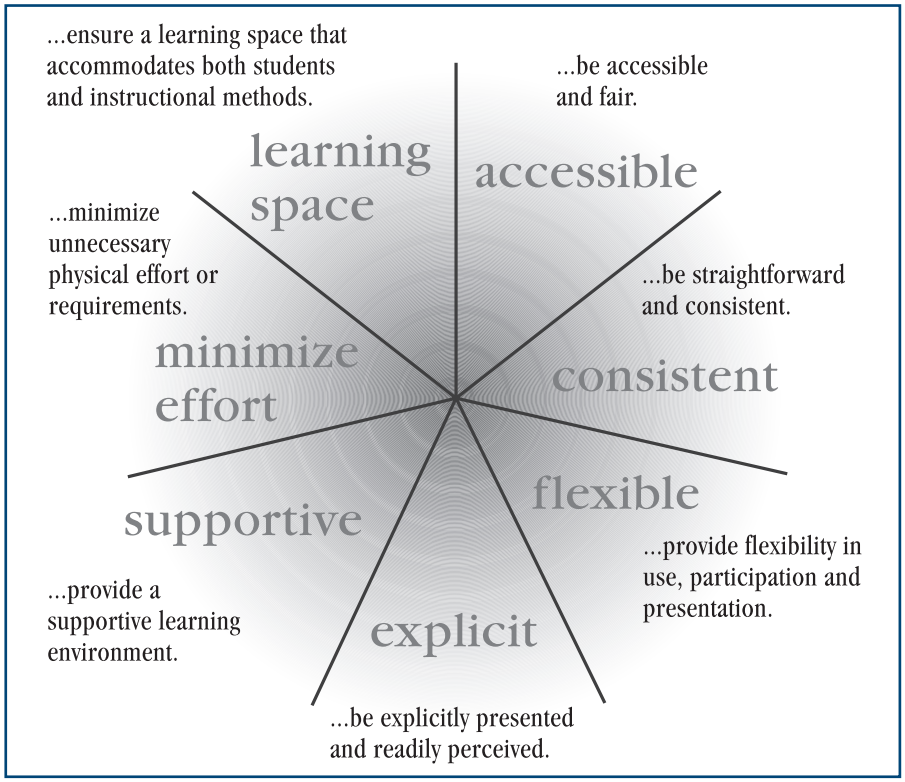
Universal Instructional Design

Creating an Accessible Curriculum

Access*Ability* Services
Teaching and Learning Services



UTSC

UNIVERSITY OF TORONTO AT SCARBOROUGH

Acknowledgments

The book represents what was a very enjoyable collaboration between Access*Ability* Services and Teaching and Learning Services at UTSC. Tina Doyle, Manager of Access*Ability* Services, initiated this handbook in the Spring of 2003 and has provided complete research direction and support throughout the project. Both *An Instructor's Handbook: Teaching Students with Disabilities and Special Needs, 1997* (edited by Deanne Fisher and published by the Office of Student Affairs, U of T) and *Teaching and Learning for Diversity at UTSC, 2003* (published by Teaching and Learning Services, UTSC, and funded by a grant from the Office of the Vice-President of Human Resources and Equity) provided starting points for this publication. Teaching and Learning Services provided funding and release time for Sarah Bassnett to research and write the first full draft of the booklet as part of her work in the Writing Centre in the summer of 2003. Subsequently Sarah King, the Coordinator of the Writing Centre since 2003, and Teresa Dawson, Director of Teaching and Learning Services, have worked to edit the publication, assisted by the entire Access*Ability* Services and Teaching and Learning Services staff, in particular Susan Weaver. Graphic design was provided by Diane Gradowski and Photography by Ken Jones. Teaching and Learning Services paid for the printing and distribution.

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Also available in alternative format.

