productivity and career success (Trice, 1993; Sechrist, Valentine, & Berlin 2006; Weber, 2006; Lester, 2011). For example, nurses with specialty certifications were more likely to agree that certification enhanced their feelings of personal accomplishment as well as their professional credibility (Sechrist, Valentine, & Berlin 2006). Large surveys of employers also show that industry certifications are preferred during the hiring process, and in IT, 93 percent of employers found IT certifications to be valuable (Ricci, 2012; CompTIA, 2014).

The Value of Certification-Degree Pathways

Certification-degree pathways have value to multiple audiences. Several of the value propositions were identified by participants in the 2019 Lumina-funded project convenings. Project participants observed that students would gain both a broad-based education and industry-specific skills that hiring managers seek in new hires. Further, earning certifications while pursuing a degree would enable learners to communicate their KSAs to employers because of an increased understanding about the relationship of their academic coursework to the competencies assessed in the certification exam. Embedded certifications could expand the possibility of students' career opportunities and awareness of career and credential pathways not previously explored. This would allow students to move beyond their academic disciplines and find employment in new fields. For example, a Spanish major could earn a certification to be a medical interpreter, a music major could add a cybersecurity certification, or a biology major could earn a certification to become a medical lab professional. Finally, learners might experience better pay, higher employment rates, and increased job opportunities sooner and possibly more affordably than if a degree and certification were pursued separately.

When considering the benefits for certification bodies, project participants observed that an increase in awareness and attainment of certifications and an increased understanding of how the certification relates to a variety of career and credential pathways would be beneficial and could bring more attention to these credentials. Further, by creating more of these opportunities, post-secondary institutions, certification bodies, and employers could substantiate the relationship between broad-based education afforded by bachelor's degrees and the success of industry professionals who hold both degrees and certifications. These could lead to expanded partnerships between certification bodies and post-secondary institutions in order to develop new programs that meet recertification requirements needed to maintain a certification. This benefit would impact both learners who have already completed both degrees and certifications and those hoping to earn both in the future. Another benefit observed by participants regarding certifications bodies was the ability to build relationships with professionals earlier in their career, adding new voices to help them understand changing demands for their certifications.

Post-secondary institutions will likewise realize benefits in embedded certifications as well:

- These programs would provide opportunities for institutions to improve and demonstrate their responsiveness to the needs of students and employers. Such programs may recruit new students by developing more opportunities to count certifications for academic credit toward a bachelor's degree and differentiate their programs from other higher education programs.
- Certification-degree pathways could support a variety of student segments, including unemployed workers, nontraditional students, and traditional students alike. Shifting to an internal lens, these pathways could help faculty learn to better articulate the skills they are imparting to students, engage faculty in developing curriculum that is both academically rigorous and labor market relevant, and strengthen relationships with employers.
- Connected pathways could facilitate the ease in which students move from college to the labor market and back again.

Project participants observed that hiring managers and employers stood to benefit from certification-degree pathways as these programs would provide more information about what an individual knows and can do if they earned both a degree and a certification. Further, they would be assured that an individual has specific competencies that are required to perform a job in addition to a broad-based education as evidenced by the credential assessment process. Likewise, individuals who earn a certification and recertify will continue to learn and update their skills. Lastly, these programs would establish stronger relationships with both universities and certification bodies that can contribute to the employer's broader workforce development strategy.

From a societal perspective, participants noted that the value of both degrees and certifications would be strengthened. An integrated certification could result in improved career outcomes for students and workers, and could build a common language and common currency around skills that apply to institutions, employers, certification bodies, and the public at large.

Essential Elements of Certification-Degree Pathways

Through the project, participants identified several essential elements necessary to engage in this new curricular pathway.

