Universal Design for Learning and the Arts

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In this article, Don Glass, Anne Meyer, and David H. Rose examine the intersection of arts education and Universal Design for Learning (UDL) to inform the design of better art, curricula, and UDL checkpoints. They build a case for the contribution of the arts to expert learning across the affective, recognition, and strategic neural networks and argue for making affective and reflective learning outcomes more explicit in the arts. Throughout this piece, the authors call for a vision of the arts playing an increasing role in providing engaging learning options in an integrated general curriculum.

Few readers of this special issue of the *Harvard Educational Review* will need us to draw attention to the continuing marginalization of the arts in education. We share the view that this marginalization impoverishes not only art education but education more generally. We also share a concern about a different form of marginalization—the marginalization of large numbers of students in our schools. We have come to believe that these two forms of marginalization reflect a common underlying problem: traditional curricula are too narrowly conceived, designed, and implemented to prepare students—any of them— for their future. The result is a persistent and pervasive disabling of many of our students, the educational system, and the arts.

In this article we—an arts educator, a neuropsychologist, and an educational designer—seek to address the underlying problem that these two marginalizations share. We will do that by advocating for curricular reform in which the power and diversity of arts education are combined with the power and flexibility of curricula designed from the outset to embrace and enhance

the natural variability of learners. The framework for this approach is encapsulated in the reform movement called Universal Design for Learning (UDL).

After briefly reviewing the framework of UDL, we examine the intersection of UDL and arts education. We argue that UDL is a helpful adjunct to arts education that can make it more universal and more central. Following that, we argue that the arts can play an increasing role in providing the rich, meaningful, and engaging types of learning options that UDL demands. By situating arts teaching and learning in current neuroscience evidence, we highlight where arts content, processes, and *habits of mind* "find voice" in the UDL framework. This arts voice will be engaged in a conversation with the UDL framework and its supporting evidence from the learning sciences. We explore what we may learn from examining UDL and the arts by addressing three main questions:

- What can the UDL framework add to the design of arts curriculum?
- How might the arts provide rich learning options for a curriculum that is universally designed?
- How might considering the arts and UDL together foster better curriculum design and learning for everyone?

Throughout this article, we build on the argument that the arts education field may also be a rich and relevant subject area for finding potential learning options and curricular strategies (Glass, Blair, & Ganley, 2012).

What Is UDL?

In the past two decades, neuroscience has demonstrated that learners are highly variable in the ways they learn and that this variability is the norm, not the exception. We all operate across a spectrum of emotional, perceptual, and cognitive capacities and proclivities when we learn. Coupled with increasing cultural and linguistic diversity and varied contextual factors, this variability makes for increasingly complex teaching and learning situations. This challenge of practice calls for rethinking how we design curricula and educational environments. It also reminds us that providing multiple, accessible, and flexible pathways to learning may be a promising strategy to address this problem.

Universal Design for Learning is a translational framework for guiding the design and evaluation of curriculum, programs, and materials (CAST, 2011; Meyer & Rose, 2000; Rose & Meyer, 2002). UDL is organized around three principles, each of which is based on the learning sciences, that guide the design and development of a curriculum that is effective and inclusive for all learners:

1. To support affective learning, provide multiple means of engagement by offering options for generating and sustaining motivation, the *why* of learning

2. To support recognition learning, provide multiple means of representation by offering flexible ways to present *what* we teach and learn

3. To support strategic learning, provide multiple means of action and expression by offering flexible options for *how* we learn and express what we know. (Rose & Meyer, 2002)

These principles are, in turn, related to corresponding affective, recognition, and strategic networks in the brain that play a primary role in learning (Rose & Meyer, 2002). The principle of engagement supports the affective networks, which relate to motivation, persistence, and emotional self-regulation. The principle of representation supports learning in the recognition networks that deal with the processing of perceptual information and comprehension. The principle of action and expression supports learning in the strategic networks that focus on using knowledge, communication, and executive functions, like planning and progress monitoring.

UDL is supported by seminal insights from the learning sciences:

• The brain consists of complex interconnected neural networks that are goal oriented, variable in their functioning, and plastic and changeable over time (Kandel, Schwartz, & Jessell, 2000; Rose & Meyer, 2002)
• Cognition and emotion are interwoven and interactive (Immordino-Yang & Damasio, 2007)
• Learning is a dynamic interaction between an individual and the physical and social affordances and constraints of the learning environment (Rose & Fischer, 2009)
• Neural, developmental, and contextual variability are the rule, not the exception. (Fischer & Bidell, 2006; Plomin & Kovas, 2005; Thelen & Smith, 1994)

Through experimentation and brain-imaging technologies, neuroscientists are mapping out the complex networks and their interrelated functions and activity levels. In addition, they are learning that the brain is altered by its interactions with the environment. On both sides of this learning relationship are types of *variability*. Neural and developmental variability are internal, but they can be influenced by the contextual variability of external physical and social environments and conditions (Rose & Fischer, 2009).

