New Blooms in Established Fields: *Four Domains of Learning and Doing*

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Educational taxonomies developed by Bloom, Krathwohl, and collaborators have been used for decades as frameworks for instructional objectives, curriculum design, and assessments of achievement. However, their scope is now too limited. The well-known cognitive domain is extended to include ideational functions of imagination and creativity, and the affective domain is enhanced to include internalization, wonder, and risk taking. The psychomotor domain is expanded into a sensorimotor domain, incorporating five senses along with balance, spatial relationships, movement, and other physical activity. A social domain is introduced to accentuate sociocultural processes that accompany thinking, feeling, and sensing/movement. Lastly, the four domains are synthesized into a unified domain of thinking, feeling, sensing/moving, and interacting to optimize potential and self-fulfillment for all students.

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The field of education for gifted students has contributed to teaching and learning in many positive ways over the past half century. One of the most practical contributions has been the attention to development of complex thinking skills and problem-solving abilities. A major catalyst for this focus was the work of Benjamin Bloom and his colleagues in conceptualizing a taxonomy of the cognitive domain. This taxonomy helped make educators aware that recall and translation of material or, in language of the taxonomy, knowledge and comprehension, dominated instruction and assessment. That domination left too little academic learning time for applications of learned content in new and novel situations (Hanna & Dettmer, 2004). This is problematic for very able students in particular, who already have mastered much basic content or can do so readily and need to move on.

The taxonomy still influences development of curriculum and assessment, and is cited widely in the educational literature. But it is time to review the original version for ways it might be made more relevant and powerful for present-day teaching and learning.

Inception of the Cognitive Taxonomy

A group of esteemed scholars, deans, psychometricians, and professors met and communicated frequently from 1949 to 1953 to consider better ways of testing learning and of communicating about testing. In doing so they found that their discussions needed to begin with instructional objectives; that is, they needed to identify outcomes of learning with which students could demonstrate that they had been changed by the educational process. They decided that a theoretical framework should be developed to classify goals that are the basis for building curricula and tests, and the starting point for much educational research. They determined that:

> Use of the taxonomy can also help one gain a perspective on the emphasis given to certain behaviors by a particular set of educational plans. Curriculum builders should find the taxonomy helps them to specify objectives so that it becomes easier to plan learning experiences and prepare evaluation devices. In short, teachers and curriculum makers should find this a relatively concise model for the analysis of educational outcomes in the cognitive area of remembering, thinking, and problem solving. (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956, p. 2)

The group worked to define terms precisely and to be consistent with accepted psychological principles and theories. They struggled with whether the product of their work should even be considered a taxonomy because that might overemphasize structure. These concerns were on target, because the taxonomy has become a convenient template for curriculum design, including independent study projects for gifted students.

Other potential drawbacks that the group predicted have surfaced as well. One was a concern that "the availability of the taxonomy might tend to abort the thinking and planning of teachers in regard to curriculum, particularly if teachers merely selected what they believed to be desirable objectives from the list provided in the taxonomy" (Bloom et al, 1956, p. 5). This occurs when teachers structure learning activities to follow the taxonomy rigidly in step-wise fashion. Such short cuts to meaningful curriculum planning are exposed when students are heard questioning each other to this effect, "You're only on application? I'm ahead of you, because I'm on synthesis."

Another concern was that the taxonomy "might lead to fragmentation and atomization of educational purposes" (Bloom et al., 1956, p. 5). So the group set it at a level of generality designed to avoid this. Even so, current lesson plans and curriculum units too often separate the processes inappropriately. Although the taxonomy is hierarchical by definition, its parts should *not* dictate compartmentalization of cognitive processing. By the same token, the logic of its categories should not be compromised. For example, a person who is undertaking the evaluative task of voting, needs to have sought knowledge about the candidates, made effort to understand the issues and candidates' positions, and analyzed all the information before casting a vote. However, in reality "evaluation" may take place in the voting booth as a hasty marking on a ballot filled with unfamiliar names. In such instances the act of evaluation occurs without careful analysis preceded by knowledge of candidate qualifications and comprehension of their positions on issues.

Importantly, the committee members who developed the cognitive taxonomy disseminated their work as an imperfect and incomplete product. They wanted it not to be a stone tablet for lesson planning but a flexible tool for stimulating thought about educational problems and methods for curriculum development, instructional techniques, and evaluation

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tools. To encourage this broad-brush activity, they urged careful, ongoing study of the taxonomy's validity and practicality, and they solicited help from readers and users in refining it.

A good place to begin a study of the group's ideas and collaborative work is with a perusal of that first publication which explains intentions of the group and outlines their classifications of cognitive thinking processes. It is useful for teachers to engage in discussion of match or mismatch among curriculum objectives built on school improvement goals, best instructional practices, and assessment tools selected or developed for measuring outcomes. It soon becomes evident that standardized tests, with their cutoff scores and percentage data to show adequate yearly progress (AYP), cannot assess student growth in the emotional, physical, and social areas teachers regard as vital for student development. Academic test results typically provide a very one-sided view of student growth.

