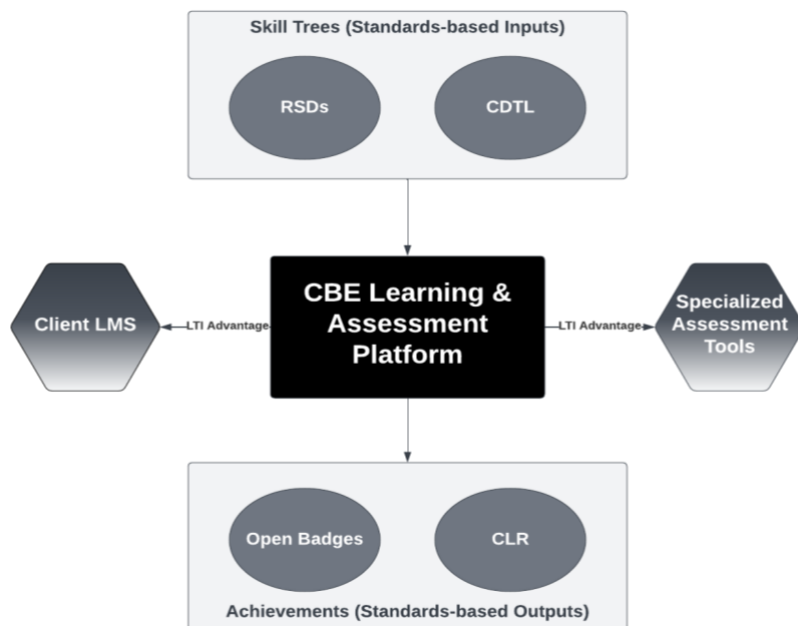


# COMPETENCY-BASED EDUCATION PLATFORMS



9/1/23

## Architecting Learning Platforms for the Future

**Education** Design Lab



This paper was created with support from the [Education Design Lab \(EDL\)](#). Their insights regarding the theory and practice Competency-Based Education (CBE) heavily influenced the thinking of this paper. Any errors in those area are solely those of the author.

This paper has been written by Michael Feldstein of *e-Literate's* Empirical Educator Project.

# Competency-Based Education Platforms

## ARCHITECTING LEARNING PLATFORMS FOR THE FUTURE

### EXECUTIVE SUMMARY

Competency-based education (CBE) and prior learning assessment (PLA) are gaining momentum across higher education institutions and employers. However, limitations of traditional learning platforms often inhibit effective implementation of CBE and PLA programs.

This white paper is intended for learning platform vendors and CBE implementers. It shares insights from an architectural analysis conducted for [Education Design Lab](#) (EDL) as they sought to evolve their CBE and PLA offerings. EDL encountered obstacles due to their legacy learning management system (LMS) lacking key capabilities needed for robust CBE support. They have graciously consented to share this version of the analysis Empirical Educator Project conducted on their behalf and with the benefit of their CBE expertise.

The core finding is that a fundamental architectural shift is required - competencies must become first-class citizens separate from course containers. Traditional LMSs silo competencies within courses, limiting features like cross-course competency dashboards, automatic credit transfer, and interoperability.

By extracting EDL's technical requirements and architectural principles from their project analysis, this white paper aims to:

- Illustrate critical CBE capabilities related to competency architectures, mastery learning, assessment, and integration
- Provide guidance to help vendors optimize their platforms for CBE suitability
- Assist other CBE programs in selecting and shaping the requirements for an optimal LMS partner

The goal is to advance understanding of the learning platform architecture changes needed to successfully scale competency-based models. With the right technical foundations, institutions can offer learners flexible and skills-focused learning pathways.

## INTRODUCTION

Competency-based education (CBE) and prior learning assessment (PLA) are becoming increasingly important in higher education and workforce training. These approaches prioritize teaching and measuring concrete skills and competencies rather than time spent in classes. However, effectively delivering CBE and PLA at scale requires learning platforms with different architectural assumptions than traditional learning management systems (LMS).

This white paper shares insights from an architectural analysis conducted with Education Design Lab (EDL) as they evolved their CBE and PLA offerings. By extracting EDL’s technical requirements and design principles, this paper aims to equip other institutions and vendors with an understanding of the learning platform capabilities needed to enable successful CBE implementation.

First, we will explore the philosophical underpinnings of CBE and PLA to provide context on how they differ from time-based credentials, with an eye toward the architectural implications for the software. Then we will highlight key technical requirements related to competency architectures, mastery learning, assessment, and integration. Our goal is to bridge theory and practice, clarifying why certain platform features are critical for competency-based models to fulfill their potential.