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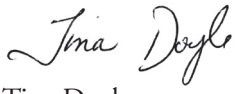
FOREWORD

As a result of our close work with faculty across UTSC, we are fully aware how much colleagues want to do their best to accommodate students with disabilities. We know that UTSC as a community strives to be open and welcoming to students with disabilities, and our offices work together with many of you to try and achieve this goal every day. But recent legislation can be confusing. Not all appropriate courses of action are immediately apparent or necessarily intuitive. Faculty have very busy lives and have to design and implement courses under extreme fiscal and time constraints. Larger classes, challenging teaching environments and the competing demands of teaching research and service all play a part. We know that thinking about disability can appear to add another layer of complexity to an already overwhelming list of things to consider for our instructors. We wanted to help with this issue and to demonstrate that teaching that accommodates students with disabilities (over and above being the law!) can be easy to do as well as extremely rewarding–not just for all students in your course but also for your own sense of teaching satisfaction.

This publication is therefore offered in response to requests we have had from many of you for assistance in navigating the apparent minefield of disability and accommodations legislation, policy, guidelines and recommendations, as well as to offer some very practical ideas you can implement in your class. The main message we would want to convey is that incorporating considerations of disability into your teaching, whether through principles of Universal Instructional Design or other means, is an on-going process. No one has all the answers and we are just beginning to explore the richness of the impact new ideas in this area can have on the curriculum at UTSC. What makes a difference is having a willingness to reflect on teaching practice. If this book encourages you to take the first step, to try one new idea next time you teach, and to share the results with others, we will have achieved our goal.



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Introduction

The number of students with disabilities attending university has increased significantly over the past decade. While this is a positive development, recent provincial government reports have determined that students with disabilities often face barriers in universities. As a result the Ontarians with Disabilities Act (ODA) was passed in 2001, and universities and colleges were asked to respond with their own plans for action. In response, the Provost's Taskforce on the ODA was established in the summer of 2003, charged with doing a baseline survey and putting in place a series of audits and processes to develop annual plans for proactively responding to the provincial legislation. The result was the first *U of T ODA Accessibility Plan 2003-04*, which identified barriers for students, staff and faculty with disabilities and laid out a course of action for eliminating them.[1]

Within the ODA taskforce there were many subcommittees, and one key area was that of instructional design. The main question the subcommittee considered was "How can faculty design curriculum so as to remove barriers for students with disabilities, allowing them to fully participate in the educational process to the maximum of their potential?" One approach to this question that is gaining wide recognition in Ontario, as across North America, is to use the principles of "Universal Instructional Design" (adapted from the universal design principles employed by architects and builders to make buildings accessible for everyone) to rethink and enhance curriculum.

This handbook introduces faculty, in a practical sense, to the concept of universal instructional design (UID) and demonstrates the relative simplicity with which inclusive teaching practices can be used. Chapter 1 begins by defining disability and outlines the required accommodations at UTSC in the context of recent legislation. Chapter 2 introduces the seven principles of UID as a way of thinking about making teaching more accessible for all students. Chapter 3 suggests concrete ways that UID principles and other accessible-friendly ideas can be incorporated into your class planning and delivery throughout the term. There is some deliberate overlap between Chapters 2 and 3 depending on how the individual instructors prefer to think about pedagogy in their own disciplinary context. Finally, the bibliography presents a selective list of resources to assist you if you wish to explore further.

This publication is intended as a reference for dipping into at will. It is very important to remember that no one can possibly (nor should one) make all the suggested changes immediately. Rather, as you read through these ideas, think about which ones make the most sense for you, and then try one or two to begin with. Simply keeping the UID principles in mind and being open are excellent first steps. Once you start to explore, you will have new ideas of your own that you will want to incorporate and hopefully share with others, thus enabling all of us to continue the work of building a positive and inclusive community at UTSC.

[1] Shirley Neuman, *Stepping Up,* 2004-2010, University of Toronto, (June 2004). Available: <http://www.provost.utoronto.ca/userfiles/HTML/nts_6_2497_1.html>.

CHAPTER 1
Definitions of disabilities and the context of accommodation at UTSC

This chapter describes the conceptual approach to disability used throughout the handbook, outlines the accommodation process we are ethically and legally required to provide, and discusses the various rights and responsibilities of everyone involved.

