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# Universal Design for Instruction

## *A New Paradigm for Adult Instruction in Postsecondary Education*

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### ABSTRACT

Postsecondary education has experienced rapid change in its student population. College students with learning disabilities (LD) represent a growing presence on college campuses across the country. Traditional means of meeting the learning needs of college students with LD through retrofitted changes and accommodations to classroom instruction have proven limited. Universal Design for Instruction (UDI) offers a new paradigm for approaching equal educational access. This article will describe UDI and discuss its implications for enhancing learning for students with learning disabilities and other diverse learners.

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**T**HE INFORMATION AGE IS MAKING POSTSECONDARY education a personal and national necessity. For example, in 1999 students who graduated from college earned, on average, between 58% and 92% more than those just graduating from high school. More than 15 million students enrolled in postsecondary education during 2000—about two of every three high school graduates (U.S. Department of Education, 2000b). As James J. Duderstadt, President Emeritus of the University of Michigan, notes, “We must respond to the rapidly evolving needs of numerous and diverse stakeholders, [and] question existing premises and arrangements” (U.S. Department of Education, 2000a, p. 6). Two of the major challenges needing attention are access to and outcomes of postsecondary education for the increasingly diverse student population. This article focuses on a new paradigm for instruction in postsecondary education to foster access for students with learning disabilities and other at-risk students.

### CHANGING STUDENT DEMOGRAPHICS

#### *Students with Disabilities*

Students with disabilities are attending college in increasing numbers. According to the National Center for Education Statistics (1999), of those students who graduated from high school in 1992, 63% of all students with disabilities and 56% of students with learning disabilities enrolled in college, compared with 70% of students who did not have a disability. This postsecondary enrollment trend has resulted in the percentage of full-time college freshmen with disabilities increasing from 2.3% in 1978 to 9.8% in 1998. Students with learning disabilities alone now make up 3.5% of the freshman class (Henderson, 1999). Given that students with learning disabilities in the public schools increased by 37% in the decade of the 1990s (U.S. Department of Education, 2000a) and that the Individuals with Disabilities Education Act (IDEA) Amendments of 1997 have put greater emphasis on transition planning for students with disabilities, it might well be anticipated that there will continue to be growing numbers of students with learning disabilities attending postsecondary institutions in years to come.

#### *At-Risk Students*

The United States has seen major changes in its demographics over the last several decades, with significant repercussions in postsecondary education. Childhood poverty, immigration, family mobility, failing inner-city schools, and divorce, among other factors, have combined with the trend toward increased

college enrollment to change the complexion of higher education. In July 2000, the American Council on Education (ACE) reported that about two thirds of “at-risk” students not only persist in high school but go on to enroll in college. ACE defines at-risk factors as changing schools two or more times, being held back in a grade, coming from a low-income or single-parent household, grades of C or lower, and having a sibling who drops out of school. Fifty-eight percent of 1992 high school graduates had at least one factor that placed them at risk for not completing high school or attending college. Nevertheless, more than 75% of those with one risk factor went on to enroll in some type of postsecondary education (ACE, 2000).

### **Other Forms of Student Diversity**

In a similar vein, students from underrepresented groups have made significant gains in college enrollment in the last 15 years. According to the National Center on Education Statistics, between 1986 and 1996, college enrollment of students of color increased 61%. Hispanics alone posted a gain of 86% during that 10-year period, and African American enrollment increased by 39%. African Americans now make up nearly 11% of college students, and Hispanics make up 8% (ACE, 1999). Population trends indicate that those numbers will increase to 13.2% and 15% respectively by 2015 (Lords, 2000).

There are also other forms of student diversity reflected in recent demographic data. In the annual *Chronicle of Higher Education* almanac (Almanac Issue, 2000), the 1998 demographic profile of students indicated that 39.5% of the student population was 25 or older; 11% more women than men were enrolled; and 43% were attending college part-time. There is little argument that student diversity enhances postsecondary education. Diverse postsecondary environments have a positive impact on students’ cognitive and personal development by broadening perspectives and challenging stereotypes (ACE, 1999; American Council on Education & American Association of University Professors, 2000). There is also no doubt that the exponential growth in many forms of student diversity, ranging from culture to life experience to educational background to learning needs, challenges the instructional process. If postsecondary education provides the critical opportunity for upward mobility and adult success, effective means must be found for institutions of higher education to meet the learning needs of this growing population.

