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Improve Curriculum, Assessment, and Instruction Using the Understanding by Design® Framework

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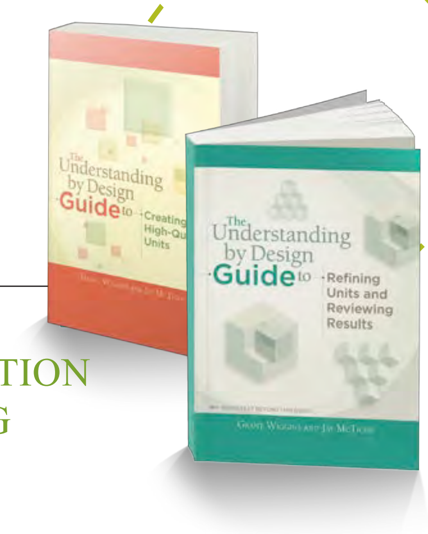

IMPROVE CURRICULUM, ASSESSMENT, AND INSTRUCTION USING THE UNDERSTANDING BY DESIGN® FRAMEWORK

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INTRODUCTION: WHAT IS THE UBD® FRAMEWORK?

The Understanding by Design® framework (UbD® framework) offers a planning process and structure to guide curriculum, assessment, and instruction. Its two key ideas are contained in the title: 1) focus on teaching and assessing for understanding and learning transfer, and 2) design curriculum "backward" from those ends.

The UbD® framework is based on seven key tenets:

1. Learning is enhanced when teachers think purposefully about curricular planning. The UbD® framework helps this process without offering a rigid process or prescriptive recipe.
2. The UbD® framework helps focus curriculum and teaching on the development and deepening of student understanding and transfer of learning (i.e., the ability to effectively use content knowledge and skill).
3. Understanding is revealed when students autonomously make sense of and transfer their learning through authentic performance. Six Facets of Understanding—the capacity to explain, interpret, apply, shift perspective, empathize, and self-assess—can serve as indicators of understanding.
4. Effective curriculum is planned backward from long-term, desired results through a three-stage design process (Desired Results, Evidence, and Learning Plan). This process helps avoid the common problems of treating the textbook as the curriculum rather than a resource, and activity-oriented teaching in which no clear priorities and purposes are apparent.
5. Teachers are coaches of understanding, not mere purveyors of content knowledge, skill, or activity. They focus on ensuring that learning happens, not just teaching (and assuming that what was taught was learned); they always aim and check for successful meaning making and transfer by the learner.

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6. Regularly reviewing units and curriculum against design standards enhances curricular quality and effectiveness, and provides engaging and professional discussions.

7. The UbD® framework reflects a continual improvement approach to student achievement and teacher craft. The results of our designs—student performance—inform needed adjustments in curriculum as well as instruction so that student learning is maximized.

The Understanding by Design® framework is guided by the confluence of evidence from two streams—theoretical research in cognitive psychology and results of student achievement studies. A summary of the key research that undergirds the UbD® framework can be found at www.ascd.org under Topics.

The Three Stages of Backward Design

The UbD® framework offers a three-stage backward design process for curriculum planning, and includes a template and set of design tools that embody the process. A key component of a curriculum based on the UbD® framework is alignment (i.e., all three stages must clearly align not only to standards, but also to one another). In other words, the Stage 1 content and understanding must be what is assessed in Stage 2 and taught in Stage 3.

Stage 1—Identify Desired Results

Key Questions: *What should students know, understand, and be able to do? What is the ultimate transfer we seek as a result of this unit? What enduring understandings are desired? What essential questions will be explored in-depth and provide focus to all learning?*

In the first stage of backward design, we consider our goals, examine established content standards (national, state, province, and district), and review curriculum expectations. Because there is typically more content than can reasonably be addressed within the available time, teachers are obliged to make choices. This first stage in the design process calls for clarity about priorities.