1.1 Disability broadly defined

The Ontario Human Rights Commission (OHRC) recommends using a broad definition of disability.[2] The term disability should be used to refer to conditions that are ongoing, episodic, and either past or present, as well as for unequal treatment because of a perceived disability. Disabilities that are not visible to others are classified as "non-evident disabilities." For example, learning disabilities, mental health disabilities, and chronic fatigue syndrome are non-evident disabilities. Episodic disabilities such as epilepsy and environmental sensitivities are non-evident most of the time. Whether or not disability is evident, people with disabilities are entitled to fair and equal treatment. People should not be treated unequally because they have, or are perceived to have, a disability. Disabilities that are not visible may be less well recognized or understood. It is important that stereotypes, stigma, barriers and otherwise unfair treatment do not result from a lack of knowledge about a disability.[3]

1.2 Functionality and disability

In recent years, the study of disability has emerged as a subject of research in the social sciences. In sociology, psychology, political science, and economics, for example, disability has come to be seen as another attribute, like ethnicity, gender, sexual orientation, and class, which has historically been used as a means of discrimination.[4] Following women's studies, queer studies, and race studies, disability has also become an important issue in the humanities, where the formation of subjectivity, relations between power and knowledge, and social justice issues are explored.[5] Research on disability has shown that different value systems are embedded in different approaches to disability, and each approach carries implications for public policy. While recognizing that there are a range of approaches to disability and acknowledging that definitions of disability are debated within the interdisciplinary field of disability studies, this handbook uses a public policy model of disability as its guiding approach.

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[2] For official definition of Disability see Ontario Human Rights Commission, *Policy and Guidelines on Disability and the Duty to Accommodate*, March 2001, (June 2004). Available: <http://www.ohrc.on.ca/english/publications/disability-policy.shtml>, 8.

[3] Ibid., 9-11.

[4] Harlan Hahn, "Toward a politics of disability: definitions, disciplines, and policies," in *The Social Science Journal, 22* (October 1985): 87-105. Available: <http://www.independentliving.org/docs4/hahn2.html>.

[5] See, for example, Rosemarie Garland-Thomson, "Integrating Disability, Transforming Feminist Theory," in *National Women's Studies Association Journal, 14,* no. 3 (fall 2002): 1-32; Catherine J. Kudlick, "Disability History: Why We Need Another "Other," *The American History Review* 108, no. 3 (June 2004). Available: <http://www.historycooperative.org/journals/ahr/108.3/kudlick.html.>; Simi Linton, *Claiming Disability: Knowledge and Identity* (New York: New York University Press, 1998).

The recent (2002) International Classification of Functioning, Disability and Health (ICF) is the World Health Organization's (WHO) framework. The measurement of disability in relation to functionality in public policy is an important indication of a recent shift in the perception of disability and represents a change in attitudes towards people with disabilities. The ICF's approach shifts the focus away from disability and towards the ability of all people to function at their potential in any given environment. It provides a consistent, international standard for measuring and comparing both health and disability, and, as such, it is applicable to everyone rather than to people with disabilities in particular.

The ICF adapts two earlier models to form a new model that more accurately conveys current approaches towards disability. In the medical model of disability, a disability was considered an attribute of a person, and medical treatment or another form of intervention was used to attempt to change the person. In contrast, the social model of disability identified disability as a social problem rather than as a feature of a person. In this case, disability required a response that modified aspects of the social environment, including social attitudes and physical surroundings. Adapting aspects of each model, the ICF's new model claims that disability results from a combination of personal attributes and the conditions of the environment in which we live. Thus, a model that takes into account both the medical and social aspects of disability provides a more complex and less reductive approach to disability. The ICF uses the term "biopsychosocial" to describe the model in which health and disability are viewed as a result of biological, individual, and social conditions.[6]

The biopsychosocial model acknowledges that health and disability are changing conditions and that everyone can experience a form or degree of disability at some time in their lives. By recognizing disability as a universal human experience, this approach "normalizes" disability.

The ICF's model of disability provides a practical basis for developing and implementing guidelines for universal instructional design, which are discussed in Chapters 2 and 3 of this handbook. A bibliography with a selection of books and articles from disability studies is also included for those interested in current research on disability.

