Brookings Metro

Whose learning counts? State actions to value skills from outside the classroom

By Annelies Goger and Felix Laniyan

In August 2022, President Joe Biden announced his administration would be cancelling up to $20,000 in student loan debt, alongside several other actions to aid student borrowers. Even so, the underlying problems that make quality higher education in the U.S. so costly and difficult to access persist.[i]

Although critics have claimed that student debt cancellation primarily benefits the "elite," 39% of U.S. borrowers do not complete a degree or certificate within six years of starting college.[ii] [iii] Furthermore, the racial wealth gap places additional burdens on Black, Native American, and Latino or Hispanic students when it comes to both completing higher education and repaying student debt.[iv] For example, 58% of Black students have not completed a degree within six years of starting college.[v] The COVID-19 pandemic worsened this crisis, as marginalized students with less access to broadband and internet devices were disproportionately vulnerable to learning loss.[vi]

With student debt topping $1.762 trillion and unemployment at a very low 3.5%, college enrollments are down and more Americans are questioning whether all that debt is worth it.[vii] [viii] [ix] Meanwhile, employers (especially small businesses) report they are in a dire situation when it comes to hiring and retaining qualified workers.[x] Many employers require a college degree in their candidate screening process even if existing employees in that role do not have a degree—largely because it is perceived as a low-risk and cost-effective way to screen people quickly.[xi] But especially in a tight labor market, this practice makes it challenging to find qualified talent and excludes potentially valuable candidates.[xii] For example, veterans typically learn many job-relevant skills during their service, but because that knowledge and experience don't count toward a formal degree, many struggle to compete in the labor market with those who have a degree.

What are states' roles in reducing these labor market frictions and providing more accessible opportunities for quality jobs and higher education, especially to those who are priced out of formal degree programs? This report provides an overview of the policy mechanisms that U.S. states can leverage to build systems that support learners without degrees. It addresses two challenges. First, how can states help learners without degrees communicate their skills and qualifications to employers more effectively? And second, how can states enable learners to receive credit for skills and knowledge attained outside of a formal accredited program, so they can complete a degree without having to repeat content they already mastered?

The key audiences for this report are leaders in higher education, workforce development, state governors' offices, state legislatures, businesses, and employer-serving organizations.

The COVID-19 recovery represents an important moment to reflect on educational transformation in a digital age. Specifically, how can we move beyond a "degree-centric postsecondary system" so that broader types of learning can be accessed, verified, and credentialed?[xiii] With expanding access to free courseware and many more flexible and affordable learning options, it is critical to revisit questions about how quality is assessed as well as whose knowledge and what forms of knowledge are valued and counted as "learning."[xiv] [xv]

Using education reform strategies and education technologies in combination

It is not necessary to start from scratch. In recent decades, education reformers have focused on three key areas to improve learning recognition: qualifications frameworks, competency-based education, and prior learning assessment. Wong (2014) clarifies the role of each below (emphasis in the original text):

> A *competence* is what an individual knows (knowledge) or can do (skills), but this may not be documented, especially when the competence is achieved outside a formal education or training system. A *qualification* is a document awarded by an accredited institution or professional body (representing a ministry of education or training) that describes what the holder knows and can do in a specific field of action, and is usually considered a prerequisite to obtaining employment or access to further education and training. The [Recognition for Prior Learning] process is intended to make visible competence achieved through non-formal and informal learning and to align that to qualifications.[xvi]

In other words, competency-based education verifies *what* someone knows; qualifications frameworks lay out *where* that learner's learning level is situated vis-à-vis equivalent levels of learning and their career progression in the system; and prior learning assessment is *how* someone gets awarded credit, or the process for articulating into the system or transferring from one learning setting to another.

In the digital era, many states and education providers have also started focusing on the data infrastructure underlying how learning is documented, verified, and credentialed as another strategy to render multiple forms of learning more visible (and machine-readable). For example, states and higher education institutions are building digital wallets that allow an individual to store all of their achievements in an application on their phone; these achievements can include formal degrees and licenses, but also other verifiable credentials or skills such as a digital badge from a professional development course or a competency mastered during an apprenticeship. If these digital wallets are set up properly, they can give individuals more control to manage their education and skills data throughout a lifetime, and offer users suggestions to navigate their progress toward a degree, a better job, or a career change. All of the policy tools and technologies described in this report can be implemented separately, but their impacts may be amplified when they are used in combination.

Barriers to learning and learning recognition in the digital age

Higher education institutions were designed to train a small, elite managerial class for an industrial-era economy. Compared to most other industrialized countries, however, the U.S. higher education system focuses narrowly on broad academic skills and knowledge rather than also offering practical and applied career paths into high-quality jobs. Over the years, the U.S. has migrated to what is effectively a "college-for-all" approach, positioning higher education institutions as the primary gatekeepers to opportunity.[xvii]

However, despite the growing need for lifelong learning in an economy with rapidly changing technologies, higher education is still largely designed around the needs of a student who "goes away to college" to be a full-time student. A holdover from the industrial era, this model is also centered on a "one-and-done" sequence of learning and working, in which a person progresses sequentially from high school to college to a career.

FIGURE 1

Switching from a one-and-done model of education to blended work and learning

Source: Brookings Authors

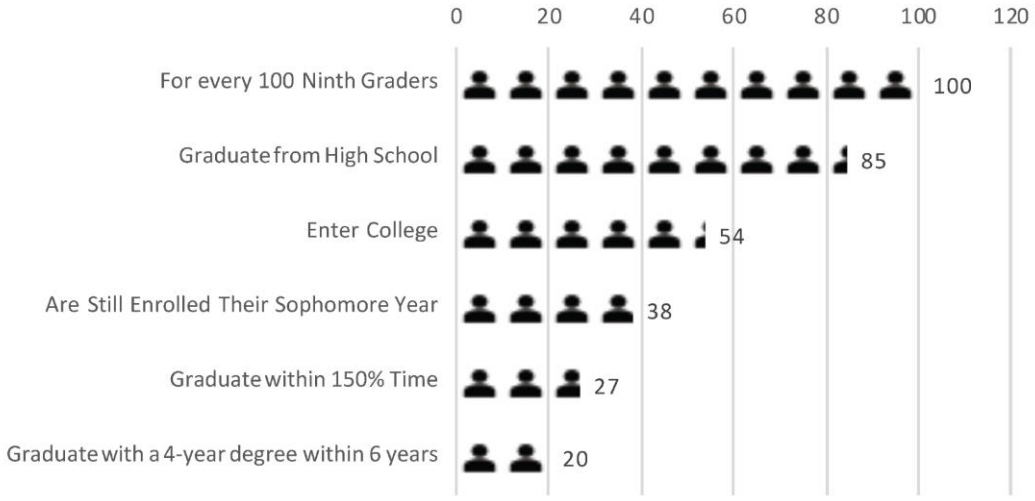
Brookings Metro

Although going to college after high school has become a cultural norm in the U.S., two-thirds of Americans still do not have a college degree.[xviii] Some of the most common barriers to degree completion are:

