

Inclusive Learning-by-Design for Teachers: A UDL-Based Model for Asynchronous CPD

An integrated theoretical framework for asynchronous, inclusive, and outcomes-oriented continuing professional development

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Universal Design for Learning

Accessibility, flexibility, and inclusion by design

Bloom's Taxonomy

Cognitive scaffolding from recall to creation

SMART Goals

Measurable, time-bound, constructively aligned outcomes

The Problem with One-Size-Fits-All Professional Development

The Structural Gap

Digital technologies have revitalized teacher CPD — enabling flexible, asynchronous, and geographically accessible training. Yet **flexibility alone is insufficient**: uniform training pathways reproduce the same participation barriers teachers are expected to eliminate in their own classrooms.

Teachers are adult learners with diverse professional identities, digital confidence levels, workload conditions, and prior experiences. A single-pathway model fails them structurally, not incidentally.

What the Field Is Missing

Current CPD design rarely integrates all three of the following dimensions simultaneously:

- **Inclusivity** — accommodating variability in participation, background, and access
- **Cognitive purposefulness** — scaffolding from foundational to higher-order thinking
- **Outcomes orientation** — producing clear, measurable, constructively aligned results

Central argument: A synthesis of UDL, Bloom's Taxonomy, and SMART goals offers a coherent theoretical foundation for asynchronous CPD design — addressing all three dimensions within a single, operable model.

Framework 1

Universal Design for Learning (UDL)

Designing for variability, not the average learner — proactive inclusion as a foundational architecture principle

Origin

CAST, 2024

Core Premise

All learners vary; design must anticipate that variability

Three Pillars

Engagement · Representation · Action & Expression

CPD Relevance

Validated for adult and online professional development contexts

UDL's Core Premise: Design for Variability, Not the Average Learner

From Reactive Accommodation to Proactive Differentiation

UDL (CAST, 2024) begins from a foundational assumption: learners are not uniform — they differ in motivation, prior experience, cultural background, and cognitive schemata. Training designed for an "average participant" will inevitably disengage, confuse, or exclude a significant portion of any cohort.

The shift UDL demands is from *reactive accommodation* — adjusting for participants after barriers emerge — to *proactive differentiation*: building flexibility into the design from the outset so that no participant is treated as an exception.

UDL in Teacher Professional Development

When applied to teacher CPD, UDL creates environments where teachers experience, as learners, the differentiation they are expected to implement in their classrooms (Craig, Smith, & Frey, 2022). This is not merely pedagogically efficient — it is epistemically coherent: inclusive design is modelled, not just described.

Research supports UDL as a valid and effective framework for adult teacher professional development, particularly in online and asynchronous environments (Dell'Anna et al., 2024; Rusconi & Squillaci, 2023). The evidence base extends across teacher education, special education, and higher education contexts.



UDL repositions "difference" as the norm — the design problem is not the learner, but the environment.

The Three Pillars of UDL: Why, What, and How

Each UDL pillar maps onto a distinct neural network, grounding the framework in cognitive neuroscience and ensuring that design decisions address motivation, comprehension, and strategic expression as integrated — not separate — dimensions of learning.

UDL Pillar	Neural Network	Focus
Engagement (Why)	Affective Network	Motivation, interest, emotional persistence
Representation (What)	Recognition Network	Perception, comprehension, cognitive load
Action & Expression (How)	Strategic Network	Planning, self-regulation, expression of knowledge

Multiple Means of Engagement — "Why"

Motivation, interest, and emotional connection. Activated when training is relevant, respectful of expertise, and connected to real classroom challenges. Options for relevance, autonomy, and emotional salience are built in.

Multiple Means of Representation — "What"

Varied formats — text, audio, video, diagrams, interactive media — plus scaffolding to reduce cognitive load and support comprehension across different prior knowledge levels.

Multiple Means of Action & Expression — "How"

Flexible ways to demonstrate learning: reflective notes, lesson plans, short videos, multimodal portfolios — rather than a single, uniform test format that privileges certain expressive modes over others.

UDL in Practice: Micro- and Macro-Design

Two Levels of Design

Micro-design addresses how individual sessions, modules, or activity sequences are structured — choice of tasks, scaffolding, pacing, and assessment within a unit.

Macro-design addresses how modules connect across a programme — progression, coherence, and the architecture of the overall learning pathway (Reardon & Unruh, 2021).

Quality CPD depends on both levels: well-designed individual resources are insufficient without a coherent programme architecture that ensures cumulative learning and purposeful progression.

