Universal Instructional Design: Not Just One Size Fits All

Fourth Annual Lindback Lecture

March 21, 2006

Presented by:

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2005 Lindback Award Winner

Community College *of* Philadelphia

Community College of Philadelphia is pleased to recognize excellence in teaching by bestowing the Lindback Distinguished Teaching Award on a member of our College faculty. This annual award, which is supported by the Christian R. & Mary F. Lindback Foundation, recognizes demonstrated excellence in teaching, the primary award criterion established by the Foundation. Each year, former Lindback award recipients serve as a peer review committee and make recommendations to the president of the College for the award.

In 2003, Community College of Philadelphia inaugurated the annual Lindback lecture, which is given by the recipient of the previous year's Lindback award. The Lindback lecture provides an opportunity for the entire academic community to draw on the teaching mastery and scholarship of the Lindback awardee. This publication serves to memorialize this lecture, presented to the College community, on March 21, 1005.

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It was quite an unexpected honor to receive the Lindback award. As I read the list of previous winners, I was humbled to now be included among the faculty that I admire greatly. I recognize that these faculty members are the architects of many of the important initiatives that we have today. They are among the leaders here at Community College of Philadelphia. So I first want to thank and pay tribute to each of our past award winners. I also want to thank President Stephen Curtis, who consistently supports endeavors that promote professional growth and recognition, and who has been a strong supporter of my efforts.

Initially I was in dread of having to speak in front of all of you today. While my anxiety certainly didn't dissipate, it did diminish as I realized I had a chance to get on the soapbox and advocate for something that had been of interest to me. But would it be something of interest to all of you? Would you embrace the concept of universal design in instruction delivery as congruent with your philosophy of teaching and learning, or would you view this as just another way to get you to pay attention to those annoying accommodation forms that I send to you from the Center on Disability? Would you see value in concepts that grew out of the disability world, or would you worry that this might be an effort to "dumb down" the contents of a curriculum? Would you see this as spoonfeeding students by giving them no responsibility for their learning or as presenting content so that they can indeed better analyze and critically evaluate?

Like many others on faculty in the College, I came through one of the side doors. Like our previous Lindback award winners and many others on the staff in the College, I am the daughter of immigrants. My parents were physicians in their country. In China during that

time, there were two classes—wealthy and poor. My parents were from the former and thus lucky enough to be educated in "western medicine." Their teachers were all English-speaking and from Europe or the United States. It would be to my parents' benefit to do some postgraduate study in the U.S. Thus, they came to the U.S. for what was supposed to be a yearlong educational experience. But it was 1948, and the government had changed hands in China. My mother was the youngest of six, and so her siblings were grown and were able to flee to Hong Kong and Taiwan. My father was the oldest of seven, and his father was a statistician who was jailed and subsequently died of tuberculosis while in prison. His mother was left to care for his six younger siblings. Many of my relatives were sent to the countryside to work the fields to be "re-educated."

So my parents were stranded in this country with no proper immigration papers, no money and no license to practice medicine in the U.S. Fortunately in those days, immigrant doctors were used to staff the tuberculosis sanitariums and the so-called insane asylums. Staff housing was provided (it almost had to be, as these places were remotely located) and the pay was low, but people like my parents were grateful to leave the rooming houses and poverty of downtown New York City.

From K to 12 my "home" was situated on a tract of county land on the top of a hill that included a large complex for the tuberculosis patients, another large complex for the mentally ill and a small minimum security prison. While most kids might have a small yard in the back with a swing, I had acres and acres of farm land tilled by the prisoners in denim shirts and pants. I was told to keep my distance. And whereas most kids might have heard a siren go off in their neighborhoods for a fire or an ambulance truck, when I heard a siren, I had to go inside because it meant that either a patient or a prisoner had escaped. And talk about diversity—I grew up in an apartment building with physicians' families from Turkey, Greece, India, Philippines, Honduras, Spain, etc.

When I reached high school age, the large complex offered me opportunities to work. And I guess my appreciation of true diversity, as well as an interest in working with people with disabilities, started there. My education, my training and most of my experiences prior to arriving at Community College of Philadelphia have been in the field of rehabilitation psychology. I have always worked in a large urban setting.