Medical approach + Social approach
= Biopsychosocial approach

[6] World Health Organization, *Towards a Common Language for Functioning, Disability, and Health: The International Classification of Functioning, Disability and Health* (ICF). Geneva: World Health Organization, 2002, (July 2003). Available: <http://www3.who.int/icf/beginners/bg.pdf>.

1.3 What is accommodation?

Accommodation is the process by which suitable arrangements are made for people with disabilities. In the context of the University, an accommodation is any change that enables students with disabilities to participate equally in the environment and activities of either a particular class or of university life in general. This includes making changes to course delivery, assessment methods, the types of resources provided, and physical access to a class. It involves removing barriers of all kinds, including physical or architectural barriers, information or communication barriers, as well as those caused by attitudes, policies or practices. Some commonly experienced barriers are detailed in the table below.

TYPES OF BARRIERS [7]

Barrier	Example
Physical	A door knob that cannot be operated by a person with limited upper-body mobility and strength
Architectural	A hallway or a door that is too narrow for wheelchairs or scooters
Informational	Handouts written in a typeface that is too small to be read by people with low vision
Communicational	A professor who simply talks louder when addressing a student who is deaf
Attitudinal	A professor who makes students feel that accommodations are an inconvenience and a "special favour"
Technological	Creating lecture notes in pdf format without using the accessibility feature, which enables use with adaptive software
Policy / Practice	A policy that requires students in a program to take a full course load

[7] Chart adapted from Council of Ontario Universities Working Group on the Ontarians with Disabilities Act, "The Ontarians with Disabilities Act, 2001, Suggested Guidelines for the University Sector," 6 and Appendix B. For more on accommodations, also see Ministry of Citizenship, Government of Ontario *Ontarians with Disabilities Act, 2001*, Bill 125, 14 December 2001, (June 2004). Available: <www.gov.on.ca/citizenship/accessibility/english/act2001.htm>.

Accommodations are often easier to implement than imagined.[8] Many of the accommodations made for students with disabilities, such as the adjustments in teaching methods suggested in Chapters 2 and 3, usually benefit all students.

1.4 Why do we accommodate students with disabilities?

It is to everyone's advantage to accommodate students with disabilities. By improving the possibility for people with disabilities to become integrated into the academic community, the University fosters the health and prosperity of both the community and the individual. To this end, the University of Toronto makes the following commitment to an inclusive curriculum: "The University of Toronto is dedicated to fostering an academic community in which the learning and scholarship of every member may flourish, with vigilant protection for individual human rights, and a resolute commitment to the principles of equal opportunity."[9]

1.5 Rights and responsibilities

The responsibility for accommodating students with disabilities does not just rest with the instructor, so do not feel you are alone in this endeavor; rather it is shared among various groups at different levels, including the University, Access*Ability* Services, the instructor and the student him/herself.

The University

Universities have an ethical and legal duty to accommodate people with disabilities. The legal duty is governed by The Charter of Rights and Freedoms and provincial human rights statutes. In Ontario, we are regulated by the Ontario Human Rights Code, which states that "every person has the right to be free from discrimination because of [disability] or perceived [disability]..."[10] The University of Toronto is therefore required to provide educational services without discrimination on the basis of disability.

The university has a range of responsibilities in the accommodation process. These include:

- Providing access to education;
- Working proactively to reduce discrimination, negative attitudes, and stereotypes on the part of educators, administrators, and other students;
- Supporting appropriate accommodations and positive accommodation processes;
- Cooperating with the parties involved in, and responsible for, the accommodation process.[11]

The University of Toronto is committed to "responding to the needs of a diverse student population" and to "enriching the experience of students by cooperating with and assisting them in the realisation of their educational goals..."[12] To this end, several University partners are involved in the process of support as discussed below.

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[8] Ontario Human Rights Commission, *Policy and Guidelines on Disability and the Duty to Accommodate*, March 2001, (June 2004). Available: <http://www.ohrc.on.ca/english/publications/disability-policy.shtml>, 27.

[9] University of Toronto, *Statement of Institutional Purpose*, 15 October 1992, (June 2004) Available: <http://www.utoronto.ca/govcncl/pap/policies/mission.html>.