As Gardner (1990) has pointed out, individual differences are "not without limit" (p. xiii), and curriculum needs to be designed to be developmentally appropriate and address these differences. This curriculum would "modulate effectively among the values of culture, the means available for arts education and assessment, and the particular developmental and individual profiles of the students who are to be educated" (p. xiii). However, with increasing cultural, linguistic, and academic diversity, educators can find themselves struggling at the limits of efficiency to provide differentiated, individualized instruction to each learner.
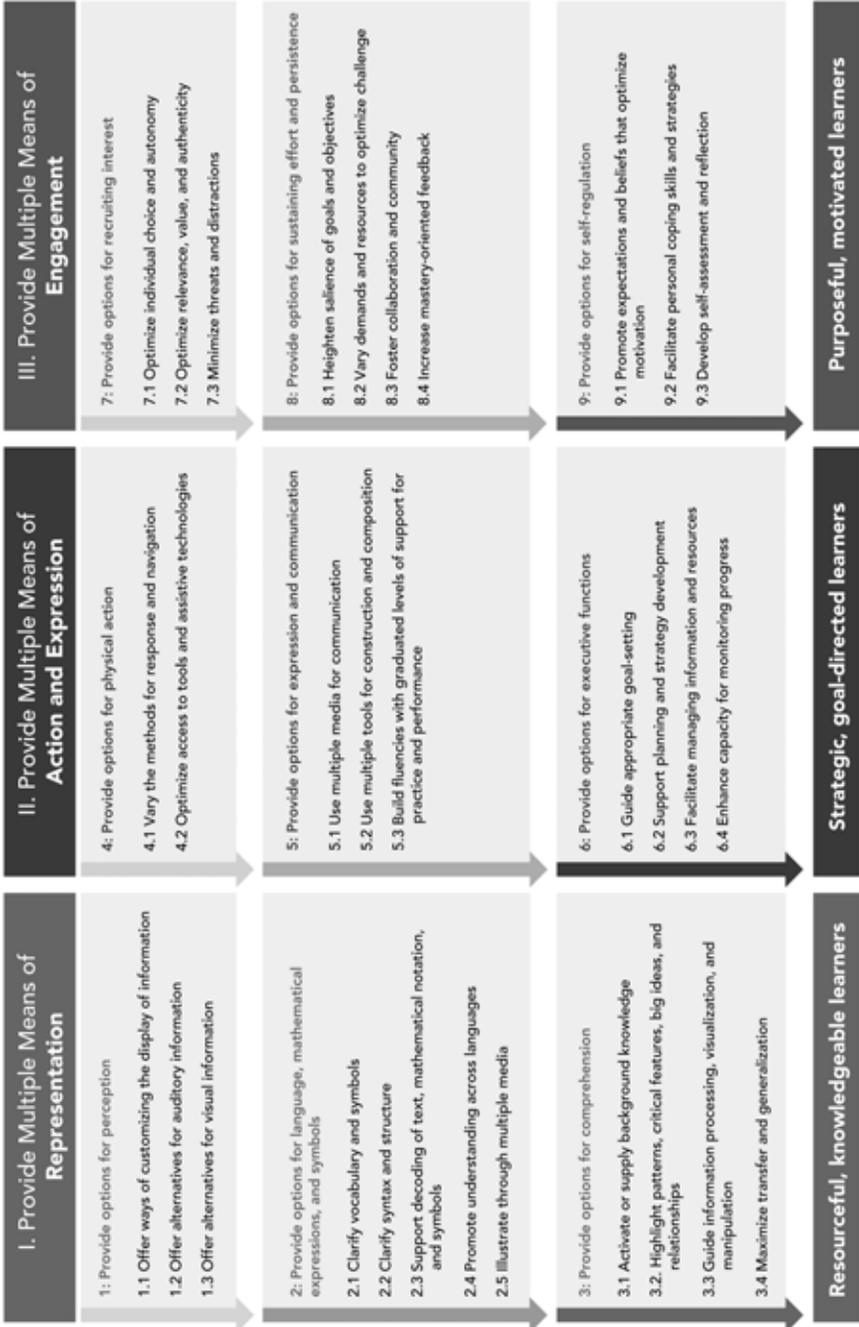
To better guide this modulated and inclusive design, UDL can be used to systematically address predictable learning variability, whether it is neural, developmental, or contextual. For example, in many communities, we know and can plan for language differences. Understanding that in most school settings English will not be everyone's first or home language—a variance, but one that is predictable—enables educators to prepare by providing scaffolds and supports for comprehension. Unpredictable variability may still occur and require responsive, differentiated instructional supports. For example, some learners may still need customized assistive technology or adaptive tools. However, to the greatest extent possible, curriculum should be designed to be varied and flexible enough to carry the instructional load for the predictable range of learner differences.

To help systematize and operationalize flexible curriculum design, the Center for Applied Special Technology (CAST) has developed UDL guidelines and corresponding checkpoints to design a curriculum that supports all learners across differing educational settings. The UDL guidelines provide a well-structured and well-researched conceptual framework grounded in evidence from the learning sciences. Focused ultimately on the goal of learning how to learn (i.e., moving beyond learning specific content and skills), these guidelines allow for many strategies and approaches drawn from best practices in all educational fields—practices that prompt inclusive curricular design and effective, data-based decision making. From a researcher's perspective, UDL may also help to organize and give structure to educational research and practice in arts education by providing a conceptual framework that is organized around how the brain learns (Glass, 2010; Wolf, 2008).

In the Common Core State Standards and twenty-first-century learning skills, there is a growing recognition that because knowledge and technology change, education is not just about learning and applying content but also about *how* to learn strategically. In the UDL framework, the goal for education is that learners develop *learning expertise:* they come to utilize and reflect on the self-regulatory, comprehension, and executive functions and strategies so they can learn under various conditions (Ertmer & Newby, 1996). The UDL expert learning outcomes are aligned with and describe what expert learning looks like in the domains that characterize the affective, recognition, and strategic neural networks. The outcomes refer to metacognitive strategies that are similar to cognitive, interpersonal, and intrapersonal skills that foster "deep learning" and may promote transfer (National Research Council, 2012).

