LEARNING FRAMEWORKS: TOOLS FOR BUILDING A BETTER EDUCATIONAL EXPERIENCE

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Executive Summary

Learning frameworks are tools that specify learning outcomes and/or competencies that define, classify, and recognize educational, learner, and industry expectations of knowledge, skills, and abilities at increasing levels of complexity and difficulty. They are not standards, and they are not limited to academia, but they do allow for alignment, translation, and mapping of learning through various spaces in order to capture learning that can be valued and recognized by education, industry, and the military.

Although centuries old in practice and developed in numerous countries (Gaston, 2010), the use of learning frameworks to connect and document various strands of learning has proliferated over the past few decades (Jankowski & Marshall, 2017). These frameworks can support quality assurance mechanisms for reviewing aligned curriculum and training, provide guideposts for awarding credentials, and serve as end points from which learning experiences can be backward-designed.

In addition, learning frameworks enable consistency; provide a common language within their user group(s); and assist in transferability within and across education providers, alternative learning pathways, military learning, and industries (including employer-developed industry expectations and career readiness skills).

This paper outlines the roles that learning frameworks play in the emerging ecosystem of connected learning—why they matter and how they can bring disparate pieces of the learning ecosystem together for greater portability and documentation of learning in all the places it unfolds. It concludes with a focus on technological innovations as a source of future directions for learning frameworks connectivity.

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Why Do Frameworks Matter?

Learning frameworks define what an individual learner can do by detailing application of knowledge in various contexts—education, military, and employment, for instance—based on levels that indicate deeper and broader knowledge and application over time (Lumina Foundation, 2014; Lumina Foundation, 2015a). They also provide access to alternative pathways for learners and workers to document and validate the skills required for credentials. This can increase the number of qualified candidates for employers and allow educational institutions to translate credentials and qualifications within a wider variety of learning pathways (Workcred, 2018).

Frameworks are important because multiple learning pathways would not connect without the translation tools that frameworks provide between and among postsecondary institutions, work-related learning, employer needs, military training and education, and community-based delivery options. With competencies as the currency, frameworks provide a mechanism to talk across providers and users of competencies by outlining how the various pieces fit together (Lumina Foundation, 2014; Lumina Foundation, 2015a).

Employers

From an employer perspective, there are regular and resounding reports that graduates and credential holders do not have the needed knowledge and skills for current positions and that open positions cannot be filled with qualified candidates (Melvin, 2018). While employers may be involved on advisory committees with educational institutions and programs, their role has traditionally been limited to reaching agreement on the articulation of desired skills and competencies and little else. Such an approach provides agreement on language without addressing the development of required knowledge, skills, and abilities; alignment with current needs; or preferred demonstrations or assessments of learning. It also assumes that employers are clear regarding required competencies and are able to articulate their needs. However, this has not been the case.

The work of the U.S. Chamber of Commerce Foundation's (USCCF) Talent Pipeline Management (TPM)[1] and Job Data Exchange (JDX) project to promote clearer signals[2] is attempting to address this issue. Instead of using credentials and experience as proxies for knowledge and skills, the efforts of the USCCF are moving to unpack the underlying competencies (Tyszko, Sheets, & Reamer, 2017). Frameworks can assist in the assembly of competencies that define job requirements and related qualifications, indicating similarities and differences between occupations and industries as well as employment paths between them.

Using frameworks to list learner competencies and to indicate the level of those competencies may assist with better matching or finding a fit in employment for learners and employees. Learning frameworks also provide a mechanism for employers to understand the competencies behind different credentials to better match credentials with desired knowledge and skills (USCCF, 2018a). Overall, frameworks help support employers in competency-based hiring and in upskilling current employees.

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[1] To learn more about Talent Pipeline Management work, see: https://www.uschamberfoundation.org/talent-pipeline-management
[2] Job Data Exchange (JDX): https://www.uschamberfoundation.org/workforce-development/JDX

Education Providers

Learning frameworks provide a mechanism for aligning activities in educational experiences so that they build toward a clearly defined end or goal. They are also useful in curricular and co-curricular development and alignment to identified reference points of learning (Jankowski & Marshall, 2017). They provide clear signals to learners regarding the knowledge, skills, and abilities acquired from a particular learning experience. They can also help demonstrate levels of learning, showcasing the curricular coherence of educational activities, allowing learners and advisors to outline more tailored pathways of learning to credential completion. Transparent learning frameworks also support learners' ability to apply competencies in novel situations because they offer a cognitive infrastructure for learning.