[10] Ontario Human Rights Commission, *Policy and Guidelines on Disability and the Duty to Accommodate*, 5.

[11] Ontario Human Rights Commission, *Education and Disability: Human Rights Issues in Ontario's Education System. Consultation Paper*, 15-20.

[12] University of Toronto, *Statement of Institutional Purpose*.

Access*Ability* Services

Access*Ability* Services at UTSC is responsible for facilitating students with disabilities' full participation in university life. The office functions as a resource centre for the University, its administrators, faculty, staff, and students on disability issues. It provides information and consultation services to students, prospective students, university departments, and faculty and staff on the assessment and provision of accommodation.

Once students identify their needs for accommodation and provide appropriate documentation for their disabilities, Access*Ability* Services begins the process of assessing individual needs and determining appropriate and reasonable accommodations, consulting with faculty where appropriate. All information that the office collects from students about their disabilities is kept in strict confidence as prescribed by law.

Access*Ability* Services has the following responsibilities:

- Accept a claim of disability in good faith, unless there is a legitimate reason not to;
- When necessary, arrange for expert consultation or advice;
- Maintain records of requests for accommodation and actions taken;
- Provide information to faculty and administrators in order to facilitate the accommodation process, while, at the same time, protecting the confidentiality of students;
- Adhere to the OHRC's guidelines for accommodation and grant accommodation requests in a timely manner;
- Take an active role in the accommodation process and ensure that appropriate solutions are implemented. [13]

The student

While students with disabilities have the right to accommodations, they also have an important role in the process. According to the OHRC, it is the responsibility of students with disabilities to convey their needs, preferably in writing, to the university. In the case of course work, students often identify their disability and needs to the faculty or UTSC Access*Ability* Services directly. Students must also provide appropriate, up-to-date documentation of their disability-related needs. In any instance where they are seeking accommodation, students should promptly identify themselves to those responsible for the accommodations (professors, administrators, etc.). The accommodation provider is not required to know the nature of the disability; however, students are expected to supply information regarding their needs and limitations, and they are encouraged to participate in finding accommodation solutions. Students should work with the accommodation provider on an ongoing basis and cooperate with those whose assistance is required to ensure a successful process. [14]

The instructor

Faculty members play a key role in accommodating students with disabilities. Instructors are encouraged to be proactive and helpful in the accommodation process and to consult with Access*Ability* Services for advice and assistance.

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[13] Ontario Human Rights Commission, "Duties and Responsibilities in the Accommodation Process," *Policy and Guidelines on Disability and the Duty to Accommodate*, 24-26.

[14] Ibid., 23-24.

Instructors are responsible for participating in accommodation in the following ways:

- Students' requests for accommodation should be taken in good faith, unless there are legitimate reasons for doing otherwise;
- When necessary, outside advice or an expert opinion should be sought;
- Instructors must maintain confidentiality; [15]
- Faculty have a duty to educate themselves about disability-related issues, to interact with students in a non-discriminatory manner, to engage in the accommodation process, and to provide appropriate accommodation;
- Faculty responsible for designing or developing new or revised facilities, services, policies, processes, courses, or curricula have a responsibility to ensure that these are designed inclusively, with the needs of persons with disabilities in mind.[16]

Confidentiality is a key part of this process. Although a student seeking accommodation for a disability must self-identify, instructors do not have the right to know the nature of the disability, except to the extent necessary to participate in the accommodation process. In addition, instructors are required to keep all information regarding the student's disability confidential. Sharing information about a student with a faculty or TA colleague, even in the context of trying to assist that student, is not permitted. Questions regarding confidentiality and the accommodation process should be directed to Access*Ability* Services. [17]

1.6 The relationship between accommodation and UID

Universal Instructional Design (UID) as described in the following two chapters benefits students with a variety of abilities and backgrounds. Barriers to learning can be eliminated or reduced for students with disabilities when the principles of UID are practiced. However, it is important to note that certain students will continue to require specific accommodations according to their individual needs above and beyond what UID can achieve. Understanding the relationship between necessary disability accommodations as outlined in this chapter and the principles of UID discussed in chapters 2 and 3 below should assist you in developing inclusive teaching and assessment strategies that meet everyone's needs.

