

Teaching for understanding

A meaningful education for 21st century learners

Why should we teach for understanding?

While the educational goal of helping students understand is certainly not new, there are three reasons why the need to teach for understanding has never been greater.

1. The nature of the modern world that today's students will enter.

The world is increasingly interconnected and rapidly changing, offering new potentials and problems. Search engines, computers and smartphones give most people increased and immediate access to huge amounts of information. E-mail, Twitter, Facebook and soon-to-be invented technologies enable instantaneous communication with people throughout the globe. The highly complex job market, with its array of novel and changing careers, calls for creative, innovative individuals who can apply their learning to new situations while functioning as continuous, lifelong learners.

These changes imply that we must educate in new and different ways if we are to prepare our children for a 21st century world. We can no longer focus education around the acquisition of knowledge – information is too easily accessible with the touch of a screen. Rather, education today must help students go beyond learning facts in order to develop deeper understandings of the world around them and the diverse global society in which they live. Our children need to learn how to find, sort, evaluate and apply information to new situations. They need to learn how to ask critical questions and solve difficult and messy problems. They need to develop a *deeper* understanding of key concepts and processes that will help them flourish in an unpredictable world.

2. The knowledge explosion.

This current reality is complicated by the fact that the knowledge base in many fields continues to expand, and most teachers today find that there is too much content to teach and not enough time to teach it all! The present curriculum simply contains too many topics and is often fragmented, without clear connections from one topic or one level to the next. The pressures of content coverage, **often driven by jam-packed** State standards and **high stakes, standardised tests**, come at

the expense of engaging learners in exploring concepts in depth, addressing complex issues and problems, or investigating interesting and important questions – many of the very skills and processes needed to succeed in the modern world.

Teaching for understanding calls for a fundamental shift from a content “coverage” approach – teaching and testing a series of facts and discrete skills – to one that emphasises the “uncoverage” of important, transferable ideas and processes. Contemporary education must shift from an emphasis on knowledge acquisition for its own sake to preparing learners to understand ideas and processes that they can use and apply flexibly and autonomously.

3. Research on learning.

Teaching for understanding is reinforced by recent insights into how people learn, and our work as educators should be guided by the most current understandings about the learning process. Over the course of the past twenty years, research in cognitive psychology and neuroscience has significantly expanded our understanding of how people learn. This research supports a set of learning principles that emphasise the importance of constructing meaning and developing understanding. Here are some of the key findings that undergird teaching for understanding and their implications:

- Views of how effective learning proceeds have shifted from the benefits of diligent drill and practice to a focus on understanding and applying knowledge.
- The knowledge of experts is not simply a list of facts and formulas that are relevant to their expertise: instead, their deeper understanding of key concepts and ideas (e.g., Newton's second law of motion) supports their ability to transfer learning to other contexts. Novices' knowledge is much less likely to be organised around big ideas; they are more likely to approach problems by searching for correct formulas and pat answers that fit their everyday intuitions.
- Knowledge learned at the level of rote memory rarely transfers. Transfer most likely occurs when the learner knows and understands underlying principles that can be applied to problems in new contexts.

Learning with understanding is more likely to promote transfer than simply memorising information from a text or a lecture.

- Skills and knowledge must be extended beyond the narrow contexts in which they often are initially learned. For example, knowing how to solve a math problem in school may not transfer to solving math problems in other contexts. It is essential for learners to develop a sense of *when* what has been learned can be used - the conditions of application.
- Curricula that are a “mile wide and an inch deep” run the risk of developing disconnected rather than connected knowledge. Research on expertise suggests that a superficial presentation of information on many topics may be a poor way to help students develop conceptual understandings and competencies or remember important information that will prepare them for future learning and work.
- It is not sufficient to provide assessments that focus primarily on testing memory of facts and formulas if the goal of learning is to enhance understanding and applicability of knowledge. Many current assessments primarily measure factual knowledge and low-level skills, and never determine whether students know *when, where, why, and how* to use that knowledge. Given the goal of learning with understanding, assessments and feedback must focus on understanding and not solely on remembering procedures or facts.

What is understanding?

If understanding is a worthy educational goal, then educators need clarity about its meaning. What *is* understanding? How would we know that a student *really* understands? In *Understanding by Design*, Wiggins and McTighe describe the nature of understanding and also propose that understanding is revealed through *six facets* that offer different types of evidence of understanding. Here is a brief summary of each of the *six facets*:

When someone truly understands, they:

- Can **explain** concepts, principles and processes by putting it their own words, teaching it to others, justifying their answers and showing their reasoning.

