

Universal Design in Education: Teaching Non-Traditional Students©

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Introduction and Executive Summary

Teachers at all levels, from preschool to K-12 to university programs to adult and continuing education, now deal with a remarkably diverse student population. Growing numbers of students have such disabilities as attention deficits or learning disabilities. Many older students have impairments of hearing and of vision. Large numbers of students come from cultural traditions other than the Euro-American, Judeo-Christian Western "white" culture and for this reason bring different expectations to the classroom. Chapter 1 explores the characteristics of these non-traditional students.

Meeting all of the tremendous variety of needs these students present is not something most teachers can do. What is possible is to design and deliver instruction that responds to most of these needs. That is what this book is about. *Universal Design in Education* is intended to be used as a handbook. It is not written to be read cover-to-cover. Rather, I suggest that readers spend some time with this executive summary and with Chapters 1-3, becoming familiar with (1) the concept of universal design, (2) how universal design can be applied to education, and (3) how the book is laid out. Chapters 4-7 may be consulted as needed throughout the academic year, as you encounter problems or have questions. Chapter 8, on Web pages, should be read quickly and consulted as needed when you design or update Web pages or refer your students to this or that Web address. The Resources section should be used as needed (e.g., if you want to caption a video); you will find in that section Web addresses for six (6) captioning companies.

Traditionally, what we have done in education is to accommodate individual needs, without changing courses. For example, we have told deaf students to arrange for sign language interpreters to translate the spoken lectures in the classroom. Similarly, we have relied upon students who are blind to secure Brailled or tape-recorded versions of printed materials used in class, including textbooks. One word to refer to this is "accessibility." Since 1977, schools, colleges, universities and other educational institutions have provided accommodations such as interpreters, note-takers, etc., free of charge to students as part of the institutions' obligations under federal law. Many such students have used assistive technology to facilitate their reading, writing, and other academic activities.

The 1990s movement of universal design challenges us to think again about who should be responsible for accessibility and more specifically assistive technology. Universal design asks us to look at courses, texts, schedules, and other aspects of education: Is it really necessary for teachers to present the great bulk of our instruction via speech? Isn't there a way, or aren't there several ways, for us to offer much of the same material visually (in print, on disk, etc.)? Of course, the obverse obtains as well: Must we assign only printed materials for student reading? Can't we find audible (spoken) versions, too, and make those available for people who need or prefer them?

In this book, we call taking those kinds of steps "universal design in education." Chapter 2 introduces the concept of universal design, and Chapter 3 illustrates how it may be applied to education. Succeeding chapters address different principles. Chapter 8 discusses Web-based materials. Chapter 9 brings it all together.

Universal design has several important advantages over assistive technologies. First, it is usually far less expensive than traditional steps and assistive technologies. Brailleing or tape-recording of texts, and in-classroom sign language interpreting, are expensive. The State of California, in Fall 1999, ordered textbook publishers that sell texts to California schools to make a available, as well, disk versions of the texts (Assembly Bill AB 422). Texts on disks can be listened to by

students who are blind and by many who have learning disabilities. They may also be listened to by any student while driving. This latter advantage -an unexpected one, to be sure, but one that students quickly discover when exams loom - illustrates the beauty of universal design. Most teachers usually compose lectures on disk anyway - and with schools giving professors disks for free, it is both economical and easy for us to make one more disk copy and give that to a deaf student, lessening the note-taking burden. In both cases, accommodating for different needs by planning in advance makes instruction available for more students, at lower costs, and reduces the need for after-the-fact steps such as interpreting and Brailleing or tape-recording of printed materials.

As these examples illustrate, universal design is a design approach that maximizes usability of products, services, and environments for everyone - young people and old, short people and tall, people with disabilities and without. The idea is that with universal design, only a small minority of students will need "special" accommodations - those who cannot use even universally designed instruction.

The concept of universal design first arose in design of the built environment, where it was employed to market homes (in particular) as responding to "life-span" needs. That is, a universally designed home is one that young children and senior citizens alike find comfortable and convenient, yet adolescents and working-age adults also find appealing. As people aged, they would feel no need to move, because the house posed no barriers to them. Thus, universal design was initially conceived as a marketing theme: it took the idea of "accessibility" (which carries connotations of disability and of government-mandated design features) and presented it as something that appeals to all of us, that is, as an approach that we would elect to use because it responds to our enlightened understanding of diverse needs.

The concept then was adopted by makers of personal-use products, including kitchen utensils, room temperature controls, desk lamps, and the like. In the minds of Ron Mace, founder of the Center for Universal

Design (CUD) at North Carolina State University, and his colleagues, the idea was that if usability could be marketed to the general public as convenient, it would sell itself. People who try wide-grip scissors or other kitchen utensils, such as Friendly Fittm forks and spoons, that are sold in Home Depot and Williams-Sonoma household supply stores, often prefer them to conventional implements: they just feel better. That was Ron's idea: if he could present universal design so that people would voluntarily adopt it, the world would become a much more livable place for all of us.