The UDL guidelines are organized around three neural networks that have been associated with learning: the affective, recognition, and strategic networks. We want to clarify that our use of *neural networks* refers to classes of networks in the brain that have been associated with learning. These networks are very complex and interactive (therefore not literally separable), but we categorize them into the three general networks for the sake of thinking about learning in a smart, useful, and manageable way. The UDL guidelines address

FIGURE 1 *Universal Design for Learning guidelines*

I. Provide Multiple Means of Representation	II. Provide Multiple Means of Action and Expression	III. Provide Multiple Means of Engagement
1: Provide options for perception	4: Provide options for physical action	7: Provide options for recruiting interest
1.1 Offer ways of customizing the display of information	4.1 Vary the methods for response and navigation	7.1 Optimize individual choice and autonomy
1.2 Offer alternatives for auditory information	4.2 Optimize access to tools and assistive technologies	7.2 Optimize relevance, value, and authenticity
1.3 Offer alternatives for visual information		7.3 Minimize threats and distractions
2: Provide options for language, mathematical expressions, and symbols	5: Provide options for expression and communication	8: Provide options for sustaining effort and persistence
2.1 Clarify vocabulary and symbols	5.1 Use multiple media for communication	8.1 Heighten salience of goals and objectives
2.2 Clarify syntax and structure	5.2 Use multiple tools for construction and composition	8.2 Vary demands and resources to optimize challenge
2.3 Support decoding of text, mathematical notation, and symbols	5.3 Build fluencies with graduated levels of support for practice and performance	8.3 Foster collaboration and community
2.4 Promote understanding across languages		8.4 Increase mastery-oriented feedback
2.5 Illustrate through multiple media		
3: Provide options for comprehension	6: Provide options for executive functions	9: Provide options for self-regulation
3.1 Activate or supply background knowledge	6.1 Guide appropriate goal-setting	9.1 Promote expectations and beliefs that optimize motivation
3.2 Highlight patterns, critical features, big ideas, and relationships	6.2 Support planning and strategy development	9.2 Facilitate personal coping skills and strategies
3.3 Guide information processing, visualization, and manipulation	6.3 Facilitate managing information and resources	9.3 Develop self-assessment and reflection
3.4 Maximize transfer and generalization	6.4 Enhance capacity for monitoring progress	
Resourceful, knowledgeable learners	Strategic, goal-directed learners	Purposeful, motivated learners

Source: CAST (2011).

ways to reduce or eliminate barriers and also to build in appropriate challenges in learning.

Like professional checklists that support attention and working memory in complex situations, the UDL guidelines provide a systematic way to review and evaluate curriculum design for accessibility and flexibility. The UDL guidelines embed and integrate neuroscientific evidence in a translational way so that educators can focus more on the learning design (Rappolt-Schlichtmann, Daley, & Rose, 2012). Consequently, the UDL guidelines become a heuristic device—rules of thumb that can be applied to curriculum design practice.

The first set of guidelines maps to the UDL principle of providing multiple means of representation (the left column in figure 1) and prompts the design of multiple, flexible options for the presentation of content; these guidelines refer to the *what* of learning. Representation guidelines and checkpoints recommend multiple ways to optimize comprehension, a range of options for vocabulary, language, and background knowledge supports and multiple ways to present information (i.e., text, visual, auditory, kinesthetic, media, etc.). The guidelines and checkpoints go beyond removing potential barriers to accessing content, helping educators support comprehension by tapping into background knowledge, highlighting patterns, guiding information processing and use, and maximizing transfer. Thus, these guidelines help learners to be resourceful and knowledgeable.

The next set of guidelines maps to the UDL principle of providing multiple means of action and expression (the middle column in figure 1) and refers to the *how* of learning by prompting the design of multiple, flexible options for demonstrating understanding, knowledge, and skills. In other words, the strategic networks focus on the use and application of knowledge. These guidelines and checkpoints prompt for the use of multiple media as well as strategies for goal setting, information management, progress monitoring, and formative feedback plus construction, composition, and communication. These guidelines support executive functioning and foster strategic and goal-directed expert learners.

The third set of guidelines maps to the UDL principle of providing multiple means of engagement (the right column in figure 1), which in turn aligns with the affective class of neural networks. The guidelines and checkpoints deal with optimizing self-regulation, sustaining effort and persistence, and recruiting interest. Going beyond motivational hooks to recruit the initial interest of learners, the guidelines offer options for maintaining motivation and using self-regulation strategies to manage stress and emotions, thereby helping learners to remain focused on a goal for an extended period of time and to develop their own metacognitive strategies for regulating their own engagement. The importance of supporting affective learning strategies is reflected in the work of Dweck (2006) on dispositions for a "growth mindset" and Duckworth and colleagues (2007) on "effortful practice"—persistence through

boredom and frustration and gritty determination in pursuit of longer-term goals. The engagement guidelines and checkpoints help learners to become purposeful and motivated expert learners.

How Can UDL Enhance Arts Education?

The marginalization of the arts in education has had one very shallow benefit: it has allowed arts educators to escape the relentless standardization and test preparation that afflicts their peers in the core content areas. The fact that the arts are still largely elective and decidedly not high stakes has allowed them to succeed with a somewhat narrower population: those who come to the arts by choice and those who come because they may feel marginalized by the general curriculum. But if the arts are to become more broadly inclusive and/or more core to the curriculum—as we would, in fact, advocate—they will inevitably inherit more of the difficulties that their peers in the core content areas continually face: a much more diverse population that includes not only those who are most eager and talented but also those who are most untalented, uninterested, and unprepared. That diversity, all by itself, will demand much higher skills and motivation for teaching and pedagogy. Will arts education teachers be able to meet the challenge of that diversity?

To be effective in a more inclusive, more demanding teaching environment, arts educators will have to be more responsive to individual differences by recognizing the variation in difficulties that their students will have and addressing them in productive ways. At its roots, UDL is a framework for understanding and responding effectively to individual differences. Any teacher or parent is well aware of the remarkable variability among their children, but it is often difficult to articulate the ways in which the knowledge of those individual differences can productively inform teaching and learning. Drawing from the rich and growing body of research in the learning sciences (cognitive and affective neurosciences in particular), UDL provides a coherent framework for understanding and then acting on the key elements of variability that affect learning and teaching.