Learning priorities are established by long-term performance goals—what it is we want students, in the end, to be able to do with what they have learned. The bottom-line goal of education is transfer. The point of school is not to simply excel in each class, but to be able to use one's learning in other settings. Accordingly, Stage 1 focuses on "transfer of learning." Essential companion questions are used to engage learners in thoughtful "meaning making" to help them develop and deepen their understanding of important ideas and processes that support such transfer. Figure 1 contains sample transfer goals and Figure 2 shows sample understandings and essential questions.

FIGURE 1—SAMPLE TRANSFER GOALS

Discipline/Subject/Skill	Transfer Goals
Mathematics	• Apply mathematical knowledge, skill, and reasoning to solve real-world problems.
Writing	• Effectively write for various audiences to explain (narrative, expository), entertain (creative), persuade (persuasive), and help others perform a task (technical).
History	• Apply lessons of the past (historical patterns) to current and future events and issues. • Critically appraise historical claims.
Arts	• Create and perform an original work in a selected medium to express ideas or evoke mood and emotion.

FIGURE 2—SAMPLE UNDERSTANDINGS AND ESSENTIAL QUESTIONS

Understandings	Essential Questions
Great literature explores universal themes of human existence and can reveal truths through fiction.	How can stories from other places and times relate to our current lives?
Quantitative data can be collected, organized, and displayed in a variety of ways. Mathematical ideas can be represented numerically, graphically, or symbolically.	What's the best way of showing (or representing) _____________? In what other way(s) can this be represented?
The geography, climate, and natural resources of a region influence the culture, economy, and lifestyle of its inhabitants.	How does where we live influence how we live?
The relationship between the arts and culture is mutually dependent; culture affects the arts, and the arts reflect and preserve culture.	In what ways do the arts reflect as well as shape culture?

Important knowledge and skill objectives, targeted by established standards, are also identified in Stage 1. Another important component of the UbD® framework is to recognize that factual knowledge and skills are not taught for their own sake, but as a means to larger ends. Acquisition of content is a means, in the service of meaning making and transfer. Ultimately, teaching should equip learners to be able to use or transfer their learning (i.e., meaningful performance with content). This is the result we always want to keep in mind.

Stage 2—Determine Assessment Evidence

Key Questions: *How will we know if students have achieved the desired results? What will we accept as evidence of student understanding and their ability to use (transfer) their learning in new situations? How will we evaluate student performance in fair and consistent ways?*

Backward design encourages teachers and curriculum planners to first think like assessors before designing specific units and lessons. The assessment evidence we need reflects the desired results identified in Stage 1. Thus, we consider in advance the assessment evidence needed to document and validate that the targeted learning has been achieved. Doing so invariably sharpens and focuses teaching.

In Stage 2, we distinguish between two broad types of assessment—performance tasks and other evidence. The performance tasks ask students to apply their learning to a new and authentic situation as means of assessing their understanding and ability to transfer their learning. In the UbD® framework, we have identified Six Facets of Understanding for assessment purposes. When someone truly understands, they

- Can explain concepts, principles, and processes by putting it in 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.

- Demonstrate perspective by seeing the big picture and recognizing different points of view.

- Display empathy by perceiving sensitively and walking in someone else's shoes.

- Have self-knowledge by showing meta-cognitive awareness, using productive habits of mind, and reflecting on the meaning of the learning and experience.

Keep the following two points in mind when assessing understanding through the facets:

1. All Six Facets of Understanding need not be used all of the time in assessment. In mathematics, application, interpretation, and explanation are the most natural, whereas in social studies, empathy and perspective may be added when appropriate.

2. Performance tasks based on one or more facets are not intended for use in daily lessons. Rather, these tasks should be seen as culminating performances for a unit of study. Daily lessons develop the related knowledge and skills needed for the understanding performances, just as practices in athletics prepare teams for the upcoming game.

In addition to performance tasks, Stage 2 includes other evidence, such as traditional quizzes, tests, observations, and work samples to round out the assessment picture to determine what students know and can do. A key idea in backward design has to do with alignment. In other words, are we assessing everything that we are trying to achieve (in Stage 1), or only those things that are easiest to test and grade? Is anything important slipping through the cracks because it is not being assessed? Checking the alignment between Stages 1 and 2 helps ensure that all important goals are appropriately assessed, resulting in a more coherent and focused unit plan.