- *Cost*. College costs are increasing faster than family incomes, making it harder for low-income students to afford it.[xix]
- *Duration*. Only about 35% of first-time, full-time college students who intend to obtain a bachelor's degree reach their goal within four years; 56% get it within six years.[xx]
- *Academic preparedness*. Many students from low-income communities attend schools that do not have the resources to prepare their students for college.[xxi]
- *Other obligations*. Barriers such as bills, child care, and transportation make degree completion hard for many college students, especially nontraditional students at community colleges.[xxii]
- *Transferring credits*. On average, transfer students lose over 40% of their credits when switching schools.[xxiii] The more credits a student loses, the less likely they are to be able to finish their degree.[xxiv]
- *Lack of credit for prior learning*. A 72-institution study found that the seven-year completion rate for adult students without credit for prior learning was 27%, while the completion rate for those with credit for prior learning ranged from 49% to 73%.[xxv]

FIGURE 2

Student persistence in the U.S.: 9th grade to a college degree, 2018



Source: NCHEMS Information Center, higheredinfo.org, 2021

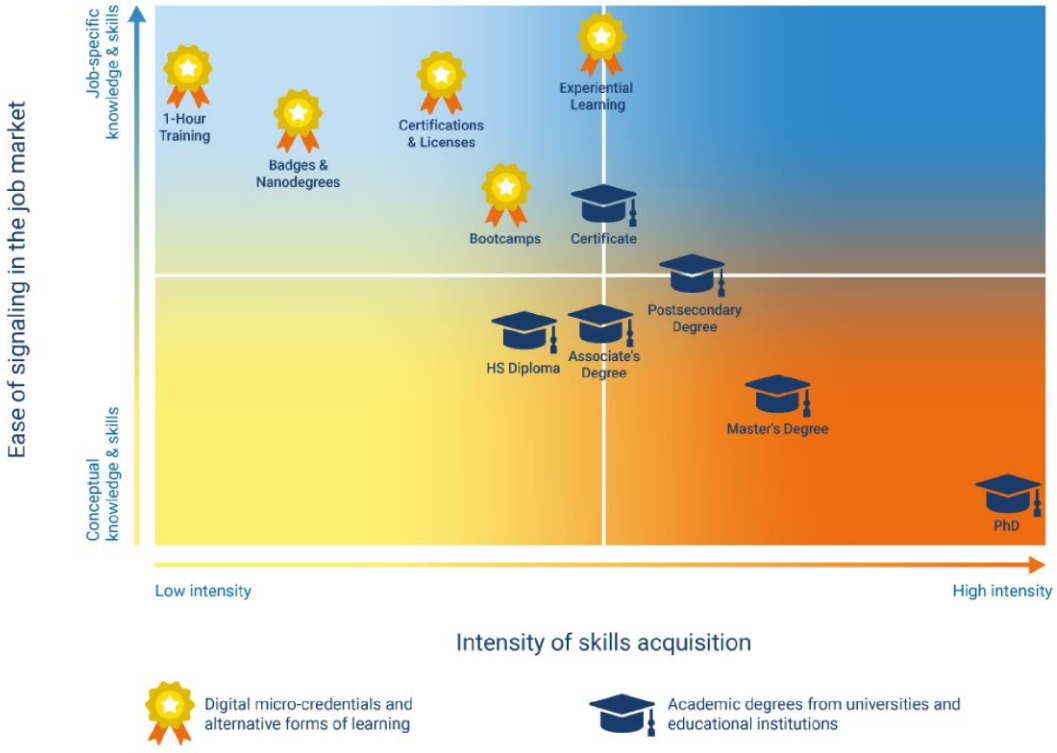
Brookings Metro

Despite these challenges, demand for learning options remains high. This has generated the proliferation of "non-credit" training options, which typically do not give the learner academic credit toward a degree or certificate. As we noted in a previous report about learning and working in the digital age, these innovations are expanding along two key dimensions: learning that is applied (or career-specific), and shorter-term programs such as digital badges, certificates, or micro-credentials.[xxvi]

The wide range and rapid expansion of shorter-term, non-credit options is confusing for both learners and employers because it can be hard for them to distinguish quality and learning level (i.e., how advanced someone's learning is). Moreover, the lack of recognition for quality learning and skill development that takes place outside an accredited academic program contributes to the undervaluation of talent in the labor market and unequal access to opportunity.

FIGURE 3

Demand is expanding for low-intensity, job-specific credentials



Note: This represents a quadrant chart of skills acquisition and ease of signaling in the labor market for the end user: The x-axis measures intensity of the acquisition from low to high, with low intensity being a one-hour training, and high intensity being a PhD. The y-axis measures ease of signaling in the labor market via skills earned with conceptual knowledge (a postsecondary degree) and job-specific skills (i.e., credentials, badges, and bootcamps).

Source: Goger, A., A. Parco, and E. Vegas, 2022. "Learning and working in the digital age: Advancing opportunities and identifying the risks." Washington, DC: The Brookings Institution. Available from: https://www.brookings.edu/research/learning-and-working-in-the-digital-age-advancing-opportunities-and-identifying-the-risks/.

B | Brookings Metro

These problems with information asymmetries, lack of transparency, and unrecognized qualifications leave degrees as the default proxy for demonstrating merit, pedigree, and capability in the hiring process.[xxvii] For their part, many within higher education institutions accept that equity and quality are both within a university's mission, but there is a prevalent belief that opening up access to learning to achieve equity goals will come at the expense of quality.[xxviii]

The lack of a coherent system for assuring quality outside of traditional higher education accreditation processes reinforces pervasive stigmas of non-credit learning and other forms of informal and nonformal learning, and privileges formal academic degrees in hiring processes. In addition, while there is high demand for more flexible learning options, the lack of a quality assurance system leaves many learners vulnerable to exploitation by unscrupulous training providers—especially the learners who have the lowest access to information and career guidance. Developing mechanisms to recognize and value informal and non-credit learning at different levels is a critical step toward addressing the devaluation of knowledge and skills that can hold people back from accessing further education and quality jobs.[xxix]

The decentralized and fragmented structure of higher education in the U.S. also makes education reform challenging. There is wide variation across states in how education and training systems are designed, set up, and operated. In addition, the U.S. has 43 separate funding streams for education and training across nine federal agencies, which lack a coherent, systems-level framework for clarifying roles, qualifications, and authority structures.[xxx] Because of this fragmented landscape, state-level reform is a logical place to first focus reform efforts.

This brief will review three common approaches to learning recognition: qualifications frameworks, competency-based education, and prior learning assessment. In addition, the brief will explore the potential of new technologies such as digital wallets and learning and employment records (LERs) to support the goals of recognizing, credentialing, and signaling learning.

Qualifications frameworks

A qualifications framework is a policy tool used in at least 150 countries (though not in the U.S.) to recognize and classify a range of skills, knowledge, and competencies (i.e., "qualifications") at each level of learning, from basic to advanced.[xxxi] [xxxii] Qualifications frameworks can be thought of as the basic scaffolding of an education and training system—establishing what the learning levels are and what types of qualifications fit within each level.