As both an ordinary citizen, as well as a "professional," I have been watching this society evolve in the area of acceptance, as well as access, with regard to people with disabilities. Many of the large institutions had closed their doors due to medical advances. Attitudes had changed as well. The Rehabilitation Act of 1973 was the first "rights" legislation to prohibit discrimination against people with disabilities, and then the Americans With Disabilities Act (ADA) of 1990 moved society further along from merely prohibiting discrimination to embracing inclusion. Okay, maybe we haven't totally arrived at the "embracing" stage.

But the inclusion of people with disabilities, particularly in our workforce, has led to modifications and innovative changes that might not have been so intuitive to those without disabilities. An example of this phenomenon is found in the work of Ronald Mace. At the age of 9 he contracted polio, and his life story is one of those feel good, inspiring stories to tell at another time. Suffice it to say, for most of his life, he used a wheelchair and understood what it was like to try to participate in a world that was not designed to include people like him. So Ronald Mace went on to become an architect who is nationally and internationally recognized as a building, home and product designer, as well as an educator, whose goal of a barrier-free environment challenged what had been conventional. He is credited with providing a "design foundation for a more usable world."

In 1989, Ron established the federally funded Center for Accessible Housing, currently known as The Center for Universal Design, at the School of Design at North Carolina State University in Raleigh.

He coined the term "universal design" to describe the concept of designing the environment and all products to be aesthetic and usable to the greatest extent possible by everyone, regardless of their ability.

The most common example is a curb cut in the sidewalk. There was no such thing when I was growing up, but what impact this small and simple change creates. This curb cut makes it so much easier for a person using a wheelchair to get from the street to the sidewalk. But this same curb cut is also used by people pushing strollers, rollerbladers, bicyclists, older people with walkers and canes or people pulling luggage. It is a design feature that is universal in its approach to access. Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

There are seven principles that have been developed by Mace's Center for Universal Design and are intended to focus attention on those characteristics of design that most impact all users—younger and older, male and female, larger and smaller, left- and right-handed, English-speaking and non, with and without disabilities. Universal design involves more than consideration for usability. Successful designers must often also incorporate cultural, economic, engineering, environmental and gender considerations.

The Center on Postsecondary Education and Disability at the University of Connecticut later took these same principles and adapted them to the field of education. But first, starting with the principles as they relate to product design and the corresponding examples, notice how basic and utilitarian these concepts are and then please take a moment to consider how you might relate these to instructional design.

(These principles are reproduced in accordance with the restrictions as set forth by North Carolina State University Center for Universal Design.)

PRINCIPLE ONE: Equitable Use
The design is useful and marketable to people with diverse abilities.

Guidelines:

1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.
1b. Avoid segregating or stigmatizing any users.
1c. Provisions for privacy, security and safety should be equally available to all users.
1d. Make the design appealing to all users.

Examples: Power doors with sensors at entrances that are convenient for all users; integrated, dispersed and adaptable seating in assembly areas such as sports arenas and theaters

PRINCIPLE TWO: Flexibility in Use
The design accommodates a wide range of individual preferences and abilities.

Guidelines:

2a. Provide choice in methods of use.
2b. Accommodate right- or left-handed access and use.
2c. Facilitate the user's accuracy and precision.
2d. Provide adaptability to the user's pace.

Examples: Scissors, designed for right- or left-handed users; an automated teller machine (ATM) that has visual, tactile and audible feedback; a tapered card opening; a palm rest

PRINCIPLE THREE: Simple and Intuitive Use
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.

Guidelines:

3a. Eliminate unnecessary complexity.
3b. Be consistent with user expectations and intuition.
3c. Accommodate a wide range of literacy and language skills.
3d. Arrange information consistent with its importance.

3e. Provide effective prompting and feedback during and after task completion.

Examples: A moving sidewalk or escalator in a public space, an instruction manual with drawings and no text

PRINCIPLE FOUR: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Guidelines:

4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.

4b. Provide adequate contrast between essential information and its surroundings.

4c. Maximize "legibility" of essential information.

4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).

4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Examples: Tactile, visual and audible cues and instructions on a thermostat; redundant cueing (e.g. voice communication and signage) in airports, train stations and subway cars

PRINCIPLE FIVE: Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Guidelines:

5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.

5b. Provide warnings of hazards and errors.

5c. Provide fail safe features.

