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EASY WAYS TO USE UNIVERSAL DESIGN IN BUSINESS COURSES

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ABSTRACT

The universal design for learning is an approach to designing curriculum and instruction to serve the needs of all students, including those with disabilities. The nine principles of universal design for learning are presented along with examples of course design, instructional materials, or teaching methods for business courses. Many of the examples are simple, easy changes for instructors that can make courses more flexible, inclusive, and accessible.

I. INTRODUCTION

Universal design for learning is being introduced into postsecondary education as a means of making courses accessible. The universal design for learning (also called universal design for instruction) is an approach to designing curricula and instructional materials not only to serve the needs of students with disabilities but also to enhance education for all students. Even though the origins of the universal design for learning are in non-business disciplines, business instructors can utilize these ideas to make their courses more effective.

This article briefly discusses the origins of universal design. Next, the nine principles for the universal design for learning are presented. These principles can serve as a checklist for business instructors designing, modifying, or developing course instructional materials or planning course presentations. Examples are provided of simple modifications in course design, instructional materials, or teaching methods that can make a business course more accessible to all participants.

II. ORIGINS OF UNIVERSAL DESIGN

Universal design was first applied in the field of architecture. Traditionally, buildings were retrofitted with ramps and elevators to meet the access needs of people with physical disabilities. The usefulness of ramps, elevators, and the like to everyone, and the problems and expense of retrofitting these modifications, led to the idea of designing buildings that are usable by anyone, regardless of disabilities or age. Ronald

Mace, an architect, coined the phrase “Universal Design” to describe this new design approach.

Because universally designed buildings were superior functionally, aesthetically, and economically, schools of architecture began including courses on universal design. The movement spread to commercial products, landscape design, transportation, and eventually to education.¹ In the 1990s, educators recognized that learning materials, such as printed books, are analogous to stairs; they do not meet the needs of everyone (Rose 2000).

Universal design in education began with the design of curricula and instructional materials for the elementary and secondary levels and is now being suggested as a philosophy for postsecondary instructors to use in designing their courses.² Using universal design for developing curricula and instruction is a systematic method of meeting the needs of diverse learners. “UDI [Universal design for instruction] anticipates the needs of diverse learners and incorporates more effective strategies into curriculum and instruction to make learning more accessible” (Shaw, Scott, and McGuire 2001, 3). Students that may benefit from a universally designed learning environment include students with disabilities, students whose primary language is not English, older students, or students with learning styles different from their instructor or the majority of their peers.

The universal design for learning does not require the use of technology, but the use of technology frequently contributes to the development of adaptive, flexible instructional materials. For example, digital format allows text material to be transformed into alternative mediums and to be customized for individual needs (Orkwis and McLane 1998). Additional information on universal design for learning is available online. Several good web sites are listed in Table 1.

¹ An example of a successful universally designed product line is Good Grips kitchen utensils. Oxo International designed these kitchen utensils for hands with arthritis, but they have become a successful product line in upscale kitchen supply and department stores.

² See, for example, material on the web site for University of Colorado, <http://www.colostate.edu/Depts/RDS/facinfo>. Their office for disability services provides information to the faculty, including a description of the Universal Design in Instruction. Also, the University of California-Irvine’s office of disability services provides a resource on Universal Design and web accessibility, <http://www.disability.uci.edu>.

TABLE 1
ONLINE INFORMATION SOURCES ON UNIVERSAL DESIGN

Organization and Internet Address	Description
CAST (Center for Applied Special Technology) http://www.cast.org/udl	CAST explores using the universal design for learning for developing learning models, approaches, and tools usable to a wide range of learners. CAST is the home of “Bobby,” a free online service for testing web pages for usability and compliance with government standards and the World Wide Web Consortium’s guidelines.
Center on Postsecondary Education and Disability Department of Educational Psychology University of Connecticut http://www.cped.uconn.edu	The Center on Postsecondary Education and Disability’s mission is to educate and support pre-professionals and professionals in acquiring knowledge and skills in disability services, including the use of universal design in instruction.
The Center for Universal Design College of Design North Carolina State University http://www.design.ncsu.edu	The Center for Universal Design is a national research, information, and technical assistance center for universal design in housing, public and commercial facilities, and products. It is the source of the definition and principles of universal design referenced by most of the other sites. A link is provided to Universal Design Education Online, the IDEA Center, and the Global Universal Design Educators Notebook.
DO-IT (Disabilities, Opportunities, Internetworking, and Technology) Computing and Communications Colleges of Engineering and Education University of Washington http://www.washington.edu/doi	DO-IT provides resources and programs to increase the successful participation of individuals with disabilities in challenging academic programs and careers. In addition to universal design, this online source includes “The Faculty Room” for postsecondary faculty and administrators, which includes information on learning disabilities.
Trace Research & Development Center College of Engineering University of Wisconsin-Madison http://www.trace.wisc.edu	The Trace R&D Center is working on ways to make information and telecommunication technologies more accessible and usable by people with disabilities.