[15] Ibid., 24-26.

[16] Ontario Human Rights Commission. *The Opportunity to Succeed: Achieving Barrier-Free Education for Students with Disabilities*. Consultation Report (October 2003), available online at www.ohrc.on.ca, p.69

[17] Also see Access*Ability* Services, "Confidentiality and Disclosure," 2003, (June 2004). Available: <http://www.utsc.utoronto.ca/%7Eability/accommodations/confidentiality_disclosure.html>.

CHAPTER 2
Using the seven principals of UID to think about your teaching

As Canadian universities have sought to accommodate students with disabilities, they have looked to a variety of experts for advice on how best to approach the challenges presented. Considerable consensus has emerged around the utility of using what have become known as Universal Instructional Design (UID) principles in order to make the curriculum more accessible. Perhaps the appeal of this approach, in particular, comes from the fact that it does not just help students with disabilities but rather offers a positive opportunity to make learning more accessible to everyone.

2.1 What is universal instructional design?

Universal instructional design (UID) is a methodology for designing course materials, activities, and environments that are usable by a wide variety of students. UID offers principles for designing a curriculum that is accessible and applicable to students with different learning styles, abilities, and backgrounds. It allows students to engage in the learning process, regardless of their physical, sensory, organizational, and linguistic abilities, and it emphasizes the learner by respecting differences in pace and ability. Adapting to the needs of learners involves flexibility on the part of the instructor; however, many concepts of UID can be easily implemented.

2.2 The history of UID

The practice of UID in education adapts the principles of universal design that were developed by architect and designer Ron Mace.[18] Frank Bowe, a professor in special education and rehabilitation at Hofstra University in New York, first translated these architectural design principles into terms that are useful for education.[19] Others have since taken up this model and have continued to adapt and refine the ideas for particular programs and institutions. Sheryl Burgstahler from Disabilities, Opportunities, Internetworking, and Technology (DO-IT) at the University of Washington describes UID as a means of designing "instructional materials and activities that make…learning goals achievable by individuals with wide differences in their abilities to see, hear, speak, move, read, write, understand English, attend, organize, engage, and remember."[20] The University of Guelph-Humber has also adopted UID, and this section incorporates and modifies many of the UID concepts, principles, and guidelines developed there.[21]

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[18] See Center for Universal Design, North Carolina State University, "Ron Mace," 1998, (June 2004). Available: <http://www.design.ncsu.edu/cud/center/history/ronmace.htm>.

[19] Frank Bowe, *Design in Education – Teaching Non-Traditional Students* (Westport, CT: Greenwood, 2000). For the history of its development, see Bowe's dedication and acknowledgement. Also see his website: <http://people.hofstra.edu/faculty/frank_g_bowe/>.

[20] Sheryl Burgstahler, "Universal Design of Instruction," University of Washington, 6 November 2002, (June 2004). Available: <http://www.washington.edu/doit/Brochures/Academics/ instruction.html>.

[21] Teaching Support Services, University of Guelph-Humber, "Seven Principles of UID: Definitions, Guidelines and Examples," and "Universal Instructional Design (UID): A Faculty Workbook" (University of Guelph, 2002, photocopy). Contact Adrienne De Schutter, Instructional Designer and Project Manager, Guelph-Humber, for more information on their project: adeschut@uoguelph.ca.

2.3 Benefits of UID for students with disabilities

The philosophy surrounding UID "recognizes that with enhanced awareness and knowledge, many aspects of the educational environment can be designed from the outset to be more inclusive of students with disabilities. The possible outcomes of this proactive approach to educational access are promising and include the potential for reduced barriers to learning, decreased time and cost of retrofitting accommodations, the development of new partnerships when considering inclusive design, compatibility with broader campus initiatives to support student diversity, and the tacit message to students with disabilities that they are welcome in the higher education environment." [22]

2.4 The seven principles of UID

The following section details the now commonly accepted seven principles of UID (see box) and provides specific examples as to how each might be implemented in a curricular setting.