Stage 3—Plan Learning Experiences and Instruction

Key Questions: *How will we support learners as they come to understand important ideas and processes? How will we prepare them to autonomously transfer their learning? What enabling knowledge and skills will students need to perform effectively and achieve desired results? What activities, sequence, and resources are best suited to accomplish our goals?*

In Stage 3 of backward design, teachers plan the most appropriate lessons and learning activities to address the three different types of goals identified in Stage 1: transfer, meaning making, and acquisition (T, M, and A). We suggest that teachers code the various events in their learning plan with the letters T, M, and A to ensure that all three goals are addressed in instruction. Too often, teaching focuses primarily on presenting information or modeling basic skills for acquisition without extending the lessons to help students make meaning or transfer the learning.

Teaching for understanding requires that students be given numerous opportunities to draw inferences and make generalizations for themselves (with teacher support). Understanding cannot simply be told; the learner has to actively construct meaning (or misconceptions and forgetfulness will ensue). Teaching for transfer means that learners are given opportunities to apply their learning to new situations and receive timely feedback on their performance to help them improve. Thus, the teacher's role expands from solely a "sage on the stage" to a facilitator of meaning making and a coach giving feedback and advice about how to use content effectively.

SUMMARY

We have included a summary of the key ideas within Understanding by Design® framework as a figure (see "UbD® framework in a Nutshell") in Appendix A at the end of this paper. Also see "Learning Goals and Teaching Roles" in Appendix B for a detailed account of the three interrelated learning goals.

FREQUENTLY ASKED QUESTIONS

Over the years, educators have posed the following questions about the Understanding by Design® framework. We provide brief responses to each question and conclude with thoughts about moving forward.

1. This three-stage planning approach makes sense. So, why do you call it "backward" design?

We use the term "backward" in two ways:

1. Plan with the end in mind by first clarifying the learning you seek—the learning results (Stage 1). Then, think about the assessment evidence needed to show that students have achieved that desired learning (Stage 2). Finally, plan the means to the end—the teaching and learning activities and resources to help them achieve the goals (Stage 3). We have found that backward design, whether applied by individual teachers or district curriculum committees, helps avoid the twin sins of activity-oriented and coverage-oriented curriculum planning.

2. Our second use of the term refers to the fact that this approach is backward to the way many educators plan. For years, we have observed that curriculum planning often translates into listing activities (Stage 3), with only a general sense of intended results and little, if any, attention to assessment evidence (Stage 2). Many teachers have commented that the planning process outlined within the UbD® planning process makes sense, but feels awkward because it requires a break from comfortable planning habits.

2. I have heard that the UbD® framework de-emphasizes the teaching of content knowledge and skill to focus on more general understanding. Is this your recommendation?

On the contrary, the UbD® framework requires that unit designers specify what students will know and be able to do (knowledge and skills) in Stage 1. However, we contend that content acquisition is a means, not an end. The UbD® framework promotes not only acquisition, but also the student's ability to know why the knowledge and skills are important, and how to apply or transfer them in meaningful, professional, and socially important ways.

3. Should you use the three-stage backward design process and the UbD® template for planning lessons as well as units?

Careful lesson planning is essential to guide student learning. However, we do not recommend isolated lesson planning separate from unit planning. We have chosen the unit as a focus for design because the key elements of the UbD® framework—understandings, essential questions, and transfer performance tasks—are too complex and multifaceted to be satisfactorily addressed within a single lesson. For instance, essential questions are meant to be explored and revisited over time, not answered by the end of a single class period.

Nonetheless, the larger unit goals provide the context in which individual lessons are planned. Teachers often report that careful attention to Stages 1 and 2 sharpens their lesson planning, resulting in more purposeful teaching and improved learning.