The UDL framework recognizes at least four important lessons about variability from the modern learning sciences (see Rose, Daley, & Rose, 2011; Meyer, Rose, & Gordon, in press). First, variability is pervasive. While there are fundamental commonalities across different human brains, what is striking is their individual variation. Human brains are more distinctive than fingerprints. Second, variability is normal. Neuroscience demonstrates that variability in how we learn is the norm, not the exception. There are few bright lines that separate what is normal from what is abnormal or disabled in the human brain (the most prominent exception is head injury, where frank damage is visible and causal). We all operate across a spectrum of emotional, perceptual, cognitive capacities and proclivities when we learn.

Third, variability can be recognized and understood only in context. That is, variability is not a function solely of inherent differences among individuals but is always a function of the dynamic interaction between the capabilities of individuals and the demands and resources of the environment. A brain that is highly disabled in one environment or task may be highly adaptive in another. And an environment (or curriculum) that enables some students to shine can just as easily disable others.

Fourth, variability is largely systematic and predictable. While there are always anomalies and unexpected sources of variation, much of the variation among humans is predictable and expected rather than random or chaotic. It is that predictability that provides a foundation for the UDL principles. Each of the three principles of UDL reflects and articulates one of the major types of variability critical to learning in the arts: (1) variability in the ways in which individuals sense and perceive the elements of art and construct meaning from them; (2) variability in the ways that individuals can express themselves through art; and (3) variability in the ways that individuals value the experience of art and are motivated to engage in them. Knowing the expected range of individual differences in each of these three areas allows one to plan and prepare ahead—the basis for UDL.

The result of understanding variability, and articulating it during planning, means that we can design better art lessons, lessons that are designed from the outset for a wide range of students rather than a narrow one. Those lessons are not designed merely for talented students or average students or untalented ones; rather, those lessons also have options and built-in supports so that most or all students are in their zone of proximal development and optimally engaged. The UDL guidelines recommend techniques and technologies that can open up art to many more students, providing many more paths to success in art.

Good design can make art more accessible to individuals who have difficulties or disabilities. The point of effective universal design is to make art more comprehensible to *anyone*. As the population becomes more diverse, careful universal designs will be more essential and more effective in arts education. That is certainly a primary advantage of UDL: increasing the understanding of variability in the arts so that more flexible and effective instructional designs can be created. The hoped-for result is that more individuals can understand art, more can create it, and more can value it.

By making art more accessible, we believe (as do others) that educators will change not only arts education but art itself. In this regard, we turn to a remarkable recent book, *Extraordinary Measures: Disability in Music,* in which Straus (2011) examines the profound (and ultimately revealing) relationship between art and disability. He begins by exploring the music of great composers who also happen to have had disabilities: Beethoven, Bach, Schoenberg, Webern, Stravinsky, Bartok, and Copeland. In their work and their personal

narratives, Straus examines to what extent their compositions reflect—and even express—their disability. The last two chapters, which focus on performance rather than composition, have titles that are as striking and evocative as their content: "Performing Music and Performing Disability" and "Prodigious Hearing, Normal Hearing, and Disablist Hearing."

It is impossible here to effectively summarize Straus's scholarship and his beautiful writing, so one example and a précis of his conclusions will have to suffice. As an example of a musical performer, he studies Dame Edith Glennie, an extraordinarily accomplished classical symphony percussionist (and recent Grammy Award winner) who happens to be deaf. He reveals how Glennie "hears" music through the vibrations of her whole body surface rather than through the specialized apparatus of her ears. As a result, she hears music quite differently than most of her fellow musicians, writes Straus (2011):

> Glennie's deafness has shaped the way she makes sense of music and produces music, causing her to attend to the tactile and visual aspects of sound: she feels and sees the music . . . By attending in her performances to the sights and feelings of the sounds she hears and produces—she performs barefoot and with extraordinary visual intensity—she makes her deafness visible to the audience, simultaneously performing her music and her deafness. (pp. 146–147)

Glennie's educated deafness makes it so that she fails to hear some things that we hear easily but also hears things we don't actually hear at all. Understanding her abilities (as well as her disabilities) is critical to understanding the power and limits of hearing and ultimately of music. Straus's explorations at the intersection of music and disability challenge our narrow and "normalizing" conceptions of both:

> Instead of trying to normalize people with disabilities, we listen to what they have to say; instead of turning them into normal hearers, we learn to hear in ways that challenge normal hearing . . . My essential point is that the range of human hearing is wider than generally recognized—the boundary between normal and abnormal hearing is a construction, a fiction . . . In fact, there are many kinds of bodies, many kinds of brains, and many kinds of musical hearing. In our theorizing, and in our pedagogy, I think we would do well to acknowledge the limitations of normal hearing. (pp. 180–181)

We wish to reemphasize that last point—"we would do well to acknowledge the limitations of normal hearing." And it is not only deaf performers like Glennie who illustrate the limits of normal hearing and normal art. Individuals who are autistic are far most likely to have perfect pitch as musicians than neurotypical individuals, for example (Dohn, Garza-Villarreal, Heaton, & Vuust, 2012). Visual artists like Chuck Close (who has prosopagnosia and dyslexia) challenge the limitations of "normal seeing."

When music, or any kind of art, is constrained by the limits of what is normal, or average, it becomes a narrow kind of art. Artists may have always understood this, but schools have not. Our schools, by standardizing what we

mean by music, art, dance, and literature, have also marginalized arts education. Those same schools, by limiting the range of students who are included in arts programs, and who are expected to be artists, have marginalized those students. In both cases, art has been diminished. The advantage of UDL in the arts is a more inclusive art—expanding the options for representation, expression, and engagement. The benefit is that we will have to expand our view of who can be an artist and what we mean by *art*.