III. PRINCIPLES OF UNIVERSAL DESIGN

Shaw, Scott, and McGuire (2001) created nine principles of universal design for learning that can guide faculty when developing instructional materials and

teaching techniques. These nine principles were created by adapting and adding to the seven principles for universal design for architecture.³ The principles and definition of each are presented in Table 2.

TABLE 2
PRINCIPLES OF UNIVERSAL DESIGN

Principle	Definition
1. Equitable Use	Instruction should be designed to be useful to and accessible by people with diverse abilities.
2. Flexibility in Use	Instruction should be flexible and designed to accommodate a wide range of abilities.
3. Simple and Intuitive Instruction	Instruction should be designed in a straightforward manner and eliminate unnecessary complexity.
4. Perceptible Information	Instruction should be designed to communicate effectively, regardless of student's sensory abilities or ambient conditions.
5. Tolerance for Error	Instruction anticipates variation in the pace at which students learn.
6. Low Physical Effort	Instruction should be designed to minimize nonessential physical effort. (This does not apply when physical effort is an essential requirement of a course.)
7. Appropriate Size and Space for Activity	Instruction should be designed with consideration for appropriate size and space for the activity.
8. Community of Learners	The instructional environment should promote interaction and communication among students and between students and faculty.
9. Instructional Climate	Instruction should be designed to be welcoming and inclusive.

Many universal designs for learning principles are easy to incorporate into business courses. The discussion below gives examples of course design, instructional materials, and teaching strategies that can result in multiple means of presenting

³ The seven principles of universal design were developed by the experts at the Center for Universal Design. The Center for Universal Design at North Carolina State University was created by Ronald Mace, the architect who is credited with originating the concept of universal design. The original seven principles of universal design can be accessed at <http://www.design.ncsu.edu/>.

information, student expression, and student engagement. These are the essential qualities of a universally designed learning environment.

Principle 1—Equitable Use. Course materials should be readily accessible. This can be especially important in analytical disciplines like business where homework solutions, computer programs, statistical analyses, spreadsheets, case solutions, and similar items are an integral part of the course. The easiest method for access is placing course materials online.⁴ Other methods, however, might include duplicated course packets, library reserves, or placing material in study centers or computer labs. For example, placing class notes on a course web site might replace the need to obtain a class note taker as an accommodation for a student with vision or motor disabilities. Students whose primary language is not English would also find class notes especially useful because they may need to focus their attention on simply understanding the instructor without the distraction of note taking. All students might find it helpful to review each day's instruction.

Principle 2—Flexibility in Use. To accommodate a wide range of abilities, instructors can help students identify patterns useful for organizing the material in their classes. Something as simple as beginning class with an outline of the topics that are being covered that day can assist students in organizing their class notes. It is also important that the instructor follow the outline. Keeping the class lecture organized is especially important for students with learning disabilities since they may lack the ability to structure the material themselves (Lerner 1997).

Comparing and contrasting information is important for critical thinking and learning. Without a mental structure or link to help organize concepts, students with learning disabilities may not identify the relationships of the new material to the topics already covered in a course. Instructors can easily tie current topics to prior learning. For example, when describing the accounting for long-term construction contracts, identify the year-end entries as adjusting entries to tie the information back to the basic accounting cycle. Conclude each year's entries by briefly reviewing which accounts are going to be closed at the end of the accounting cycle and which accounts are carried forward as balance sheet accounts. Simple one-minute summaries of applicable elementary concepts reinforce prior learning and, while useful to all students, may be crucial to students with learning disabilities.