## The Shift to Competency

Historically, courses have been the atomic units of learning in higher education and training programs. Courses are developed as cohesive packages with defined learning objectives. Traditional learning management systems reflect this by siloing courses into isolated containers.

Competency-based education takes a more modular approach centered around concrete skills and abilities. Rather than monolithic courses, CBE breaks down learning into discrete competencies that empower personalized pathways. For example, EDL has a competency model for core skills that apply across a wide range of workplace needs:

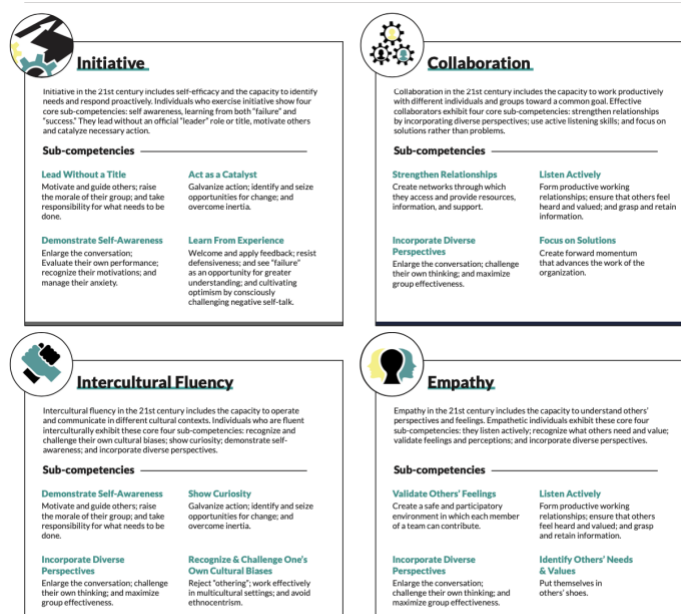
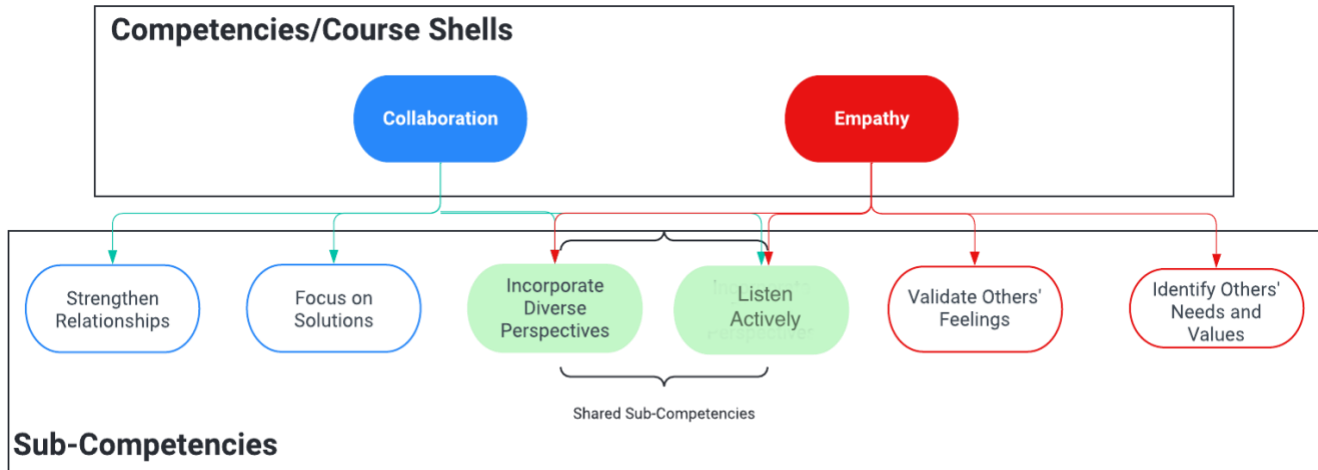


FIGURE 1: EDL'S COMPETENCIES

This transition in philosophy requires a change in how learning platforms are architected. Competencies must become first-class citizens, separate from course containers. Some examples of the increased flexibility this enables:

- Students can receive automatic credit for competencies mastered previously rather than retaking entire courses. For instance, an adult learner with years of marketing experience can test out of social media competencies required in a digital marketing certificate.
- Learners can mix-and-match competencies from diverse providers to build custom learning journeys aligned with their goals. A student could take online competency content from Education Design Lab(EDL) to supplement an in-person degree program at a local college.
- Learners have transparency into their specific skill gains. Detailed competency dashboards provide motivating visibility rather than just broad course grades in a course.

While courses still have value for providing structured learning, competencies allow for more modular, personalized, and efficient education. To support this competency-driven model, learning platforms require an underlying architecture that treats competencies as first-class citizens.