4. What is the relationship between the Six Facets of Understanding and Bloom's Taxonomy?

Although both function as frameworks for assessment, one key difference is that Bloom's Taxonomy presents a hierarchy of cognitive complexity. The taxonomy was initially developed for analyzing the demands of assessment items on university exams.

The Six Facets of Understanding were conceived as six equal and suggestive indicators of understanding, and thus are used to develop, select, or critique assessment tasks and prompts. They were never intended to be a hierarchy. Rather, one selects the appropriate facet(s) depending on the nature of the content and the desired understandings about it.

5. I find it hard to use all Six Facets of Understanding in a classroom assessment. How can I do this?

We have never suggested that a teacher must use all of the facets when assessing students' understanding. For example, an assessment in mathematics might ask students to apply their under- standing of an algorithm to a real-world problem and explain their reasoning. In history, we might ask learners to explain a historical event from different perspectives. In sum, we recommend that teachers use only the facet or facets that will provide appropriate evidence of the targeted understanding.

6. Our national/state/provincial tests use primarily multiple-choice and brief, constructed response items that do not assess for deep understanding in the way that you recommend. How can we prepare students for these high-stakes standardized tests?

For many educators, instruction and assessing for understanding are viewed as incompatible with high-stakes accountability tests. This perceived incompatibility is based on a flawed assumption that the only way to raise test scores is to cover those things that are tested and practice the test format. By implication, there is no time for or need to engage in in-depth instruction that focuses on developing and deepening students' understanding of big ideas. Although it is certainly true that we are obligated to teach to established standards, it does not follow that the best way to meet those standards is merely to mimic the format of a standardized test, and use primarily low-level test items locally. Such an approach mistakes the measures for the goals—the equivalent of practicing for your annual physical exam to improve your health!

In other words, the format of the test misleads us. Furthermore, the format of the test causes many educators to erroneously believe that the state test or provincial exam only assesses low-level knowledge and skill. This, too, is false. Indeed, the data from released national tests show conclusively that the students have the most difficulty with those items that require understanding and transfer, not recall or recognition.

7. Are textbooks important in the implementation of the UbD® framework?

Textual materials can provide important resources for teachers. However, it is not a teacher's job to cover a book page-by-page. A textbook should be viewed as a guide, not the curriculum. A teacher's job is to teach to established standards using the textbook and other resources in support of student learning.

Major textbook companies have worked to integrate approaches outlined in the UbD® framework into their materials. When well done, such textbooks can be very helpful. Educators are encouraged to carefully examine textbooks and use them as a resource for implementing the curriculum, rather than as the sole source.

8. Is the UbD® framework appropriate for mathematics?

Some educators have questioned the use of the UbD® framework in mathematics (and other skill-focused areas, such as world languages or early literacy). The most commonly expressed concern is that the UbD® framework seems to stress understanding to the exclusion of basic knowledge and skills.

The suggestion that the UbD® framework does not recognize the need for learners to develop basic knowledge and skills could not be further from the truth! Indeed, the Unit Planning Template based on the UbD® framework in Stage 1 calls for teachers to identify the important things students should know (e.g., multiplication tables) and be able to do (e.g., division). While acknowledging the importance of the basics, the UbD® framework also emphasizes understanding of conceptually larger ideas (e.g., equivalence and modeling) and processes (e.g., problem solving and mathematical reasoning). This is a point repeatedly stressed in the new Common Core Mathematics Standards.

The distinction between basic knowledge and understanding is important not only for curriculum planning, but also for pedagogy. Effective educators know from research that rote learning of mathematical facts and skills does not promote mathematical reasoning, problem solving, or the capacity to transfer learning. In fact, test score analysis repeatedly shows that although learners may be able to solve a decontextualized problem that resembles ones that they learned in a mechanical way, they are often unable to apply the same facts and skills to a novel problem or more complex situation. Moreover, superficial learning in a rote fashion leaves students unable to explain their reasoning or the meaning of the concepts involved.