The goals of qualifications frameworks vary. Some countries use them to define the learning levels and descriptions of formal qualifications to improve transparency and navigability, whereas others use them to advance specific policy goals, such as improving one or more of the following:

- The ease of progressing to a more advanced learning level
- The ease of switching between education and vocational training pathways or from unaccredited (informal) to accredited learning without having to start from scratch

- The alignment between formal education or training qualifications and labor market demand
- International or interstate transparency, credit transfer, and labor market mobility (e.g., recognizing foreign-earned degrees for immigrants and refugees).
- The recognition of informal or nonformal qualifications in the labor market
- The rigor of quality standards for qualifications

Qualifications frameworks also vary with regard to what types of qualifications are included; most have a pathway for formal general and higher education (academic programs) and/or formal vocational education and training (VET) programs.[xxxiii] Some also include informal qualifications, professional education and training (e.g., professional licenses), equivalency information or recognition procedures for continuing and nonformal education (e.g., the Danish Qualification Framework for Higher Education), and micro-credentials.

Qualifications frameworks can be used to bring previously separate education and training systems into a single, unified system and clarify equivalencies across different forms of learning.[xxxiv] In turn, the establishment of equivalencies and a quality assurance process can potentially help overcome the stigmatization or devaluation of certain forms of knowledge, such as unaccredited coursework or vocational education. In essence, it helps transform a dead end into a career on-ramp, which over time can improve the social status and perceptions of the quality of those learning options.

Measuring the success of qualifications frameworks across countries is difficult because there is so much variation in how they are implemented, countries often have shifting priorities over time, and many countries are still in the early stages of implementing them.[xxxv] Among the more successful implementations of qualifications frameworks are the Scottish Credit and Qualifications Framework (SCQF), which was associated with positive developments in access, progression, and transfer, and the French National Register for Professional Certificates, for its alignment with the labor market.[xxxvi] In countries with longer experience in national qualifications frameworks, a common challenge is the lack of adoption and awareness by learners and employers, which suggests a need to prioritize outreach and communication.[xxxvii]

Implementing a qualifications framework is a long-term effort, and there is still limited research that qualifications frameworks on their own have a clear and direct impact on education reform goals.[xxxviii] Although it can be hard to demonstrate a straightforward impact in isolation, policymakers still widely consider qualifications frameworks to be valuable in supporting a broader set of education system reforms, increasing the transparency of information about career paths, and helping employers recognize the level of rigor of someone's applied and practical skills. Currently, employers struggle to differentiate between the applied programs that provide deep, high-quality training and those that are merely surface level. More research into the problems that countries tend to encounter during implementation might ensure that qualifications frameworks meet or exceed expectations for advancing education reforms.[xxxix]

The U.S. does not have a qualification framework, and compared to other countries, relies more exclusively on academic pathways with very few resources and students entering vocational education and training pathways such as apprenticeships, despite comparatively higher starting pay and high employer demand for those who complete apprenticeships.[xl]

Alabama's credentialing framework

In 2019, Alabama started building a skills-based, demand-driven qualifications framework for two key reasons:

1) To give learners credit for short-term "non-credit" training programs, allowing them to be more stackable into degree programs; and
2) To improve alignment across the credit and non-credit postsecondary education system, the military, and public workforce programs.

State leaders felt that recognizing the value of learning in short-term programs could advance students in their postsecondary education faster without having to retake classes. They also observed that the lack of coordination across learning pathways was making career switching unnecessarily difficult and time-consuming.

The Alabama Committee on Credentialing and Career Pathways (ACCCP) was created during the 2019 legislative session as a public-private entity composed of employers in 16 industry sectors and subject-matter experts from education and workforce agencies. The ACCCP's mission was to determine Alabama's regional and statewide in-demand occupations and identify competency models, career pathways, and credentials of value linked to those occupations using labor market information. The ACCCP developed a taxonomy for classifying competencies and another for classifying credentials. Taken together, the Alabama credential and competency taxonomies form the Alabama Occupational Ontology.

The Governor's Office of Education and Workforce Transformation partnered with the Corporation for a Skilled Workforce to calibrate Alabama's occupational qualifications frameworks for each of the occupations on the ACCCP's list of regional and statewide occupations using the Occupational Ontology. This work will conclude in September 2022 and will provide the common language to connect the Alabama Credential Registry, the Skills-Based Job Description Generator, and the Alabama College and Career Exploration Tool to form the Alabama Talent Triad, a full-scale talent marketplace.

If implemented to do so, qualifications frameworks could clarify how short-term trainings and micro-credentials can be combined to signal a person's level of qualification for a job or learning level for further education. States could also set them up to make the process of transferring credits more systematic or even automatic, so they would be less reliant on the idiosyncratic policies of programs and institutions and less burdensome on the learner when

navigating a cumbersome administrative process. In addition, a learner could use the framework to guide their choices to pursue additional micro-credentials or courses they might need to eventually obtain a credential or degree.[xli] On the other hand, attempting to catalog, organize, and make transparent the credentials, competencies, and frameworks that populate the American postsecondary education and training ecosystem is a gargantuan task and would take many years to implement.[xlii]

U.S. states may want to consider qualifications frameworks. They have many potential uses, but their most valuable role in the U.S. context is likely in situating different types of learning within a broader system to address the extreme fragmentation across education and training funding streams and the lack of effective quality assurance processes for unaccredited learning and short-term trainings. For example, a state could use a qualifications framework to redesign and improve quality assurance and transparency in their Eligible Training Provider List, which is a list of training programs that qualify for Workforce Innovation and Opportunity Act funds. Situating these shorter trainings in a larger framework could help learners and employers make better sense of the value of short-term trainings or certificates. States may also use qualifications frameworks to facilitate easier transitions for students in non-credit programs into credit-bearing programs, using the framework to streamline articulation and credit transfer processes.

However, in considering qualifications frameworks, evidence from other countries suggests that states should be realistic about the time to implementation; take steps to articulate clear goals, a strong legal basis, and a feasible scope for the effort; and prioritize outreach and awareness among learners and employers throughout implementation.[xliii] Using a qualifications framework in isolation to reform an education and training system is unlikely to have a clear impact, so it is important to connect it with broader efforts and use it to identify programmatic gaps in learning progression.

Competency-based education

Within an overarching qualifications framework, states can use another method to recognize learning in multiple forms: competency-based education. Competency-based education differs from hours-based education (the dominant method of awarding credit for learning in the U.S.) because it evaluates a student's progress based on outcomes (the mastery of a skill or competency) rather than a set amount of instruction time and standardized assessments.[xliv]

Competency-based education uses modularized and personalized instruction with ongoing evaluation and feedback, so it can vary in duration.[xlv] This flexibility allows the learner to work on advancing at their own pace, even if it takes longer, which makes ongoing learning more accessible for learners who struggle to succeed in a standardized, hours-based program because they are juggling multiple jobs, family care responsibilities, or other barriers to completion. Competency-based education is structured similarly to how most employers assess performance of their employees as well, so it can be easier to align with work-based learning activities such as apprenticeships or on-the-job training.