### Mastery Learning

In addition to shifting the focus to competencies, CBE utilizes mastery learning rather than traditional grading systems. Students must demonstrate mastery of all components of a competency in order to show achievement of that competency.

In a typical course, students may pass by averaging together scores across assignments, exams, projects, and other assessments. Some components may be failed while others compensate. In contrast, mastery learning requires students to meet a high bar for every competency. Mastery is binary - students have either achieved it or not.

For example, a Collaboration competency may contain sub-competencies like Active Listening, Incorporating Diverse Perspectives, Strengthening Relationships and Focusing on Solutions. To gain credit for Collaboration, a student must demonstrate mastery of all the interconnected sub-skills. A weak score on Active Listening cannot be offset by higher marks on the other components.

This mastery model has key implications for learning platforms:

- Assessments must be designed to evaluate discrete sub-competencies independently.
- Gradebooks need to track mastery status at granular levels rather than just calculating averages.
- Dashboards, which could be simpler and more useful substitutes for gradebooks, need to competency achievement across courses.
- Content unlocking rules can be based on mastery of prerequisites rather than simply completing activities. Students who have not demonstrated mastery may be prevented from advancing.
- Multiple attempts are often allowed for mastery demonstrations until the standard is met.

The technical architecture and user experiences must account for this fundamental change in what “successful learning” means in a CBE context. Mastery of each skill is required.<sup>1</sup>

### Authentic Assessments

Because competency-based education focuses on preparing learners for real-world skills application, assessment techniques emphasize authentic demonstrations of mastery. Traditional tests and assignments often fall short of evaluating true competency.

CBE programs like EDL leverage several key strategies to achieve authentic assessment:

- Performance-based challenges in simulated environments, enabled through immersive technologies like virtual reality. Learners confront realistic scenarios to problem-solve.
- Human evaluation of open-ended artifacts using structured rubrics. Work products judged by trained assessors provide personalized feedback.
- Recognition of credentials earned in professional settings through prior learning assessment. On-the-job achievements converted to academic credits.
- Incorporation of assessments from external partners who specialize in their competency domains. Network of credential providers.
- Ongoing demonstrations of competency over time, enabled by longitudinal tracking. Sustained mastery rather than one-off high-stakes testing.

These innovative assessment models require learning platforms with robust support for:

- Integration of specialized assessment tools through LTI Advantage and similar standards.
- Flexible gradebooks that link across course structures and flag mastery status.
- Interoperability to exchange credentialing data across systems.

By partnering with institutions like EDL, vendors can evolve their learning platforms to meet the needs of authentic competency evaluation

<sup>1</sup> While not all CBE utilizes a purely binary “competent/not yet” mastery learning approach, even the ones with more shares of gray focus on relatively simple gradations of mastery and act as triggers within learning platform.

## INTEGRATION

So far, we have led each requirements section with a discussion of the pedagogy and transitioned to the implications for software architecture. As competency-based models proliferate, the amount of integration required both within and between institutions will increase dramatically. Comprehensive integration is key to realizing the potential of CBE. In this section, we will sum up the technological integration needs in the context of the larger CBE credentials software ecology.

There are two main integration challenges:

1. Importing shareable competency frameworks from trusted sources.
2. Exporting detailed records of competency achievements.

Fortunately, technical standards have emerged to enable this integration:

### Importing Competencies

Platforms must support importing competencies defined in schema like:

- Competency and Skills System (CTDL)
- Achievement Standards Network (ASN)
- Rich Skill Descriptions (RSD)

These allow adoption of credentialing taxonomies from leading organizations.

### Exporting Credentials

Platforms must issue verifiable competency credentials using standards like:

- Open Badges (for granular micro-credentials)
- Comprehensive Learner Records (CLR)

These contain rich metadata and evidence for downstream consumers.