What Does Arts Education Bring to UDL?

Just as UDL can provide a structured means for understanding human variability, the arts can enhance our ability to respond to variability. A core advantage of the arts in education is the way they expand and enrich our cultural perceptions, ideas, and values. The arts push us to recognize and consider the multiple, flexible ways in which people learn and interact with the world. They expand our notions of how content can be represented, perceived, and understood. They also show us that the ways in which we engage, act, express, and interact can be rich, varied, and contextual. In these ways, the arts offer rich, engaging, and meaningful options for teaching and learning. These options provide alternative pathways for addressing variability and enabling learners to find their own directions for learning.

Multiple Means of Representation

In recent centuries, schools have been dominated by a narrow set of representations—those that can be captured in printed books or on paper or blackboards. Text in particular, being the easiest to capture in print, has dominated until very recently. That medium has been differentially successful, widening opportunities for some students and drastically narrowing opportunities for others.

To broaden opportunities for all students in the means of representation, the UDL framework offers three guidelines:

- Provide options for perception
- Provide options for language and symbols
- Provide options for comprehension

By nature, the arts encourage and provide multiple options for representation and address the options suggested in all three of these guidelines. To consider the first—providing perceptual options—as an example, the arts overall span most of the perceptual spectrum. The same meaning or emotion can be conveyed through multiple forms of art: through visual art (painting, drawing, collage), movement (dance, pantomime), sound (instrumental music, choral music, sound design), written or oral language (poetry, novels, short stories), physical construction (sculpture, architecture), multimodal combinations (film, video, theater), and so forth. In a curriculum, the same big ideas

(3.2 in figure 1), historical events, and cultural traditions can be carried in many different representations: using narrative or documentary film, fiction and nonfiction text, visual diagrams and period paintings, poetry, or spoken word (2.5).

As for the second guideline—options for language and symbols—each of these various perceptual media has distinctive and multiple elements of "vocabulary," "language," and "syntax" that further enlarge the available representations (e.g., there are barriers and options for the vocabulary and syntax of film).

But we want to concentrate here on the third guideline, providing options for comprehension. There are several reasons for this. First, the initial two—perception and symbolic representation—are basic building blocks, and both of these can raise potential barriers for some students and must be addressed. But the ultimate goal in any of the arts is not about basic perception or symbols but, rather, about what is constructed from those basic building blocks: meaning, understanding, and emotion. Second, while the first two guidelines tend to be specific to one medium or another (visual art may require visual perception), the skills and strategies for comprehension may have more generalizability across media.

Comprehending art, like comprehending anything, requires more than perception and language; it requires cognitive strategies and skills, prior knowledge, etc. But these processes are not innate or automatic; they are learned. We *learn* to construct meaning from perception and symbols. Providing representations that help students with very different abilities and backgrounds learn to make meaning is the critical goal of any education, including arts education. This is where arts education has a lot to teach practitioners of UDL.

One research-based arts instructional option to support comprehension is Visual Thinking Strategies (VTS). Abigail Housen and Philip Yenawine developed VTS as a structured protocol or thinking routine for observing and understanding works of visual art. The use of VTS has been strongly correlated to context and content transfer of critical thinking skills (Housen, 2002). Educators facilitate and scaffold observation and comments using three open-ended questions: What's going on in this picture? What do you see that makes you say that? What more can we find?

The VTS process supports student information processing and the assimilation of new information with existing knowledge (3.1, 3.3). Learners are asked to look carefully and respond to what they observe. All comments, whether they are descriptions, connections, or interpretations, need to be supported by evidence. Learners need to listen to each other and consider multiple interpretations. Learners begin with concrete observations and personal narratives that activate background knowledge (3.1). Over time, with temporary scaffolds provided by the facilitator, learners become more expert with this strategy. They are able to integrate their observations, narratives, and contextual information into increasingly sophisticated interpretations and judgments

(3.3). Learners can then apply aspects of this strategy to explain and evaluate their own artwork (3.4).

There are benefits of using art specifically. Most content taught in schools is well structured, where rules and principles are applied across multiple cases. The arts, however, are often a more complex, ill-structured domain where knowledge is constructed through engagement with unique one-of-a-kind cases, where rules and generalizations may not always apply. Efland (2002) argues in his *integrated cognitive theory* that the arts are socially constructed representations of reality that use elaborated metaphor and narrative for thinking and feeling. This often requires finding patterns and connections, drawing inferences, making new meaning, and solving problems. Interpretations of meaning and emotion in art are often varied depending on the background knowledge and experience of the viewer, as well as the contextual information provided. Investment in the arts may be important for developing *cognitive flexibility*—the ability to select relevant strategies for comprehending and representing knowledge from various domains in multiple ways from multiple perspectives.

The arts provide promising techniques and options for learning to comprehend in difficult domains. For example, producing a *looking log* to document the history of our looking and thinking about a piece of art is a strategy to become more reflective about our perceptual habits and meaning-making processes (Perkins, 1994). Participants begin by describing what they perceive in a piece of art and then reflect on what and how they were paying attention during the timed period. The observations may be descriptions, interpretations, or connection making between the art and background information available. Additional interpretations can be shared in a group report-out of looking log experiences. Contextual information about an artist and his or her intent can also be added to the mix. The timed periods of looking and group sharing can be repeated multiple times to co-construct rich and layered understandings of the art. The goals of the looking log are to become more comfortable with complex and varied interpretations and more aware of various comprehension and meaning-making strategies.