Under Ron's leadership, CUD developed seven principles of universal design. Here is a brief summary:

1. The design can be used by, and marketed to, all kinds of people. A good example is power doors which open automatically when someone steps on a pressure-sensitive area on the pathway leading to the door.
2. The design incorporates a wide variety of preferences. People have choices in how they use it. An example is an ATM machine that lets people decide whether to read or listen to information.
3. The product or service is easy to understand and use. It avoids unnecessary complexity. A good example is the user manuals that accompany Hewlett-Packard printers - they are very brief and clear.
4. It works in all kinds of settings. Even in eye-busy or noisy environments, people can use it with ease. An example is an information system at a train station that offers arrival/departure information in both visual and auditory modes.
5. The design accommodates error. People can make a mistake without disastrous consequences. An example is a kiosk that offers the option at every screen of returning to the main menu.
6. The product or service requires minimal effort to use. Neither intense nor sustained physical effort is needed. Door levers are an excellent example - no grasping or twisting motions are required.
7. It accommodates variations in size and position. People can use it while standing, sitting, or reaching. An example is subway turnstiles that present the token or card slot at a height easily

reached by people using wheelchairs and young children, yet do not require ambulatory adults to crouch.

What does universal design tell us to do as teachers? The principles of universal design place responsibility for making curricula, materials, and environments accessible to and usable by all students upon the teacher and the school. As educators, we need to consider ways to make education more convenient for time-pressed students, more comfortable for people from diverse backgrounds, and more flexible for persons having different learning styles.

A teacher preparing universally designed curricula and materials will:

⟨ Present information in multiple ways. Anything written or otherwise offered visually is also spoken aloud, and vice versa. The teacher, recognizing that personal computers and software provide easy and rapid ways to customize how information is presented, not only prepares curricula, materials, hand outs, etc., on disk but also makes those disks available to students on request (so they can make large-print versions, etc.) and posts them on Web pages where they may be read by students using their personal adaptive equipment. Teachers may also take advantage of such tools as the eReader, from the Center for Applied Special Technology, www.cast.org; this software adds voice, highlights text, and reduces support for students as they become more independent.

⟨ Offer multiple ways for students to interact with and respond to curricula and materials. Students may respond by speaking (e.g., in class, into a tape recorder, to a computer program, etc.), writing, typing, etc. Students may also control the "look" of information (type size, font, foreground and background colors, etc.) and the pace at which material is presented on a computer.

⟨ Provide multiple ways for students to find meaning in the material and thus motivate themselves. Students may work independently, may work as members of a team, and may show that they have mastered principles by applying those to favorite activities (e.g., calculate batting averages to demonstrate knowledge of adding, dividing, etc.). Some students may benefit from participating in an

instructor-sponsored listserv, through which students may post comments, questions, etc., to each other and to the instructor, while others may learn well through group study listservs that allow student-only interaction via e-mail.

Make good use of personal and course Web pages. Web pages can easily be made interactive, greatly adding to students' benefit. Information on a Web page may be read using the students' own, personal adaptive technology devices and equipment at home. Teachers must ensure that such Web pages comply with the World Wide Web Consortium (W3C) access guidelines (www.w3.org/wai). One convenient way to check such compliance is to use "Bobby" (see www.cast.org/bobby). Bobby is a computer software program that evaluates the accessibility of Web pages and offers specific suggestions for improvement.

What else will educators teaching in universally designed ways do?

TIP SHEET: UNIVERSALLY DESIGNED TEACHING

1. Become aware of your own culture's teachings and how those affect you as an educator. Then learn how the cultures of your students may predispose them to approach education differently. In particular, examine the place of time, the relative importance of academic work v. family needs if/when the two conflict, and individual v. group achievements. As a product of Eurocentric cultures, I automatically value promptness in my students, expect them to complete their academic work even if family needs intervene, and measure performance by each student individually. Those are my biases. When I have students who come from other cultural traditions, I need to recognize that their values may well differ from mine; occasionally, I bend and sometimes I expect them to. (Details: Chapter 1.)
2. Provide students with options for demonstrating knowledge and skills. Those options should include not only traditional tests and term papers but also group activities, demonstration via activities in the community and/or in the classroom, and portfolios of achievements. This rich variety of alternatives responds to

- variances in student learning styles and preferences. (Details: Chapter 1.)
3. Offer instruction, and accept student work, at a distance. Attending class in person is not an option for some people; it is inconvenient for others. Today, e-mail, the Web, and the increasing availability of broadband telecommunications (which transports voice, video, and data over the same phone line at the same time) make distance learning a viable alternative for many people. (Details: Chapter 3.)
 4. Alert students to availability of digitized texts (e-books). Not all distance-learning students will need them, but some will, and so will some students who are blind or have dyslexia: the already enormous volume of electronic (digital) books and other reading materials offers exciting options for universally designing instruction. (Details: Chapter 3.)
 5. Offer students information in redundant media. Your lectures were prepared on disk; make a disk copy available. Upload the lecture and other handouts to your Web page, where students can read them using personal adaptive technologies such as screen enlargers and speech synthesis. Very important: the same information should be offered in both ways. This includes things you say or show in class. (Details: Chapters 4 and 5.)
 6. Provide the support students need to improve accuracy and speed. For example, some students do far better when they can dictate something than when they write or type it. Computer speech recognition has matured to the point that it understands one person's voice quite well and thus may be used for dictation. (Details: Chapter 4.)
 7. Translate important materials to other languages as needed by your students. Computer software that translates between English and other language has matured to the point that it provides "draft quality" translations. Ask a colleague who is fluent in the target language to polish the product. (Details: Chapter 5.)
 8. Choose physically accessible locations for your classes. If you have a choice, select rooms with desks/chairs that are movable rather than one with fixed seats. (Details: Chapter 7.)
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