1. Accessibility

Methods of instruction and educational materials should be useful to and accessible by students of all abilities. When possible, provide instruction using methods and materials that all students will be able to use, and, when necessary, provide equivalent alternative means for achieving those educational goals. Avoid stigmatizing students who require alternate methods, and provide a way for students to approach you privately to discuss their needs and to arrange accommodations.

Examples

- Use a variety of instruction methods so that students have more than one opportunity to understand course material. For example, assign course readings, review key concepts in class, and organize small group exercises where students can apply the concepts.

SEVEN PRINCIPLES OF UNIVERSAL INSTRUCTIONAL DESIGN [23]

1. Accessibility
2. Flexibility
3. Straightforward and intuitive use
4. Effective and clear instructional methods
5. Supportive learning environment
6. Minimising unnecessary tasks and requirements
7. Adequate space

[22] Scott, Sally S. et al. Implementing Universal Design in Higher Education: Moving Beyond the Built Environment. *Journal of Postsecondary Education and Disability* 16.2 (2003): 78-79.

[23] These principles are adapted from the seven principles outlined in Frank Bowe, *Design in Education – Teaching Non-Traditional Students*, as well as from the University of Guelph-Humber's adaptation of Bowe's principles, "Seven Principles of UID," which can also be accessed from *Universal Instructional Design 2003*, (June 2004). Available: <http://www.tss.uoguelph.ca/uid/index.html>, and from Norma Hart and Susan Gauthier, Georgian College, "Principles of Universal Instructional Design," 2002, (June 2004). Available: <http://www.georgianc.on.ca/student-services/ destinationsuccess/2002/abstract/hart.htm>. Also from Georgian College, see Centre for Access and Disability Services, "Principles of Universal Instructional Design," May 2003 (June 2004). Available: <http://www.georgianc.on.ca/c4a/uid_principles.htm>.

- Provide accessible web-based course material so that students can access material for review and follow up class sessions with on-line resources.

2. Flexibility

Course instruction should be designed to accommodate a wide range of learning styles and abilities. By offering course material in a variety of forms, you make it possible for students to select the formats they find most accessible. Allow some flexibility in the way students participate in a course, and be aware that students will digest the material at various rates.

Examples

- Provide a range of assessment methods. Students could, for instance, be asked to either write an essay or give a presentation. If appropriate, allow students to choose whether they work individually or in groups.
- During a lecture, pause occasionally to allow students both to keep up and to assimilate the material. Give examples to demonstrate important concepts.[24]
- Use on-line discussions so that students who do not feel comfortable speaking in class can participate in the discussion of course material.

3. Straightforward and intuitive use

Course materials should be well organized and easy to use, regardless of students' experience, knowledge, language skills, or current level of concentration. Students with certain learning disabilities have particular difficulty organizing information, but all students benefit from a clear, hierarchical order that demonstrates the relationship between information and ideas. Where possible, and without compromising course content, eliminate unnecessary complexity.

Examples

- Provide a course syllabus that clearly outlines the goals and expectations of the course.
- Ensure that course material is appropriate for the level of the course.
- Reinforce course goals in each class by providing an outline that emphasizes key concepts and shows their relation to the course as a whole.[25]

4. Effective and clear instructional methods

Lectures and other course materials should be delivered in a way that is accessible to students with different sensory abilities under all kinds of conditions. Important information, in particular, should be available in various forms (visual, auditory, tactile). According to UID specialist Frank Bowe, redundancy is a key feature of accommodating students with physical and learning disabilities, but it is also beneficial for all students. [26]

Examples

- When possible, select texts that are available in both print and digital format so that, for example, students with low vision can use a screen reader to easily access the readings. [27]
- Explain difficult concepts and theories in a logical, step-by-step manner and using multiple teaching methods, and give students the opportunity to practice applying concepts.

5. Supportive learning environment

Course design and methods of instruction should be welcoming and inclusive. Try to establish a class environment that is comfortable for all students and where students respect the diversity of class members. Incorporate opportunities for students to apply course material to relevant tasks, and provide feedback on their

[24] Bowe, 70.

