



CONSIDERING WAYS IN WHICH WE CAN ALL BE MAKERS

Considerations of UDL and Special Education Through an ADST Lens

EXECUTIVE SUMMARY

All students gain a sense of accomplishment when they work with tools and materials to produce tangible objects. A helping teacher has applied Universal Design for Learning (UDL) concepts to accommodate the needs of students with special needs and make trades and technology accessible to everyone.

BACKGROUND

The Applied Design, Skills and Technologies (ADST) curriculum opens trades, skills and technologies to all students, believing that everyone can be a designer, creator, and maker and begin to make thoughtful decisions about careers in trades and technology.

To be inclusive of all students, the ADST curriculum must be considered through a Universal Design for Learning (UDL) lens. UDL is typically described as “a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn” (<http://www.cast.org/our-work/about-udl.html>).

UDL helps teachers to think through options, pathways, tools, strategies and scaffolds to help students participate to their full capabilities in classroom activities. One of the major benefits of UDL considerations is that modifications made for one sector of a population actually tend to benefit everyone. For example, curb cuts—initially designed to make sidewalks wheelchair accessible—also benefit skateboarders, parents with strollers, and many others.

SETTING THE STAGE

Zale Darnel is a helping teacher who visits K-12 classrooms across Surrey School District and helps teachers to bring the new ADST curriculum into their classrooms. In the following interview, Zale shares some of his insights on the integration of UDL and Making in the classroom.

CASE DESCRIPTION

What are some of the reasons why students with special needs have been excluded from trades training?

As teachers we try not to exclude students with special needs from any part of school. We recognize that we may need to modify the nature of a project so that it fits with the student’s specific needs, and there are definitely times when we’ve had to modify the classroom environment.



Can you provide some examples of how the classroom environment can be modified to accommodate students with special needs?

Sometimes the physical environment is not very accessible, but we can move things around to accommodate any student. At one point we had a student who couldn't fit their wheelchair under the workbench, so we created a special bench that allowed him to use it with his wheelchair.

I remember one situation when a student felt stigmatized by having their educational assistant present in the shop. So the accommodation was to have the student work with me, and have the EA stand out of the way. The student worked on projects alongside all the other students, gained a lot of confidence and really opened up. That student took shop classes for quite a few years, and ended up doing very well.

Is tool safety a concern when working with students with special needs?

There are students who are not designated that I sometimes have concerns about. But as a teacher you need to demonstrate tool safety and work with all students to help them understand the consequences of their actions; its all about the expectations and standards you set for your classroom. Students understand what's safe and what's not safe if you clearly articulate it. You don't just give them the tools and say go for it. There is always some instruction and expectations around safety.

Everyone requires a different level of guidance and support; again it all depends on the needs of the student. When using a scroll saw or a coping saw I might guide them 'hand over hand'. In the case of the Compound Sliding Miter Saw the student may need some help to secure the board to the guide or the table. We may modify the type of equipment so that a student works with tools that better meet their individual needs. For example, one student had difficulty using certain equipment, so we set them up with some carving tools and a Dremel instead. They were still able to participate in the project and they felt special because they had access to tools that nobody else got to use.

What are some of the potential benefits of introducing the new ADST curriculum to students in special education programs?

There are huge benefits to every student, especially for those who are not academically gifted. Working with their hands and building something gives them an opportunity to express their learning in a non-academic forum.

I remember one particular student who had some behavior problems; he was screaming at the TOC the first time we met. He ended up in my class the following year and he wanted to make a bentwood reclining chair. He made some rough designs and figured out what recline angle was best for his body. He enjoyed being in the shop so much that I brought him back the following year as a lab assistant. He found something that kept him in school. It's really nice when you can build that kind of connection with kids.



Can you give an example of an ADST project that was inclusive of students with special needs?

I worked with a grade 5 class that was inspired by current events in space exploration. The students learned about the differences between airplanes and rockets, and explored concepts related to weight and balance, fin design, aerodynamics and wind resistance.

We built our own rockets using old file folders and launched them using a bike pump. It took about 40-50 pounds of pressure to launch the rockets. The students tested their rockets at various stages in the development cycle, which led them through cycles of innovation based on the results of these tests.

What advice would you give to teachers who are hesitant to take making into their classrooms?

I say to teachers, “Do what you’re comfortable with.” I would prefer that teachers try something hands on then to avoid taking those risks altogether.

SOLUTIONS AND RECOMMENDATIONS

Some key UDL principles that can be applied to trades and technology environments, include:

- Understand the special need / requirement
- Modify the project
- Modify the tools
- Adjust the workspace
- Demonstrate proper safety
- Clearly articulate expectations
- Supervise tool use
- Guide tool use (hand over hand)
- Encourage peer helping

KEY TERMS & DEFINITIONS

UDL: Universal Design for Learning (UDL) is about meeting the unique needs of students with physical and cognitive limitations and reducing the physical, cognitive, and organizational barriers to learning, as well as any other obstacles.

Special Education: The practice of educating students with special educational needs in a way that addresses their individual differences and needs.

Modification: Includes flexible workspaces, materials and tools that are accessible for all types of learners, multiple ways to show learning, and lesson goals that each student can attain.