As education and employment move toward clearer, more integrated pathways, learning frameworks offer guideposts. Frameworks also clarify for those outside education what is contained within a credential. The work of Credential Engine[3] to increase transparency of credentials is an effort to address this gap in understanding. Shared language and reference points support more seamless transfer among postsecondary institutions, assisting in the structural development of digital learner records. They open translation and acceptance of learning from other sectors such as military or employment—making learning discoverable and portable across sectors (Green & Parnell, 2017). They give educational providers and employers a translation tool to facilitate transfer of learning and placement of learners into employment.

Learners

Frameworks help support learners as well. Many learners have skills and competencies that their credentials do not directly address or signal. Further, learners may not be aware of or able to articulate or translate the knowledge, skills, and abilities they possess. Without a clear understanding of their knowledge and skills, learners may opt out of talent pools, unaware they have the necessary knowledge and skills for particular jobs or careers.

For those involved in upskilling and learning while in their jobs, being aware of advancements in their own knowledge and skills allows them to better articulate their value to employers (Crummenerl, Yardi, Buvat, Khadikar, & Ghosh, 2018). Further, it enables learners to make the case for the learning they bring with them from employment and/or are acquiring in an educational experience.

Institutionalized learning is one option of many available to learners, yet there are few traditional structures that recognize knowledge and skills gained through other means (Green & Parnell, 2017). Frameworks provide a mechanism to address this gap. In addition to the role of frameworks in helping learners understand, communicate, and translate their skills, they also identify what the competencies are without limiting where they may have been acquired.

Military

The military provides training, education, and experiences in active learning with regular and ongoing feedback that gives learners ample opportunity to demonstrate their knowledge, skills, and abilities. Unfortunately, military-connected students who transition to a postsecondary or employment setting rarely receive recognition for their knowledge and skills (Logue, 2015).

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[3] Credential Engine: http://www.credentialengine.org

Without clear information on credentialing and competencies, connections are missed, credentials are not awarded, and learning is not recognized. Frameworks provide a translation tool and connection point for integration of learning pathways and recognition of knowledge, skills, and abilities acquired from multiple settings, including the military. Frameworks also allow military trainers and educators to build in credentials based on existing levels of assessment of knowledge and skills. Therefore, veterans can leave the military with recognized credentials built on shared learning frameworks.

Not All Frameworks Are Alike

Frameworks used in postsecondary learning systems in the United States have taken different pathways. Absent the education ministry structure that exists in other countries, curricular decisions are often made locally rather than mandated at state or federal levels. An exception is the movement in core curricular standards at elementary and secondary educational levels (Conley & Gaston, 2013). Starting in the 1990s, many states created common core standards, which led to the Common Core State Standards Initiative, addressing language arts and mathematics requirements at K-12 levels. At this point, 42 of 50 states, the District of Columbia, four territories, and the Department of Defense Education Activity have adopted these standards,[4] with the expectation that schools in those areas will follow the standards for language arts and mathematics.

Learning frameworks thus far have been described as flexible schema allowing for translation, while standards are generally interpreted as absolute requirements. Frameworks do not dictate what is taught, and various frameworks serve different ends, addressing different questions of interest such as:
- What is the learning behind a degree at a specific level?
- What does a major (such as history) mean in terms of knowledge and skills?
- What does career readiness look like?
- What competencies are acquired through liberal education?
- What is the level of learning within a certification or badge?
- What competencies are needed for a specific job?

Instead of serving to standardize education, learning frameworks provide a mechanism to outline similarities as well as differences between and among educational programs and institutions. In part, this is a result of the curriculum development process within traditional postsecondary education. Frameworks also provide an anchor for curriculum development, enabling faculty to make connections across activities, courses, and disciplines.

The postsecondary approach to curriculum development has been quite different from elementary and secondary education. Academic freedom is paramount in higher education, which often is at tension with anything that suggests standardization—however, one can have standards without standardization and standardization without standards (Cain, 2014). On one hand, academic freedom has allowed curriculum to grow and shift as knowledge changes and new philosophical and theoretical approaches have evolved. Yet, the lack of shared language and reference points has limited faculty's understanding of what they collectively teach and how different courses and credentials align within and across disciplines, either at the same institution or for transfer to another (Jankowski & Marshall, 2017). This disparate approach inhibits the importation of learning from various providers such as military and employers. Further, it has limited learners' understanding of what they acquire from learning experiences.

