

# Universal Design for Learning

*Creating learning opportunities for all.*



**Greg Alchin**

*1st Edition*

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# Introduction

*"Poorly designed systems can create new barriers to participation in society, but good universal design can empower everyone to participate as equals." Professor Norman Coombs*

Ensuring that all students develop the skills and attitudes to become expert learners is the cornerstone of education. This is reinforced by the Australian Curriculum, Assessment and Reporting Authority (ACARA) which calls for all students to develop 'a comprehensive set of knowledge, skills and dispositions or general capabilities that will assist them to live and work successfully in the twenty-first century.'

A critical examination of these 'skills and dispositions' leads one to recognise that successful learners are expert learners. Expert learners possess specific skills and attitudes that have enabled them to progress as well as a capacity for sustained learning. The Center for Applied Special Technology (CAST) has identified three broad characteristics (and their constitute elements) of an expert learner. In classifying and articulating these characteristics, CAST supports teachers to more easily identify the specific skills and strategies that each child requires. ACARA also recommends the teaching of these general capabilities should be incorporated in ways appropriate to each learning area/subject. Furthermore, it is worth noting that whilst the appropriate use of ICT can support the development of these skills and attitudes, it is not reliant upon possessing the latest ICT.

A crucial element of supporting all students to become expert learners is recognising and responding to learner variability as an integral dimension of the curriculum design process. Whilst the *Quality Teaching Framework (QTF)* recognises that students bring a huge variety of skills, needs, and interests to learning, CAST has studied learner variability at a deeper level from pedagogical, neuro-scientific and cultural perspectives.

CAST's research has highlighted that advances in neuroscience have revealed that student differences are as varied and unique as our DNA or fingerprints particularly in the three networks of Recognition, Strategy and Affect. The extent of these differences debunks many presumptions particularly about the mythical 'average' student, and teachers who 'teach to the middle.'

In response to their research findings, CAST has developed a curricular framework for supporting learner variability known as the [\*Universal Design For Learning Guidelines \(UDL\)\*](#). The UDL Guidelines are a scientifically valid framework by which teachers could provide flexibility in the ways information is presented, students respond or demonstrate

knowledge and skills, and subsequently build and sustain engagement in the learning process. They provide a rich proactive framework that supports all students from the start, in contrast to reactive ways of responding to learner variability such as differentiating after the main curriculum design work has been completed.

CAST's research has motivated Universities and school systems around the world to reexamine curriculum design. Basham, Diedrich and Lawrence's Instructional Process provides a 5-step planning process to follow when using the UDL instructional framework. It is similar to Wiggins & McTighe's curriculum design model Understanding by Design, only more focused on learner variability.

I hope that you find this introduction into [Universal Design For Learning](#) as the start of professional learning into this area.

*Greg*

Greg Alchin

## Affective networks



Affective networks in the brain are the "why" of learning. They involve how learners get engaged and stay motivated, how they are challenged, excited, or interested. These are affective dimensions. Interest and motivation for learning triggers the affective networks. This encourages learners to become purposeful and motivated. Such learners are:

- Eager for new learning and are motivated by the mastery of learning itself;
- Goal-directed in their learning;
- Know how to set challenging learning goals for themselves,
- Know how to sustain the effort and resilience that reaching those goals will require;
- Monitor and regulate emotional reactions that would be impediments or distractions to their successful learning.

The key to stimulating the affective networks of all the learners in your class is to provide multiple means of engagement. Some suggested solutions include:

### Options for Recruiting Interest

- Provide learners with as much discretion and autonomy as possible by providing choices in the level of challenge, type of tools used, colour, design and layout of graphics, and sequence or timing of tasks
- Involve learners, where and whenever possible, in setting their own personal academic and behavioural goals
- Vary activities and sources of information so that they can be personalised and contextualised to learners' lives, culturally relevant and responsive, appropriate for different racial, cultural, ethnic and gender groups
- Design activities so that outcomes are authentic, communicate to real audiences, and are purposeful
- Provide tasks that allow for active participation, exploration and experimentation
- Invite personal response, evaluation and self-reflection to content and activities