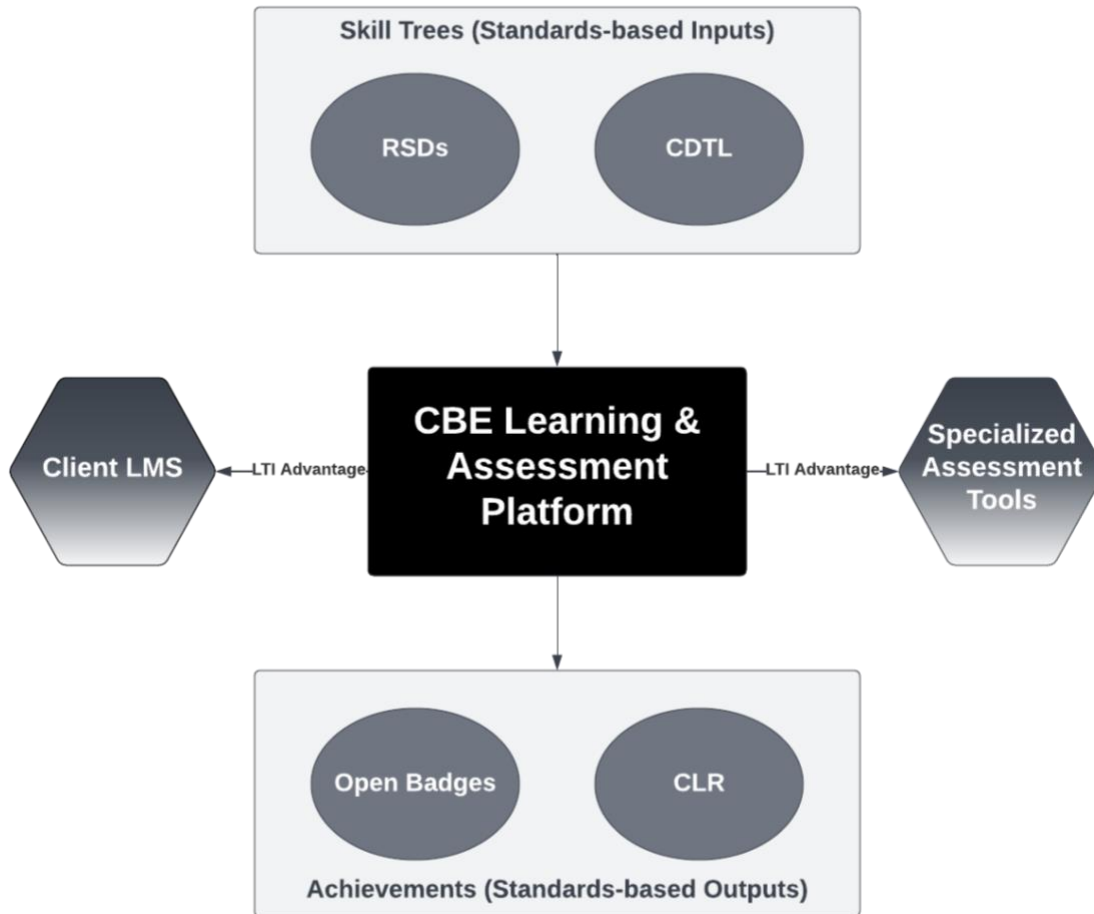
Bidirectional integration, both importing shared competency frameworks and exporting granular credential data, is a must-have capability for CBE learning platforms.

In addition, the learning experience itself will rely on integration:

- As an LTI Advantage tool consumer to incorporate specialized assessments from partners.
- As an LTI Advantage tool provider to supply competency content to other learning platforms.

Robust support for LTI Advantage and public competency schemas vastly increases ecosystem connectivity.

And finally, the 1EdTech standard Competencies for Academic Standards Exchange (CASE) provides an interoperability standard for representing that provides guidance for the representation of an interoperable skill tree in a learning platform. While it is still relatively new, it has some traction with major platform providers.



## RECOMMENDATIONS AND CONCLUSION

Realizing the full potential of competency-based education will require evolution by both programs and platforms. As institutions expand their expertise in next-generation CBE models, technology partners must adapt their tools to meet emerging needs.

We recommend CBE providers approach this evolution in the following ways:

- Audit existing platforms against the requirements outlined here. Identify gaps that may constrain program ambitions.
- Construct detailed requirements documents oriented around competency architectures, mastery learning, assessment, and integration.
- Ask pointed questions about competency support when evaluating new platforms. Don't settle for vague feature claims.
- Be willing to invest in customization or extensions if vendors cannot meet all needs out-of-the-box.
- Participate in communities like the Competency-Based Education Network to advocate for optimized platforms.

Meanwhile, learning platform vendors should deeply evaluate their products and roadmaps, including:

- Assessing their competency architecture. Can competencies be tracked and integrated outside of courses?
- Building mastery learning gradebooks, customizable achievement templates, and flexible content unlocking rules.
- Expanding support for LTI Advantage, Open Badges, and public competency schemas.
- Working with institutions like EDL to connect specialized assessments and create integrated learner experiences.
- Joining working groups focused on next-generation competency standards and models.

By working together, CBE programs and learning platforms can overcome today's constraints to realize tomorrow's potential. Competency-based models hold great promise to provide more personalized, efficient and effective learning pathways focused on real-world skills. We hope the insights shared in this white paper will help equip institutions and vendors to collaborate to fulfill that promise.