Inception of the Affective Domain Taxonomy

At the time Bloom's group was working on the cognitive taxonomy, they identified the affective domain as another area in need of instructional objectives. However, after much discussion they decided that classifying objectives about feelings and attitudes and in particular, assessing them, would be a daunting task. Affective assessment generally is dependent on self reports and these can be exaggerated or falsified if respondents feel it is to their advantage to do so. Consequently, the group set that project aside to be addressed later. It was completed in 1964 under the leadership of David Krathwohl (Krathwohl, Bloom, & Masia, 1964).

The cognitive taxonomy group also had identified the existence of a psychomotor domain but determined that little attention was given to it in secondary schools or colleges. Consequently, they decided objectives in that area would not be very useful at that time. How very different their decision might have been in this day of intense involvement by students and teachers in computer and video technology, driver education, dance and drill teams, physical fitness programs, and competitive athletics! Simpson (1972) and Harrow (1972) constructed separate psychomotor domains a decade later.

Recent Revisions of the Cognitive Taxonomy

In recent years another learned group convened to discuss, consider, and eventually produce, *A Taxonomy for Learning, Teaching, and Assessment: A Revision of Bloom's Taxonomy of Educational Objectives* (Anderson & Krathwohl, 2001). Their overhaul of the 1956 product expands its single dimension into two dimensions—cognitive process and knowledge. The cognitive process dimension, appearing as columns in a table, is presented as six categories (remember, understand, apply, analyze, evaluate, and create). The knowledge dimension, as rows in the table, has four categories (factual, conceptual, procedural, and metacognitive). Organizing questions for the taxonomy table focus on learning, instruction, assessment, and alignment of the three. In chapter 15 of the complete version of this book, the authors cited 19 alternative frameworks to the 1956 cognitive domain handbook. They also made note of a memorandum from Bloom circulated around 1971 in which he proposed that each major field should have its own taxonomy of objectives in its own language.

Anderson and Sosniak (1994) produced a book, *Bloom's Taxonomy: A Forty-Year Retrospective,* describing the taxonomy's effect on education during its first 40 years in the United States and abroad. One example of its wide impact is its translation into more than twenty languages. In their extensive review, Anderson and Sosniak found that it was virtually impossible to determine from the literature how much the taxonomy is used in actual curriculum practice and test preparation. One explanation they offered for its persistent presence is pressures by government or foundation sources to have "an objectives model" for curriculum work. If this is the case, that rationale may continue to apply with demands created by mandates and legislation such as *No Child Left Behind* and the *Individuals with Disabilities Education Act.*

Reflections, discussions, brainstorms, and revisions for such classic educational tools can be beneficial to educators in many ways. The remainder of this article is a call for deep and wide thinking about the learning that educators believe students should do, how to facilitate learning through use of expanded educational taxonomies, and how to assess outcomes of instruction, all in ways that optimize student potential.

Terms and Semantics

Definitions of several terms and meanings will be useful for the material to follow:

1. A taxonomy is a set of classifications ordered and arranged on the basis of a principle or a consistent set of principles. Well-constructed taxonomies have predictive value and organizational usefulness.
2. A domain is a sphere or range of influence or activity. The domains to be presented here are cognitive, affective, sensorimotor, and social, with an integration of the four into a unified domain.
3. A phase is a facet or distinguishable part. The phases used here are typically referred to elsewhere as levels of the taxonomy—for example, know/comprehend (cognitive), receive/respond (affective), and perception/set (psychomotor).
4. A stage is a step, scene of action, or scaffold. The three stages constructed here are *Essential*—including phases 1 and 2 for acquisition of content; *Developmental*—including phases 3, 4, and 5 for utilization of content; and *Ideational*—with phases 6, 7, and 8 for innovation with content. (Terms often used, such as *level, high,* and *low,* tend to be value-laden in distracting ways, so they will be avoided except when needed for referencing to other works.)
5. A unified function exemplifies the holistic aspect of learning in which intellect, emotion, sociability, and senses and body movement are integrated.
6. Within the cognitive domain the word *know* can be misleading. Knowledge that reflects rich experience and encompasses more than recall and regurgitation of facts becomes wisdom, a more complex outcome than remembering or stating. Some avoid misrepresenting the one kind of know as the other kind of knowledge by depicting the taxonomic *know* with a k, and the unlimited and continuously expanding *Knowledge* that leads to wisdom with a K.

At any rate, knowing is the nucleus or core of cognition. As the foundation of learning it should not be dismissed lightly even for gifted students who already have much knowledge. Knowledge acquisition is like air inflating a balloon. As the air increases, the boundary of the balloon expands. So

the more one knows, the more one knows that there is more to know. As knowledge expands, so do understanding, application, and all other phases of cognition.

Appraisal of Established Domains

In the cognitive domain, synthesis is regarded as a complex process of combining elements and parts to form a whole. But, as the Bloom group stated, "it should be emphasized that this is not completely free creative expression since generally the student is expected to work within the limits set by particular problems, materials, or some theoretical and methodological framework" (Bloom et al., 1956, p. 162). No category in the taxonomy targeted freely expressive creativity. That omission would imply that curriculum plans do not need to include free time, materials, encouragement, and recognition for creative exploration. But nothing could be further from good educational practice. Davis and Rimm (1994), in their discussion of a creative person, cited Einstein's cogent remark that fantasy meant more to him than his talent for absorbing knowledge.