5d. Discourage unconscious action in tasks that require vigilance.

Examples: Double-cut car key easily inserted into a recessed keyhole in either of two ways; an "undo" feature in computer software that allows the user to correct mistakes without penalty

PRINCIPLE SIX: Low Physical Effort
The design can be used efficiently and comfortably and with a minimum of fatigue.

Guidelines:

6a. Allow user to maintain a neutral body position.
6b. Use reasonable operating forces.
6c. Minimize repetitive actions.
6d. Minimize sustained physical effort.

Examples: Lever or loop handles on doors and faucets, touch lamps operated without a switch

PRINCIPLE SEVEN: Size and Space for Approach and Use
Appropriate size and space is provided for approach, reach, manipulation and use regardless of user's body size, posture or mobility.

Guidelines:

7a. Provide a clear line of sight to important elements for any seated or standing user.
7b. Make the reach to all components comfortable for any seated or standing user.
7c. Accommodate variations in hand and grip size.
7d. Provide adequate space for the use of assistive devices or personal assistance.

Examples: Controls on the front and clear floor space around appliances, mailboxes, dumpsters and other elements; wide gates at subway stations that accommodate all users

Other common examples include international symbols (e.g. women's restroom), track ball, multilevel water fountains and classroom tables with chairs as opposed to chair with the wrap around arm/desk surface.

To repeat, the concept of universal design as it applies to products and physical space takes into consideration the needs of people with disabilities, but in fact creates an environment that is accessible and useful for all people.

Similarly, educators have proposed that modifications to the classroom setting, presentation of course content and assessment of comprehension and mastery which are designed and delivered with the needs of disabled students in mind are likewise more accessible and effective for all students—regardless of age, learning style, facility with the English language or presence of a disability. One of the first groups to directly adapt these same principles is the Center on Postsecondary Education and Disability at the University of Connecticut. They modified them for consideration in curriculum and instruction design, and then added two more principles. We will look at these principles with concrete examples for their use in education. But before we do, can you envision how this might apply to those of us who teach?

I know many of you use some of these principles already. Implementing some of them is quite intuitive and requires no light bulb or "aha" type of thinking. Implementation of some of them is in the area of technology. And maybe you, like I, had not thought about them. I admit that I am only modestly computer savvy. If you have a teenage son—back track—a 5-year-old son, at best you can only say modestly tech savvy. While there has been much written about the use of novel technology in teaching and much written about the use of original and specialized technology to open the educational horizons of students with disabilities, the overlap, while increasing, is far from complete. Of course, utilizing technology in the classroom is inevitable, and being aware of modifications that will make it more universally obtainable is a "no-brainer" here. A small awareness can bring a big reward of greater inclusion. Universal instructional design does not remove academic challenges; it removes the barriers to access.

Many in the field of education believe that courses designed and presented to be more accessible and effective for all students have, at

its core, the value of "inclusiveness and equity." A classroom environment that respects and values diversity creates a welcome sign for all students regardless of possible disability, learning style preference or personal background (University of Guelph).

While special accommodations cannot be eliminated for the particular situations of some students, incorporating the principles of universal instructional design, from the point of view of the instructor, aids in eliminating much of the need to retrofit an aspect of the course for each student who comes along with a different need. From the point of view of the student, it promotes a more receptive environment free of segregation or labeling.

And how "radical" or far-off are these concepts from our current notions of teaching and learning? Well, while one might view the implementation of universal instructional design as part of the nuts and bolts of teaching or the science side of teaching, one can also appreciate that it expresses the "art" side of teaching that Vincent Castronuovo addressed in his Lindback lecture as well. Teaching that delivers subject matter with optimism, empathy and integrity surely respects the differences that students bring to the classroom. Using the concepts of universal instructional design can aid in seamlessly presenting content in ways that are not obscure, divisive or stigmatizing.

Ned Bachus in his Lindback presentation noted that "In so many important ways, faculty and students simply do not think alike, act alike or believe the same things. This divide between students and faculty has always existed." He went to say, "We must never forget how alien, intimidating and unwelcoming this experience can be for our students, despite our best efforts." And if this is true for students who are not of the same culture or have the same background as we the faculty, it is most certainly true for students who are from a different culture and who have a different set of motoric or sensorial abilities. Universal instructional design is but one way to try "to bridge the gulf of cultural disarticulation, to make academics inviting and engaging" as Bachus implores.