## **INSTRUCTIONAL CHALLENGES**

Traditionally, the instructional needs of college students with disabilities have been addressed within the context of legal mandates for nondiscriminatory treatment. Legislation including two civil rights laws, the Americans with Disabilities Act

(ADA) of 1990, and Section 504 of the Rehabilitation Act of 1973 established that qualified students with disabilities are entitled to equal access to postsecondary education. Typical approaches to nondiscrimination consist of accommodating the regular class procedures for instruction and assessment. For example, common accommodation procedures require that a student with a disability self-identify as having a disability to the class instructor within the first weeks of class, provide documentation to authorized campus disability professionals that verifies eligibility for accommodations, request specific accommodations based on the disability (e.g., extended time on tests), and wait for adjustments to be implemented (e.g., confirming and clarifying coordination with the disability services office, provision of a note taker, location of a reader, etc.).

These traditional approaches to serving college students with learning disabilities make less sense in the context of the changing demographics facing institutions of higher education. Making individual accommodations may have seemed manageable when students with learning disabilities were a small, and almost invisible, cohort of the college population. Today, growing numbers of students with apparent and hidden disabilities combined with students at risk for academic failure require new approaches to provide accessible and effective instruction for this diverse cohort of college learners.

The prescriptive IDEA requiring a free, appropriate education is not applicable in postsecondary settings. Therefore, special education services, assessment, and personnel are typically not available after high school graduation. Section 504 of the Rehabilitation Act of 1973 and the ADA (1990) provide for equal access for “otherwise qualified” students but allow colleges and universities to maintain academic standards (Brinckerhoff, McGuire, & Shaw, 2002). College faculty, however, have typically been focused on content, not pedagogy, raising concerns about their willingness and ability to provide effective instruction, especially for those with disabilities (Bigaj, Shaw, & McGuire, 1999; Houck, Asselin, Troutman, & Arrington, 1992; Stodden, 2000).

The twenty-first century has brought with it new opportunities to improve instruction for college students with learning disabilities and students at risk for failure. Students are now perceived as consumers to whom colleges have to market their most important product: instruction (Shaw, Scott, & McGuire, 2001). There has been an increasing emphasis on supporting and rewarding effective instruction (Magner, 1998). Effective teaching has become a more important aspect of the professorial role, with increased emphasis in terms of compensation and new recognition of excellence in teaching. The turnover in the professorial ranks during this decade provides an opportunity to emphasize and reward effective teaching with the untenured junior faculty beginning their careers. The availability of information technology provides tools to support instructional approaches previously not feasible in the college classroom.

Postsecondary disability services are also moving in a new direction. Historically, disability personnel in both public schools and postsecondary education have experienced tension working with instructors. Although the IDEA has fostered placement in regular education classrooms in K–12 settings since 1978, public school faculty still express concern that they are not prepared to instruct students with disabilities. The Regular Education Initiative of the 1980s, which was intended to encourage serving students with disabilities in general education classrooms, had a fatal flaw: It did not involve regular educators (Kauffman & Hallahan, 1995). In higher education, disability service personnel have focused faculty outreach activities on training pertaining to legal mandates, compliance requirements, and office procedures (Scott & Gregg, 2000). In recent years, there has been increasing acknowledgment of the need to work more collaboratively with college faculty. Those perceptions must move to the next level, beyond mere collaboration for legal compliance. A focus on effective instruction by faculty offers a powerful and proactive approach for providing equal educational access (Scott & Gregg, 2000).

A major role for personnel in the office for students with disabilities is now seen as collaboration with faculty and other postsecondary personnel to help students become self-determined, independent learners (Shaw, McGuire, & Madaus, 1997). The Association on Higher Education and Disability (AHEAD) recently promulgated program standards for disability services in higher education (Shaw & Dukes, 2001) that reinforce this collaborative role in instruction. These standards were determined through a rigorous empirical process and reflect overwhelming consensus among postsecondary disability service providers regarding essential programmatic components (Dukes, 2001). Four standards in the category of Faculty/Staff Awareness encourage consultation with faculty. In another category, Instructional Interventions, seven items were proposed, most of which involved content tutoring and remedial education. Notably, only one item in this category, “Advocate for instruction in learning strategies,” was approved as a standard (Shaw & Dukes, 2001, p. 85), reinforcing the collaborative role with faculty and the focus on effective instruction as opposed to accommodation.