A taxonomy for a cognitive domain should emphasize the exercise of imagination to spark creativity and facilitate creative production. Bower (2005) cited researchers who have found that imagination is a thinking tool with which children figure out how the world works and address issues that are mysterious to them. Children also call upon fantasy for dealing with pain and for fueling their play. As articulated in Egan and Nadanar (1988), stimulating the imagination is not an alternative educational activity, but a prerequisite to making *any* activity educational.

In the affective domain, the original five categories fall short of the six provided for the cognitive taxonomy. A sixth affective phase of internalization is useful when added to complement the cognitive phase of evaluation. (The question of phase parallelism will be discussed later.) Furthermore, to address feeling aspects of the imagination and creativity cognitive domain phases, affective phases of aspiration toward innovative ideas and self expression are added.

Extant psychomotor domains fail to emphasize the significance of engaging the senses: sight, taste, feeling, hearing, and smell, along with balance and perhaps more. The amazing geologist and author Geerat Vermeij became blind at an early age, and yet earned a Ph.D. in geology from Yale, taught at the University of California-Davis, served as editor of *Evolution,* and wrote *Privileged Hands.* He had been intrigued with shapes of seashells given to him by his fourth-grade teacher who did not think it incongruous for a blind boy to study such intricate artifacts. She aroused in him a lasting curiosity about things unknown. As he put it, "She created an opportunity, a freedom for someone to observe, an encouragement to wonder, and in the end a permissive environment in which to ask a genuine scientific question" (Vermeij, 1996, p. 79).

When the senses are included with movement, the domain is much more than a psychomotor process. The domain is sensorimotor and provides a powerful avenue for learning and doing. Vermeij's skills would confirm that, as would validated instructional principles of early childhood education. Bower (2001) urged scientists to stop thinking of senses as discrete information sources. In his view, a merger of the senses is more than a sum of its parts. Many brain cells react to input from multiple systems. Eisner (in Buescher, 1986) faults educators for taking very narrow views of "knowing." Aesthetic ways of knowing can expand the richness of every student's intelligence.

Next, a social domain of learning and doing is much needed in today's complicated and oftentimes volatile social climates. Social theories have been presented and promoted in the educational literature in many forms and contexts where social intelligence is defined, analyzed, and assessed. However, a simple, direct taxonomy is needed for regularly and systematically addressing interpersonal functions of increasing complexity in more or less public environments. An organizational structure can help educators develop children's social skills from a state of scarcely acknowledging another person's existence and right to exist, such as demonstrated by the toddler's egocentrism or the adolescent's intense loyalty to a gang, to applications of complex behaviors such as negotiation and collaboration. Teachers and parents cannot expect children to manage bullies, mediate conflicts, or work together without acknowledgement and communication skills. A major part of the next section will be to set forth a taxonomy for the social domain.

Finally, a unified function provides for integration of the domains, naming eight gestalt-type outcomes in which each exceeds the sums of the four separate domains' eight phases. For example, in Phases 1 and 2, when learners know and comprehend, receive and respond to, observe and react to, and relate and communicate, they will perceive and understand at proficiencies beyond what they would achieve in any one of the four domains.

Providing Structure and Expanding Established Taxonomies

Educators have many opportunities for making a difference in the world. But along with those opportunities come challenging responsibilities. Table 1 outlines educators' responsibilities *and* opportunities in four domains of function—cognitive, affective, sensorimotor, and social by designating terms for process, content, purpose, and goal in each domain.

Processes of thinking, feeling, sensing/moving, and interacting create an overall process of doing (see the top-quarter section of Table 1). Educators have clear-cut, frequent opportunities to develop learner potential in these domains. *Content* fields of education are generalized as intellectual, emotional, physical, and sociocultural. Educators plan, teach, and assess learning in these areas. *Purposes* of teaching are to expand thinking, enhance feeling, cultivate senses and movements, and enrich relationships for students and their teachers, coaches, and counselors in order to optimize potential. Broad educational *goals* of educators for students are that they gain knowledge, develop self-understanding, nurture self-expression, and cultivate socialization.

In the remaining three sections of Table 1, basic learning, applied learning, and ideational learning organize the framework for essential, developmental, and generative phases of learning and doing. Baseline states for each domain of function are labeled, for want of better words, as cognizant, sentient, conscious, aware, and viable. Teaching and learning begin there.

Phases 1 and 2 are anchored in realism, asking the question, "What should learners know?" These phases include acquisition of essential material for basic, near/low-road transfer of learning

DEVELOPING HUMAN POTENTIAL in Four Domains With Unification for Learning and Doing