There are many other techniques of arts instruction that provide valuable options for building comprehension. We want to draw particular attention to the rich framework and research presented in *Studio Thinking: The Real Benefits of Visual Arts Education* (Hetland, Winner, Veenema, & Sheridan, 2007). In this remarkable book by arts educators and cognitive psychologists, there is an exposition of a set of eight Studio Thinking Habits that are the primary benefits of well-implemented arts education programs. Based in both research and practice, the authors have identified an evidenced-based foundation for arts learning that has great generality within the arts curriculum and the potential to transfer to other subject areas as well.

Two habits of mind within Studio Thinking are particularly apt for this UDL guideline: *observe* and *understand the art world*. *Observe* involves the teaching of perceptual skills, information gathering, and deep observation of personal

artwork and the artwork of others. *Understand the art world* refers to activating background knowledge and highlighting relationships between the contexts of past and contemporary art. Both of these habits of mind offer options for building comprehension, meaning making, and contextualization of knowledge. Both align well with the UDL principle for representation and provide the right kind of guided experiences necessary to develop students who are resourceful and knowledgeable learners.

Does the practice of comprehension skills in arts education transfer to other domains? Catterall (2002; see table 1) summarizes studies that demonstrate the influence of arts activities on academic outcomes like reading comprehension, which include evidence for language support, reading readiness skills, and comprehension strategies. In addition, studies show that various art forms contribute to other types of nonverbal reasoning (i.e., spatial-temporal, visual). These studies indicate potential for using multiple arts media and modalities to present information and provide learners with additional supportive pathways for comprehension.

Multiple Means of Action and Expression

For centuries, the core curriculum of most schools has concentrated primarily on (and demanded) the use of written text for expression. Although a written expository essay or multiple-choice items are the privileged modes of communication in traditional instruction, they are far from the only way—or even the most effective way—to make sense of the world and show one's understanding of it. Moreover, these narrow means of expression privilege some students and raise barriers for others. To equalize the opportunities for expression, the UDL framework suggests three guidelines:

- Provide options for action
- Provide options for communication
- Provide options for strategic and executive function

Arts education has always encouraged, and taught, expression through a much wider range of media. All by itself, that increased range would appear to provide better opportunities to meet the challenge of diversity; there are more paths open to success. But it is important to take a closer look at what students can learn about expression through the arts.

Take, for example, a class in contemporary dance that is exploring the concept of dreams through movement. The instructor helps the dancers develop the theme by generating images, metaphors, gestures, and movements that express hopes and aspirations. An appropriate piece of music is selected to match the emotive tone and meaning of the dance piece (5.2 in figure 1). The instructor then helps dancers to set short- and long-term goals for creating and performing the choreography (6.1). In this case, the group sets a goal to fully include an injured dancer in the choreography and plans strategies for how to design movements using her wheelchair (6.2).

TABLE 1   *Mapping arts learning outcomes to the principles of Universal Design for Learning*

Arts learning outcomes	Representation (recognition)	Action and expression (strategic)	Engagement (affective)
Studio habits of mind (Hetland et al., 2007)	Observe Understand art world Reflect	Develop craft Envision Express Stretch and explore Reflect	Engage and persist Stretch and explore Reflect
Arts dispositions and habits of mind (Burton, Horowitz, & Abeles, 1999)		Fluency Creativity Originality Elaboration Resistance to closure Expression Imagination	Risk taking and persistence Ownership of learning Perception of achievement
Academic and social outcomes (Catterall, 2002)	Content and organization of writing Reading readiness English skills for ESL learners Reading comprehension skills and strategies (7) Reasoning about scientific images Nonverbal reasoning Spatial-temporal reasoning (4)	Content and organization of writing Proficiency and prolixity of writing (2) Expressive skills Creativity (2) Problem-solving strategies	Engagement (2) Paying attention Concentrated thought Persistence/Perseverance (3) Peer interaction Collaboration Social tolerance Empathy Self-confidence (2) Self-initiating Risk taking Problem-solving dispositions Educational aspirations Leadership Achievement motivation Ownership of learning Self-efficacy Self-concept (2)

The dance is then chunked into manageable sections to practice and concentrate on short-term performance goals for becoming proficient with particular skills and movements. Multiple sessions are devoted to practicing in various ways, such as in small and large groups or with only a rhythm or with the full musical score or in sections or as a whole technical rehearsal (5.3). "Stop and think" moments allow dancers to reflect on their ideas and envision possible solutions or strategies for expressing their ideas and emotions more effectively (6.2). Along the way, the teacher models dance movements, corrects posture, and gives oral and visual coaching. Her graduated levels of support and feedback are provided over time to meet short-term goals and then to achieve the final goal of an inclusive performance that reflects their dreams, hopes, and aspirations through movement, spoken word, music, set design, and costume (5.3, 6.4).

An illustrious example is found in the Liz Lerman Dance Exchange's performance of *The Farthest Earth from Thee.* The performance integrates dancers with and without disabilities into a piece that uses various mobility devices (including bicycle wheels, carts, and wheelchairs) to explore movement. By including individuals who are otherwise marginalized or excluded from dance, this piece leverages individual variability to expand our understanding of dance and to display what beautiful dance is. In doing so, these artists expand what we understand about, how we participate in, and why we value the arts. The Dance Exchange's performance could be said to be universally designed in that the natural variability of participants is seamlessly integrated into the performance and simultaneously lowers barriers to participation for all.

Dance is one form of expression, but the more general development of expressive arts provides many examples and models for improving and extending the practice of UDL. Once again, it is instructive to turn to the Studio Thinking framework. Here there are rich and extended examples of how to use multiple means of expression to develop habits of mind that are critical to the UDL guidelines and to the development of students who are strategic learners more generally. Five of the habits of mind map directly to the expressive guidelines of UDL. *Develop craft* is about developing skills in various media and materials, which is one of the arts-specific habits of mind. *Envision* refers to generating and imagining visual ideas and solutions that will guide practical work. *Express* is about communicating and putting these ideas and emotions into works of art and design. *Reflect* refers to evaluating and explaining aspects of your work: What are your goals, intentions, and process? How well did you attain your goals? What is quality work?