- Can **interpret** by making sense of data, text and experience through images, analogies, stories and models.
- Can **apply** by effectively using and adapting what they know in new and complex contexts.
- Can demonstrate **perspective** by seeing the big picture and recognising different points of view.
- Display **empathy** by perceiving sensitively and walking in someone else's shoes.
- Have **self-knowledge** by showing meta-cognitive awareness and reflecting on the meaning of the learning and experience.

The six facets offer a framework for creating rich learning activities that develop and deepen students' understanding. They can also be used to develop assessments that determine whether students understand concepts and can apply learning to new situations. For example, we suggest that students have regular opportunities to explain a scientific principle in their own words, interpret literature and data, apply and transfer knowledge and skills to new and novel situations, form opinions based on evidence while considering the perspectives of others, self-assess their work and reflect on their learning. The use of activities and assessments based on the six facets will go a long way towards promoting understanding in schools and classrooms.

How do we teach for understanding?

Teaching for understanding involves two interrelated approaches:

1. Engage learners in meaning-making

Meaning-making occurs when learners are given the opportunity to construct their own understanding around big ideas and essential questions. Observing young children helps us to understand how learners make meaning. They often ask questions that begin their learning process. They learn through physical and mental activity that helps them make connections and construct their own meaning. For them, learning core concepts is not a linear process. They refine and revisit concepts over time and move from simple, sometimes erroneous constructs to more sophisticated, accurate concepts. Young children's learning is mediated through thinking – asking questions, analysing and interpreting what

they see, putting ideas together, making inferences, trying to solve problems and learning to reason and strategise. Moreover, learning for young children is often a social, collaborative process with adults and other children. Usually, the more opportunities there are for interaction, the greater the learning and understanding.

Unlike factual information that can be transmitted by telling, understanding must

be “earned” by the learner. In other words, coming to an understanding requires an active construction of meaning. We encourage teachers to help students construct meaning by focusing learning around big ideas and essential questions. Big ideas and essential questions are chosen because they are fundamental to a discipline, thought provoking and support transfer of learning to new situations. A history teacher may focus learning around the question, “How do we learn to live together in a diverse society?” and use the concept of *diversity* as a focus for learning. A science teacher may concentrate on the question, “How do we know what to believe about a scientific claim?” and focus on the big idea of *scientific truth*. An art teacher might focus on the question “What makes great art?” and concentrate on the big idea *artistic excellence*. A focus on a smaller number of core ideas allows for a greater emphasis on in-depth learning. In the words of Newmann, we should create a curriculum with a “sustained examination of a few topics rather than superficial coverage of many”.

A variety of instructional activities encourage meaning-making. These include Socratic questioning and related inquiry approaches: classification and categorisation of information and data, developing and testing hypotheses, conducting research, drawing conclusions, explaining results and using project and problem-based learning strategies.

With a meaning-making perspective and appropriate instructional strategies,

the teacher's role shifts from that of an information giver to a facilitator of meaning making by the learner.

2. Teach and assess for transfer

A fundamental goal of schooling is to equip learners to be able to apply what they have learned - on the job, in life, as citizens and in future learning situations.

Ultimately, we want students to be able to transfer their learning when confronted with new information, issues and problems. Wiggins and McTighe characterise transfer as follows: “Students can only be said to have fully understood if they can apply

“ Understanding core ideas and the ability to transfer them to new situations should be the twin goals of education today.”

their learning without someone telling them what to do and when to do it. In the real world, no teacher is there to direct and remind them about which lesson to plug in here or there. Transfer is about intelligently and effectively drawing from their repertoire, independently, to handle new contexts on their own”.

The use of performance tasks help to reveal whether students understand core ideas and are able to transfer and adapt their learning to new situations. Here are several examples of such tasks:

Reading, Writing and Literature: After reading several fables and studying their characteristics, write a modern-day fable in order to teach a lesson about the characteristics of fables to younger children.

Geography: Develop a proposed route for a continental highway across central Africa, considering human and physical geography along with economic and political factors.

Mathematics: Based on a building blueprint, determine the amount of paint and cost estimates for painting the interior of a building.

Science: Design an experiment to test the capacity of different types of fabrics (e.g., cotton, wool, silk) for absorbing liquids.

Technology: Create a YouTube tutorial to teach your grandparents how to use Twitter or Facebook.

Visual Arts: Create an original mural or

3-D sculpture for your school/community to symbolise its history and values.