DOMAIN	Cognitive	Affective	Sensorimotor	Social	UNIFIED
Process	thinking	feeling	sensing and moving	interacting	doing
Content	intellectual	emotional	physical	sociocultural	holistic
Purpose	expand thinking	enhance feeling	cultivate senses and movement	enrich relationships	optimize potential
Goal	to gain knowledge	to develop self-understanding	to nurture self-expression	to cultivate socialization	to realize self-fulfillment
BASIC LEARNING: Phases 1 and 2 with near (low-road) transfer of learning.				Characterized by **REALISM** (What should learners know?)	
Essential					
ACQUISITION. Rudimentary. Is requisite for all learners. Educator teaches, learner masters. The content is necessary, the process is structured, and the context domain designates the standard(s). Time is provided for mastery and compensatory alternatives are supplied as needed if mastery is not possible.					
Baseline	Cognizant	Sentient	Conscious	Aware	**Viable**
Phase 1	Know	Receive	Observe	Relate	**Perceive**
Phase 2	Comprehend	Respond	React	Communicate	**Understand**
APPLIED LEARNING: Phases 3, 4, 5 with far (high-road) transfer of learning.				Characterized by **PRAGMATISM** (What can learners do?)	
Developmental					
UTILIZATION. Complex. Is to be individualized for each learner. Educator guides, learner grows. The content is important, the process is flexible, and the context domain determines suitability. Variable stages of achievement are expected and learning opportunities are provided that challenge every student.					
Phase 3	Apply	Value	Act	Participate	**Use**
Phase 4	Analyze	Organize	Adapt	Negotiate	**Differentiate**
Phase 5	Evaluate	Internalize	Authenticate	Adjudicate	**Validate**
IDEATIONAL LEARNING: Phases 6, 7, 8 with original construction/production.				Characterized by **IDEALISM** (To what do learners aspire?)	
Generative					
INNOVATION. New. Is to be personalized for every learner. Educator facilitates, learner generates. The content is novel, the process is open ended, and the domain supports uniqueness. Diverse outcomes of accomplishment are anticipated and encouragement is offered to enable learner fulfillment.					
Phase 6	Synthesize	Characterize	Harmonize	Collaborate	**Integrate**
Phase 7	Imagine	Wonder	Improvise	Initiate	**Venture**
Phase 8	Create	Aspire	Innovate	Convert	**Originate**

Table 1

by all students. They contain content that is necessary to know; the learning process is structured and each domain has specific standards. Teachers teach and learners master the material. Teachers provide the time needed for mastery and then move the class on. They supply compensatory alternatives as needed for any student who receives much additional time and instruction, but still cannot master the content.

The applied learning stage (in the third quarter of Table 1) includes developmental phases 3, 4, and 5. These phases ask a pragmatic question, "What can learners do?" The functions elicit more complex, far/high-road transfer of learning and feature developmental utility. Teaching here should be differentiated inasmuch and insofar as possible for each learner. Teachers guide and learners grow. Content is important, but presented with flexibility. Contexts for learning determine the suitability of content and in some instances the allocation of learning time. Not all content can or even needs to be mastered by all learners. Educators expect that there will be variable stages of achievement; therefore, they provide learning activities to interest and challenge every student, from less able to gifted.

In the final section of Table 1, Phases 6, 7, and 8 constitute an ideational stage that asks the generative, idealistic question, "To what do learners aspire?" Synthesis fits well here as Phase 6 and a precursor to Phases 7 and 8. Ideational learning is new, innovative, and personalized for each learner. Educators facilitate, learners generate. Students who are gifted, talented, and

highly creative, blossom here. The content is novel, processes are open ended, and each context domain encourages uniqueness. Teachers anticipate diverse outcomes of accomplishment and offer support to enable all learners to achieve and produce as guided by their talents and personal aspirations.

Those who teach, coach, and counsel children and youth incorporate these phases into their instructional practices as well. For example, they strive to *know* and *understand* their content and pedagogy. They *apply* that understanding to *analyze, synthesize,* and *evaluate* information in the thousands of actions, reactions, and interactions they absorb daily. They also can extend their creative processes to *imagine* and *create.*

To do this educators *receive* and *respond* to the information, *valuing* its importance so that they can *organize, characterize,* and *internalize* the meanings. They can extend these affective processes to *wonder* and *aspire.*

Continuing with this example, teachers *observe* and *react* with senses and body on the alert to situational data and *act* on it, *adapting, harmonizing,* and *authenticating* what they observe, then *improvising* and *innovating* when opportunities arise. They carry out these sensorimotor-domain functions in very public places where they *relate* to and *communicate* with dozens of others—students, families of students, and other school personnel, *participate* in group settings, and in various times and circumstances *negotiate, collaborate,* and *adjudicate* for the good of all. They may move beyond these sociocultural phases to *initiate* and *convert.*

With the structure for the four domains now framed, a unified domain added to integrate them, and additions made to existing taxonomies, the phases of the two most familiar taxonomies are displayed left-of-center in Table 1 and summarized here as (a) cognitive domain: know, comprehend, apply, analyze, evaluate, synthesize, imagine, and create; and (b) affective domain: receive, respond, value, organize, internalize, characterize, wonder, and aspire.

Altering Psychomotor Taxonomies

Existing psychomotor domains are limited because they have been too narrowly defined. It is convenient but myopic to assume that this domain can be addressed adequately through organized sports activities. On the contrary, motor skills are needed not only for putting the ball in the basket, but also for coordinating one's eyes, hands, ears, and body movements to make a speech and display supporting materials for it. Senses and movements are vital when learning to hold a welding torch and steadying the joint to be welded. Senses of sight, taste, smell, and touch help in determining the safety of a food product for human consumption. Sight and hearing are used for observing and reacting to facial expressions and body movements when learning to get along with others. Senses and movement are vital for developing skills in driving, orienteering, presentation and demonstration, keyboarding, and much more. They also are sources of pleasure for many in dance, yoga, bodybuilding, cheerleading, and theater.