This focus on instruction will require not only a change in attitude but also a new approach to services for students with disabilities. There have been challenges to the traditional special education model of *identify, label, tutor, and accommodate* that suggest it has not been effective and needs to be replaced (Finn, Rotherham, & Hokanson, 2001; Scotch, 2000). Brinckerhoff et al. (2002) recommended a new paradigm in which “the goal should center upon serving students with disabilities in universally accessible learning environments. Just as a student in a wheelchair needs no disability services in a physically accessible environment, a student with LD may need no disability services in an instructionally accessible environment” (p. 481).

There are few data that demonstrate that students with learning disabilities have succeeded in college, graduated, or developed skills to prepare themselves for professional positions. Increasing reliance on support services, modifications, and accommodations have not fostered effective learning or positive outcomes. A new paradigm for instruction of college students with learning disabilities is needed. Universal Design for Instruction (UDI) is a model that provides a comprehensive approach to effective instruction for students with learning disabilities and a broad range of diverse learners.

## UNIVERSAL DESIGN: AN INTRIGUING CONCEPT

The term *universal design* (UD) was coined in the early 1970s by Ronald Mace, the founder of the Center for Universal Design at North Carolina State University (NCSU). Over the past 30 years there has been growing awareness within the architectural and design fields of the value of UD. Emanating from a newly articulated value system, designers and architects embracing UD have asserted that they have a responsibility to proactively consider human diversity in the design of public spaces so that resulting environments and products are usable by the intended audience: the diverse public (Welch, 1995; Wilkoff & Abed, 1994).

### *What Is Universal Design?*

The Center for Universal Design at North Carolina State University has defined UD as the design of products and environments to be usable by all people to the greatest extent possible (*The Center for Universal Design*, 1997). When principles of UD are applied to the physical environment, adaptations benefit a broad range of users and are built in rather than added on as an afterthought. For example, a ramp to a building could be viewed as an accommodation providing access for an individual using a wheelchair. However, it is also useful for a parent pushing a baby stroller or a delivery person carrying large packages. When the ramp is integrated into the architectural and landscape designs from the outset, aesthetics of the building are not compromised, but the “usability” by the public has been broadened. Other examples might include the use of large-print signage (benefiting the elderly, individuals with visual impairments, or people in a hurry); electronic door openers; or the height of elevator call buttons, drinking fountains, or public telephones (increasing usability by individuals using wheelchairs, children, or people of short stature). UD, therefore, entails awareness of human diversity, anticipation of a variety of needs, and an intentional approach to designing an inclusive environment (*The Center for Universal Design*, 1997; Covington & Hannah, 1997).

Is there an analogy to be found here for instruction in higher education? Can we anticipate the diversity of students

in the classroom and build in approaches to learning and assessment that are more inclusive of a broader range of learning needs? Continuing this comparison, will incorporating these ideas result in an environment that is more universally designed and “usable” by a broader range of students while maintaining the “aesthetics” of the product (i.e., the academic integrity of the course)?

For any instructor concerned about the frequently impromptu practice of retrofitting changes and accommodations to a course (e.g., adjustments in assignments, exams, or attendance expectations) to address individual student needs, this notion of proactively designing instruction that is responsive to diversity in learning is worthy of further exploration. Just as after-the-fact architectural accommodations are often awkward and expensive, after-the-fact instructional adaptations can be time-consuming and difficult to implement. For example, in our experience, some faculty struggle with requests from students with learning disabilities for accommodations in the classroom. Providing a student with a documented learning disability with extra time on an exam can create logistical issues that, in the best of circumstances, should be addressed during the hectic first weeks of class. Where will the accommodated test be administered? Who will proctor the exam? Beyond the additional time and effort, such requests may lead the instructor to questions about the impact of after-the-fact changes on the integrity of the class. Is this fair to other students? Does this accommodation change the nature of the assessment? Applying the principles of UD to college instruction may provide tools for addressing disability access and other legitimate student needs in a proactive way that preserves the integrity of the course while promoting learning for a broader range of students.

### **Initial Responses**

In our discussions with colleagues about applying Universal Design to instruction in higher education, we have found that the concept is variably perceived as either intriguing or off-putting. Those who see the value of designing instruction in a universal fashion have noted the strong intuitive appeal for reaching the broad range of student needs they are experiencing in the classroom. Approaching instructional design and diversity in a holistic manner holds tremendous potential for providing effective instruction. Others, though far fewer, find the notion of UD for instruction as off-putting. Questions and comments have arisen such as these: “Are you suggesting one-size-fits-all for college teaching?” “Is ‘universal’ a euphemism for a more generic approach to instruction that will lower standards?” “Claiming that instruction can be universal is not realistic.”