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[4] Credential Engine: http://www.corestandards.org

Educational design done without a framework as a reference point limits employers' understanding of what competencies a potential candidate possesses and what he or she knows and can do. The movement for developing learning outcomes, and now competencies, across the curriculum is part of a larger shared need for transparency in the teaching and learning process for all stakeholders. Unfortunately, learning outcomes often are written without an organizing framework to align and build upon the disparate or shared outcomes and competencies (NILOA, 2018). Thus, while there may be clarity within a single learning experience, what is lacking is a coherence and integration across various learning experiences within institutions. Learning frameworks are the mechanism by which these gaps can be addressed.

Challenges and Opportunities

Many industries have developed frameworks and/or standards that specify competencies for specific jobs, certifications, and licenses. Often these frameworks have been developed with one particular field in mind, rather than a broad perspective that examines shared competencies across fields. As a result, many industry credentials are difficult to align with or relate to educational credentials (Workcred, 2018).

The National Institute for Metalworking Skills (NIMS) is an example of an organization with frameworks that include sets of competencies and skills developed to support jobs in manufacturing. However, employers are not the only ones with challenges related to frameworks. Within educational programs designed to prepare learners for credentials, connection points are seldom raised or stressed along the educational journey. Further, education-based frameworks tend to operate in silos or disciplinary tents, not connecting learning from one framework to another.

What is lacking in the U.S. is coordination or integration across educational levels or across education and industry sectors. There are too few connected pathways that enable learners to build on credentials in a concerted way. Frameworks can provide the architecture within which curricular, co-curricular, and credential designs can be developed and aligned, while honoring academic freedom and industry proprietary needs. While frameworks identify what the competencies are, they rarely indicate how they are achieved and are not specific about how or where learning occurs (Lumina Foundation, 2014). Frameworks can help the learning system be more responsive to mobile learners who stop in and out, allowing educational systems to be more adaptive as learners move through the learning environment.

In addition, if competency is the currency and we agree that learning occurs in all sorts of places, frameworks built on competencies can serve as equivalency points for alternative learning pathways to certifications. In the current system of learning, alternative pathways to credentials are not viewed as equivalent to degree-level learning. However, a competency-focused learning framework allows for equivalences based on rigorous demonstrations of learning, connecting multiple pathways into a seamless system. Thus, as part of an approach to interlink frameworks to enhance workforce development and portability and transferability of learning across sectors and segments, assessment of tasks and learning demonstrations is key.

A Note on Recognition of Learning

Frameworks provide the mechanism by which to map learning, informed by multiple measures, recognizing that learning occurs in various places, not just those validated by postsecondary education providers or captured in a specific learning experience. Employers, learners, and education providers need to agree and be clear about how a learner has demonstrated learning at the level identified in a framework.

As educational providers, learners, and employers map learning to frameworks, we need to ensure that the demonstrations of learning behind the claims within a framework are appropriate for the level of interest, audience, content, and required knowledge and skills (NILOA, 2018). To evaluate demonstrations of learning, institutions of higher education, employers, and others engage in assessment. As it relates to learning frameworks, assessment of learning, performance-based efforts, and learning demonstrations identify what a learner can do and at what level.

The process of recognizing and validating learning is not one-size-fits-all. For instance, an employer may have different demonstration needs regarding specific frameworks than a college or military curriculum might have. Clear demonstrations aligned with learning frameworks help learners better understand their knowledge, skills, and abilities, making them more aware of their qualifications for various positions and credential opportunities.

What Types of Frameworks Are There?

Frameworks are not all alike; there are different purposes and assumptions behind their development and use. Frameworks can be organized based on:

- **Source:** who designed the framework (such as education, industry, or community efforts).
- **Purpose:** the role of the framework (such as why the framework was developed and the issues it addresses).
- **Targeted learning or competencies addressed**: the framework could address, for example, prior learning, new or emergent learning, and culminating or convergent learning.
- **Intention:** the role the framework fulfills within a specific setting (such as articulating learning or competencies; assessing learning or competencies; standards for a field; designing curriculum, or connecting competencies, curriculum, and credentials).

The **source** refers to those who were involved in developing the framework. This is important because the organization and shaping of the framework is influenced by its creators. A framework developed by educators might be perfectly suitable for educational settings, but may be less appropriate for industry, and vice versa. On the other hand, a framework developed jointly by educators and employers may be very adaptable in both settings. Being mindful of source audience, language, and translatability can assist in selection of a framework for the task at hand.