Too often psychomotor education is predominantly competition-driven game playing, in which the best athletes get the most exercise, rather than opportunity to hone life skills of body movement, stamina, coordination, muscle strength, orientation, agility, spatial accuracy, and interpretation of a myriad of sensory data. Skills that provide for the fleeting (relatively speaking) recognition of a limited number of participants in sports, dance teams, and yell teams have significantly less long-term impact on all students than skills needed for maneuvering in small spaces such as elevators or trains or space capsules, for managing physical aspects of technology such as cameras for laproscopic surgery, for detecting and responding with one's senses and muscles to signs of impending danger such as fire, tornado, or acts of terrorism, and for working with equipment ranging from massive, sophisticated machinery to extraordinarily complex and tiny computer chips and circuits.

Eisner (interviewed by Buescher, 1986) stressed that the senses are avenues for concept formation, problem solving, and experiences that nurture intellectual skills. He contended that a culture or a school program that dulls the senses by neglect or disrespect thwarts development of human aptitude and undermines the enormous possibilities of the human mind. Knowing stems from what the senses have access to and how they are used. The adage that "brains are born but minds are made" is particularly pertinent here.

Programs in the arts and in physical development, which have been sensory and motor vehicles for human development and fulfillment throughout the ages and more recently are credited with improving students' basic skills, attendance records, and behaviors, have been reduced and in many schools cut outright in the scramble to prepare students for making acceptable test scores on standardized tests of achievement. In an unusual forum for commentary on school issues, writers for a special *Sports Illustrated* magazine article (Layden, 2004) on obesity pointedly fault the *No Child Left Behind Act* for drawing inordinate attention to standardized achievement testing to the neglect of physical and life skills activities for students.

In questioning "why Johnny shoots stop signs" and presenting an environmentalist's perspective on school programs that ignore the senses, Williams (1988) targeted the teaching strategy of lecturing students on the evils of dumping trash and marring signs in the country, and then transporting them to a beautiful outdoor setting to pick up trash. Williams asserted that this primarily cognitive and affective instructional ploy backfires, spoiling students' sensorimotor and social opportunities to sense, move about in the beauty and share the wonder of the environment. If the lecture and clean-up tactic works, he asked, then why do Johnny and Jane continue to throw trash and shoot signs?

New research on perceptual theory suggests that the merging of senses is more than the sum of its parts. So it is time to move beyond thinking of perception as a process grounded in separate, independent content of sight, sound, touch, taste, and smell (Bower, 2001). Senses are funnels, yardsticks, and manuals for receiving environmental signals and interpreting them. Movements are key elements in expressing oneself, interpreting the intentions of others as expressed through movement, and navigating among impediments in the physical world. Therefore, physical activities and experiences with sensory messages should be integrated into school curricula for students of all ages.

Phases of the new sensorimotor taxonomy, displayed down the center in Table 1, can be summarized as sensorimotor: observe, react, act, adapt, authenticate, harmonize, improvise, and innovate.

Adding a New Taxonomy for the Social Domain

Although there is no general consensus on social theory, society can be described as a form of regular and repeated order in which individuals interact, and in doing so learn from and support one another. The social domain, an essential area for learning, doing, and practicing behaviors, includes sociocultural interactions in school classrooms and school-related settings such as playgrounds, buses, gymnasiums, workshops, hallways, administrative offices, theater stages, restrooms, laboratories, cafeterias, athletic fields, and parking lots. A diversity of school personnel and students interact to teach and learn behaviors deemed necessary for survival of the society and transmission of the social culture.

The hidden curriculum, not much talked about but ever present in any school setting, has a powerful, wide-ranging influence on teachers and learners. This curriculum is revealed through opportunities given for student choices, in routine procedures for the school day, monitoring systems, bulletin boards, showcases, assemblies, schedules and bells and public address systems, and perhaps most of all in the general demeanor of interactions among students and school personnel.

Positive social learning in the school setting occurs through engaging in teamwork, building friendships, respecting others' rights, choosing effective role models, developing etiquette and manners, being examples for others in constructive ways, leading and following appropriately for the welfare of all, modifying one's own preferences to facilitate group success, and assisting others in need (Hanna & Dettmer, 2004). The learning may be simple and basic, calling on essential content and structured processes to relate and communicate, or complex and developmental, having important content and flexible processes of participation, negotiation, and adjudication for achieving success in social learning and doing. Then again, it may become innovative and generative, with novel content and open-ended processes for collaboration, initiation, and converting within relationships.

Phases of the new social domain, displayed just right-of-center in Table 1, can be summarized as social domain: relate, communicate, participate, negotiate, adjudicate, collaborate, initiate, and convert.

Piaget, Vygotsky, Bruner, Dewey, Gardner, and other well-known theorists and researchers have directed attention to the social order that is integral to education and the social nature of teaching and learning. DeVries (1997) noted that Piaget believed social factors are equal to cognitive factors in child development (Piaget, 1945/1995). Piagetian social theory focuses on the role of social interaction in development and on ways cooperative social interactions function to promote cognitive, affective, and moral development (DeVries, 1997).