President Stephen Curtis referred to the work of Vincent Tinto in his address to the College during professional in-service. As we seriously and aggressively focus on the issue of retention, the quote by Tinto that "The secret of retention has nothing to do with keeping students. It has to do with educating them," clearly has relevance here. Tinto noted that many colleges like our Community College of Philadelphia have had no difficulty in attracting a diverse student body. And when you think diverse, you may be thinking gender, age, race, religion and culture. But hopefully when you proudly describe the diversity at our College, you also mention diversity of abilities. The numbers of students entering colleges, particularly community colleges, with motoric, sensory or cognitive disabilities has increased nationally, and this is true of our College as well. Students with disabilities now represent about 9 percent of the incoming students (Heath Resources, American Council on Education).

But admitting them falls short of "tapping the benefits which a diverse group offers." The retention rate of students with disabilities is more dismal than the general rate. While Tinto was not intentionally speaking about students with disabilities, he did say "If we aspire to be a society that is multicultural, we have to have our citizens work collaboratively and recognize the need to have all voices included." He goes on to say that with regard to persistence, involvement matters. "The more academically and socially involved individuals are—that is, the more they interact with other student and faculty—the more likely they are to persist."

Tom Ott, in his recent article in *Viewpoints*, similarly makes the point that effective faculty in our classroom must do more than transmit information. He notes that the scholarship of teaching includes an examination of the cognitive and affective connections in how people learn. Many of the teaching and instructional strategies using the principles universal instructional design promote this type of engaged teaching to which he refers.

The universal design for instruction concepts that parallel those for design of products were developed by the faculty and staff at the University of Connecticut's Department of Educational Psychology and their Center on Postsecondary Education and Disability. Rigorous construct validation of these nine principles was the heart of their UDI (Universal Design for Instruction) project. Theirs was one of several demonstration projects funded by grants from the U.S. Department of Education designed to enhance opportunities of students with disabilities in postsecondary education.

So comparatively, the principles are as follows:

Principle 1: Equitable Use

[The design is useful and marketable to people with diverse abilities.]

Instruction is designed to be useful to and accessible by people with diverse abilities.
Examples: Course materials accessible online; lecture notes available on a Web site

Principle 2: Flexibility in Use

[The design accommodates a wide range of individual preferences and abilities.]

Instruction is designed to accommodate a wide range of individual abilities.
Examples: Lecture notes presented in both slides and orally; multi-representation of content and varied instructional delivery; choice of assessment methods, such as taking an exam, writing a paper or conducting an online project

Principle 3: Simple and Intuitive

[Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.]

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.
Examples: Selection of course materials that is well organized, use of concept maps, handbook for difficult assignments, comprehensive syllabus

Principle 4: Perceptible Information

[The design communicates necessary information effective to the user, regardless of ambient conditions or the user's sensory abilities.]

Instruction is designed so that necessary information is communicated effectively, regardless of ambient conditions or the user's sensory abilities.
Examples: Book and CD formats for college textbooks, course materials in digital format

Principle 5: Tolerance for Error

[The design minimizes hazards and the adverse consequences of accidental or unintended actions.]

Instruction anticipates variation in individual student learning pace and prerequisite skills.
Examples: Allowance for multiple drafts of student's writing project; instruction that anticipates variation in individual student learning rate and prerequisite skills, making available additional instructional resources to address the need for skill building and scaffolding; online practice exercises; course activity packet for additional skills and content mastery; long-term project structure

that allows for option of turning in project components for constructive feedback and integration into final project

Principle 6: Low Physical Effort

[The design can be used efficiently and comfortably and with a minimum of fatigue.]

Instruction is designed to minimize nonessential physical effort in order to allow maximum attention to learning.
Examples: Laptop computer to take notes, allowance of word processor to write exams or essays, materials in digital format

Principle 7: Size and Space for Approach and Use

[Appropriate size and space is provided for approach, reach, manipulation and use, regardless of user's body size, posture or mobility.