There have been several waves of interest in competency-based instruction, starting in the 1960s and 1970s.[xlvi] Some of the earliest institutions to use federal funding to develop competency-based programs focused on adult learners included Empire State College, Regents College (now Excelsior University), Thomas Edison State University, Alverno College, and DePaul University's School for New Learning (now the School for Continuing and Professional Studies), among others.[xlvii]

Recently, interest has surged again due to supply-side and demand-side factors. Most notably, the rise of online learning platforms that allow for asynchronous learning has made easier for education and training providers to offer a more diverse array of instructional delivery in a cost-effective manner at scale through hybrid (in person and online) and fully online learning. Many higher education leaders are expanding these options to reach a wider pool of learners as they struggle with low enrollment among traditional students.[xlviii] For example, the State University of New York system has adopted a systemwide focus on micro-credentials to provide ways for students to keep their skills fresh, align with demand, and articulate what was "non-credit," skills-focused learning into a degree and stackable career pathway.

A systematic review completed by Henri, Johnson, and Nepal analyzed the strengths and weaknesses of competency-based learning.[xlix] They found that competency-based learning is effective due to its student-centered approach, which allows students to be more autonomous, perform better, and be more motivated due to a stronger sense of perceived control over their own education. Competency-based learning also ensures that students master prerequisite materials before advancing to more complex content, which improves learning outcomes and experiences. In addition, competency-based learning is easy to adapt to remote, mobile, and online learning platforms, which offers more flexibility for students who work, lack transportation, or manage other responsibilities. They also found that competency-based learning is effective for students who have low performance in traditional instruction and can make students more enthusiastic about learning than their counterparts in traditional courses.

If increasing degree completion and better serving adult learners are a state's goals, then another major advantage of competency-based instruction is that it is easy to assess students' prior learning in each subject area.[l] That allows students who already have proficiency in some of the required competencies to progress faster and avoid repeating material. This reduces the cost and time to degree completion and can motivate students to finish their degree.

Colorado's competency-based approach to career alignment in K-12 education

In 2007, the Colorado legislature passed House Bill 07-1118 to align education outcomes with evolving changes in the skills needed in the workplace. The bill states, "Dramatic changes have occurred in our national, state, and local economies that were unforeseeable in the mid-1990s when the academic content standards were developed. As a result, students need to be prepared for a variety of possible futures as businesses adjust to competitive national and international pressures. Simultaneously, technology and innovation have changed expectations in the workplace and introduced a level of sophistication that was not present even ten years ago in traditional office jobs, jobs in technical fields, such as manufacturing, construction, and auto mechanics, and jobs in agriculture and health care."

The bill resulted in the creation of Colorado's Graduation Guidelines, a menu of options for school districts to use in determining a student's postsecondary and workforce readiness, including competency-based options such as "district capstones" or "collaboratively developed, standards-based performance assessments" rather than seat-time measures.

School districts have the opportunity to meet or beat the Colorado Academic Standards starting with the graduating class of 2021 using collaboratively developed standards by grade and subject. Guides are available to help students, families, and educators understand what competencies are expected and ways in which those competencies can be displayed.

There are also some disadvantages and trade-offs to competency-based education. The Henri, et al. study found mixed evidence of effectiveness for teaching students professional skills such as communication, prioritization, working under pressure, and teamwork.[li] Also, due to its more applied nature, competency-based education tends to provide a limited conceptual foundation to learners and can make it harder for students to see the "big picture." Transitioning from hours-based to competency-based instruction can be difficult for instructors and students to adjust to, and in the 1960s and 1970s, there was resistance to implementing it from higher education institutions.[lii] Higher education institutions in most states also have financial disincentives to invest in competency-based education, because it is often not easy for students (especially part-time students) to receive Title IV financial aid. The state of Indiana has a state financial aid program that allows students to use award dollars at WGU Indiana, an online university that offers competency-based education pathways.

Another study by the Aurora Institute found that the shift to delivering instruction through personalized learning pathways (as opposed to age-based cohorts) has been a challenge in many countries that are trying to implement competency-based learning.[liii] Another common challenge is the need to keep competencies up to date with the world's changing demands.[liv]

Credit for prior learning

While competency-based education delivers and documents learning outcomes across a lifetime and qualifications frameworks assign learning levels and quality standards to different forms of learning, the recognition of learning beyond formal academic pathways also requires the "how"—a process that allows the learner to receive credits or transfer credits from one domain of learning to another. Although this process has different terms globally, in the U.S. it is typically called Prior Learning Assessment (PLA).

PLA is a catchall term for several methods that colleges, universities, and other education/training providers use to assess and formally recognize learning that has taken place outside of the traditional academic environment. It is used to award college credit, certification, or advanced standing toward further education or training, with the recognition that many adult learners have accrued substantial learning through military experience, work experience, self-study, volunteering, unaccredited coursework, or elsewhere.[lv] PLA has been available since the 1970s, but it has not been widely adopted, despite the fact that most students switch institutions at least once before completion.[lvi] When it is used, PLA is associated with better student outcomes, including higher credential completion, cost savings, and time savings. [lvii]

Not many students apply for and receive credit through PLA processes. In a study of 69 colleges and universities conducted by the Western Interstate Commission for Higher Education and the Council for Adult and Experiential Learning, only 11% of adult students across all institutions earned PLA credit.[lviii] One reason for this is students' unfamiliarity with PLA, even in colleges with well-developed PLA policies.[lix] In addition, applying for PLA can be time-consuming, costly, and confusing, and some faculty are hesitant to grant credits for out-of-classroom learning. Many colleges also charge a fee for PLA that can be as high as the tuition required to retake the course, presenting a financial barrier to utilization.[lx] PLA has the potential to close equity gaps in postsecondary achievement, but to do this, it has to be easier to navigate and more accessible to students who could benefit most from it.

The reasons behind the resistance toward PLA from higher education institutions and faculty are challenging to disentangle. Although there may be legitimate concerns about a lack of quality or watered-down learning standards, the way that accreditation processes in higher education assess quality often ignores or undervalues forms of knowledge that are based on different ontological systems, such as Indigenous knowledge and values.[lxi] Likewise, as higher education institutions have solidified their role as gatekeepers in awarding credit for learning, many higher education leaders may be concerned that granting credit for learning outside a formal classroom could empower other institutions to compete for slots, threatening a decline in revenue, especially as enrollment slows. However, this argument assumes that those same students would have otherwise enrolled in a traditional program, which may not be the case.

Ohio's statewide credit for prior learning

The state of Ohio has become a national leader in establishing consistent, statewide credit for prior learning processes. The Ohio Revised Code Chapter 3333 includes rules for universal course equivalencies and a shared course classification system, as well as standardized and required processes for transferring credit. For example, students can rely on guarantees that learning from the military, apprenticeships, work, volunteering, or career and technical education experience will transfer to out-of-college learning credits.

Even transferring credits from one accredited program to another is quite difficult for learners in many states. In states that lack statewide transfer and articulation agreements, it is common to have one-by-one arrangements between programs to articulate credit. Moreover, few states actually track what number of credits do transfer, whether they apply to core courses or just electives, and whether or not they improve student outcomes.