Both active and passive learning opportunities can be incorporated into courses to accommodate different learning styles. Guest speakers, videos, theory discussion, and/or problem demonstrations support active and passive learning. Simulations, lab

⁴ Legal ownership issues may be involved with material placed on a website. It is beyond the scope of this article to consider these issues.

work, and internship opportunities also provide opportunities for active learning. Colleges of business have especially good opportunities for encouraging active learning. Internships in all areas of business are available to students. Successful alumni make good guest speakers, professors for a day, or even adjunct faculty.

Students use different senses to learn material: visual, auditory, and kinesthetic. Students without learning disabilities may have a preference for a particular method, but students with learning disabilities may have a significant deficit in one or more senses that results in an information-processing deficit (Kirk, Gallagher, and Anastasiow 1997). Thus, instructors can enhance learning for students by being sensitive to the fact that students learn in different ways and by incorporating multi-sensory teaching strategies. While lecturing, provide visual support for lecture material by placing an outline of the lecture on an overhead transparency or write any new terminology on the board. (This outline could also be provided in advance or after class on a course web site.) In a case-based management course, instructors can verbally describe the steps being used to work a case solution as it is being written on the board. This allows students to simultaneously see and hear the new terms and problem solving techniques, accommodating both visual and auditory learners.

Principle 3—Simple and Intuitive Instruction. In accordance with simple and intuitive instruction, material should be presented in a straightforward manner. When presenting new material, use clear simple language and give concrete examples of new concepts. Real world examples help students relate to abstract concepts. For example, when introducing management control systems for merchandise in a retail store, the instructor might begin by discussing point-of-sale scanners and the updating of inventory counts before introducing economic order quantity calculations that involve quantity-based purchase discounts, fixed order costs, shipping rate schedules, storage costs, etc.

Exam questions should also be written in a straight-forward manner, which will accommodate students with learning disabilities (Gaumnitz, Gaumnitz, and Zalar 2002). Exams should be designed to test the students' knowledge of the course content, not their ability to interpret the question. Students with documented learning disabilities frequently take their exams in a disability services office. Understandable examination questions are important since the instructor is not usually available to answer questions.

Another teaching strategy that falls under this principle is use of grading rubrics. These might be especially helpful in information systems classes that require large computer projects. The grading rubric is provided to students with the assignment to provide them with a clear understanding of the requirements for each project and the instructor's expectations for a particular grade on the project.

Principle 4—Perceptible Information. The versatility and flexibility of digital multimedia technologies are ideal for a universally designed learning environment (Bowe 2000; Rose 2000; Rose and Meyer 2000). Digital multimedia technologies are advantageous to students both with physical disabilities and with learning disabilities. “They [instructional designers] will use the transformability and flexibility of digital media to reduce the barriers and inefficiencies inherent in fixed, one-size-fits all, printed textbooks” (Universal Design: Ensuring Access to the General Education Curriculum 1999). A visually impaired student, for instance, may find it easier to listen to the textbook. With the textbook in digital format, the material can be read aloud by a computer or screen reader, printed on a Braille printer, presented with highlighted main points and organizational supports, or even translated into another language. A digital format can also include hyperlinks to definitions, elaborations, and related media for more in-depth understanding.⁵

Kinney and Kinney (2003) described the use of multimedia software combined with a textbook in a college math course and found that it allowed students greater control over the pace of their learning. It also provided a more visual and interactive way of learning. Immediate feedback allowed students to review and reattempt problems. This technique can also be used in business courses. Most publishers of college business textbooks provide companion web sites where students can work homework problems or access tutorials. When a homework problem is solved online, students may receive hints, references to applicable text material, and feedback as to the correctness of the solution. Encouraging use of these companion web sites can substantially enrich the non-classroom portion of the learning experience.

Principle 5—Tolerance for Error. Tolerance for error and pace of learning means that instructional techniques should provide feedback and consider the differing amounts of time it takes students to learn. This should begin at the course planning stage with construction of the course syllabus (Sandock 2000). Complete course information should be provided early (before the semester begins if possible) to allow students with different learning rates to begin their preparation early and/or to schedule their study time. This is especially useful for students with learning disabilities (Lerner 1997). Announcing that an assignment will be due or that a quiz will be given at the next class may not allow enough time for some students to prepare.

