

DESIGNING FOR LEARNER VARIABILITY AT SCALE: A UDL-ALIGNED FRAMEWORK FOR ASYNCHRONOUS ONLINE TEACHING

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Abstract

Asynchronous online learning expands access to higher education, but it can also magnify barriers related to learner variability, accessibility, and sustained engagement. Universal Design for Learning (UDL) offers a proactive framework for addressing these challenges; however, faculty often lack practical, scalable structures that translate UDL principles into repeatable course design decisions. This paper presents a design-based, practice-informed framework for asynchronous online teaching developed at a public university through collaboration among a centralized online learning unit, the Center for Teaching and Learning, a faculty advisory board, and a pedagogy-focused community. Rather than introducing a standalone initiative, the framework enhances an institutionally adopted guided course design template by embedding explicit UDL expectations at the module level. Core design features include aligned outcomes, multiple means of representation, structured choice in engagement and assessment, and accessibility-by-design practices. The paper describes the framework's institutional context, collaborative development process, and integrated design logic, and discusses its implications for scalable, policy-aligned, and equitable asynchronous online learning.

Keywords: *Universal design for learning, asynchronous online learning, course design frameworks, inclusive pedagogy, faculty development.*

1. Introduction

Asynchronous online learning has become central to higher education, particularly for institutions serving adult learners, working professionals, and geographically distributed students. Its flexibility expands access, but it also increases the importance of course structure, transparency, and navigational clarity because students often work without immediate instructor support. When online courses rely on a single pathway for accessing content or demonstrating learning, barriers can intensify for students with disabilities, neurodivergent learners, multilingual students, and those balancing employment, caregiving, or other external responsibilities (Hodges et al., 2020; Martin et al., 2020).

Universal Design for Learning (UDL) offers a proactive response to learner variability by encouraging instructors to provide multiple means of engagement, representation, and action and expression (CAST, 2018). In higher education, UDL has increasingly been positioned not only as an accessibility framework, but also as an equity-oriented approach to inclusive pedagogy in digital learning environments (Chick et al., 2025; Moríña, 2025). Yet implementation in asynchronous online learning remains uneven. Faculty often value inclusive teaching, but report uncertainty about how to operationalize UDL in ways that are sustainable, aligned to outcomes, and realistic within existing workloads (Altowairiki, 2023; Wells, 2024).

This paper addresses that gap by presenting a design-based, practice-informed framework for asynchronous online teaching that embeds UDL directly into an existing guided course design template. The framework was developed collaboratively through a centralized online learning unit, the Center for Teaching and Learning (CTL), a faculty advisory board, and a pedagogy-focused community. The purpose of this paper is to describe the institutional problem of practice, the collaborative development process, and the design logic of a framework intended to support scalable and equitable asynchronous online learning.

2. Institutional context and development approach

SUNY Empire State University serves a diverse population of adult learners through largely online and asynchronous academic programs. Many students balance academic study with full-time work, caregiving, military service, or other responsibilities. Within this context, asynchronous online learning functions as a primary access mechanism rather than simply an instructional preference.

The institution had already established a centralized online learning unit, Empire Online, that supported course development through an institutionally adopted guided course design template. That template promoted consistency, basic usability, and quality assurance across online courses, but it did not explicitly operationalize UDL. At the same time, CTL faculty development efforts increasingly emphasized inclusive pedagogy, accessibility, and UDL. Faculty often expressed interest in applying these ideas, yet they also raised recurring concerns: how to provide meaningful student choice without increasing workload, how to align flexibility with course outcomes, and how to address accessibility proactively instead of retroactively.

This disconnect constituted the core problem of practice. Inclusive design was valued institutionally, but it was not yet embedded within the standard infrastructure of course design. As a result, UDL implementation depended largely on individual faculty expertise and initiative. To address this challenge, CTL partnered with Empire Online to enhance the existing template rather than create a separate framework. This decision built on familiar faculty workflows, reduced resistance to change, and treated UDL as an expected feature of course design rather than an optional add-on.

The development process was intentionally collaborative. Empire Online instructional designers contributed expertise in learning management system functionality, usability, and accessibility standards. CTL contributed leadership in UDL, inclusive pedagogy, and faculty-facing professional learning. A CTL Advisory Board made up of faculty representatives from different disciplines reviewed proposed elements for feasibility, disciplinary relevance, and academic rigor. In parallel, a Pedagogy and Practice community provided a venue for dialogue about teaching realities, learner needs, and sustainable implementation. Multiple rounds of feedback refined the language, expectations, and examples embedded in the framework.