Indeed, Patricia Silver and her colleagues at the University of Massachusetts, Amherst, began an initial discussion of the UD concept in higher education by conducting a focus group with faculty to tap their thinking about applying UD in the area of instruction (Silver, Bourke, & Strehorn, 1998).

They concluded that Universal Design would reduce student needs for campus support systems, make diverse student learning needs an integral component of all instructional planning, and ultimately benefit all students in the class. They also noted that UD would serve to complement current approaches to effective teaching in higher education.

## **UNIVERSAL DESIGN IN EDUCATIONAL SETTINGS**

The value of Universal Design as it applies to educational settings and instruction is under exploration in a number of areas (Bowe, 2000; Center for Applied Special Technology, 1999; McGuire & Scott, 2002). Yet there are considerations for implementing Universal Design in instruction in postsecondary settings that warrant distinct examination. Although all educational environments unarguably exist for the purpose of promoting learning, there are differences between the instructional milieus of colleges and K–12 classrooms. Whether the adult learner is transitioning directly from secondary to postsecondary education or is accessing higher education at a later stage in life, he or she will enter settings in which the instructional context is likely to vary substantially from previous settings.

Primary attributes that distinguish K–12 from postsecondary instructional environments include these: (a) legal mandates relating to educational access; (b) specification of the curriculum; and (c) preparation of instructors. As noted, legal protections for students with disabilities under the IDEA are clearly prescribed. Every student with a disability in the K–12 system is entitled to a free, appropriate public education. Furthermore, if related services are required to ensure this education, they, too, must be provided at no cost to the student or parent. In contrast, students with disabilities are not entitled to a postsecondary education, and, in fact, not every student with a disability can or should access higher education. Colleges are not required to alter academic and technical standards, meaning that students with disabilities must demonstrate they are qualified in order to pursue higher education (Rothstein, 2002). Upon enrollment, no student with a disability in a postsecondary setting is entitled to an individualized instructional program. Colleges are required to provide reasonable accommodations and auxiliary aids on a case-by-case basis, but there is no mandate to create an educational program to meet individual needs.

A second area of difference between the two systems relates to curriculum and curriculum materials. Under the IDEA Amendments of 1997, students with disabilities must be ensured access to the general education curriculum. Curriculum is defined as “not only . . . the instructional materials used for learning, but also . . . the course of study for each discipline and the scope and sequence within each grade level necessary to build conceptual understanding” (Mastropieri & Scruggs, 2000, p. 173). Curriculum and instructional materials in the K–12 system are regulated through state education

codes, and there is a growing trend for states to develop regulations that require textbook series adopted by school districts to include digital or technology-based materials. Twenty-two states, referred to as “adoption states,” now have legislated a process for approval or adoption of instructional materials (Texas Education Agency, 2001). As an example, California code requires that instructional materials used in the K–12 system include technology-based supplementary materials designed “to provide for meeting the diverse educational needs of pupils with a language disability” as well as those students whose educational needs are “reflective of a condition of cultural pluralism” (California Education Code, Section 60010). In summary, at the K–12 level, curriculum is specifically defined and delineated through state regulations, including parameters in 22 states for the selection of textbook and instructional materials and an emerging emphasis on products that are digitally formatted.

In postsecondary settings, the role of state governance in delineating elements of the curriculum is generally far less prescriptive than in the K–12 system. Curricula and courses differ tremendously among liberal arts, research, vocational, and technical colleges and universities (Morelli, 1999). Although certain disciplines (e.g., education, accounting, occupational therapy) are guided in their curricular offerings by professional standards and certification requirements, many more embody flexibility of curriculum. Furthermore, the trend in the K–12 system toward state textbook adoption policies is not reflected in postsecondary education. Faculties often are autonomous in their selection of course textbooks, and they may decide to use a different text or revised edition every year. Whether the higher education system will follow the lead of the 22 textbook adoption states is noteworthy. In fact, the California Community College system is presently overhauling its system so that students with visual impairments can access print and computer-based information to the same extent as students without disabilities (California Community Colleges, 2001). A clearinghouse will produce books and other documents in alternative formats, and a log of available publications will make it easier for colleges to respond to requests more efficiently. At the present time, however, curriculum and instructional materials in postsecondary education vary greatly, with limited state statutory oversight regarding their selection. For students with disabilities, flexibility in curricular requirements at the postsecondary level speaks to the importance of carefully choosing a college or program that constitutes a suitable match with learning strengths, weaknesses, and interests. Faculty flexibility in choice of curricular materials can, however, create a challenge for students who rely on an audiotape or electronic version of a text, because timely ordering of materials is essential and a decision to change a textbook shortly before the start of a semester can create a barrier.