Florida's framework recognizing diverse learning experiences

The state of Florida has taken several steps to streamline how credits are transferred and articulated within a statewide framework. In 2013, the state legislature amended the Career and Professional Education (CAPE) Act to create an incentive that awards funding to schools that enroll students in career and technical education programs that lead to an industry-recognized credential, and the State Board of Education provided guidance for how schools should award credit for industry-recognized credentials statewide.

Additionally, in 2021, the state legislature passed the Reimagining Education and Career Help (REACH) Act—a multipronged bill establishing a more coherent statewide system for recognizing learning across formal education, career and technical education, workforce pathways, and funding streams. This included the creation of a Credential Review Committee responsible for creating and maintaining a list of Credentials of Value—a way to identify quality, in-demand credential programs that are stackable and lead to positive employment outcomes.

States that are considering ways to implement or improve their PLA processes may want to focus their efforts on: messaging and outreach; reducing administrative burdens and costs for learners by establishing statewide articulation and automated credit transfer processes (e.g., through a qualification framework and supporting policies); and setting up competency-based data infrastructure such as learning and employment records, which make it easier to assess learning outcomes, digital credentials, and micro-credentials for prior learning credit.

Colorado's academic credit for work experience

In 20020, Colorado's state legislature passed House Bill 20-1002, which requires the creation and implementation of a plan for awarding academic credit based on work-related experience. Beginning in the 2022-23 academic year, higher education institutions will accept and transfer academic credit awarded for work-related experience as courses with guaranteed-transfer designation or part of a statewide degree transfer agreement. Currently, the state is giving credit for approved industry certifications rather than work experience itself. Even though very few high school students currently are engaged in work-related experiences, the bill incentivizes students to do so as a strategy for reducing time to degree completion.

Rethinking the underlying data infrastructure

As states and postsecondary institutions continue to grapple with the proliferation of credentials and labor market information challenges, new technologies have expanded the realm of possibilities for accessing, verifying, and credentialing learning. For example, the information that used to be communicated in a resume and transcript may, in the near future, be stored in a learning and employment record and shared through a digital wallet.

Similarly, technology platforms allow states, educational institutions, and employers to store more detailed information on the level of someone's qualifications and competencies and the skills sought in a job description. Making this fine-grained, competency-based information available can improve the precision of the matching process between candidates and jobs. Whereas previously, search technologies tended to rely on higher-level information such as a job title, degrees, key terms, or discipline of study, competency-based learning and employment records (LERs) and job descriptions enable searches based on skills and other qualifications. (Additionally, they make the data machine readable for artificial intelligence.) This type of search is likely to reveal a lot more candidates who do not have a college degree, but who may be a good fit for the job.

There is a wide range of use cases that states may want to consider when thinking about the data infrastructure that can recognize learning and make transitions from learning to work more transparent and easy. For example, many states or countries are already focusing on:

- Improving the frequency, quality, process, and standardization of employment data collected from employers through wage record enhancement.[lxii]
- Offering a digital wallet or set of wallets that adhere to interoperability and portability standards.[lxiii]
- Redesigning the Eligible Training Provider List process to situate it within a qualifications framework, integrate it with employment records to track student outcomes, and streamline federal reporting requirements.[lxiv]

- Redesigning labor exchange platforms to match candidates and positions based on skills and credentials rather than less detailed search criteria.[lxv]
- Developing a statewide learning portal to make courses, pathways, and credentials more transparent and accessible to a wider population of learners rather than just one institution.[lxvi]

Although new technologies may expand opportunities for learning recognition and signaling in the labor market, they can also bring new risks and be challenging for states to implement. As we examined in a 2021 report, state education and labor data systems are under-resourced and commonly 30 or 40 years old, while data governance is fragmented.[lxvii] Staff capacity is also a major challenge, as expertise in areas such as cloud services, data science, and artificial intelligence is scarce. In addition, a larger federal blueprint for data infrastructure across agencies and programs—including standard data definitions and clarification about data privacy rules in different domains—has yet to be developed. State procurement processes are also challenging, especially for developing technology in a more iterative fashion with continuous user input.

The growing use of new education technologies and platforms also presents new risks such as exacerbating the digital divide, the lack of data ownership and privacy rights for end users, and missing governance frameworks for monitoring and addressing bias in artificial intelligence.[lxviii] This context can make it quite challenging for states to deploy new educational technologies, digital credentials, and learning and employment records in a way that aligns with existing systems, meets reporting requirements, and ultimately enhances equity and well-being.

Conclusion

The literature on qualifications frameworks, competency-based education, and credit for prior learning has established one certain fact about transforming education systems: It is a long-term effort. That being said, the ability for the U.S. to invest more equally in its talent, generate inclusive economic growth, and overcome persistent shortages in qualified labor will determine the country's future success. Recognizing learning for all and supporting more degree completion for those who learn in the military, on the job, in an apprenticeship, or elsewhere is a critical step toward closing the opportunity gap. As Americans live and work in an increasingly digital age, addressing rising inequality in access to quality education and jobs is critical for ensuring that we do not leave marginalized communities even more excluded.

There are several things that the federal government could do to make it easier for states to build more holistic education and training systems in which different forms of learning can be documented, verified, and valued. These include:

- Create an incentive structure for postsecondary education providers to put adult learners (e.g., working learners, learners who have care responsibilities) at the center of the funding model for higher education, give free credit for prior learning, and allow students easy access to PLA and credit transfer.

- Create an incentive program or competitive grant program for states to develop interoperable learning and employment records and for employers to adopt skills-based hiring practices.
- Pass data governance legislation, with a cross-agency data governance structure to implement it using policies that establish data standards, require interoperability and portability of learning and employment records, protect data privacy and ownership rights, and minimize bias in artificial intelligence.
- Develop a national qualifications framework and quality assurance process that states can build on in a harmonized manner to improve cross-state learning recognition and labor mobility, similar to regional qualifications frameworks in other parts of the world that help to harmonize learning levels and competency-based definitions across countries.
- Allow learners to access financial aid for short-term trainings as long as they are approved under a state or federal quality assurance framework, and establish a process for recognizing this short-term training for academic credit.
- Transform the workforce development system to align learning options and employer engagement activities with sector-based career pathways, so that funding streams are no longer operated in a standalone fashion but rather each program fits into a learner-centered pathway into a quality job—some of which are more hands-on and others more academic.
- Reimagine the accountability framework and supporting data infrastructure for the public workforce system to focus fewer resources on eligibility determination and more on universal access to one-on-one career services, including prior learning assessment, credit transfer, and supportive services.
- Expand Title IV financial aid eligibility for students who are less than half-time students and those enrolled in competency-based education, publicly funded incumbent worker training programs, or registered apprenticeships.