None of these is specific to a single medium of art, but all are habits of mind that are critical to students' ability to express themselves strategically and effectively. Catterall's (2002) review of the research (see table 1) includes those aspects of art education that heavily emphasize "doing." Many of the studies examined arts integrated curricula that focus on demonstrating liter-

acy and other academic outcomes, and the outcomes reflect active, strategic aspects of art making: generating and organizing content, expressive skills, creativity, and problem solving. These cognitive capacities align with the UDL principle of action and expression, again offering enriched options for possible use in the general curriculum.

Multiple Means of Engagement

Arguably, the most difficult challenge facing American schools is the wide variance in the engagement of its students. While some students are highly motivated and positive about school, large numbers, particularly at the higher grades, are completely disaffected and disengaged. One of the things that neuroscience teaches us is the important linkage between affect (engagement) and learning. The UDL guidelines around meeting the variance in engagement are:

- Provide options to recruit interest
- Provide options to sustain engagement
- Provide options to develop self-regulation

To begin, the mere presence of the arts—and its wider opportunities—provides more options to recruit interest, sustain engagement, and develop self-regulation, at least for many students. And the arts, where students learn to respond to and make sense of the emotions and affective meanings in artistic works, provide an ideal environment for learning how to recognize, express, and regulate their own emotions. But the arts offer more articulated options as well, and there is much to learn from arts education about how to create an effective UDL curriculum.

Consider, as an example, ensemble building in a drama class. Ensemble building is a process that includes games and routines to improve acting skills and foster a sense of community (8.3 in figure 1). These scaffolded activities minimize threats (7.3), optimize challenge (8.2), and focus collaborative work around the long-term goal of a public performance (9.1). The variety of games that build theater skills are often supported by an instructor and include warm-ups, circle exercises, and improvisation activities that help participants pay attention, support each other, and work as a team.

To recruit interest, these games are designed to be fun. Within the interactions, participants get to know each other and value their peers' contributions through eye contact, touch, movement, and collaborative tasks over time. A simple warm-up game like Mirror has students work in pairs, where one actor generates expressions and movements and other partner tries to mirror them. Many exercises occur in a circle to minimize threats and distractions, focus attention (7.3), and foster collaboration (8.3). Each game has a focused goal and objectives that can be adjusted to optimize challenge by adding levels of complexity (8.1, 8.2). For example, in Group Jump, all of the participants

have to jump and land at the same time. Additional challenges can be added by removing voice commands, making the landing quiet, or adjusting the height of the jump.

Improvisation activities include Tableaus, where small groups of actors put together "still pictures" of characters based on themes like family or a historical moment. Tableaus provide a goal and structure while leaving room for individual and group choice for creative improvisation (7.1). Ensemble games can be used prior to performances to lessen anxiety and regulate emotions (9.2) as well as to increase focus on working together to have an excellent performance. To be successful on stage requires a strong sense of community, energy, and shared expectations. Working together as an ensemble optimizes motivation and promotes the expectation that the actors are all in it together (9.1).

More broadly, it is helpful to return finally to the Studio Thinking framework and the habits of mind developed in teaching and learning about art. Hetland and colleagues (2007) describe two habits of mind that align with the UDL engagement guidelines: *engage and persist* and *stretch and explore. Engage and persist* is described as "learning to embrace problems of relevance within the art world and/or of personal importance, to develop focus and other mental states conducive to working and persevering at arts tasks" (p. 6). *Stretch and explore* requires the use of coping skills to regulate stress and feeling while exploring new challenges or risks. Risk taking and making the most of mistakes are a key part of self-regulation. Both habits of mind map directly to the guidelines of the UDL principle of engagement. Thus, the arts can contribute not only to the comprehension, application, and construction of knowledge but to motivation, persistence, and self-regulation. Hetland and colleagues (2007) demonstrate how these Studio Thinking Habits can be optimally taught and scaffolded through the various instructional moves of arts educators.

It is easy to see the ways in which arts education, and especially the practices included in Studio Thinking, provide rich and expanded opportunities to realize the UDL guidelines. But do those practices transfer beyond the arts program?

Three major studies or analyses are widely cited. Hetland and colleagues (2007; see table 1) build a foundation for future studies on the potential transfer of visual arts learning to other domains or subject areas. They identify and explain the set of Studio Thinking Habits observed in the high-art setting of a visual arts studio as well as the Studio Structures and flexible teaching methods that support them. The Studio Thinking Habits are easily aligned to the UDL principles, as we have shown, and this research demonstrates the potential impact on the development of learning expertise in general (Hetland et al., 2007).

Burton, Horowitz, and Abeles (1999; see table 1) find that high-arts schools employ educational curricula that are open and flexible, with multiple ways to be creative, think through problems, and construct elaborated knowledge using various media. They argue that the arts are inherently complex and

multidimensional. Their comparison study of two thousand elementary and middle school students uses questionnaires, observations, and several standardized instruments, including the Torrance Tests of Creative Thinking. Overall, the high-arts groups outscore the low-arts groups for the arts thinking competencies of fluency (number of ideas generated), creativity, originality, elaboration, resistance to closure, expression, and imagination. The authors characterize these competencies as habits of mind, or "the flexible interweaving of intuitive, practical, and logical modes of thought" (p. 43), and relate closely to the UDL guidelines about action and expression. In addition, they identify the *dispositions of risk taking* and *persistence, ownership of learning*, and *perception of achievement* as typical of arts learning. These related dispositions map well to the UDL guidelines for engagement and can therefore help build affective expertise.