Another attribute that distinguishes K–12 from postsecondary settings is the preparation of personnel to teach. A comprehensive system of personnel development is an inte-

gral component of the IDEA. Elementary and secondary classrooms are staffed with teachers and paraprofessionals trained in special education and related services fields. Government funding of personnel preparation projects has targeted both preservice and professional development initiatives, and today there are more than 800,000 teachers and related services personnel providing services to children with disabilities (U.S. Department of Education, 2000c). In contrast, preparation for teaching in higher education settings derives primarily from graduate and professional training programs. Faculty have expertise in content, not pedagogy. There are no requirements for training in effective instructional strategies, let alone training to work with students with disabilities. Paradoxically, despite the absence of specialized professional training or preparation, postsecondary instructional environments are by nature fully inclusionary under the definition of inclusion discussed by Alper, Ryndak, and Schloss (2001): “Inclusion generally refers to the practice of educating students with disabilities alongside their chronological age peers in the same classrooms they would be in if they didn’t have disabilities” (p. 2). With only a few specialized postsecondary settings or programs that are exclusively geared toward the instruction of students with learning disabilities (Brinckerhoff et al., 2002), college students with disabilities are most often fully integrated into classes and programs with nondisabled peers. Yet faculty are often unaware that validated instructional practices exist that can enhance the learning environment for students with learning disabilities.

It is, therefore, essential to consider the unique context variables of higher education, and it is timely that federally funded initiatives to enhance access to postsecondary education for students with disabilities include creative ideas to promote faculty development (U.S. Department of Education, n.d.). With the increasing diversity of the student population comes the need for increased diversity of instruction (Upcraft, 1996). Although certain attributes of the higher education system are slow to change (e.g., criteria for promotion and tenure), the emphasis on learning and students as consumers creates a backdrop for innovation in instructional resources that faculty can use as they reflect on the craft of teaching.

## APPLYING UNIVERSAL DESIGN TO COLLEGE INSTRUCTION

We first approached the task of applying UD to college instruction through the framework of the seven principles of Universal Design developed by the NCSU Center for Universal Design (*The Center for Universal Design*, 1997). These principles are widely acknowledged and cited as seminal in the field of UD. They delineate considerations for the “usability of an environment” based on a broad spectrum of human abilities, including vision, hearing, speech, body function,

mobility, and cognition. Our intent was to examine college instruction in light of these principles, and to take a more in-depth look at what might constitute UD in an instructional environment. We anticipated that many “usability” features of UD would be applicable to the college classroom. However, given the nature of instruction, we also anticipated that UD in this environment would entail a greater expansion of principles in the areas of cognition and learning.

### ***Underlying Assumptions About Effective Instruction***

Two underlying assumptions pertaining to effective instruction have influenced our thinking in applying and considering the value of these principles of UD that are now incorporated into the curricula of architectural degree programs in a number of colleges. In college classrooms, student diversity is increasingly becoming the norm. It is our assumption that the role of the college instructor is to teach these diverse students and, indeed, all students in the classroom as effectively as possible without compromising academic standards and expectations. We do not espouse a philosophy of “weeding out” the “unqualified” student.

Our second assumption is that when designing or refining college instruction to meet the needs of various students, an integrative approach is preferable to multiple separate solutions. Approaching instruction and diversity from a holistic perspective provides a more cohesive instructional environment for the broad range of students. In contrast to instructional situations in which constant exceptions create the potential to dilute instructional goals, compromise standards, or provide different or varying expectations, we assert the functional integration of strategies and methods to address diverse student needs as preferable. In addition to promoting consistency of academic goals and standards, an integrative approach encapsulates a significant paradigm shift in instruction from making exceptions for “different” learners to anticipation and planning for student diversity as the norm.

### ***Our Process***

We began with an extensive review of the literature on Universal Design, effective instruction in higher education, and effective instruction with students with learning disabilities in both secondary and postsecondary educational settings. We included the area of learning disabilities because these students, by definition, represent a broad range of learning and cognitive differences that often challenge traditional notions of college instruction. In light of this review, we found the principles of UD to be quite encompassing as a framework for inclusive college instruction. Working with seminal principles identified in higher education by Chickering and Gamson (1987), and emerging guidelines for inclusive education at the K–12 level from the Center for Applied Special Technology (1999) and the National Center to Improve the Tools

of Educators (Kameenui & Carnine, 1998), we viewed these four sources in tandem, with particular attention to overlaps across principles as well as gaps in the literature base. (See Scott, McGuire, & Foley, 2001, for more information about the development and ongoing validation of the UDI principles.)