⁵ Publishers are providing texts in digital format for elementary and secondary schools. In 1999, the state of California ordered textbook publishers to provide disk versions of all texts sold to California schools (Bowe 2000). College texts are also beginning to be available in digital format.

Large projects may be separated into smaller components that allow constructive feedback as students work on the project. In business courses where a research project is required, the paper may be divided into a series of assignments. Due dates can be given for turning in a list of references, an outline, a draft of the paper, and then the final paper. This helps ensure that students are proceeding with the project in a timely fashion and with acceptable content.

Sample exams, pretests, or a series of exams with a possible drop of lowest score limit damage of a single bad performance. Providing a sample exam on a course web site can reduce student anxiety before the first exam. Dropping one quiz or test score eliminates the problem of what to do when a student is sick when the quiz or test is given. Quizzes can also be available on a course web site with a window of time (several days) for the student to take the quiz. Instructional software, such as WebCT, Blackboard, or D2L, contains online quizzing functions.

Principle 6—Low Physical Effort. Low physical effort implies that instruction should be designed to minimize nonessential physical effort. That way, students can focus on learning. A word processor can be used for writing papers or essay exams. Examinations that are to be completed by hand should provide sufficient answer space to allow for large or awkward handwriting. If possible, individual exam questions should not span a page break.

When designing web pages, providing large buttons to click on makes it easier for students with poor eye-hand coordination. A great deal of information is available on designing accessible web pages. See, for example, Shapiro (2003) and the web site for the Trace Research & Development Center included in Table 1.

Principle 7—Appropriate Size and Space for Activity. When assigning classrooms, colleges should consider the appropriateness of the classroom for the course. A course that includes group work should be in a room with movable chairs or a room with attached break-out rooms. Management information systems courses may need to meet in a computer lab for hands-on instruction. Most accounting courses should be in rooms with tables, not auditorium flip-up style desks or chairs with attached work surfaces. This allows students to place both their textbook and problem solutions or worksheets in front of them. Management case classes should be held in tiered horseshoe shaped rooms, if possible. This type of classroom facilitates class discussions.

Principle 8—Community of Learners. A learning community can either be a curricular approach that offers a cluster of classes around an interdisciplinary theme with a common set of students enrolled or a link between students and faculty through

the Internet (Jahangir 2003). Some MBA programs use cohort groups or lock-step programs to foster a community of learners who share their business experiences. Chat rooms, e-mail lists, or online office hours are easy to arrange and can be very useful for students. Students need time to assimilate and master the complex material contained in most business courses. Thus, student questions do not always occur during class. Questions may arise later when students are reviewing their notes or doing their homework. A community of learners or online office hours can provide students with easy ways of asking these questions and for learning from each other.

Principle 9—Instructional Climate. The instructional climate should be welcoming and inclusive. Something as simple as a statement the first day of class concerning disability, accommodation, and access issues can improve the instructional climate. Pedelty (2003) reported an immediate, positive response from adding such an oral statement on the first day of class. This was in addition to providing a written statement in the course syllabus. The first time Pedelty made an accessibility statement on the first day of class, a student with a visual impairment asked that the color of the PowerPoint font be changed from blue to black. This was an easy change that accommodated this student's visual needs. Pedelty reported that a student with documented learning disabilities stayed after class the next semester to thank him for making the statement and to discuss his particular learning disability. Making the statement on accessibility at the beginning of the course also gave other students the impression that the instructor was approachable. From experience, most college instructors know how important it is to be approachable. Students need to get help as soon as they experience difficulty in a course, so they do not get behind.

Apart from enhancing the instructional climate, business instructors are providing an example of situations that may be encountered after graduation. After students graduate, they may encounter the need to provide accommodations or observe coworkers receiving accommodations in the workplace.⁶ A welcoming work environment can be good business practice.

IV. CONCLUSION

Business instructors can improve instruction by using the universal design for learning when planning and preparing for their courses. More flexible, inclusive, and accessible course materials and teaching strategies need not be either time consuming or burdensome to provide. Often simple, easy changes in instruction help to meet the diverse needs of students. As a result, instructors can enhance the educational

⁶ The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 prohibits discrimination on the basis of disability. Thus, providing reasonable accommodations is mandated under federal law.

experience for all students, while ensuring that the educational needs of students with physical and/or learning disabilities are met.

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