Instruction is designed with consideration for appropriate size and space for approach, reach, manipulation and use regardless of student's body size, posture, mobility and communication needs.
Examples: Placement of chairs and desks in a round seating structure to assure opportunity to see and face speakers, which helps students with hearing and attention difficulties; adjustable lab seats and tables to accommodate wheelchairs; handles and latches to drawers and cabinets that are easy to grasp and operate with one hand

This concept of universal design in instruction represents a variation in thinking. Currently as we welcome the increasing number of students with various different disabilities to our classroom, we take a case-by-case approach to the modification of instructional delivery. Universal instructional design places accessibility issues as an integral component of all instructional planning. It is proactive and

inclusive. Students will not have to rely as heavily on support systems that are secondary to the primary instructional programs. The need for special accommodations is minimized, as well as the need to retrofit the learning environment.

The current and common accommodation procedures that you are familiar with, require that a student with a disability self-identify as having a disability and provide documentation to our center in M1-22, where we verify eligibility. The student then must self-identify again to the classroom instructor with accommodation forms and wait for adjustments to be implemented.

This service model is based on a philosophical construct of the medical or rehabilitation viewpoint. Although individual accommodations will not be eliminated, it reinforces a "separate but equal" system rather than a full inclusion within a community of peers. It does not provide an avenue for the development of self-determination. This model does not take into account that the environment and the curriculum delivery methods often limit the full participation of disabled individuals.

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. The economic benefits of saving time and resources by designing or preparing something once for reuse becomes obvious.

Jaellayna Palmer of the University of Guelph in Ontario, Canada, also noted that there is the regrettable tendency at some post secondary institutions to suggest that we should accommodate only when we must, and then in a narrow fashion targeted to an individual's specific needs. So the principle of universal instructional design might seem overly qualitative and imprecise in this view. But in fact, it can fill in the gap between mandated accessibility and individual needs. It becomes something far greater than a methodology to determine the best accommodation. It becomes a way to help break the boundaries—social and educational—that can

separate persons on both sides of the fence. The needs of targeted students with disabilities are met, but so are the needs of learners with personal circumstances that might otherwise marginalize them. Adopting these principles move beyond access as a physical fact and applies principles that assist all learners, disabled or not.

Thus Scott, McGuire and Foley noted that the application of universal design in instruction starts with two underlying assumptions about effective instruction: 1) the role of the college instruction is to teach all students in the classroom as effectively as possible without compromising academic standards and expectations. It does not include the philosophy of "weeding out" the "unqualified" student; 2) an integrative approach is preferable to multiple separate solutions. An approach from a holistic perspective provides a more cohesive instructional environment for the broad range of students in contrast to instructional situations where constant exceptions create the potential to dilute instructional goals, compromise standards or provide different or varying expectations. Again there is a shift from making exceptions for "different" learners to anticipation and planning for student diversity as the norm.

Universal design in education operates on the premise that the planning delivery of instruction as well as the evaluation of learning can incorporate inclusive attributes that embrace diversity in learners without compromising academic standards.

Universal instructional design is not a synonym for "one size fits all" instruction. The principles of UID are designed to support faculty in creating courses that accommodate a wide spectrum of student needs. College classrooms of today are enriched by the presence of students with differing abilities, goals, experiences and backgrounds. Higher education too is characterized by diversity in faculty and staff, and in curriculum perspective. Thus college instruction should vary with respect to the format, style, pace and expectations for learning as well. Faculty can benefit from responding to student diversity while maintaining their role as designers of their courses with academic standards and autonomy. The word "universal" does

not imply one size fits all, but really just the opposite. It refers to a flexible design that creates universal access to a course, not a universal curriculum.

If the essential components are identified and which all students in a course are expected to master, then fair evaluation of all students should occur, and there should be no worry about watering down a course.

The essential components, of course, are the outcomes, including skills, knowledge and application that all students must demonstrate with or without using accommodations and are evaluated in a nondiscriminatory manner. In other words, some students might use accommodations and some might not, but all students must achieve the same outcomes.

In his Lindback lecture, Larry Mackenzie spoke about the need for respect, inquiry and concern as teaching rubrics. In a diverse urban setting with its attendant fast-paced stride and differing viewpoints, these rubrics are not just nice ideals that everyone takes for granted. They are of real concern if there is truly to be a learning environment. As Larry said, "Teachers and learners [should] enter a learning session consciously adopting a spirit of respectful openness to each other and to the ideas and the community they might discover." He noted that respect incorporates coaching and honest encouragement and that each class session offers the promise of collaborative inquiry encounters.