### ***The Principles of Universal Design for Instruction***

Table 1 outlines the resulting nine Principles of Universal Design for Instruction<sup>®</sup>. For each principle, a definition and example are provided. While each of the examples demonstrates an application of the principle, the examples are not necessarily universal in reflecting all of the nine principles, but illustrate the intent of the principle under consideration. Because the principles of UDI are intended to be a framework to inform faculty planning and practice rather than a rigid procedure or prescription for instruction, it is perhaps most useful to illustrate UDI with a case study.

### ***Case Study: One Professor’s Response to Student Diversity in the Classroom***

When Debra Smith began teaching biology at Randolph College, she taught undergraduate classes. Based on her own experiences as a teaching assistant in graduate school, she structured her large classes in a lecture format and administered multiple-choice tests three times during the semester.

She was surprised when early in the semester some students approached her requesting extra time on tests and someone to take their notes. Official letters from the campus office of students with disabilities said that these students experienced barriers to learning because of obstacles such as dyslexia and attention-deficit disorder and were thus eligible for certain accommodations in the classroom.

“Come on,” the biologist thought. “If you’d work harder, you’d get it.” That was 7 years ago. As Smith learned more about this college minority, with their obvious capability but inconsistent academic performance, she started to question her teaching. She also began to notice other “nontraditional” students in her classroom: students who were older and had responsibilities of a family and employment; students from the growing Hispanic population who spoke English as a second language; and students of ethnic and racial minorities.

“Part of me started to raise the question: If strategies like extended test time and a note taker help one student, might they not help others?” Smith initially turned to a few trusted colleagues in her department. What did they do to address this range of diverse students’ learning needs? Smith got a mixed response. Some of her colleagues advised her not to worry about it. “Publications are what counts. Besides, you’re doing these students a favor by weeding them out early if they can’t meet the department’s standards.” One colleague suggested she visit the teaching and learning center on campus to see if its staff had any suggestions.

**TABLE 1. The Nine Principles of Universal Design for Instruction©**

Principle	Definition	Example(s)
Principle 1: Equitable use	Instruction is designed to be useful to and accessible by people with diverse abilities. Provide the same means of use for all students; identical whenever possible, equivalent when not.	Provision of class notes online. Comprehensive notes can be accessed in the same manner by all students, regardless of hearing ability, English proficiency, learning or attention disorders, or note-taking skill level. In an electronic format, students can utilize whatever individual assistive technology is needed to read, hear, or study the class notes.
Principle 2: Flexibility in use	Instruction is designed to accommodate a wide range of individual abilities. Provide choice in methods of use.	Use of varied instructional methods (lecture with a visual outline, group activities, use of stories, or web board–based discussions) to provide different ways of learning and experiencing knowledge.
Principle 3: Simple and intuitive	Instruction is designed in a straightforward and predictable manner, regardless of the student’s experience, knowledge, language skills, or current concentration level. Eliminate unnecessary complexity.	Provision of a grading rubric that clearly lays out expectations for exam performance, papers, or projects; a syllabus with comprehensive and accurate information; or a handbook guiding students through difficult homework assignments.
Principle 4: Perceptible information	Instruction is designed so that necessary information is communicated effectively to the student, regardless of ambient conditions or the student’s sensory abilities.	Selection of textbooks, reading material, and other instructional supports in digital format or online so students with diverse needs (e.g., vision, learning, attention, English as a Second Language) can access materials through traditional hard copy or with the use of various technological supports (e.g., screen reader, text enlarger, online dictionary).
Principle 5: Tolerance for error	Instruction anticipates variation in individual student learning pace and prerequisite skills.	Structuring a long-term course project so that students have the option of turning in individual project components separately for constructive feedback and for integration into the final product; provision of online “practice” exercises that supplement classroom instruction.
Principle 6: Low physical effort	Instruction is designed to minimize nonessential physical effort in order to allow maximum attention to learning. Note: This principle does not apply when physical effort is integral to essential requirements of a course.	Allowing students to use a word processor for writing and editing papers or essay exams. This facilitates editing of the document without the additional physical exertion of rewriting portions of text (helpful for students with fine motor or handwriting difficulties or extreme organization weaknesses, and provides options for those who are more adept and comfortable composing on the computer).
Principle 7: Size and space for approach and use	Instruction is designed with consideration for appropriate size and space for approach, reach, manipulations, and use regardless of a student’s body size, posture, mobility, and communication needs.	In small class settings, use of a circular seating arrangement to allow students to see and face speakers during discussion—important for students with attention deficit disorder or who are deaf or hard of hearing.