## Options for Sustaining Efforts and Persistence

- Use prompts or requirements to explicitly formulate or restate goals
- Use hand-held or computer-based scheduling tools with reminders
- Provide opportunities for collaboration, peer tutoring and support
- Vary the degree of freedom for acceptable performance
- Emphasise process, effort improvement in meeting standards as alternatives to external evaluation, performance goals, competition
- Use co-operative learning groups with scaffolded roles and responsibilities
- Prompt learners on when and how to ask peers and/or teachers for help
- Construct virtual communities of learners engaged in common interests or activities
- Differentiate the degree of difficulty or complexity within which core activities can be completed

## Options for Self-regulation

- Use prompts, reminders, guides, rubrics and checklists that focus on self-regulatory goals
- Use differentiated models, scaffolds and feedback for managing frustration, seeking external emotional support and developing internal controls and coping skills
- Provide recording devices, aids or charts to assist individuals in learning to collect, chart and display data from their own behaviour (including emotional responses, effect etc.) to monitor changes in those behaviours.
- Design activities in which learners get feedback and have access to alternative scaffolds (charts, templates, feedback displays) that support them in understanding their progress in an understandable and timely manner.

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*APA Citation: CAST (2011). Universal design for learning guidelines version 2.0. Wakefield, MA: Author.*

## Recognition networks



Recognition networks in the brain are the "what" of learning. They involve how we gather facts and categorise what we see, hear, and read. Identifying letters, words, or an author's style are recognition tasks. Presenting information and content in different ways, triggers the recognition networks. This encourages learners to become resourceful and knowledgeable. Such learners:

- Bring considerable prior knowledge to new learning, and activate that prior knowledge to identify, organise, prioritise, and assimilate new information;
- Recognise the tools and resources that would help them find, structure, and remember new information;
- Know how to transform new information into meaningful & useable knowledge.

To key to stimulating the recognition networks of all the learners in your class is to provide multiple means of representation. Some suggested strategies include:

### Options for Perception

- Use text equivalents in the form of captions or automated speech-to-text (voice recognition) for spoken language
- Provide visual diagrams, charts, notations of music or sound
- Provide written transcripts for videos or auditory clips
- Vary the display of information in flexible format including: the size of text, images, graphs, tables or other visual content
- The contrast between background and text or image
- The colour used for information or emphasis
- The volume or rate of speech or sound
- The speed or timing of video, animation, sound, simulations etc
- The font used for printed materials

## Options for Language and Symbols

- Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge'
- Highlight how complex terms, expressions or equations are composed of simpler words or symbols
- Clarify unfamiliar syntax (in language or in math formulas) or underlying structure, in diagrams, graphs, illustrations, extended expositions or narratives)
- Support decoding of text, mathematical notation and symbols
- Present key concepts in one form of symbolic representation (eg an expository text or a math equation) with an alternative form (eg an illustration, dance/movement, diagram, table, model, video, comic strip, storyboard, photograph, animation, physical or virtual manipulative)

## Options for Comprehension

- Activate prior knowledge (eg using visual imagery, concept anchoring or concept mastery routines), using advanced organisers (eg KWL methods, concept maps) and pre-teaching critical prerequisite concepts through demonstration or models, concrete objects
- Bridge concepts with relevant analogies and metaphors
- Highlight patterns, critical features, big ideas and relationships
- Emphasise key elements in text, graphics, diagrams, formulas
- Use cues and prompts to draw attention to critical features, explicit prompts for each step in a sequential process
- “Chunk” information into smaller elements
- Use checklists, organisers, sticky notes, electronic reminders and mnemonic strategies
- Explicit opportunities for spaced review and practice.

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## Strategic networks



Strategic networks in the brain are the "how" of learning. They involve planning and performing tasks. How we organise and express our ideas. Writing an essay or solving a math problem are strategic tasks. Differentiating the ways that students can express what they know, triggers the strategic networks. This encourages learners to become strategic, goal-directed. Such learners:

- Formulate plans for learning;
- Devise effective strategies and tactics to optimise learning;
- Organise resources and tools to facilitate learning;
- Monitor their progress;
- Recognise their own strengths and weaknesses as learners;
- Abandon plans and strategies that are ineffective.