The UDI project team from the University of Connecticut added two more principles to the seven developed by the NC State University Center for Universal Design. These two speak to the classroom atmosphere and to the promotion of discourse and collaboration:

Principle 8: A Community of Learners

The instructional environment promotes interaction and communication between students and among students and faculty.

Examples: Students working in collaborative group, online office hours, faculty/student meetings, online discussion boards and chat-rooms, acknowledgement of excellence

Principle 9: Instructional Climate

Instruction is designed to be welcoming and inclusive. High expectations are espoused for all students.
Examples: Syllabus to reflect climate and expectations, anonymous feedback from students to assess climate, student and instructor discussions

So, what research has been carried out to support the effectiveness of universal instructional design in the classroom?

One of the earliest pilot studies was conducted by Silver, Bourke and Strehorn in 1998 and was sponsored by the University of Massachusetts Center for Teaching. Researchers engaged and surveyed faculty members in clarifying and defining characteristics of universal instructional design, describing strategies to implement this and identifying potential barriers. They described universal instructional design as a method that is responsive to the diverse learning needs of students and includes cooperative learning, contextual learning, scaffolding and use of technology. They noted that the potential barriers to success included possible resistance to a culture transformation that must occur for universal design to be successful. They noted that a mission statement of the college needed to include diverse learners as members of the educational community.

Studying the implementation of universal instructional design principles in a freshman introduction to psychology class at Holyoke Community College, Jack Mino started with what he described as the "cardinal rule of universal instructional design" in teaching. That is, he noted, "There is no single method for representing

information that will provide equal access for all students, no single method of expression that will provide equal opportunity for all students, no single way to ensure that all students are engaged in learning because any method that works for some students presents barriers to learning for others." After discerning the core learning objectives, he developed multiple modes of representation as well as multiple methods for measuring achievement of those objectives. He concluded that utilizing universal instructional design practices that emphasize flexibility in curriculum and instruction provide "a powerful pathway for affirming student diversity; promoting a genuine sense of community; and improving student retention, achievement and motivation."

Similarly, Donna C. Van Handle successfully applied various principles of universal design both in delivery and assessment to improve classroom practice in her teaching of foreign languages.

At The School of Mathematics, Science and Engineering at Springfield Technical Community College in Massachusetts, a team of faculty and staff from Disability Services received a National Science Foundations research grant to study the concepts of universal design and implement them in the classroom. With fewer students with disabilities entering math and science classes, their interest to reach these students was strong. The outcome of their research project included positive responses from students with disabilities, as well as better content mastery. From their research, they then received a second grant from the U.S. Department of Education to develop faculty handbooks and workbooks to create increased access in math and science classes.

Correspondingly, the American Chemical Society has published a manual titled *Teaching Chemistry to Students with Disabilities*. It includes information on presemester planning, architectural modifications, lab considerations, assistive technology, classroom strategies, testing and evaluation—universal, where applicable and oriented toward students with different specific types of differences, visual, hearing, mobility, cognitive, etc, where appropriate.

Internationally, the Pembroke College of Oxford University in the U.K. proposed utilizing universal course design to address their Disability Discrimination Act legislation that took in effect in 2002 in higher education.

In Canada, the University of Guelph obtained funding to use the research developed in the United States, Australia and New Zealand to introduce the principles of universal instructional design to two community colleges, two universities and one adult college program sponsored by the Canadian army, all in Ontario, Canada. This project produced checklists, manuals and faculty resource support.

Separate demonstration grants through the U.S. Department of Education, Office of Postsecondary Education have funded various universal instructional design training programs that include the development and implementation of corresponding materials to assist faculty throughout the United States.

Ohio University received a grant to provide training and information on universal instructional design particularly as it relates to Web accessibility. The University of Minnesota produced publicly available materials through its curriculum transformation and disability grant. Similarly, the University of Arkansas has now received its third grant to develop PACE 3 to continue research that demonstrates effectiveness but also promotes the concepts to faculty outside of the disability arena. All in all, of the 24 abstracts of the 2005 demonstration projects funded by the U.S. Department of Education, Office of Postsecondary Education, 10 of them specifically refer to the term universal design with regard to course instruction and/or planning.