- **Get leadership buy-in.** Most importantly, leaders must buy-in to the concept of embedded credentials. Without executive sponsorship and support, novel ideas like this one cannot be realized. This includes faculty leaders, university deans, provosts and presidents, the heads of certification bodies, employers, and community leaders.
- **Create a common language.** Further, a common language is necessary to facilitate communication and understanding of such certification-degree pathways among and between faculty members and leaders, accreditors, and certification body executive directors and directors of certification. This may mean temporarily abandoning units such as the credit hour and seat time and discussing the evaluation of learning through the demonstration or knowledge of specific KSAs or competencies (which can later be translated back into the credit hour system).
- **Align competencies and determine appropriate fit.** By engaging in a discussion of competencies, institutional leaders, leaders of certification bodies, and employers can better understand the discrete regional workforce needs that exist, comparing competencies between degrees and

certifications and identify gaps. This could help institutions determine the appropriateness or fit of academic programs and allocate resources accordingly.

- **Allocate resources.** Most often, certification exams currently sit outside of documented programs of study, making them ineligible for federal financial aid funds. This could prevent students with limited resources from engaging in these opportunities. Finding the means and resources to cover the cost of certification exams for learners is critical. Once exam funding has been addressed, socializing these programs through targeted marketing needs to be addressed. Enrolling students in these programs and matching them with employers who will value and hire students who have earned a certification and a degree is a critical component to the success of such programs, just as in-degree student supports are necessary.
- **Identify how credentials will be communicated.** Lastly, when all is said and done, institutions will need to reconcile how certifications earned within a bachelor's degree program are articulated on student records and transcripts. The means the way in which these credentials are displayed for external audiences is just as important as the achievements themselves (e.g., transcripts, learning and employment records, badges, digital portfolios).

Future Opportunities

With employers continuing to voice concerns about the lack of preparedness of learners entering the workforce—nearly 40 percent of employers report they could not attract prospective employees with the skills or competencies necessary for entry-level jobs (Committee for Economic Development of The Conference Board, 2019)—innovations and change in this area are critical. Supporting learners through the post-secondary education and workforce training journey and offering affordable access and improved career readiness outcomes that meet the new needs of the labor market while advancing the nation's interest in education serves all individuals in the workforce and post-secondary systems.

This is best achieved through collaborations among institutions of higher education and certification bodies to ensure their offerings evolve to align with the changing needs of a new labor market. Even more critical is the need to gather data points to continue to address the workforce's needs, while ensuring learners are provided with the skills and competencies necessary to advance and succeed in not only a job, but also a long-term, growing career. For example, a partnership among the National Student Clearinghouse, the National Association of Manufacturers/Manufacturing Institute, and the U.S. Census Bureau is for the first time linking administrative data from certification bodies, educational attainment and enrollment data from universities, and aggregate wage data from the U.S. Census Bureau. To support this work, Workcred convenes a network of certification bodies to explore the potential for data-linking efforts to improve understanding of the value of certifications, the labor market outcomes of individuals who hold them, and insights into successful career pathways into the workforce.[2]

Noting the speculative language used throughout this chapter, there are many opportunities to engage in research on the prospects provided by embedding certifications in degree pathways. More research would substantiate the suggested benefits akin to those of prior learning assessment, such as earlier access to program-specific advisors and the persistence of students. Similarly, the research could shed light on the career outcomes of certification holders with "some college" to determine if certifications earned during an abandoned degree plan resulted in better career outcomes than those of peers with only "some college." Research is needed on candidate differentiation and the impact certifications have on the economic and career mobility of students as well as career outcomes. Finally, future research could

focus on the ease in which degree earners move into the workforce and if a connected pathway with embedded credentials eases a learner's transition from student to employee.

CONCLUSION

The U.S. economy and higher education institutions are both experiencing massive change amid the 2020-2021 pandemic. As a result, many students will find that their pre-pandemic jobs are no longer available or require new skills. For these students, moving to and through a sustainable career path means understanding, obtaining, and articulating to employers the skills and competencies that their education and experience provide. To employers, skills shortages, demographic changes in the workforce, and accelerating innovation demand an efficient way to express the requirements of a position and to assess quickly whether a potential employee has the skills necessary for success.