In translating and editing Vygotsky's complex writings about thought, language, and learning, authors Cole, John-Steiner, Scribner, and Souberman (1962/1978) interpret his ideas to say that learning occurs when the child interacts with people in the environment and is in cooperation with peers to awaken internal developmental processes. Vygotsky contended that the only effective learning is that which is in advance of development. This belief led to his concept of a zone of proximal development: the distance between actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more able peers.

Kelly and Moon (1998) caution that current conceptions of social talent are crude in comparison to theories of intellectual ability. They cite a number of findings from recent debates regarding social intelligence. Four of the most relevant for the purposes here are:

1. Social and academic intelligence are distinct constructs.
2. Social intelligence consists of cognitive, affective, and behavioral skills.
3. Social intelligence is developed within and shaped by social context.
4. It remains to be demonstrated that social intelligence can be developed in school programs.

The last point is a challenge for educators to ponder and address. These two researchers believe current interest in emotional and social intelligence is just the beginning of a sustained period of interest in, and subsequent understanding of, personal and social talent.

In describing what the work world requires of school graduates and calling on schools to prepare them for it, the SCANS report (U.S. Department of Labor, 1991) targeted several interpersonal competencies needed to succeed:

1. Participates as a member of a team, contributing to group effort.
2. Teaches others new skills.
3. Works to satisfy expectations of customers/clients.
4. Exercises leadership, communicating and persuading and convincing others.
5. Negotiates to resolve divergent interests.
6. Works with men and women from diverse cultures and environments.

It is virtually impossible to negotiate, lead, and collaborate without the ability to relate, communicate, and participate in groups. This punctuates the need for a social domain that begins preparing children and youth in school for their future social roles and relationships. Classrooms are rich settings for social development; students as captives of the curriculum can be guided with the right curriculum through a wide variety of activities for developing social skills.

This may be an appropriate time to rethink a stereotype that has been around for a long time—that "elementary teachers teach kids, and secondary teachers teach content." On the contrary, elementary teachers should focus on content because young children yearn for it, and it can be enhanced with concomitant practice in social skills. Secondary teachers should address interrelationships and the socializing that adolescents crave, using students' appetite for interaction to enliven the content in which many show little interest or even outright disdain. During an assembly at a large high school, a prominent educational speaker posed the question "What do you like best about coming to school?" to a panel of high-achieving students and was visibly surprised at the identical response from each panelist in turn: "Being with my friends."

Teachers can take advantage of students' need for socialization and use their classrooms as a viable social system where talking, public reasoning, distribution of combined knowledge, collaborative problem solving, and shared projects serve an important role in learning (Leinhardt, 1992). As just one example, when teachers are helping students understand a work of complexi-

ty such as the Declaration of Independence, they can have them read and reread phrases aloud to discover meanings. All can discuss and debate the phrases and sentences. Leinhardt proposes that much more can be gained from group experiences like this than from having each student read all of the background material independently.

In studies of young children, researchers found that being competent with playground games forecasts boys' social competence and both boys' and girls' adjustment to first grade (Pellegrini, Kato, Blatchford, & Baines, 2002). Such findings reinforce earlier research (Ladd & Price, 1987) in which children's peer relations in school predicted school success. Many educators are increasingly concerned that children are losing opportunities to interact with their peers (Pellegrini et al., 2002). Children often go home to lock themselves into empty houses for safety. Playgrounds are closely supervised and refereed by adults. Class schedules are kept tight purposefully to minimize time for the mingling in hallways and restrooms that can initiate trouble in volatile school environments.

Schools and school-sponsored activities that can provide positive social configurations include but are by no means limited to: committees, teams, partnerships, councils, circles, discussion dyads and triads, study pairs, fraternities and sororities, organizations, friendships, cliques, bands, investigative groups, alliances, fellowships, leagues, clubs, societies, crews, assemblies, and camps. Other configurations for combining socialization and study can be: debate teams, work committees, after-school clubs, conflict resolution teams, community or school service project members, collaborative learning groups, Internet chat groups, book or current event discussion groups, problem-solving teams, tutoring dyads, music and drama ensembles, athletic teams, academic teams and clubs, presentation panels, student councils, pep squads, and much more. Even the grade-level class as a whole constitutes a group that can be tightly knit and loyal to one another, providing an instant social configuration for learning and doing activities.

Cooperative techniques have been declared successful in helping students learn, but the research is not convincing that gifted students benefit much. Those who do benefit probably do so because they are motivated to attain knowledge and understanding of the instructional goals (a cognitive function); therefore, they receive and respond to the aims of the tasks (affective), relate to the group and communicate effectively, and enjoy group activity (social). They accurately observe the needs of others in the classroom, react appropriately, and act to facilitate cooperative endeavor (sensorimotor). This sophisticated unity of domain functions does not just happen as a general rule. But it can take place when teachers plan with care and prepare students, then coach and monitor (from a distant sideline, but readily available) as the cooperative activity evolves.

All students need to learn new things and benefit from the cooperative activities: both the less able and the very able, not just the ones in the middle range of capability. If they do not, then cooperative learning and other kinds of group work are not constructive learning experiences. The capstone to learning together is set by analyzing the experience and evaluating the outcomes (cognitive activity), internalizing felt results (affective activity), authenticating the experience (sensorimotor activity), and adjudicating difficulties (social activity) to ensure greater success next time.

