

A Case Story

Schools Attuned® and Universal Design for Learning (UDL) represent complementary approaches to teaching and learning.

Used together, they provide educators with powerful tools for helping students achieve success in school.

A 6th Grade Scenario

The students in Mr. Goddard's 6th grade science class have begun a unit on marine ecosystems, including how organisms are adapted to their environments, the concept of a food chain, symbiotic relationships, and the effects of climate change on ocean life. As is the case for most educators, Mr. Goddard has a spectrum of learners in his class, each representing a unique profile of neurodevelopmental strengths and weaknesses. He completed the Attuning a Student process with one of his students, Heidi. He used a Student Learning Partnership to gain insight into the profile of Nolan. A third student, LaToya, was attuned as a 5th grader and that teacher passed along what was learned about her profile to Mr. Goddard. In addition, he has a sense of the main strengths and weaknesses of his other students by considering their participation in discussions and group work, written assignments, and test/quiz performance.

In addition to his Schools Attuned perspective, Mr. Goddard utilizes principles of UDL whenever possible in order to give his students the best opportunities to engage with the material, access information, and communicate their ideas and knowledge. He has found that understanding students' neurodevelopmental strengths and weaknesses is extremely helpful in selecting which particular UDL techniques to employ. In addition, being aware of the neurodevelopmental demands his lessons place on students helps him to prevent learning challenges from occurring.

The following sections describe how Mr. Goddard combined his insights into neurodevelopmental profiles with UDL principles to support the learning of Heidi, Nolan, and LaToya.

Multiple Means of Representation

Heidi has trouble understanding material, especially when it is language-based. She struggles to make sense of her textbook and has hard time "getting it" during lectures and discussions. Mr. Goddard sees lots of evidence for weak *receptive language* and *verbal conceptualization*. In particular, Heidi has very shaky grasps on concepts such as symbiosis and environmental adaptation. In fact, he suspects that she doesn't fully comprehend what an ecosystem is. The good news is that her *spatial ordering* appears to be operating much better than her language.

Knowing Heidi's profile, Mr. Goddard wants to provide her with several ways to acquire information through *multiple means of representation*. His goal is to better activate her *recognition networks*, which make it possible to receive and analyze information (the "what" of learning). A key piece of his approach with Heidi is to broaden how she gets information from text.

One specific tactic is a digital version of the textbook which includes pop-ups and more dynamic visual supports (which leverage Heidi's spatial ordering). He will also set Heidi up with a text-to-speech screen reader that will allow her to read and hear content simultaneously. With navigational control of the reader, she can slow the pace when necessary or review material. Mr. Goddard also will coach her to access background definitions from digital text; by using on-line dictionaries (like Merriam-Webster's), she can trace connections between terms and even use a visual thesaurus (which also leverages her spatial ordering). Mr. Goddard is helping Heidi use CAST's eTrekker software so that she can more easily find and organize information on the internet. The eTrekker search engine helps Heidi identify keywords and the interface is stripped of distracting images and information. The software also helps her to collect material on a notepad and saves her work so that she can come back to it later.

These various supports help Heidi to access information that is represented in different ways, thus bolstering her receptive language and verbal conceptualization, often by taking advantage of her good spatial ordering. Classmates with other weaknesses, such as long-term memory, will also benefit from multi-modal, dynamic presentation of content.

Neurodevelopmental Connections with the Recognition Networks:

- > attention (mental energy control, processing controls)
- > temporal-sequential ordering
- > spatial ordering
- > memory (long-term)
- > language (receptive)
- > higher order cognition

Multiple Means of Expression

Nolan has some problems with output. Mr. Goddard can tell that Nolan understands the material and essential concepts, at a pretty sophisticated level, but he has a hard time demonstrating all that he knows, especially when he has to put it in writing. Mr. Goddard has identified *graphomotor function* and *sentence formulation* as the bottlenecks on Nolan's output, with receptive language and *higher order cognition* his important assets.

Mr. Goddard's priority for Nolan is to allow several options for showing what he knows through *multiple means of expression*. He wants Nolan to make better use of his *strategic networks*, which make it possible to generate patterns and develop strategies for action and solving problems (the "how" of learning). Getting Nolan to communicate without a pencil in his hand will be pivotal.

For example, Mr. Goddard wants his students to share their understanding of the concept of a food chain, including examples from marine habitats. Whereas some students will have no difficulty writing about this, Nolan will use Inspiration software to build a semantic web (by-passing both his graphomotor function and sentence formulation). This software helps to plan writing so it will also support the work of classmates grappling with unreliable *attention production controls*.

Neurodevelopmental Connections with the Strategic Networks:

- > attention (mental energy control, production controls)
- > temporal-sequential ordering
- > spatial ordering
- > memory (short term, active working)
- > language (expressive)
- > neuromotor function

Multiple Means of Engagement

LaToya has excellent *social cognition* but struggles with her concentration; her mind often wanders and she is prone to distraction (*weak focal maintenance* and *saliency determination*).

Mr. Goddard's strategy is to make the material and tasks more compelling to LaToya, thereby drawing her attention to it. He wants to kindle her *affective networks*, which fuel motivation and guide the capacity to establish priorities, focus, and select action (the "why" of learning). To do this, he needs to tap into her interests, provide appropriate challenges, and utilize her good social cognition.

To study the effects of climate change on ocean life, Mr. Goddard puts students into teams and has them create interactive Web text on the topic. By working alongside her peers in the researching, design, and construction of the project, LaToya will be more engaged than she would during lectures, class discussion, or individual work. Mr. Goddard has created the backdrop for the students to motivate each other and stimulate dynamic thinking about the topic, including how ocean ecosystem changes could affect their lives, directly and indirectly.

Neurodevelopmental Connections with the Affective Networks:

- > attention (mental energy control, processing controls)
- > social cognition
- > higher order cognition

Mr. Goddard's teaching exemplifies the potential synergy when Schools Attuned and UDL are combined. He utilizes neurodevelopmental insights to make decisions about optimizing student engagement, access to material, and expression of knowledge. As a result, his classroom celebrates neurodevelopmental diversity, strengthens strengths while addressing weaknesses, and infuses optimism for all students.

Relating the All Kinds of Minds Framework to UDL Brain Networks

Neurodevelopmental Constructs/Functions	Brain Networks Emphasized by UDL
attention, mental energy control	recognition, strategic, affective
attention, processing controls	recognition, affective
attention, production controls	strategic
temporal-sequential ordering	recognition, strategic
spatial ordering	recognition, strategic
memory, short-term	strategic
memory, active working	strategic
memory, long-term	recognition
language, receptive	recognition
language, expressive	strategic
neuromotor function	strategic
social cognition	affective
higher order cognition	recognition, affective

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