While post-secondary institutions strive to equip students to fill the skills and communications gap by offering the skills their target employers say they need, embedding certifications into degree programs better enables students to demonstrate those skills. The labor market is sending a clear message that workers need foundational skill sets to ensure lifelong learning and employability over the long haul. In addition to positioning students for the new labor market, post-secondary institutions must provide students with a mechanism and language for communicating their competencies, character, and continued appetite for lifelong learning. A significant component of this challenge is to bridge the divide between universities and employers, as they often look to one another to initiate the effort. Finding a way to collaborate and partner to discover the best methods for embedding certifications into bachelor's degree programs with labor-market demands through establishing certification-degree pathways will provide the greatest value to students, institutions, and employers alike.

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REFERENCES

AACSB International. (n.d.). *AACSB*. https://www.aacsb.edu

Albert, K. (2017). The certification earnings premium: An examination of young workers. *Social Science Research*, *63*, 138–149. doi:10.1016/j.ssresearch.2016.09.022 PMID:28202138

American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). American Psychological Association., doi:10.1037/0000165-000

Berker, A., Horn, L., & Carroll, C. D. (2003). *Work first, study second adult undergraduates who combine employment and post-secondary enrollment*. Institute for Education Sciences.

Berling, V. (2013). *Five most critical needs of adult students*. The EvoLLLution. Retrieved from http://www.evolllution.com/opinions/critical-adult-students

Brigham Young University. (n.d.). *Certificate-first Format*. https://www.byupathway.org/degrees/degree-options#certificate-first

Committee for Economic Development of The Conference Board. (2019a). *Improving non college pathways to skills and successful careers*. Committee for Economic Development of The Conference Board. Retrieved from https://www.ced.org/reports/improving-noncollege-pathways-to-skills-and-successful-careers

Committee for Economic Development of The Conference Board. (2019b). *Growing the American workforce: bolstering participation is critical for us competitiveness and economic strength.* Committee for Economic Development of The Conference Board. Retrieved from https://www.ced.org/reports/growing-the-american-workforce

CompTIA. (2014). *State of the IT skills gap: 2014 summary*. https://govstore.pearsonvue.com/v/vspfiles/documents/State_of_IT_Skills_Gap_CompTIA_2014.pdf

Council for Higher Education Accreditation. (n.d.). *Regional accrediting organizations: Regional accrediting organizations 2020-2021*. https://www.chea.org/regional-accrediting-organizations

Credential Engine. (2021). *Counting U.S. post-secondary and secondary credentials*. Credential Engine.

Cronen, S., McQuiggan, M., & Isenberg, E. (2018). *Adult training and education: Results from the national household education surveys program of 2016. First Look. NCES 2017-103rev*. National Center for Education Statistics.

Cutler, F. (2021, January 20). Creating rich transcripts for career activation. *Inside Higher Ed*. https://www.insidehighered.com/views/2021/01/20/students-should-demand-better-college-transcripts-opinion

Distance Education Accrediting Commission. (n.d.). *About Accreditation*. https://www.deac.org/Discover-DEAC/About-Accreditation.aspx

Duke-Benfield, A., Wilson, B., Kaleba, K., & Lenentoff, J. (2019). *Expanding opportunities: Defining quality non-degree credentials for states.* National Skills Coalition. https://www.nationalskillscoalition.org/wp-content/uploads/2020/12/9.18-NSC_QNDC-paper_web.pdf

Eaton, J. (2020). Will regional accreditation go national? *Inside Higher Ed*. https://www.insidehighered.com/views/2020/03/17/pros-and-cons-having-regional-accreditors-go-national-opinion

Everhart, D., Ganzglass, E., Casilli, C., Hickey, D., & Muramatsu, B. (2016). *Quality dimensions for connected credentials*. American Council on Education. https://www.acenet.edu/Documents/Quality-Dimensions-for-Connected-Credentials.pdf

Ewert, S., & Kominski, R. (2014). *Measuring alternative educational credentials: 2012*. Household Economic Studies.