One type of cooperative learning that can be effective is the jigsaw method. If, for example, the learning task is to find out about endangered species in North America and efforts being made to preserve them, the objectives and materials can be divided among groups, with each bringing their learning back to the whole class for sharing and synthesis. This type of cooperative learning reflects the more complex and ideational phase 6 of collaboration, or laboring together for the good of each and every learner, including the teacher(s).

Are Domain Phases Parallel?

Processes in the four domains should not be treated as rigidly parallel functions. To illustrate, a second-phase function in one domain does not automatically accompany a second-phase function in another one. Cognitive-based comprehension does not categorically involve response in the affective domain, communication in the social domain, and reaction in the sensorimotor domain. But that scenario is likely (see Table 1).

If, for example, one is analyzing material, doing so with others in a social context would call for behaviors as complex as ones needed for negotiation. Conversely, when negotiating, there would be considerable analysis along with understanding and use of the prior knowledge in the cognitive domain, and with relating, communication, and participation in the social domain. The phenomenon is comparable to standing on one rung (phase) of a ladder and holding on to the sides (other domain phases). If the phases were not somewhat parallel in complexity, one would seem off balance. A particular phase could be slightly advanced on one side or the other, but the climber probably would feel a need to achieve balance.

Consequently, as an example, when teachers help learners develop communication skills, they are preparing them for the next rungs—to value affectively, participate socially, apply cognitively, and act with senses and movement on the content, with the plausible assumption that preceding phases in each domain have been developed and employed productively.

A Taxonomy for a Unified Domain

Several examples have been given up to this point for unifying the phases of all four domains into a function of the whole. Knowing, receiving, observing, and relating in social situations are components of unified *perception* in the first phase of the unified domain. Comprehending, responding to, reacting to, and communicating then build on the perception phase to obtain unified *understanding*. Applying, valuing, acting upon, and participating in, facilitate unified *use* of learning. See Table 1 to picture a synthesis of phases five through eight for the four domains into phases five through eight of the unified domain.

Phases of the unified domain, in the right-hand column of Table 1, can be summarized as unified domain: perceive, understand, use, differentiate, validate, integrate, venture, and originate.

Recommendations for Using the Taxonomies Productively

Taxonomies are not the be-all and end-all for curriculum development. They are not intended to be difficult, cute, rigid, or a shortcut for lesson plan-

ning. The four domains and the unified domain presented here are offered as a theory-oriented catalyst to induce thinking in different ways about curriculum, instruction, and assessment, and to provide a practical organizer that can be used in many aspects of teaching and learning by school personnel and students.

It is said that there is nothing so practical as a good theory. Strategies illustrating practical applications of educational taxonomies to teaching and learning include the following:

1. First and foremost, teachers of gifted students have known for some time that they must work in different ways for their messages and ideas to be accepted among school staff if they are to better serve their students' needs (Dettmer, 1993). Overarching taxonomies that frame definitive but flexible learning objectives such as the examples shown in Table 2 can help teachers of all students differentiate curriculum and teaching techniques in order to develop every student's potential.

2. Teachers need to let students in on what and how they plan to instruct by discussing what educational taxonomies represent, how they are put to use, and why. To help with this, an appealing tool that can be explained easily and understood by students of all ages is a metaphor of a flowering plant. Seeds for learning will take root in a rich environment. Then the first two, most basic leaves appear: knowing and comprehending. If these leaves wither, growth stops. But with the right nourishment (books, discussions, practice, study, collaborative work, sensory input, homework, praise, positive attitude, and so forth) more leaves appear higher and higher on the stem so that eventually the plant produces a beautiful bloom of learning and doing (Dettmer, Thurston, & Dyck, 2005). Plant posters that metaphorically show phases of learning could be displayed in the classroom, on corners of desks, in the locker room, in the music room, behind the theater stage, in hallways, and in the lunchroom.

3. Teachers can engage students in richer class participation experiences occasionally with a different way of assessing participation. Students would receive one point for a response at the comprehension level, two for an analytic response, three for synthesis, and so forth. The technique is predicated on students' familiarity with the "feel" of advanced phases of the taxonomies that are being featured and monitored especially for the exercise. It would need to be preceded by explanation and advance notice, perhaps by using the plant example described earlier. Such preparation is in and of itself a development tactic. Double credit could be given for a complex question asked for the good of the lesson, and perhaps more if a question or response is built on another student's remarks. It will be demanding of the teacher to orchestrate the interactions and keep score at least informally, but it should go more smoothly with practice and as students seek to demonstrate the skills that are being evaluated. One way of ensuring further growth is to have a debriefing session with students afterward.

4. Educators must refrain from regarding the taxonomies as recipes to be followed step by step and use them flexibly and openly instead. Searches for non-conventional curriculum materials and other teaching resources that can be helpful will turn up possibilities such as Aesop's Fables, maxims and credos, movies that make the targeted point, biographies of models and heroes, and thought-provoking descriptions of critical events in history.

5. Teachers can take advantage of opportunities to coach social behavior techniques (Brown, McEvoy, & Bishop, 1991) in order to improve peer interactions of young children, particularly for those who are delayed in social development. Five minutes of such instruction and practice in these days of fraying interpersonal and intergroup relationships can have immeasurable long-term value.