These symptoms point to an essential goal of the UbD® framework—teaching so students understand and can transfer their mathematics learning to new situations. Because knowledge acquired in a rote manner rarely transfers, there is a need to develop understanding of the larger concepts and processes along with the basics.

Note: For a good example of an Algebra 1 course designed using the UbD® framework, we encourage readers to visit the following website and click on "Sample Algebra Course" to download a PDF file. This example shows how the UbD® framework should be applied in mathematics: www.acps.k12.va.us/curriculum/design

9. What does it take for a school or district to successfully implement the UbD® framework?

We propose three general requirements for successful implementation of the UbD® framework.

1. Help the key constituents (administrators, teachers, parents, students, and the general public) understand the rationale for and the requirements of the UbD® framework prior to moving forward. Without sufficient time to disseminate basic information and offer necessary training, key constituents may form opinions based on misconceptions or inaccurately conclude that UbD® framework is too demanding or irrelevant to their needs.

2. Teachers must have access to high-quality curriculum materials based on the UbD® framework. Weak or flawed examples convey the wrong idea of what a curriculum based on the UbD® framework should look like, and teachers who use imperfect resources will have negative experiences that hurt the overall reform effort designed to influence student learning. Time is once again an important factor here; we know from years of experience that it takes time to develop high-quality curriculum using the UbD® framework.

3. Long-term and ongoing professional development is essential to ensure that all teachers and administrators have sufficient expertise to implement the UbD® framework with fidelity.

For Further Information

Additional information about the Understanding by Design® framework is available through the following publications.

McTighe, J., & Wiggins, G. (1999). *Understanding by Design professional development workbook*. Alexandria, VA: ASCD.

http://shop.ascd.org/ProductDetail.aspx?ProductId=411

Tomlinson, C., & McTighe, J. (2006). *Integrating differentiated instruction and Understanding by Design: Connecting content and kids.* Alexandria, VA: ASCD.

http://shop.ascd.org/productdisplay.cfm?productid=105004

Wiggins, G., & McTighe, J. (2005). *Understanding by Design (expanded 2nd edition).* Alexandria, VA: ASCD.

http://shop.ascd.org/ProductDetailCross.aspx?ProductId=406

Wiggins, G., & McTighe, J. (2007). *Schooling by design: Mission, action, and achievement*. Alexandria, VA: ASCD.

http://shop.ascd.org/ProductDetailCross.aspx?ProductId=822

Wiggins, G., & McTighe, J. (2011). *The Understanding by Design guide to creating high-quality units*. Alexandria, VA: ASCD.

http://www.ascd.org/publications/books/109107.aspx

Wiggins, G., & McTighe, J. (2012). *The Understanding by Design guide to advanced concepts in creating and reviewing units.* Alexandria, VA: ASCD.

http://shop.ascd.org/productdetail.aspx?productid=51504913

Wiggins, G., & McTighe, J. (2013). *Essential questions: Opening doors to student understanding.* Alexandria, VA: ASCD.

http://shop.ascd.org/productdetail.aspx?productid=87130939

Wiggins, G., & McTighe, J. (2014). *Essential questions [Video program].* Alexandria, VA: ASCD.

http://shop.ascd.org/productdetail.aspx?productid=116901734

APPENDIX A
UNDERSTANDING BY DESIGN® FRAMEWORK IN A NUTSHELL

Stage 1: Desired Results

What long-term transfer goals are targeted?
What meanings should students make in order to arrive at important understandings?
What essential questions will students explore?
What knowledge and skill will students acquire?
What established goals/standards are targeted?

Stage 2: Evidence

What performances and products will reveal evidence of meaning-making and transfer?
By what criteria will performance be assessed, in light of Stage 1 desired results?
What additional evidence will be collected for all Stage 1 desired results?
Are the assessments aligned to all Stage 1 elements?

Stage 3: Learning Plan

What activities, experiences, and lessons will lead to achievement of the desired results and success at the assessments?
How will the learning plan help students with acquisition, meaning-making, and transfer?
How will the unit be sequenced and differentiated to optimize achievement for all learners?
How will progress be monitored?
Are the learning events in Stage 3 aligned with Stage 1 goals and Stage 2 assessments?