Gallup. (2014). *The 2013 Lumina study*. Lumina Foundation. Retrieved from https://www.luminafoundation.org/files/resources/2013-gallup-lumina-foundation-report.pdf

Giani, M., & Fox, H. L. (2017). Do stackable credentials reinforce stratification or promote upward mobility? An analysis of health professions pathways reform in a community college consortium. *Journal of Vocational Education and Training*, *69*(1), 100–122. doi:10.1080/13636820.2016.1238837

Gittleman, M., Klee, M., & Kleiner, M. (2014). *Analyzing the labor market outcomes of occupational licensure. Research Staff Report 504*. Federal Reserve Bank of Minneapolis.

Good, L., Ganzglass, E., Crawford, S., Albert, K., Swift, R., Elzey, K., & Cardenas-Navia, I. (2019). *(rep.). Understanding certifications*. Workcred. https://workcred.org/Documents/Understanding-Certifications-Report-Dec-2020.pdf

Hesse, T. (2017, January 18). How hard is it for a university to revoke a ph.d.? *The Chronicle of Higher Education*. https://www.chronicle.com/article/how-hard-is-it-for-a-university-to-revoke-a-ph-d

Horn, L., & Carroll, C. D. (1996). *Nontraditional undergraduates: Trends in enrollment from 1986 to 1992 and persistence and attainment among 1989-90 beginning post-secondary students. 1-72. U.S. Department of Education. National Center for Education Statistics*. Office of Educational Research and Improvement.

Hussar, B., Zhang, J., Hein, S., Wang, K., Roberts, A., Cui, J., Smith, M., Bullock Mann, F., Barmer, A., & Dilig, R. (2020). *The Condition of Education 2020*. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020144

Jaschik, S., & Lederman, D. (2014). *The 2014 inside higher education survey of college & university chief academic officers*. Deltak, Education Advisory Board, Jenzabar, and Pearson. Retrieved from https://www.insidehighered.com/system/files/media/IHE_ProvostsSurvey-final.pdf

Klein-Collins, R., Taylor, J., Bishop, C., Bransberger, P., Lane, P., & Leibrandt, S. (2020). *The PLA boost: Results from a 72-institution targeted study of prior learning assessment and adult student outcomes*. Council of Adult and Experiential Learning (CAEL) and Western Interstate Commission for Higher Education (WICHE). Retrieved from https://www.cael.org/hubfs/PLA%20Boost%20Report%20CAEL%20WICHE%20-%20October%202020.pdf

Lester, S. W., Fertig, J., & Dwyer, D. J. (2011). Do business leaders value human resource certification? *Journal of Leadership & Organizational Studies*, *18*(3), 408–414. doi:10.1177/1548051811404422

Marcus, J. (2020, June 2). More students are 'stacking' credentials en route to a degr. *Wired*. https://www.wired.com/story/students-stacking-credentials-route-degree

Moody, J. (2018, November 26). A Guide to Different Types of College Degrees. *U.S. News and World Report*. https://www.usnews.com/education/best-colleges/articles/a-guide-to-different-types-of-college-degrees

National Center for Education Statistics. (2015). *Demographic and enrollment characteristics of nontraditional undergraduates: 2011–12*. Institute of Education Sciences. https://nces.ed.gov/pubs2015/2015025.pdf

National Student Clearinghouse Research Center. (2019). *Some college, no degree: A 2019 snapshot for the nation and 50 states*. Retrieved from https://nscresearchcenter.org/wp-content/uploads/SCND_Report_2019.pdf