Before closing, I would like to mention three university-based projects and two organization based projects that provide useable information on their Web sites. The University of Washington's Disabilities, Opportunities, Internetworking and Technology Center is using its second grant, AccessCollege, to expand the project

methods and materials from their earlier work by paring their first 24 two- and four-year postsecondary educational institutions from around the country with another institution in their home state. Each partner school has different demographics than the project team school, ensuring that under this grant they will increase the development of multiple delivery systems to improve the accessibility of students with disabilities, as well as for those without. An outgrowth of their first grant is a site called the Faculty Room.

Lest you think this is an effort directed mainly toward two-year colleges or urban universities, a group of five universities: Columbia, Dartmouth, Yale and Stanford, spearheaded by Brown University, founded the IVY Access Initiative. The objective of the initiative was to educate faculty at selective and competitive institutions to become effective teachers of students with nonvisible disabilities. The project was based on the concept of universal instructional design to develop effective teaching strategies for students with disabilities that would enhance the learning of all students.

We have a connection right here at our College to the third university-based project. As mentioned before, the University of Connecticut was the first to take the principles of universal design in architecture and products and apply them to education. Their own work is extensive, but they also appear to have the Web site that centralizes outside information on this concept and related concepts. One feature of their Center for Postsecondary Education and Disability's FacultyWare is a review of instructional products and tools, such as teacher-generated materials, descriptions of specific use of technology, etc. These products are reviewed at two tiers, and I am happy to report that our own Lakshmi Gudpati and Joan Monroe are part of that juried review process.

There are two organizations that I would also like to mention for their support of universal instructional design particularly as it relates to computer and Web support. The emergence of the World Wide Web has made it possible for students to discover and learn

from a whole new source. The Internet can be a wonderful aid in accessing information, but the form and format of a Web site can either help or hinder access for people with disabilities. New Web browsers and new versions of existing browsers are constantly being introduced. Web tools such as HTML scripting tools, document converters, programming environments like Java and corresponding standards are continuously evolving. Some of these may include features that enhance a person's ability to use the Web, and others may not. A user with special hardware and/or software, such as screen readers, may or may not be able to integrate the new features. A new feature may not be designed with universal accessibility in mind. Adaptive technology for students with disabilities is usually a step behind the introduction of new Internet components. The World Wide Web Consortium (W3C) is an international consortium of approximately 500 organizations that support and follow the common protocols that promote interoperability. Two other organizations that also promote accessibility in the area of computer technology and have Web sites which promote accessibility, are the Alliance for Technology Access and Center for Applied Special Technology (CAST). The latter created a desktop tool that tests Web site accessibility by exposing barriers and suggesting changes so that students with screen readers, voice recognition, etc. can easily navigate these sites.

In conclusion, universal design in instruction is one educational intervention that has been demonstrated as an effective means for making postsecondary classrooms and campuses more supportive of diverse learning than have been traditional approaches to collegiate education.

Educational research and practices have acknowledged the importance of a shift in focus from the individual to the systemic. Multicultural education and social justice education have been addressing inequities for students from historically underrepresented groups for quite some time. Similarly universal instructional design moves away from asking students to personally overcome structural, attitudinal and institutional barriers to learning, to creating more

equitable and socially just learning environments. Educators have now called for conceptualizing universal instructional design within a multicultural education and social justice framework as a means to empower students and to create social change.

To quote Larry Mackenzie, "A classroom climate of high expectations, openness and mutual respect is a good base from which to validate and promote inquiry and the development of intellectual good judgment."

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University of Minnesota
http://www.gen.umn.edu/research/CTAD

The Faculty Room
Disabilities, Opportunities, Internetworking and Technology (DO-IT)
University of Washington
http://www.washington.edu/doit/Faculty

Facultyware
Universal Design Project (UDI)
Center on Postsecondary Education and Disability
University of Connecticut
http://www.facultyware.uconn.edu

The Ivy Access Initiative
Brown University
http://www.brown.edu/Administration/Dean_of_the_College/uid

Learning Opportunities Task Force
Teaching Support Services
University of Guelph, Ontario, Canada
http://www.tss.uoguelph.ca/uid
Project PACE
University of Arkansas at Little Rock
http://www.ualr.edu/pace

Web Accessibility Center
The Ohio State University
http://www.wac.ohio-state.edu