The **purpose** provides the motivation behind creating the framework and the issues that it is trying to address. For example, the Global Learning Qualifications Framework[5] evolved from research and practice trying to determine when prior learning met college-level requirements. The developers found no satisfactory definition of college-level learning and created the framework to help institutions better assess prior learning for credit at an undergraduate level.

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[5] Global Learning Qualifications Framework: https://www.esc.edu/suny-real/

The **targeted learning** can be thought of in terms of prior learning, new or emergent learning, and culminating or convergent learning. In this context, prior learning is the knowledge and skills that an individual has acquired prior to engaging in an educational program, employment, and/or community involvement. Frameworks that explore prior learning (e.g., Global Learning Qualifications Framework) often are focused on assessing that learning and guiding how that learning can fit into an existing program.

New and emergent learning are the knowledge and skills that are gained while participating in an activity within an educational program, employment, and/or community involvement. Frameworks (e.g., 21st Century Skills Framework, Resiliency Competency Model) focus on identifying the types of knowledge and skills a learner acquires while experiencing the activity.

Culminating or convergent learning refers to the knowledge and skills that develop over time, integrating prior and emergent learning, and is often represented through credentials. Frameworks (e.g., Degree Qualifications Framework[6], Beta Connecting Credentials Framework[7], disciplinary frameworks[8]) provide an overarching conceptualization of what learning or competencies would be represented in a credential at different levels.

The **intention** points to how the framework should be used. This could be to articulate the knowledge and skills or competencies that would be expected through learning experiences. Some frameworks are intended to be used to assess learning and target the indicators of learning, skills or competencies. Others codify standards required in a field or across fields. Some establish criteria for the design of curriculum or training, or connecting competencies, curriculum, and credentials.

Table 1 delineates some examples of current frameworks using these classifications to sort them. Assessing a framework in terms of its source, purpose, targeted learning, and intention enable one to be assured that the framework is being used appropriately. One critique of frameworks is that they claim to do more than what has been verified. In many cases, this has more to do with ways in which the framework has been applied than how the framework was designed and intended. Care must be taken to not overreach a framework's purpose.

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[6] Degree Qualifications Framework: http://degreeprofile.org

[7] Beta Credentials Framework: http://connectingcredentials.org/framework/

[8] History Discipline Core: https://www.historians.org/teaching-and-learning/tuning-the-history-discipline/2016-history-discipline-core and Learning Outcomes in Communication: https://www.natcom.org/learning-outcomes-communication

Examples of Current Frameworks with Organizing Characteristics

Framework Name	Source by Sector	Targeted Learning	Intention	Purpose
LEAP Essential Learning Outcomes	Education	New, emergent learning	• Articulating learning • Assessing learning (VALUE Rubrics)	Defining essential, broad outcomes applied across degree programs
Degree Qualifications Framework	Education	New, emergent and culminating, convergent learning	• Articulating learning • Standards for learning • Designing curriculum	Expected learning outcomes of associate, bachelor's, and master's degree programs
Global Learning Qualifications Framework	Education	Prior learning	• Articulating learning • Assessing learning	Defining college-level learning to award credit for prior knowledge
Resiliency Competency Model	Education and industry	New, emergent learning	• Articulating learning • Assessing learning • Designing curriculum	Building competencies that are needed to be a resilient person in learning, work, and life
21st Century Skills Framework	Education and industry	New, emergent learning	• Articulating learning • Assessing learning • Designing curriculum	Defining and devloping skills and knowledge students need to succeed in work, life, and citizenship
Department of Labor Competency Frameworks	Industry	Culminating, convergent learning	• Designing curriculum • Connecting competencies and industry credentials	Providing a core of foundation and technical skills that are valued and applicable across occupations
Employability Skills Framework	Education and industry	New, emergent and culminating, convergent learning	• Designing curriculum • Connecting competencies, curriculum and credentials	Developing general skills necessary for success in the labor market at all employment levels and in all sectors
Beta Connecting Credentials Framework	Education and industry	New, emergent and culminating, convergent learning	• Articulating learning • Assessing learning • Designing curriculum	Providing a way to compare, develop, and stack competencies and credentials across all fields and sectors

Table 1

Frameworks are useful tools, and as with all tools, they have a specific form and function. One does not get good results if using a hammer to drive in a screw. Using a framework appropriately can provide good results; however, there are many different frameworks available. This variety provides choices and the ability to use more than one framework to meet a need. In addition, frameworks can be explored for relations and points of connection between and among them.