O'Donnell, B. (2021, April 26). Looking to level up? Amazon, Google, Microsoft and more offer training programs. *USA Today*. https://www.msn.com/en-us/news/technology/looking-to-level-up-amazon-google-microsoft-and-more-offer-training-programs/ar-BB1g3ZN2

Pettit, E. (2018, July 26). Republicans and Democrats both think higher ed's on the wrong track — for very different reasons. *The Chronicle of Higher Education*. https://www.chronicle.com/article/republicans-and-democrats-both-think-higher-eds-on-the-wrong-track-for-very-different-reasons

Porter, M. (2007). *Colleges and universities and regional economic development: A strategic perspective, forum for the future of higher education.* Forum for the Future of Higher Education. http://forum.mit.edu/articles/colleges-and-universities-and-regional-economic-development-a-strategic-perspective

Prebil, M., & McCarthy, M. (2017). *Building better degrees using industry certifications: Lessons from the field.* Education Policy, Center on Education & Labor, New America. https://www.newamerica.org/education-policy/reports/building-better-degrees-using-industry-certifications/

Ricci, T. (2012). *Are certifications worth the effort?* American Society of Mechanical Engineers. https://www.asme.org/topics-resources/content/are-certifications-worth-the-effort

Sechrist, K. R., Valentine, W., & Berlin, L. E. (2006). Perceived value of certification among certified, noncertified, and administrative perioperative nurses. *Journal of Professional Nursing*, *22*(4), 242–247. doi:10.1016/j.profnurs.2005.11.001 PMID:16873047

Trice, H. M. (1993). Occupational subcultures in the workplace (No. 26). Cornell University Press.

Vedder, R., Denhart, C., & Robe, J. (2013). *Why are recent college graduates underemployed: University enrollments and labor market realities*. Center for College Affordability and Productivity. Retrieved from https://files.eric.ed.gov/fulltext/ED539373.pdf

Weber, D. A., Bauer, R. M., Ris, D., & Yeates, K. (2006, September). Becoming a neuropsychologist: From graduate school to board certification. *The Clinical Neuropsychologist*, *20*(3), 595–595.

Western Governors University. (n.d.). *Online IT Certifications with Information Technology Degree.* https://www.wgu.edu/online-it-degrees/it-certifications.html#close

Woodley, C. (2015, April 29). *Careful selection of subject matter experts is the key to a successful JTA meeting*. https://www.proftesting.com/blog/2015/04/29/2015429careful-selection-of-subject-matter-experts-is-the-key-to-a-successful-jta-meeting/

Workcred. (2018). *How do credentials differ?* https://workcred.org/Documents/How-Do-Credentials-Differ-image.pdf

Workcred. (2019). *Types of Certificates.* https://workcred.org/Documents/Types-of-Certificates-image.pdf

ADDITIONAL READING

Elzey, K., & Jyotishi, S. (2020, July 1). *Combining degrees with quality certifications is a win for everyone*. RealClearEducation. https://www.realcleareducation.com/articles/2020/07/01/combining_degrees_with_quality_certifications_is_a_win_for_everyone_110439.html

Elzey, K., & Zanville, H. (2020, May 25). *Embedding certifications into bachelor's degrees could improve transitions into the labor market.* The EvoLLLution. https://evolllution.com/programming/credentials/embedding-certifications-into-bachelors-degrees-could-improve-transitions-into-the-labor-market

Swift, R., Elzey, K., Cardenas-Navia, I., Hansen, R., Uranis, J., Martin, S., Jyotishi, S., Garmise, S., & Rodriguez, A. (2020). *Embedding certifications into bachelor's degrees: Certification-degree pathways project.* Workcred. https://workcred.org/Documents/Embedding-Certifications-Into-Bachelors-Degrees-Certification-Degree-Pathways-Project-Framework-Report-November-2020.pdf

Workcred. (2018). *U.S. Credentialing System.* https://workcred.org/Documents/Credentialing-Maze-Diagram-image.pdf