This collaborative design process aligns with literature showing that sustained pedagogical change is more likely when institutions engage shared governance, communities of practice, and cross-unit expertise rather than relying on isolated innovation (Kezar & Holcombe, 2020; Trust & Horrocks, 2023). By embedding UDL in an established course design tool and developing it through existing institutional structures, the framework sought to move inclusive pedagogy from individual preference to institutional practice.

3. UDL-aligned framework for asynchronous online teaching

The framework translates UDL principles into repeatable course design expectations for asynchronous online teaching. It is not intended as a rigid checklist. Instead, it provides a clear structure within which faculty can exercise disciplinary judgment and preserve academic freedom while still creating more inclusive, transparent, and accessible learning environments. Five interrelated components organize the framework.

First, the framework begins with module-level alignment. Each module includes a concise overview, clear module learning outcomes, and explicit connections among outcomes, resources, discussions, and assignments. This helps students understand why materials matter and how different pathways still support the same expectations. In asynchronous settings, where students self-navigate course spaces and schedules, this level of alignment reduces confusion and supports persistence.

Second, the framework incorporates multiple means of representation. Faculty are guided to include more than one way for students to encounter core ideas, typically through text-based resources, multimedia resources, and interactive or applied materials. These resources are selected to support the same concepts and outcomes rather than functioning as disconnected extras. This design helps students access content through formats that better match their learning needs while preserving conceptual coherence.

Third, the framework supports multiple means of engagement through structured choice. Rather than relying on a single uniform discussion prompt in each module, instructors can offer different prompts that are conceptual, applied, or reflective while aligning all options to the same learning outcomes. This approach increases relevance and learner agency without reducing rigor. It also acknowledges that students may connect most strongly to ideas through theory, professional practice, or lived experience.

Fourth, the framework embeds multiple means of action and expression in assessment. For major assignments, students may choose among formats such as written analysis, multimedia presentation, or applied artifact, provided each option addresses the same outcomes. To preserve fairness and clarity, a common rubric is used across formats. This shifts emphasis away from a single preferred mode of expression and toward demonstrated learning.

Fifth, accessibility is treated as a cross-cutting design principle rather than a separate compliance task. Faculty are supported in using accessible document structure, captioned media, clear navigation, and readable visual design from the outset. In asynchronous courses, where instructional materials are often reused across terms, accessibility-by-design is more sustainable than retroactive accommodation and better aligned with inclusive digital learning.

Taken together, these five components create an integrated system. Alignment provides coherence; varied representation, engagement, and expression create structured flexibility; and accessibility ensures that all pathways are usable. The framework therefore balances consistency of experience with meaningful learner choice. It also addresses a common institutional tension: the assumption that scalable course design requires uniformity. In this model, scalability is achieved not through identical learning experiences, but through shared design logic.

4. Implementation supports and implications

The framework is implemented as an institutional support structure rather than an isolated instructional mandate. Empire Online supports faculty in applying the template, using the learning management system, and addressing accessibility requirements. CTL complements this work through workshops, consultations, and design guides that help faculty connect UDL principles to real course decisions. Because the framework is built into existing course development processes, it reduces the need for faculty to translate abstract principles into practice on their own.

This implementation model has several implications. For teaching and learning, it reframes asynchronous online instruction as intentional learning design rather than content transmission. Structured choice and explicit alignment support learner agency while maintaining common expectations. For faculty development, it offers a practical routine for enacting inclusive pedagogy, making UDL more usable and sustainable. For institutional leadership, it illustrates how online learning units, teaching centers, and faculty governance structures can work together to embed equity into everyday academic infrastructure.

The framework also has implications for how institutions define course quality. Traditional quality assurance models often emphasize standardization, which can conflict with inclusive design. This framework suggests a different approach: consistency in structure can coexist with flexibility in how students access content and demonstrate learning. In this way, equity is advanced through design decisions made upstream rather than through individualized intervention after barriers emerge.

5. Conclusion

Asynchronous online learning increases access to higher education, but access alone is insufficient when course design reproduces barriers to participation. The UDL-aligned framework described in this paper responds to that challenge by embedding inclusive design within an existing institutional course template and supporting its use through collaborative governance and faculty development. Its central contribution is not a new theory of online learning, but a practical model for translating UDL into sustainable institutional practice.

By integrating module-level alignment, multiple means of representation, structured engagement choices, flexible assessment pathways, and accessibility-by-design, the framework offers a scalable approach to learner variability in asynchronous online teaching. It also demonstrates that inclusive pedagogy is most sustainable when it is supported by institutional infrastructure rather than left to individual faculty effort. Future empirical research should examine faculty experiences, student perceptions, and learning outcomes associated with this model; however, even at the design level, the framework provides a transferable approach for institutions seeking to align online course quality, equity, and inclusive teaching.

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