Barriers to Adoption and the Neurodiversity Perspective

Three persistent barriers impede UDL adoption in CPD contexts (Hills, Overend, & Hildebrandt, 2022):

- Insufficient institutional support and policy mandate
- Limited trainer preparation in UDL principles and their application
- The pervasive misconception that UDL is relevant only to disability contexts

UDL must be embedded in training culture — not presented as a single-session topic — so teachers internalize its logic as both learners and designers of learning (Xie & Rice, 2021).

Crucially, the neurodiversity perspective reframes the goal: differences are not deficits but natural expressions of human variability. The task is to improve the learning environment, not to "fix" the learner (Gillespie-Lynch et al., 2021).

Framework 2

Revised Bloom's Taxonomy

Structuring cognitive progression — from foundational recall to higher-order professional judgement and creative application

1

Remember

Recall

2

Understand

Explain

3

Apply

Implement

4

Analyze

Examine

5

Evaluate

Judge

6

Create

Design

Bloom's Taxonomy: Structuring Cognitive Progression in CPD

The revised taxonomy (Anderson & Krathwohl, 2001) organizes cognitive demand into six levels, preventing CPD from stopping at passive "coverage" and pushing design toward application, analysis, and creative professional output. **Constructive alignment** (Biggs & Tang, 2007) demands that if an objective requires "Create," both activities and assessment must genuinely demand that level — not merely describe it.

Level	Key Verbs	CPD Application
Remember	Recall, list, identify	Name UDL principles
Understand	Explain, summarize	Describe how UDL reduces barriers
Apply	Use, implement, adapt	Adapt a lesson plan for diverse learners
Analyze	Compare, examine, identify	Identify participation barriers in a task
Evaluate	Judge, assess, critique	Evaluate a learning activity against UDL criteria
Create	Design, develop, produce	Design a UDL-aligned assessment tool

📌 Active verbs (design, analyse, evaluate, create) make ILOs observable — they guide both participant effort and trainer feedback, operationalizing constructive alignment at the level of individual objectives.

Framework 3

SMART Goals

Translating broad learning intentions into specific, observable, time-bound outcomes that support constructive alignment

S — Specific

A clear skill or product, not a vague intention

M — Measurable

Observable through a task, artefact, or rubric

A — Achievable

Realistic given prior knowledge and training conditions

R — Relevant

Connected to programme purpose and professional needs

T — Time-bound

Anchored to a clear timeframe and module endpoint

SMART Goals: Translating Intentions into Measurable Outcomes

Origins and Educational Adoption

Originally from business management (Doran, 1981), the SMART framework has been widely adopted in education to ensure intended learning outcomes (ILOs) are concrete, actionable, and evaluable. In CPD contexts, vague language — "participants will understand inclusion" or "teachers will be familiar with UDL" — produces neither clear guidance for participants nor reliable evidence of learning for programme evaluators.

Each SMART criterion addresses a distinct design risk: Specific eliminates ambiguity; Measurable enables assessment; Achievable respects participant conditions; Relevant connects to professional purpose; Time-bound creates structure and accountability.

SMART + Bloom: A Productive Pairing

Bloom clarifies the cognitive level expected; SMART ensures the outcome is operational and measurable. Together, they produce ILOs that are both **challenging** and **clear**.

Example SMART ILO (Bloom: Apply/Create):

"By the end of the module, participants will be able to design a digital activity that integrates UDL principles at the 'Apply' or 'Create' level of Bloom's taxonomy."

This single sentence is specific (design a digital activity), measurable (reviewable artefact), achievable (scoped to the module), relevant (UDL + Bloom alignment), and time-bound (end of module).

The Integrated Framework

UDL + Bloom + SMART

Three complementary lenses that together produce CPD which is simultaneously inclusive, cognitively scaffolded, and measurable



UDL → Inclusive

Anticipates variability; builds in multiple means of engagement, representation, and expression



Bloom → Scaffolded

Structures learning from foundational knowledge to higher-order professional judgement and creative application



SMART → Measurable

Translates broad intentions into specific, observable, time-bound outcomes that support constructive alignment

A Holistic Design Model for Inclusive, Effective CPD

Framework	Focus	Contribution to CPD Design
UDL	Accessibility, flexibility, inclusion	Multiple means of engagement, representation, and action & expression
Bloom's Taxonomy	Cognitive progression	Structures objectives from simple recall to higher-order professional judgement
SMART Goals	Measurability, clarity	Specifies what will be assessed, when, and how — supports constructive alignment

What the Synthesis Produces

Together, the model produces CPD that is simultaneously **flexible** (UDL), **cognitively scaffolded** (Bloom), and **measurable** (SMART). No single framework achieves all three: UDL alone lacks cognitive progression and measurability; Bloom alone lacks an inclusion lens; SMART alone lacks architectural coherence.