We suggest that teachers establish realistic, authentic contexts for the performance tasks they offer to students. Authentic performance tasks usually reflect the way in which real people in the world outside of school use knowledge and skill to address various situations. Authentic tasks typically include a goal (e.g., solve a problem, analyse an issue, conduct an investigation, communicate for a purpose) and a target audience. These tasks yield tangible products (e.g., a position paper, a poster, a 3-D model) and performances (e.g., an oral presentation, a skit, a demonstration) that are valued in the wider world. Such tasks often include realistic constraints such as time, schedule, and budget.

In order to develop transfer abilities, students need multiple opportunities to apply knowledge and skills in novel and realistic contexts, and that is precisely the opportunity that authentic performance tasks offer. Moreover, the regular use of such tasks signals to learners that a major goal of education is to enable them to use their learning in ways valued in the wider world beyond the classroom.

In transfer activities, learners have many opportunities to apply their learning and practice transferable skills in new and varied situations. When transfer is the goal, we propose that a teacher function more like a coach in athletics or the arts. A coach observes and assesses students' efforts, and provides timely and ongoing feedback to help them improve their performance. Of course, there is a role for direct instruction and modeling of skills and strategies associated with transfer performance. But the ultimate goal is to render the teacher/coach unnecessary, since we want learners to be able to independently transfer their learning. Thus, over time, teacher support and scaffolding is gradually reduced so that students become increasingly capable of transferring their learning on their own.

Yes, but...

What about factual learning and "basic" skills? Aren't there things that students just need to remember and specific skills they need to learn how to do? How can they think and apply without knowledge and specific skills? Our emphasis on teaching for understanding through meaning making and transfer is not meant to suggest that learning core knowledge and developing proficiency in fundamental skills is not important. However, what we are proposing is that teachers help students learn facts and skills in the larger

context of understanding and transfer. The learning principles cited above support the idea that learners are more likely to appreciate and remember specific facts and skills when these are connected to conceptually larger ideas used in authentic and meaningful ways.


What would we see in classrooms where teaching and assessing for understanding is emphasised?

How do these ideas play out in classrooms? A thorough examination of all the relevant instructional methods and teaching techniques for creating understanding based classrooms is beyond the scope of this article. However, in figure one (below), we describe a set of ten observable indicators that highlight the practices we would expect to see in classrooms where understanding based teaching and learning are occurring. This list can be used by teachers for self-assessment and by administrators, coaches and mentors for classroom observations.

Some Final Thoughts

A rapidly changing world with easy access to information, new social media, shifting employment needs and an explosion of knowledge requires a different way of thinking about educational practice. We can no longer dedicate a major portion of our teaching and testing to the "coverage" of facts and discrete skills.

Instead of emphasising rote learning of superficial content, teaching for understanding focuses on engaging learners in "meaning making" by exploring essential questions and engaging in meaningful applications of learning. Understanding core ideas and the ability to transfer them to new situations should be the twin goals of education today.

The principles and practices of the *Understanding by Design*® framework by McTighe and Wiggins offer educators a practical and proven approach for restructuring curriculum, assessment and instruction to achieve these goals. Rethinking teaching and learning using an understanding-based framework will lead to a more meaningful, authentic approach to learning in a 21st century world. 

Teaching and Assessing for Understanding: Observable Classroom Indicators

To what extent are...

1. Instruction and assessment focused around "big ideas" and essential questions?	4 3 2 1
2. Essential questions posted and examined throughout a unit?	4 3 2 1
3. Pre-assessments used to check students' prior knowledge and potential misconceptions regarding new topics of study?	4 3 2 1
4. Opening "hooks" used to engage students in exploring the big ideas and essential questions?	4 3 2 1
5. Students' understanding of the "big ideas" and core processes assessed through authentic performance tasks involving one or more of the six facets?	4 3 2 1
6. Evaluations of student products/performances based upon known criteria/rubrics, performance standards, and models (exemplars)?	4 3 2 1
7. Appropriate instructional strategies are used to help learners make meaning of the big ideas, transfer their learning, and acquire requisite knowledge and skills?	4 3 2 1
8. Students are given multiple opportunities to demonstrate understanding using the six facets – explanation, interpretation, application, perspective, empathy and self-reflection.	4 3 2 1
9. Students given regular opportunities to rethink, revise and reflect on their work based on feedback from on-going formative assessments?	4 3 2 1
10. Students expected to self-assess, reflect on their work/ learning, and set goals for improvement?	4 3 2 1

Key: 4 = extensively 3 = generally 2 = sometimes 1 = rarely