Workcred. (2019, March 26). *Certification development process: Background for Workcred/APLU/UPCEA convenings*. Workcred. Retrieved from http://bit.ly/CertDevProcessV3_Workcred

Workcred. (2020, August). *Differing types of workplace credentials* [video]. YouTube. https://www.youtube.com/watch?v=NWqhdiTGP2w&feature=emb_logo

Workcred. (n.d.). *Questions for universities to ask certification bodies to assess quality.* https://workcred.org/Documents/Questions-Universities-Should-Ask-Certification-Bodies.pdf

KEY TERMS AND DEFINITIONS

Accreditation for Personnel Credentials: Recognition that the credential is evaluated by a third party against a set of national or international standards.

Associate Degree: An associate degree is granted for the successful completion of a sub-baccalaureate program of studies, usually requiring at least two years (or equivalent) of full-time college-level study (Hussar et al., 2020).

Bachelor's Degree: A baccalaureate or bachelor's degree is awarded for the successful completion of a baccalaureate program of studies, usually requiring at least four years (or equivalent) of full-time college-level study (Hussar et al., 2020).

Certificate: Certificates are generally associated with training or educational courses and usually do not have a time limit or renewal requirement and cannot be revoked for reasons of incompetence or unethical behavior (Workcred, 2018).

Certification: Certifications are attestations of their holders' ability to perform a set of skills relevant to a professional setting. They are awarded and tracked by certification issuers—typically nonprofit organizations, professional associations, industry or trade organizations, or employers. High-quality certifications are based on a third-party standardized assessment, time-limited, renewable, and can be revoked for incompetence or unethical behavior (Workcred, 2018).

Degree-Granting Institutions: Post-secondary institutions that are eligible for Title IV federal financial aid programs and grant an associate or higher degree. For an institution to be eligible to participate in Title IV financial aid programs it must offer a program of at least 300 clock hours in length, have accreditation recognized by the U.S. Department of Education, have been in business for at least two years, and have signed a participation agreement with the Department (NCES, n.d.).

Job Task Analysis: A job task analysis (JTA) is study of a job, portion of a job, or concept job to identify the tasks and associated knowledge, skills, and abilities (KSAs) required to competently perform the job (Woodley, 2015).

Licenses: Licenses are credentials that permit the holder to practice in a specified field or occupation. An occupational license can only be awarded by a government licensing agency based on a set of criteria (Workcred, 2018).

Master's Degree: A master's degree is awarded for successful completion of a program generally requiring one or two years of full-time college-level study beyond the bachelor's degree (Hussar et al., 2020).

Nontraditional: A nontraditional student may have one or more of the characteristics that may be barriers or impede their enrollment in higher education institutions or lengthen their time to a degree. These characteristics may include having a gap between high school completion and college enrollment, enrolling part-time enrollment, being financially independent, working full-time while enrolled in higher education, having dependents, being a single parent, or not earning a standard high school diploma (Horn & Carroll, 1996).

Professional/Terminal degrees: Terminal degrees, or commonly referred to as professional or doctoral degrees, are the highest award a student can earn for graduate study. Includes such degrees as the Doctor of Education (Ed.D.); the Doctor of Juridical Science (S.J.D.); the Doctor of Public Health (Dr.P.H.); and the Doctor of Philosophy (Ph.D.) in any field (Hussar et al., 2020).

Psychometrician: A psychometrician is an expert in test and measurement. In relationship to certifications, they are responsible for ensuring the validity, reliability, and fairness of an assessment.

ENDNOTES

[1] For more information about personnel certification accreditation, see the ANSI National Accreditation Board (ANAB): https://anab.ansi.org/credentialing, and the National Commission for Certifying Agencies (NCCA): https://www.credentialingexcellence.org/page/ncca

[2] For more information, visit https://workcred.org/Our-Work/Demonstrate-Value-through-Linking-Data