This report has reviewed a host of tools that states and higher education institutions can use to improve learning recognition and an ongoing interaction between work and learning throughout someone's lifetime. Although none of the tools in isolation will solve the challenges discussed, building up capacity with qualifications frameworks, competency-based education, prior learning assessment, and data infrastructure is important for staying relevant and accessible in the digital era. In getting started with education reform efforts, we recommend the following based on the existing evidence:

- Create a vision that incorporates different aspects of a holistic education and training system, such as enhancing PLA and competency-based education in combination, rather than focusing only on one.
- Within each area of work, develop a clear scope of work, establish metrics or outcomes to track progress, and clarify roles for implementation.
- Build on existing assets and institutions, and identify ways to track progress, reduce duplication of effort, and scale what is working well.
- Establish a statewide qualifications framework and statewide transfer and articulation processes to create equivalencies between academic and non-academic/non-university

programs, ideally using technology to automate or semi-automate the transfer, verification, and documentation of credit.
- Establish statewide common course numbering and aligned learning outcomes.
- Create financial incentives to reward institutions for giving credit for prior learning and competency-based education.
- Create legislation and policies to standardize the process of awarding prior learning credits for work-based learning, non-credit credentials, apprenticeships, career and technical education, the military, self-study, and other forms of informal and non-formal learning.
- Provide training, guidance, and technical assistance support to postsecondary institutions in their capacity to award credit for prior learning, transfer and articulate credit, and conduct outreach about these options.

Ultimately, being able to better signal qualifications, competencies, and experience between workers, learners, and employers will not only create new opportunities for talent, but also help the economy function better overall and ensure we are engaging the talent we already have in the future we are trying to build.

This report was prepared with input from state delegations in Colorado, Indiana, and Alabama as part of the Scaling Earn-and-Learn Opportunities project at the Brookings Institution. The authors are also grateful for feedback and suggestions from Dr. Katherine Caves, Wilson Finch, Jeannine LaPrad, and Amanda Bergson-Shilcock.

List of resources and toolkits for further information

Competency-Based Education Network Resource Library

Council for Adult and Experiential Learning Resource Archive

Competency-Based Education Network, 2017. Quality Principles and Standards for Competency-Based Education Programs.

Hunter, Virginia, et al., 2021. All Learning Counts Policy Toolkit. Philadelphia, PA: RFA.

Scottish Credit and Qualifications Framework. (n.d.). About the framework.

Werquin, Patrick, 2010. Recognition of Non-Formal and Informal Learning: Country Practices. Organization of Economic Co-operation and Development.

[i] Perry, Andre, August 25, 2022, "Biden's student debt cancellation doesn't solve the root problems facing borrowers—but it's a start." The Brookings Institution. Accessed September 8, 2022 from: https://www.brookings.edu/blog/the-avenue/2022/08/25/bidens-student-debt-cancellation-doesnt-solve-the-root-problems-facing-borrowers-but-its-a-start/.
[ii] Rampell, Catherine, August 25, 2022, "Opinion| Biden's student debt plan is a Democratic version of 'trickle-down' economics." The Washington Post. Accessed September 8, 2022 from: https://www.washingtonpost.com/opinions/2022/08/25/biden-student-debt-forgiveness-trickle-down-economics/.
[iii] Bryan, Michael, Cooney, Darryl, and Barbara Elliot, November 8, 2019, "Beginning Postsecondary Students Study 12/17 (BPS:12/17)." National Center for Education Statistics. Accessed September 8, 2022 from: https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020522.
[iv] Perry, Andre, Steinbaum, Marshall, and Carl Romer, June 23, 2021, "Student loans, the racial wealth divide, and why we need full student debt cancellation." The Brookings Institution. Accessed September 8, 2022 from: https://www.brookings.edu/research/student-loans-the-racial-wealth-divide-and-why-we-need-full-student-debt-cancellation/.
[v] Bryan, Michael, Cooney, Darryl, and Barbara Elliot, November 8, 2019, "Beginning Postsecondary Students Study 12/17 (BPS:12/17)." National Center for Education Statistics. Accessed September 8, 2022 from: https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020522.
[vi] The World Bank, December 3, 2021, "The State of the Global Education Crisis: A Path to Recovery." Accessed August 25, 2022 from: https://www.worldbank.org/en/topic/education/publication/the-state-of-the-global-education-crisis-a-path-to-recovery?cq_ck=1638565414093.
[vii] Hanson, Melanie, May 30, 2022, "Student Loan Debt Statistics." Education Data Initiative. Accessed July 20, 2022 from: https://educationdata.org/student-loan-debt-statistics#:~:text=The%20federal%20government%20loans%20an,%2413.3%20billion%20for%20FFEL%20loans.
[viii] U.S. Bureau of Labor Statistics, October 7, 2022. "Employment situation summary." Accessed October 7, 2022 from: https://www.bls.gov/news.release/empsit.nr0.htm.
[ix] Torpey-Saboe, Nichole and Dave Clayton, June 15, 2022, "Education Expectations: Views on the Value of College and Likelihood to Enroll." Strada Education Network, Public Viewpoint. Accessed July 20, 2022 from: https://stradaeducation.org/report/pv-release-june-15-2022/.
[x] Wiersch, Ann Marie and Lucas Misera, 2022, "2022 Report on Hiring and Worker Retention." Fed Small Business. Accessed July 20, 2022 from: https://www.fedsmallbusiness.org/medialibrary/FedSmallBusiness/files/2022/2022-sbcs-hiring-and-worker-retention-071222.
[xi] Fuller, Joseph B., and Manjari Raman. October 2017, "Dismissed by Degrees: How Degree Inflation Is Undermining U.S. Competitiveness and Hurting America's Middle Class." Accenture, Grads of Life, Harvard Business School.
[xii]January 2022, "Rise with the STARs: Building a Stronger Labor Market for STARs, Communities, and Employers." Opportunity@Work. Accessed September 30, 2022 from: https://opportunityatwork.org/our-solutions/stars-insights/rise-with-the-stars-report/.
[xiii] Zanville, Holly, and Nan Travers, August 25, 2022, "Transforming the Nation's Degree-Centric Postsecondary System to an Incremental Credential System." *Change: The Magazine of Higher Learning* 54, no. 5 (2022): 4-11.
[xiv] Kamenetz, Anya, "The transformation of higher education through prior learning assessment." *Change: The Magazine of Higher Learning* 43, no. 5 (2011): 7-13.
[xv] Mandell, A, 2000, "Prior learning assessment corner: Saving what is messy: PLA in a world of testing." Journal of Continuing Higher Education. 48(2), 48-50.
[xvi] Wong, A.T., 2014, "Recognition of prior learning and social justice in higher education." In J. Harris, C. Wihak, & J. Van Kleef. (Eds.). "Handbook of the recognition of prior learning: Research into practice." (pp. 178-205). Leicester, UK: National Institute of Adult Continuing Education (NIACE), p. 186.
[xvii] Rosenbaum, J.E., November, 2001, "Beyond college for all: Career paths for the forgotten half." Russell Sage Foundation.
[xviii] United States Census Bureau, February 24, 2022, "Census Bureau Releases New Educational Attainment Data." Accessed August 11, 2022 from: https://www.census.gov/newsroom/press-releases/2022/educational-attainment.html.
[xix] George D. Kuh et al., July 2006, "What Matters to Student Success: A Review of the Literature." National Postsecondary Education Cooperative. Accessed August 8, 2022 from: https://nces.ed.gov/npec/pdf/kuh_team_report.pdf.