To key to stimulating the strategic networks of all learners in your class is to provide multiple means of action and expression. Some suggested strategies include:

### Options for Physical Action

- Provide alternatives in the requirements for time, rating amplitude and range of motor action necessary to interact with instructional materials, physical manipulatives and technologies
- Provide alternatives for physically responding or indication selections (eg to marking with pen and pencil, to mouse control)
- Provide alternatives for physically interacting with materials (eg by hand, voice, switch, joystick, keyboard or adapted keyboard)
- Use keyboard commands for mouse action
- Consider switch options, alternative keyboards and customised overlays for touch screens and keyboards

## Options for Expressive Skills and Fluency

- Compose in multiple media such as text, speech, drawing, illustration, comics, storyboards, design, film, music, visual art, sculpture or video
- Provide learners with spell checkers, grammar checkers, word prediction software, speech-to-text software, human dictation and recording
- Provide calculators, graphing calculators, geometric sketchpads, preformatted graph paper
- Use sentence starters, sentence strips, story webs, outlining tools, concept mapping tools, Computer-Aided-Design (CAD) and music notation (writing) software
- Provide base-10 blocks, algebra blocks (either concrete or virtual)
- Use web applications (eg wikis, animation presentation)
- Provide scaffolds that can be gradually released with increasing independence and skills

## Options for Executive Functions

- Use prompts and scaffolds to estimate effort, resources and difficulty and models or examples of the process and product of goal-setting
- Provide learners with guides and checklists for scaffolding goal-setting
- Use prompts that embed “stop and think” before acting, coaches or mentors that model think-alouds of the process and prompts for categorising and systematising
- Use checklists and project planning templates for setting up prioritisation, sequences and schedules of steps
- Break long-term goals into reachable short-term objectives
- Use checklists and guides for note-taking and guided questions for self-monitoring

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# Learning Design Cycle

*"We will make real progress only when we realise that our problem in education is not one of performance but one of design." Ron Wolk, founder of Education Week*

## Step 1: Establish Clear Outcomes

Establish a clear understanding of the goal(s) of the lesson (or unit) and specific learner outcomes relate to:

- The desired outcomes and essential student understandings and performance for every learner. (What will learning look like? What will students be able to do or demonstrate?)
- The desired big ideas and their alignment to the established standards within the program of study that learners should understand.
- The potential misunderstandings, misconceptions, and areas where learners may meet barriers to learning.
- How will goals be clearly communicated to the learners, in ways that are understandable to all learners.

## Step 2: Anticipate Learner Variability

Prior to planning the instructional experience teachers should have a clear understanding of the barriers associated with the curriculum as it related to learner variability within their environment. Understandings should minimally include:

- Curriculum barriers (e.g., physical, social, cultural, or ability-level) that could limit the accessibility to instruction and instructional materials.
- Learner strengths and weaknesses specific to lesson/unit goals.
- Learner background knowledge for scaffolding new learning.
- Learner preferences for representation, expression, and engagement.
- Learner language preferences.
- Cultural relevance and understanding.

## Step 3: Measurable Outcomes and Assessment Plan

Prior to planning the instructional experience, establish how learning is going to be measured. Considerations should include:

- Previously established lesson goals and learner needs.
- Embedding checkpoints to ensure all learners are successfully meeting their desired outcomes.

- Providing learners multiple ways and options to authentically engage in the process, take action, and demonstrate understanding.
- Supporting higher-order skills and encouraging a deeper connection with the content.

#### Step 4: Instructional Experience

Establish the instructional sequence of events. As a minimum plans should include:

- Intentional and proactive ways to address the established goals, learner variability, and the assessment plan.
- High-expectations for all learners.
- High quality content integrated with explicit and targeting teaching.
- Considerations how to support multiple means of..
  - **Engagement:** A variety of methods are used to engage students (e.g., provide choice, address student interest) and promote their ability to monitor their own learning (e.g., goal setting, self-assessment, and reflection)
  - **Representation:** Teacher purposefully uses a variety of strategies, instructional tools, and methods to present information and content to anticipate student needs and preferences
  - **Expression & Action:** Student uses a variety of strategies, instructional tools, and methods to demonstrate new understandings.

#### Step 5: Reflection and New Understandings

Establish checkpoints for teacher reflection and new understandings. Considerations should include:

- Whether the learners obtained the big ideas and obtained the desired outcomes. (What data support your inference?)
- What instructional strategies worked well?
- How can instructional strategies be improved?
- What tools worked well? How could the use of tools be improved?
- What strategies and tools provided for multiple means of representation, action/ expression, and engagement?
- What additional tools would have been beneficial to have access to and why?
- Overall, how might you improve this lesson?

#### Copyright Acknowledgement

*This resource is based upon UDL-IRN (2011) [UDL in the Instructional Process](#). v 1.0. Lawrence, KS: Author .*

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