*(table continues)*

Principle	Definition	Example(s)
Principle 8: A community of learners	The instructional environment promotes interaction and communication among students and between students and faculty.	Fostering communication among students in and out of class by structuring study groups, discussion groups, e-mail lists, or chat rooms; making a personal connection with students and incorporating motivational strategies to encourage student performance through learning students' names or individually acknowledging excellent performance.
Principle 9: Instructional climate	Instruction is designed to be welcoming and inclusive. High expectations are espoused for all students.	A statement in the class syllabus affirming the need for class members to respect diversity in order to establish the expectation of tolerance as well as encourage students to discuss any special learning needs with the instructor; highlight diverse thinkers who have made significant contributions to the field or share innovative approaches developed by students in the class.

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Through the campus teaching and learning center, Smith encountered other faculty dealing with similar questions. Mark Goodwin, a professor of psychology, described how he provides a "quiet room," whenever possible, for all students taking his exams (Principle 1, Equitable Use). This optional testing space allows students to be more spread out and have fewer distractions. It is also frequently an accommodation provided to students with learning disabilities. Goodwin also considers time in the development of tests. Though he designs tests to last 1 hour, all students are permitted to use the entire 90-minute class period if needed (Principle 1, Equitable Use; Principle 5, Tolerance for Error). "It takes the stress off for all students," says Goodwin.

Pam Rhodes, an associate professor of English, noted, "At first I just didn't get it. I had gotten through graduate school just fine with textbooks and lectures. But when a student who was blind asked for my class syllabus early so she could get the books tape-recorded a lightbulb went on for me." Rhodes now makes a special effort to select assigned reading that is available on CD-ROM or other electronic formats whenever possible (Principle 1, Equitable Use; Principle 2, Flexibility in Use; Principle 4, Perceptible Information).

Smith was energized to know that other colleagues were grappling with similar questions of how to teach Randolph's diverse students. She had initially learned from the office of students with disabilities that federal law says that students with disabilities must be reasonably accommodated, but she wanted to go further.

Taking a hard look at her own teaching practices, Smith thought she was an effective lecturer. Student feedback had

indicated that she made good use of stories, humor, and real-life events that made her lectures engaging to students. She didn't want to change what she was already doing well, but could she do more? Over time, Smith's reliance on lectures gave way to periodic group work and collaborative problem-solving assignments (Principle 2, Flexibility in Use). Students were given the opportunity to replace the lowest test score with a project grade (Principle 5, Tolerance for Error). Smith now puts lecture outlines on the Web, and anyone who asks may get copies of notes taken by students she rewards with extra credit (Principle 1, Equitable Use; Principle 4, Perceptible Information; Principle 8, Community of Learners). She learned from many semesters of student evaluations that a broad range of students appreciated her organized and comprehensive syllabus. She decided to take this a step further and provide a "newsletter" for each class session. The newsletter reiterated where students should be in their reading, provided key illustrations of concepts to be covered in class, and provided a thought for the day. "I've come to realize," Smith notes, "that it's very important that I share some of my enthusiasm for biology with my students—that I help them see what a difference it makes to really be committed to doing their best for the short class time we have together" (Principle 3, Simple and Intuitive; Principle 9, Instructional Climate).

"It's been a real learning process," says Smith. "I guess I've come a long way from my early days of just trying to lecture on the material in the text." Smith is among many faculty members around the country intrigued by teaching students with learning disabilities and challenged to change the way they teach everyone.

## DISCUSSION

Universal Design for Instruction holds great potential for expanding inclusive teaching practices in higher education. As exemplified in the case study, UDI is not a radically new way of teaching. In fact, it is intentionally built on what people in the field already know from research and practice about creating an accessible environment and good teaching. In our experience talking with faculty acknowledged to be outstanding college teachers, we have met many who report engaging in an exploratory process similar to that of Debra Smith in the case study. These excellent teachers are already using many inclusive practices in their classrooms, though they are not calling their instructional approaches UDI. Many of these dedicated teachers have also spent years of trial and error in responding to student needs in their college instruction.