The Seven Tenets of the UbD® framework

1. Learning is enhanced when teachers think purposefully about curricular planning. The UbD® framework helps this process without offering a rigid process or prescriptive recipe.
2. The UbD® framework helps to focus curriculum and teaching on the development and deepening of student understanding and transfer of learning (i.e., the ability to effectively use content knowledge and skill).
3. Understanding is revealed when students autonomously make sense of and transfer their learning through authentic performance. Six Facets of Understanding—the capacity to explain, interpret, apply, shift perspective, empathize, and self-assess—can serve as indicators of understanding.
4. Effective curriculum is planned backward from long-term, desired results through a three-stage design process (Desired Results, Evidence, and Learning Plan). This process helps avoid the common problems of treating the textbook as the curriculum rather than a resource, and activity-oriented teaching in which no clear priorities and purposes are apparent.
5. Teachers are coaches of understanding, not mere purveyors of content knowledge, skill, or activity. They focus on ensuring that learning happens, not just teaching (and assuming that what was taught was learned); they always aim and check for successful meaning making and transfer by the learner.
6. Regularly reviewing units and curriculum against design standards enhances curricular quality and effectiveness, and provides engaging and professional discussions.
7. The UbD® framework reflects a continual improvement approach to student achievement and teacher craft. The results of our designs—student performance—inform needed adjustments in curriculum as well as instruction so that student learning is maximized.

Source: Adapted from Wiggins, G., & McTighe, J. (2011). *The Understanding by Design guide to creating high-quality units*. Alexandria, VA: ASCD.

APPENDIX B
LEARNING GOALS AND TEACHING ROLES

Learning Goals and Teaching Roles

Three Interrelated Learning Goals →	ACQUIRE	MAKE MEANING	TRANSFER
Note: These three goals are of course interrelated. However, there is merit in distinguishing them to sharpen and focus teaching and assessment.	This goal seeks to help learners *acquire* factual information and basic skills.	This goal seeks to help students *construct meaning* (i.e., *come to an understanding*) of important ideas and processes.	This goal seeks to support the learner's ability to *transfer* their learning autonomously and effectively in new situations.
Teacher Role/ Instructional Strategies *Note: Like the above learning goals, these three teaching roles (and their associated methods) work together in pursuit of identified learning results.*	Direct Instruction In this role, the teacher's primary role is to *inform* the learners through explicit instruction in targeted knowledge and skills; differentiating as needed. *Strategies include:* ❍ diagnostic assessment ❍ lecture ❍ advanced organizers ❍ graphic organizers ❍ questioning (convergent) ❍ demonstration/modeling ❍ process guides ❍ guided practice ❍ feedback, corrections ❍ differentiation	Facilitative Teaching Teachers in this role engage the learners in actively processing information and guide their inquiry into complex problems, texts, projects, cases, or simulations; differentiating as needed. *Strategies include:* ❍ diagnostic assessment ❍ using analogies ❍ graphic organizers ❍ questioning (divergent) & probing ❍ concept attainment ❍ inquiry-oriented approaches ❍ Problem-Based Learning ❍ Socratic Seminar ❍ Reciprocal Teaching ❍ formative (on-going) assessments ❍ understanding notebook ❍ feedback/ corrections ❍ rethinking and reflection prompts ❍ differentiated instruction	Coaching In a coaching role, teachers establish clear performance goals, supervise on-going opportunities to perform (independent practice) in increasingly complex situations, provide models and give on-going feedback (as personalized as possible). They also provide "just in time teaching" (direct instruction) when needed. *Strategies include:* ❍ on-going assessment ❍ providing specific feedback in the context of authentic application ❍ conferencing ❍ prompting self assessment and reflection

Source: Wiggins, G., & McTighe, J. (2011). *The Understanding by Design guide to creating high-quality units*. Alexandria, VA: ASCD.