In his much-cited meta-analysis of arts education research, Catterall (2002; see table 1) outlines an inventory of the academic and social learning outcomes associated with arts learning that were identified in the studies. Removing test scores, as well as the professional and school outcomes from the list labeled "Cognitive Capacities and Motivations to Learn," we are left with forty-six cognitive and affective learning outcomes that were evidenced for some learners.

The greatest number of outcomes, twenty-three, related to engagement and affect. Several studies showed evidence for outcomes related to focus and persistence as well as to fostering collaboration and community with peers. There was evidence for self-regulation options that support expectations and beliefs. Researchers also found evidence for self-confidence, self-initiation, risk-taking, and problem-solving dispositions. In addition, educational aspirations that may optimize motivation for meeting longer-term goals were also found. These findings suggest that arts education may have a robust positive impact on a variety of affective dimensions. Adding examples from the arts to the UDL guidelines can expand educators' options for building affective expertise and may also lead to the development of new checkpoints applicable across the curriculum.

Both Burton and colleagues (1999) and Hetland and colleagues (2007), as well as the studies summarized by Catterall (2002), have sharply focused on the thinking dispositions and habits of mind that are outcomes of arts learning opportunities. The strengths of these studies are that they present a set of empirically based outcomes and explicitly recognize both the cognitive and the affective elements of arts learning. They underscore the important role that arts education can have on the development of learning expertise in general.

What Does the Combination Offer Education Reform?

There are two broad kinds of approaches to educational reform. On the one hand, there are approaches (dominant in today's schools) that seek to raise

the mean by narrowing the variance; that is, they narrow the curriculum (e.g., removing art, music, athletics, extracurricular activities, advanced elective courses) in favor of remediation along fewer dimensions, particularly among basic skills. Eisner (2001) articulates these approaches and their consequences in his pivotal article "What Does It Mean to Say a School Is Doing Well?"

> What are the consequences of the approach to reform that we have taken and what should we pay attention to in order to tell when a school is doing well? First, one of the consequences of our approach to reform is that the curriculum gets narrowed as school district policies make it clear that what is to be tested is what is to be taught. Tests come to define our priorities. And now we have legitimated those priorities by talking about "core subjects." The introduction of the concept of core subjects explicitly marginalizes subjects that are not part of the core. One of the areas that we marginalize is the arts, an area that when well taught offers substantial benefits to students. Our idea of core subjects is related to our assessment practices and the tests we use to determine whether or not schools are doing well.
>
> . . . the public is reinforced in its view that test scores are good proxies for the quality of education a school provides. Yet what test scores predict best are other test scores. If we are going to use proxies that have predictive validity, we need proxies that predict performances that matter outside the context of school. The function of schooling is not to enable students to do better in school. The function of schooling is to enable students to do better in life. What students learn in school ought to exceed in relevance the limits of the school's program. (p. 369)

Eisner's concern, which we share, is that as schools have increased their focus on "raising the mean" in test scores, they have narrowed the variance in what schools value, in what methods they use to achieve those values, and in the ways those values are measured. That narrowing of the curriculum marginalizes many things that are valuable, including, most alarmingly, many students. Moreover, the results of that narrowing on the means have been decidedly underwhelming for educational reform in general. So much reform, so little change.

There is a second set of approaches: raising the mean by *increasing* the variance. These approaches—explicit in the intersection of UDL and arts education—seek to raise overall achievement not by narrowing the options but by broadening them. To educate the whole child and to provide an education that prepares the child for his or her future will require curricular designs that address learner variability with multiple, flexible learning options and pathways. We argue that including arts options, especially informed by UDL practices, can provide a rich range of unique and complex content, processes, and thinking habits for valuing, understanding, and making meaning of the world. The arts can reflect multiple perspectives and solutions as well as embed content with both intellectual and emotional aspects of being human. What we envision through the integration of the arts and UDL is a better form of edu-

cation—full and complex, cognitive and emotional, and rich with culture and human expression.

These considerations are timely, as many schools and districts are aligning curriculum to the Common Core State Standards and generating related assessment tasks and curriculum. In addition, the arts education field in the United States is in the process of writing a new set of voluntary standards for the arts. It is time for our arts standards to embrace, incorporate, and reflect pride in the broad spectrum of learning that can be supported in the arts and disseminated throughout the curriculum. It is time to rethink the design of the general curriculum to include a variety of arts learning pathways: What types of arts routines can build expert learning strategies for persistence, grit, and emotional self-regulation? What arts content and reflective comprehension strategies can help us make sense of complex information? What are the many digital and nondigital arts tools and media that are options for communication and expression? What are the arts planning, practice, and reflective feedback processes that can support learners to be strategic and goal oriented?

Universal Design for Learning can help guide learning design in this direction, and the arts education field can share arts content, processes, strategies, and examples to special and general educators who will be looking for varied, rich, engaging learning opportunities in their curriculum redesign and remixing. Burton and colleagues (1999) recognize these opportunities for "de-marginalization":

> What is critical is not that the capacities and dispositions transfer from the arts to other subject areas, as has often been argued, but that they are exercised broadly across different knowledge domains. Given this interpretation, no subject has prior rights over any other subject, for to diminish one is to diminish the possibility and promise of them all. If the arts are to help define our path to the future, they need to become curriculum partners with other subject disciplines in ways that allow them to contribute their own distinctive richness and complexity to the learning process as a whole. (p. 45)

What is critical is not to make education more accessible to students with disabilities, as has often been argued, but to ensure that UDL options and alternatives are exercised broadly across the whole range of students. Given this interpretation, no particular type of student has prior rights over any other student, for to diminish one is to diminish the possibility and promise of them all. If students in the margins are to help define our path to the future, they need to become learning partners with other students in ways that allow them to contribute their own distinctive richness and complexity to the learning process as a whole.

Together, these two demarginalizations will make an education that is more *art-full* for everyone.

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