Andragogical Grounding

The integrated model positions teacher CPD as an application field of both inclusive pedagogy and andragogy — respecting how adults learn, not just what they need to know (Knowles, 1980). Teachers are not passive recipients of training content; they are purposeful, experienced, and self-directed learners who require agency, relevance, and challenge.

Operationalizing the Framework: A Module Example

Module title: "Introduction to Universal Design for Learning" — designed to both teach and embody UDL principles, allowing teachers to experience as learners the flexibility and choice that UDL promotes.

SMART ILO (Bloom: Evaluate)

"By the end of the module, participating teachers will be able to evaluate the extent to which a learning activity reflects the three core principles of UDL and justify their judgement using relevant pedagogical criteria."

Multiple Means of Representation

Short video lectures, written texts, infographics, and audio summaries — participants encounter content in multiple, cognitively accessible formats suited to diverse prior knowledge levels and learning preferences.

Multiple Means of Engagement

Optional learning pathways, self-reflection prompts, and examples drawn from diverse educational contexts — participants can connect training to their own professional reality and level of experience.

Multiple Means of Action & Expression

Written analysis, audio commentary, or multimedia presentation — participant's choice. The assessment task demands the same Bloom level regardless of expressive modality.

📌 The module does not merely describe inclusive design — it embodies it. The medium is the message: teachers learn *through* UDL what it means to teach *with* UDL.

Pedagogical Implications: From Delivery to Design

A Paradigm Shift in CPD

UDL in CPD represents a fundamental reorientation: from a **"delivery model"** — trainer transmits, teachers adapt — to a **"design model"** in which learning environments are intentionally planned for variability from the outset.

When CPD models the principles it promotes, teachers gain a *lived experience* of inclusive design — substantially increasing the likelihood of transfer to classroom practice (Craig et al., 2022). This is not incidental: embodied experience of inclusion is the most powerful professional development argument for UDL-aligned CPD.

Evidence on choice and flexibility: Meaningful options strengthen participation, interest, and positive emotional response during training (Lee & Griffin, 2021). Participation in UDL-based CPD increases teachers' ability and confidence to apply UDL principles in their own teaching (Craig et al., 2022; Rusconi & Squillaci, 2023).

Social Learning and the Greek Context

UDL-aligned CPD supports collaboration through asynchronous discussion spaces, peer review of lesson plans, shared artefact repositories, and optional synchronous sessions — combining individual flexibility with community and professional dialogue.

The **Greek educational context** makes blended CPD especially appropriate:

- Asynchronous components provide time flexibility for teachers managing multiple school sites and island geography
- Synchronous components support interaction, community building, and professional identity formation
- LMS platforms (eClass, Moodle) enable equitable access across remote and island schools — reducing the geographic inequities that have historically limited CPD participation

Conclusions & Implications for Policy and Practice

1 UDL as Meta-Framework

UDL functions as a meta-framework for CPD design — inclusion is a **foundational design principle**, not an additional layer applied after the fact. This reframes the role of CPD designers: proactive architects of accessible environments, not reactive accommodators of individual needs.

2 Bloom's as Cognitive Architecture

Bloom's taxonomy provides the cognitive scaffolding that separates professional development from information delivery — driving participants from low-level knowledge acquisition to higher-order professional judgement and creative application that generalizes to classroom practice.

3 SMART Goals as Operational Precision

SMART goals increase clarity and measurability, supporting constructive alignment among ILOs, activities, and assessment. Without this precision, CPD outcomes remain aspirational rather than evidential.

Policy Recommendation

UDL principles should be systematically adopted in CPD design across educational levels, with emphasis on accessibility, autonomy, and professional empowerment. Institutional mandates, trainer preparation programmes, and LMS infrastructure must align to support this shift.

Future Research

Empirical testing of the UDL–Bloom–SMART model is needed — examining engagement and completion rates, sustainability of implementation over time, and the degree of transfer to classroom practice. The framework presented here is theoretically grounded; the field now requires evidence of its impact at scale.

CPD designed through this integrated lens is not content delivery — it is *inclusive learning-by-design*: a structured pathway that respects variability, supports deep thinking, and produces clear evidence of professional growth.