[xx] George D. Kuh et al., July 2006, "What Matters to Student Success: A Review of the Literature." National Postsecondary Education Cooperative. Accessed August 8, 2022 from: https://nces.ed.gov/npec/pdf/kuh_team_report.pdf.
[xxi] Wimberly, George and Richard Noeth, 2015, "College Readiness Begins in Middle School." America College Testing ACT Inc. Accessed August 12, 2022 from: https://www.act.org/content/dam/act/unsecured/documents/CollegeReadiness.pdf.
[xxii] Geckler, Christian, May 2008, "Helping Community College Students Cope with Financial Emergencies: Lessons from the Dreamkeepers and Angel Fund Emergency Financial Aid Programs." MDRC. Accessed August 12, 2022 from: https://files.eric.ed.gov/fulltext/ED501648.pdf
[xxiii] Government Accountability Office, August 14, 2017, "Higher Education: Students Need More Information to Help Reduce Challenges in Transferring College Credits." Accessed August 12, 2022 from https://www.gao.gov/assets/gao-17-574.pdf.
[xxiv] Mullane, John, August 16, 2021, "How Students Can Maximize Their Transfer Credits." DegreeSight. Accessed August 12, 2022 from: https://www.degreesight.com/news/how-students-can-maximize-their-transfer-credits/.
[xxv] Rebecca Klein-Collins et al., November 1, 2020," Results from a 72-Institution Targeted Study of Prior Learning Assessment and Adult Student Outcomes." Council for Adult and Experiential Learning and The Western Interstate Commission for Higher Education. Accessed August 8, 2022 from: https://www.cael.org/hubfs/PLA%20Boost%20Report%20CAEL%20WICHE%20-%20October%202020.pdf.
[xxvi] Goger, Annelies, Parco, Allyson, and Emiliana Vegas, May 17, 2022, "Learning and working in the digital age: Advancing opportunities and identifying the risks." The Brookings Institution. Accessed August 11, 2022 from: https://www.brookings.edu/research/learning-and-working-in-the-digital-age-advancing-opportunities-and-identifying-the-risks/.
[xxvii] Rivera, Lauren A., "Pedigree: How Elite Students Get Elite Jobs." Princeton University Press, 2016.
[xxviii] Pitman, Tim & Lesley Vidovich, 2012, "Recognition of prior learning (RPL) policy in Australian higher education: The dynamics of position-taking." Journal of Education Policy. 27(6), 761-774.
[xxix] Kamenetz, Anya, "The transformation of higher education through prior learning assessment." *Change: The Magazine of Higher Learning* 43, no. 5 (2011): 7-13;
Zanville, Holly, and Nan Travers, August 25, 2022, "Transforming the Nation's Degree-Centric Postsecondary System to an Incremental Credential System." *Change: The Magazine of Higher Learning* 54, no. 5 (2022): 4-11.
[xxx] U.S. Government Accountability Office, March 28, 2019, "Employment and Training Programs: Department of Labor Should Assess Efforts to Coordinate Services Across Programs." Accessed September 8, 2022 from: https://www.gao.gov/products/gao-19-200.
[xxxi] Castel-Branco, Eduarda, July 29, 2021, "National and regional qualifications frameworks: Overview for CINTERFOR Training." European Training Foundation. Accessed August 23, 2022 from: https://www.oitcinterfor.org/sites/default/files/file_publicacion/NQF-RQF_Overview%20CINTERFORTraining_ETF.pdf.
[xxxii] Ron Tuck, "An Introductory Guide to National Qualifications Frameworks: Conceptual and Practical Issues for Policy Makers," International Labour Organization, 2007, 2, https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/instructionalmaterial/wcms_103623.pdf.
[xxxiii] European Center for the Development of Vocational Training, November 2017, "Do national qualifications frameworks make a difference? Measuring and evaluating NQF impact." Accessed August 23, 2022 from: https://www.cedefop.europa.eu/files/background_paper_pla_nqf_impact_cedefop_final_2.11.pdf.
[xxxiv] Tuck, Ron, 2007, "An Introductory Guide to National Qualifications Frameworks: Conceptual and Practical Issues for Policy Makers." International Labour Organization, 2007. Accessed August 12, 2022 from: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/instructionalmaterial/wcms_103623.pdf.
[xxxv] Pilcher, Nick, Scott Fernie, & Karen Smith, December 16 2015, "The impact of National Qualifications Frameworks: by which yardstick do we measure dreams?" Journal of Education and Work 30, no.1, accessed August 8, 2022 from: https://www.tandfonline.com/doi/abs/10.1080/13639080.2015.1122178?journalCode=cjew20; European Center for the Development of Vocational Training, November 2017, " Do national qualifications frameworks make a difference? Measuring and evaluating NQF impact." Accessed August 8, 2022 from: https://www.cedefop.europa.eu/files/background_paper_pla_nqf_impact_cedefop_final_2.11.pdf.