Sometimes it's difficult to identify which framework is the best tool for the problem at hand. The schema in Table 1 can help determine best fit for various situations. Yet, frameworks can be used in conjunction with each other, which can result in a more robust approach, enable cross-walking, and assist in translation between communities. For instance, if an associate degree program is being developed to accept prior learning credits, incorporate liberal arts learning integrated with technical skills, transfer into a bachelor's program, and lead toward industry certification, no single framework in Table 1 could accomplish the full design. Rather, by using a combination of several of the frameworks, a more accurate picture of the degree could be accomplished (see Table 2).

Example of Using Different Frameworks to Develop an Associate Degree

Sample Degree: Associate degree to accept prior learning credits, incorporate liberal arts learning integrated with technical skills, transfer into a bachelor's program, and lead toward industry certification.

Framework	How Framework Can Be Used
Global Learning Qualifications Framework	To assess prior learning for college credit
LEAP Essential Learning Outcomes	To develop liberal arts competencies to integrate into program
Department of Labor Competency Frameworks	To develop specific industry competencies to integrate into program
Degree Qualifications Framework	To ensure the associate degree has all the needed components expected of a credential at that level
Beta Connecting Credentials Framework	To align associate degree with bachelors'degree programs and industry credentials

Table 2

Any one framework is not the solution, yet each can provide strong backing on which to develop, assess, recognize and integrate learning and credentials. Frameworks do provide a shared language and organizing structure, creating a common denominator across competencies, curricula, and credentials. Frameworks can support greater integration across education, industry, military, and community opportunities and help explain how credentials meet the needs of each. They are an important part of the solution to integrated education and industry learning systems that more fully support learners.

Future Directions: Technology and Learning Frameworks

Learning frameworks, when used properly, can distribute benefits among learners, communities, and employers by enhancing transparency around credentialing. Through leveraging existing and emerging frameworks, integrating robust, authentic and valid assessment, individualized learning plans may help students complete credentials effectively and efficiently. Leveraging an open and transparent set of frameworks, assessments and learning opportunities supports learning regardless of where it occurs and enables the development of a common currency built on learning.

However, in order to realize the potential of translation and portability afforded by learning frameworks, technology solutions are needed.

The T3 Innovation Network is an "open innovation network that is working to promote and build an open, shared, and distributed public-private data and technology infrastructure for the talent marketplace" (USCCF, 2018a, p. 1). The T3 Innovation Network is composed of employers; education, training, and credentialing providers; technical standards organizations; technology vendors government agencies, and others. They argue that the diversity of the competency framework environment "complicates the task of creating, interpreting, translating, and comparing competencies by both humans and machines," opening the space for technology solutions that enable a "globally linked ecosystem of competency frameworks." To do this, artificial intelligence (AI) can be used to "interpret, align, and translate the unstructured or semi-structured data that exist to be machine readable."

However, a first step in this technology solution is to translate competency information into a machine-actionable competency framework, a pilot project that was identified as a top priority by T3 Innovation Network participants. As a network report states, "having an open and shared solution and infrastructure for competency authoring and translation is critical to ensure that all major stakeholders can communicate competencies and skills with one another via technology."

The network has argued for publishing competency data in ways that can be accessed, analyzed, and linked to other data in order to improve the search and discovery process and aid in the translation, comparison, and analysis of competency frameworks and competency requirements (USCCF, 2018b). Further, the group raised the issue of different data standards being used for competencies across employer, learner, and education and training provider groups, hindering the ability to translate competency to competency.

Once a data standard is used for competency information, then working groups within the T3 Innovation Network pilot projects can determine AI algorithms best suited for interpreting, aligning, and generating competencies and for defining metrics for training. AI can also help with the cross-framework comparisons and mapping, built upon a "strength of fit" approach to cross-framework competency translations and comparisons (USCCF, 2018b). The competency data standard put forward by the Competency Classification Index (Uranis, Erskine, Cullum, & Debate, 2018) can help develop this technology area. For articulating learning across various educational providers and learning spaces, a taxonomy and competency data standard would help enable interoperability across framework providers. Such an approach supports a reimagined credentialing ecosystem that is easily understandable, interconnected, and allows for comparisons (Lumina Foundation, 2015b).

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