The principles of UDI build on this knowledge base and provide a framework for thinking about inclusive instructional strategies. By identifying each of the nine areas extrapolated from the literature, the principles provide a rubric not previously available to faculty. Given the broad nature of the principles, several applications are in keeping with faculty development initiatives on college campuses and the broadly varying needs of individual faculty members interested in enhancing their teaching:

1. The principles are written in a tone and with content to support the instructional design process and to offer faculty guidance to integrate instructional features that will meet the needs of diverse learners. The UDI principles can be applied to components of instruction (e.g., textbook selection, delivery of instruction, student assessment methods) with the goal of creating an instructional environment that is more universal over time.
2. The principles also serve as a developmental tool to support faculty self-reflection as they examine their own instruction. By using the principles, faculty are assisted in placing the goal of proactively considering student diversity as a priority in the process of revising and refining a course.
3. Finally, the principles may be used for professional development of faculty and others interested in characteristics of more inclusive instructional products, environments, and approaches to learning in the college classroom. This may prove particularly useful in training programs for junior faculty and graduate teaching assistants seeking support in instructional design.

Though many faculty are intrigued with the potential of UDI, implementing it in college classrooms will be no small

undertaking. Indeed, we are asking faculty to increase their awareness of pedagogy and student diversity and alter existing practices in the classroom. Creating a paradigm for access within an educational system will obviously take time. Instructional change on a large scale will optimally occur in increments as more faculty develop and incorporate inclusive teaching practices over time. Though a goal of UDI is to diminish the need for retrofitted accommodation of students with disabilities, individualized accommodations for students with disabilities (e.g., use of assistive technology to access instructional materials) must be assured as faculty continue to approach the goal of universally designed instruction.

In order to provide faculty with support in this ongoing instructional development process, the University of Connecticut's Center on Postsecondary Education and Disability is developing a Web site resource specifically for faculty. As part of a 3-year federal grant provided through the U.S. Department of Education, Office of Postsecondary Education, the Web site ([www.facultyware.uconn.edu](http://www.facultyware.uconn.edu)) contains resources and information about UDI that faculty around the world can access online. To support the implementation of inclusive instructional practices, the site hosts a large repository of high-quality instructional products submitted by college faculty from across the country and selected for publication on the Facultyware site through a blind peer review process. Those instructional tools found to be of high quality and to reflect the principles of UDI are showcased on the Facultyware Web site and available as freeware for other faculty wishing to enhance their instruction of diverse learners.

## FUTURE DIRECTIONS

Although the principles of UDI are grounded in the literature, and early construct validation through student focus groups, faculty interviews, and college administrator discussions has been affirming (see Scott, McGuire, & Foley, 2003, for a more complete description of these activities), it will be important to move this critical analysis to the next level by conducting systematic research on the effectiveness of UDI. Indeed, research should address the effectiveness of UDI through such questions as these: Does it enhance instructional outcomes? Will it reduce the need for accommodations for students with disabilities? What considerations need to be made for the acceptance and ease of use by faculty? What institutional support is needed for faculty to implement these strategies and approaches in their college classrooms?

In the course of our work applying UD to college instruction, compelling questions have emerged about the application of UDI to other educational settings, such as the K-12 or adult education systems. Though the underlying principles of UDI would be anticipated to generalize across settings, we have found that significant context variables (such as different legal mandates, curriculum, and professional preparation procedures discussed previously) will

warrant future research to optimize the application of the principles for practitioners in different settings. For example, in the K–12 environment, what is the role of accessible curricula in providing educational access? How will accessible curricula interface with UDI? In the adult education arena, variables such as the diverse professional preparation of staff and the widely varying educational contexts will need to be explored.

Universal Design for Instruction is indeed a new paradigm for adult instruction in postsecondary education. It requires that faculty anticipate student diversity in the classroom and intentionally incorporate inclusive teaching practices. The UDI model shifts the primary responsibility for providing equal educational access from retrofitted accommodations often spearheaded by reminders of legal mandates from a disability services office, to the proactive consideration and use of inclusive teaching strategies identified by college faculty. The beneficiaries of UDI extend beyond those protected by civil rights nondiscrimination laws (i.e., students with disabilities) to the growing number of diverse learners found on college campuses. Perhaps most important, UDI provides a powerful tacit message—that student diversity is now the norm and college instructors are welcoming all students through the creation of inclusive instructional environments. ■

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