[xxxvi] Allais, Stephanie, 2017," Labour market impact of National Qualification Frameworks in six countries." International Labour Organization, Accessed August 25, 2022 from: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_585696.pdf.
[xxxvii] Allais, Stephanie, 2010, "The implementation and impact of National Qualifications Frameworks." International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_126589.pdf.
[xxxviii] Allais, Stephanie, 2017, "Labour market impact of National Qualification Frameworks in six countries." International Labour Organization. Accessed August 23, 2022 from: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_585696.pdf.
[xxxix] Allais, Stephanie, 2010, "The implementation and impact of National Qualifications Frameworks." International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_126589.pdf.
[xl] Shanahan, Maya, October 20, 2021," A Closer Look at the Rising Popularity of Apprenticeships and the Decrease in College Enrollment." Policy Interns. Accessed August 23, 2022 from: https://policyinterns.com/2021/10/20/a-closer-look-at-the-rising-popularity-of-apprenticeships-and-the-decrease-in-college-enrollment/.
[xli] February 1, 2022, "Building a Talent Ecosystem in Alabama Based on Quality Non-Degree Credentials Problems trying to be solved with qual frameworks," 7.
[xlii] Lorenzo, George, March 2021, "Revealing and Comparing Credential Quality So Learners & Employers Can Make Wise Choices," Workforce Monitor, https://wfmonitor.com/2021/02/06/revealing-and-comparing-credential-quality-so-learners-employers-can-make-wise-choices/
[xliii] European Center for the Development of Vocational Training, November 2017," Do national qualifications frameworks make a difference? Measuring and evaluating NQF impact." Accessed August 8, 2022 from: https://www.cedefop.europa.eu/files/background_paper_pla_nqf_impact_cedefop_final_2.11.pdf.
[xliv] Educause," Competency-based Education (CBE)," https://library.educause.edu/topics/teaching-and-learning/competency-based-education-cbe
[xlv] Nodine, T.R., April 27, 2016, "How did we get here? A brief history of competency-based higher education in the United States.", The Journal of Competency-Based Education. Accessed August 23, 2022 from: https://onlinelibrary.wiley.com/doi/full/10.1002/cbe2.1004.
[xlvi] Nodine, T.R., April 27, 2016," How did we get here? A brief history of competency-based higher education in the United States." The Journal of Competency-Based Education. Accessed August 25, 2022 from: https://onlinelibrary.wiley.com/doi/full/10.1002/cbe2.1004.
[xlvii] Klein-Collins, Rebecca, 2012," Competency-Based Degree Programs in the U.S.: Postsecondary Credentials for Measurable Student Learning and Performance." Council for Adult and Experiential Learning. Accessed October 2, 2022 from: https://files.eric.ed.gov/fulltext/ED547416.pdf.
[xlviii] Texas Tribune Events Staff, February 15, 2022, "Watch: Higher education leaders reflect on enrollment losses and the need for virtual learning even after the pandemic." The Texas Tribune, Accessed August 25, 2022 from: https://www.texastribune.org/2022/02/15/covid-higher-education-year-3/.
[xlix] Maria Henri, Michael D. Johnson, and Bimal Nepal," A Review of Competency-Based Learning: Tools, Assessments, and Recommendations," *Journal of Engineering Education* Vol. 106, no. 4 (2017): 612, https://par.nsf.gov/servlets/purl/10186242
[l] Nodine, T.R., April 27, 2016, "How did we get here? A brief history of competency-based higher education in the United States.", The Journal of Competency-Based Education. Accessed August 23, 2022 from: https://onlinelibrary.wiley.com/doi/full/10.1002/cbe2.1004.
[li] Maria Henri, Michael D. Johnson, and Bimal Nepal," A Review of Competency-Based Learning: Tools, Assessments, and Recommendations," *Journal of Engineering Education* Vol. 106, no. 4 (2017): 612, https://par.nsf.gov/servlets/purl/10186242.
[lii] Nodine, T.R., April 27, 2016," How did we get here? A brief history of competency-based higher education in the United States." The Journal of Competency-Based Education. Acessed August 25, 2022 from: https://onlinelibrary.wiley.com/doi/full/10.1002/cbe2.1004.

[liii] Bristow, Sara Frank and Susan Patrick, October, 2014," An International Study in Competency Education: Postcards from Abroad," Aurora Institute, https://aurora-institute.org/wp-content/uploads/CW-An-International-Study-in-Competency-Education-Postcards-from-Abroad-October-2014.pdf.
[liv] Online Learning and Distance Education Resources," The strengths and weaknesses of competency-based learning in a digital age," September 15, 2014, https://www.tonybates.ca/2014/09/15/the-strengths-and-weaknesses-of-competency-based-learning-in-a-digital-age/#:~:text=Weaknesses%20of%20a%20competency%2Dbased%20approach%20to%20design&text=it%20does%20not%20suit%20subject,the%20importance%20of%20social%20learning.
[lv] Khemani, Deanna, September 2017, "Helping Students Earn College Credit for Prior Learning: Michigan's M-CAM Experience." Social Policy Research Associates. Accessed August 25, 2022 from: http://www.spra.com/wordpress2/wp-content/uploads/2017/10/Helping-Students-Earn-College-Credit-for-Prior-Learning.pdf.
[lvi] Kamenetz, Anya, "The transformation of higher education through prior learning assessment." *Change: The Magazine of Higher Learning* 43, no. 5 (2011): 7-13.
[lvii] Rebecca Klein-Collins et al., December 2020, "The PLA Boost: Results from a 72-Institution Targeted Study of Prior Learning Assessment and Adult Student Outcomes." CAEL, Accessed August 19, 2022 from: https://www.cael.org/hubfs/PLA%20Boost%20Report%20CAEL%20WICHE%20-%20October%202020.pdf.
[lviii] Rebecca Klein-Collins et al., December 2020, "The PLA Boost: Results from a 72-Institution Targeted Study of Prior Learning Assessment and Adult Student Outcomes." CAEL, Accessed August 19, 2022 from: https://www.cael.org/hubfs/PLA%20Boost%20Report%20CAEL%20WICHE%20-%20October%202020.pdf.
[lix] Khemani, Deanna, September 2017, "Helping Students Earn College Credit for Prior Learning: Michigan's M-CAM Experience." Social Policy Research Associates. Accessed August 25, 2022 from: http://www.spra.com/wordpress2/wp-content/uploads/2017/10/Helping-Students-Earn-College-Credit-for-Prior-Learning.pdf.
[lx] Khemani, Deanna, September 2017, "Helping Students Earn College Credit for Prior Learning: Michigan's M-CAM Experience." Social Policy Research Associates. Accessed August 25, 2022 from: http://www.spra.com/wordpress2/wp-content/uploads/2017/10/Helping-Students-Earn-College-Credit-for-Prior-Learning.pdf.
[lxi] Wong, A.T., 2014, "Recognition of prior learning and social justice in higher education." In J. Harris, C. Wihak, & J. Van Kleef. (Eds.). "Handbook of the recognition of prior learning: Research into practice." (pp. 178-205). Leicester, UK: National Institute of Adult Continuing Education (NIACE).
[lxii] The U.S. Chamber of Commerce Foundation, "Jobs and Employment Data Exchange (JEDx)." Accessed August 26, 2022 from: https://www.uschamberfoundation.org/JEDx.
[lxiii] Leu, Sharon, April 2022, "Building a Skills-Based Talent Marketplace: Verifiable Credentials Wallets for Learning and Employment." Jobs for the Future. Accessed August 26, 2022 from: https://info.jff.org/hubfs/Digital%20Wallet%20Market%20Scan/Market-Scan-Digital-Wallet-040122-vF.pdf.
[lxiv] Downs, Lindsey, July 16, 2021, "Credential Transparency and Informed Decision-Making in Indiana." WCET. Accessed August 26, 2022 from: https://wcet.wiche.edu/frontiers/2021/07/16/credential-transparency-informed-decision-making-in-indiana/.
[lxv] Opportunity Works," Hire for the Skills It Takes to Do the Job." Accessed August 26, 2022 from: https://opportunityatwork.org/wp-content/uploads/2019/12/Skills-Based-Hiring.pdf.
[lxvi] Irish Universities Association," MicroCreds Project Overview." Accessed August 26, 2022 from: https://www.iua.ie/ourwork/learning-teaching/microcreds/microcreds-project-overview/.
[lxvii] Goger, Annelies & Janie McDermott, July 2021," Digital Transformation in Labor Education and Systems: Improving the government response to the next unemployment crisis." The Brookings Institution. Accessed August 26, 2022 from: https://www.brookings.edu/essay/digital-transformation-in-labor-and-education-systems/.
[lxviii] Goger, Annelies, Parco, Allyson, & Emiliana Vegas, May 17, 2022," Learning and working in the digital age: Advancing opportunities and identifying the risks." The Brookings Institution. Accessed August 26, 2022 from: https://www.brookings.edu/research/learning-and-working-in-the-digital-age-advancing-opportunities-and-identifying-the-risks/.