6. Development of social skills and graces needs to be a regular part of the curriculum at all age levels. Teachers should search for excellent materials to help teach and practice skills regularly such as: presentation to peers and to adults; introduction of self and others; how to state and restate one's idea; how to get included in a group and how to include others in a group; use of door openers to enter the conversation; ways of saying no persuasively; how to compromise; parliamentary procedure; techniques for resisting undesirable peer pressure (not all peer pressure is bad); how to be a good leader; how to be a good follower even if preferring to lead; good listening skills; understanding and use of body language effectively; management of bully behavior; appreciation of sign language; a code of caring social behavior; friendly talk for several minutes with someone not very well known or not very popular; comple-

Examples of Domain-Related Instructional Objectives

Cognitive Domain	
Will know basic elements of music notation	Phase 1 — know
Will set a short poem to music	Phase 6 — synthesize
Will set an original poem to original music	Phase 8 — create
Affective Domain	
Will attend appropriately when others speak	Phase 1 — receive
Will find two new areas of books in the library from which to read books for pleasure	Phase 3 — value
Will practice learned driving tips voluntarily and follow them when not being observed or graded	Phase 6 — characterize
Sensorimotor Domain	
Will imitate movements of basketball coach to improve dribbling skills	Phase 3 — act
Will correct improper keyboarding positions, making gains in speed each week for one month	Phase 4 — adapt
Will develop a new routine for the dance team	Phase 7 — improvise
Social Domain	
Will use body language and verbalization that invite positive interactions	Phase 2 — communicate
Will invite at least one new person into the game during free play each day for a week	Phase 3 — participate
Will lead a group service project for the kindergarten class's after-school program	Phase 6 — collaborate
Will initiate group action for improvement of hallway behavior during passing periods	Phase 7 — initiate

Table 2

tion of a service project for school or community; interview skills; managing conflict; anger control; turn taking; ways of handling interruptions; and good "netiquette" when on line.

7. Teachers have responsibilities and opportunities to recognize and encourage imaginative, creative thinking and behavior. A classic resource to help teachers reflect on and plan ways of doing this is *Rewarding Creative Behavior: Experiments in Classroom Creativity* (Torrance, 1965). Innovative questions, comments, and products are rewarded by accepting them and offering friendly critique if the owner wishes.

8. Students should be encouraged and guided to put more into their portfolios than just cognitive-based work such as tests and assignment charts. They also can self select and self assess examples and products of meaningful affective production such as an interest inventory, a self-portrait, an autobiography, or a bio-poem. Sensorimotor activities could be documented with a progress chart for exercises, dance movements, and walking; a video of improvisations; imaginative writing or drawing initiated by the senses; and notes of keen observations in senses-rich situations or environments. Social interactions could be recorded as taped conversations that were very productive and pleasant, a description of good deeds performed or volunteered service, collaborative enterprises, leadership episodes, description of a social incident handled successfully, and cooperative endeavors carried out well. Again, the possibilities are endless.

9. Educators must not sidestep assessment of objectives in any domain. School psychologists and counselors can help by finding or constructing instruments that measure affective, social, and sensorimotor development as well as cognitive growth. Cognitive outcomes are observable not only through grades, scores, and credits, but also in far/high-road transfer of learning shown as solutions, plans, examples, concept formations, verifications, critiques, certifications, revisions, unique ideas, and more. Affective outcomes can include enthusiasm, curiosity, confidence, self direction, positive assertiveness, self understanding, commitment, constructive fantasy, adjustment, resiliency, altruism, empathy, responsiveness, and much more. Sensorimotor outcomes may be skills, stamina, good health, self expression, proficiency or mastery, control, fitness, attempts, victories, and adjustment. Desirable social outcomes will include participation, communication, collaboration, teamwork, contribution, compromise, leadership, reconciliation, negotiation and arbitration, courtesy, modeling, assistance to others, and much, much more.

Assessment tools are to be developed at the same time instructional objectives are formed. Examples of ways to assess cognitive learning include test scores, grades, progress reports, testing out, summary narratives, student use of library, Internet and other sources, and adjudication and review by experts. Affective learning is more difficult to assess, but can be addressed through interviews, student self-report, dropout and absentee rates, survey, and observation. Sensorimotor development is measured with data recording, skill and progress charts, opinions of experts, checklists, video/audio records, self-report, safety records, and demonstrated success in sensorimotor-based events. Social development is demonstrated through participation levels, peer-report, sociograms, counselor and teacher judgment, peer selection and election, and observation of monitored activities. Ways of assessing unified learning include portfolios, exhibits, product and performance assessments, judgments of experts, and completion of individual education plan (IEP) goals.

Summary

Teachers, school administrators, curriculum planners, professional development personnel, related services personnel, and most certainly students will benefit from studies and dialogues on effective ways of developing all domains of learning and doing. Parents and other community members can be included to add richness of experiences and broad perspectives to the discussions.

Educators should never regard frameworks for educational taxonomies as finished and perfect. Research and development must be ongoing and the resulting information shared widely. Much remains to be studied, rethought, created, revised, and studied again as teachers teach and learn, and students learn and do.

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