[25] Teresa Dawson's template for a class outline is available from Teaching and Learning Services, UTSC: <http://tls.utsc.utoronto.ca/faculty/template_outlines.htm>

[26] Bowe, 76-77.

[27] See the chart of Assistive Technology in Appendix B for a description of a screen reader.

performance. Encourage collaboration and cooperation, and review material with students at regular intervals. Since students benefit from frequent contact with their instructors, try to provide the opportunity for interaction. [28]

Examples

- Help students form study groups, or set up an on-line discussion forum.
- Include a statement in the course syllabus outlining your expectations for the classroom environment and encouraging students to discuss any individual needs with you.
- Put an Access*Ability* statement on your syllabus (see box).
- Design course assignments so that they are integrated. Most beneficial for student learning are long-term projects that build skills and understanding through a series of smaller cumulative assignments.
- Provide students with feedback on each assignment to help them progress to the next stage of the larger project and to build and reinforce learning. [29]

6. Minimising unnecessary tasks and requirements

In order to maximize the energy students expend on learning, plan your course to avoid unnecessary administrative or physical work. [30]

Examples

- Make required course readings easily accessible. If you are using individual articles, offer them as a prepared course pack rather than requiring students to photocopy the readings themselves.
- Design fieldtrips to maximise learning but minimise physical exertion.

7. Adequate space

Ensure that there is adequate space in your classroom to accommodate students' physical requirements and the modes of instruction you will be using.

Examples

- Check that your classrooms or labs are suitable for students with a variety of physical characteristics and for those using assistive devices.
- Ensure that students have a clear line of sight to you and to any visual material. [31]

Sample statement on disability for a syllabus

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability or health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. The UTSC AccessAbility Services staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let them and me know your needs, the quicker we can assist you in achieving your learning goals in this course.

[28] "Seven Principles of UID" 11-12.

[29] Teresa Dawson's template for providing feedback on student assignments is available from Teaching and Learning Services, UTSC: <http://tls.utsc.utoronto.ca/faculty/template_feedback.htm>.

[30] Bowe, 76-77.

[31] Examples are drawn from Bowe, 91-98.

CHAPTER 3
Suggestions for incorporating UID into your course planning and delivery

Universal instructional design (UID) entails designing a curriculum that does not create barriers for students. Developing teaching and assessment strategies that integrate all students' needs from the outset helps to provide an inclusive environment, and it makes it easier for students with disabilities to achieve their learning goals. The following sections outline methods for incorporating the principles of UID into different aspects of a course.[32] They are organised in an order consistent with the sequence of course planning and delivery. Do not try to do everything at once. As with any instructional innovation, just start small with something that is of interest to you and that you feel can make the biggest difference to your students.

3.1 Planning your course: the importance of the syllabus

The planning stage is the ideal time to begin to integrate accessible features into your curriculum. When you are making choices about aspects of your course, such as policies, delivery methods, and modes of assessment, try to avoid creating barriers for any students.

A carefully prepared syllabus is particularly important to students with disabilities. For those who need to make special arrangements, the syllabus gives them advance notice of readings, assignments, and special activities. For instance, students who need more time to complete assignments can start early if they have the assignment guidelines, and students can arrange for accommodations such as alternate format materials (electronic or audio). Students with learning disabilities, in particular, benefit from a written document that clearly outlines the expectations and procedures of the course; however, all students are able to get more out of a course if they are given a comprehensive syllabus with clear goals.

When it comes to your syllabus:

- Define your goals for the course. What course content and what skills do you expect students to learn?
- Decide how you will present the material so that it is logical and easy to follow. Introduce core concepts and progress to complex ideas and their application. Introduce students to the big picture of your discipline and your course before dealing with specifics.[33]
- When choosing texts for your courses, check if there is a suitable book that is available in electronic format. If the text you prefer is not available in electronic form, talk to the publisher about the possibility for the future.[34]
- Choose modes of assessment that will be suitable for all students. On-line timed tests, for example, can create barriers for students who require additional time. Considering this during the planning phase will save time later if a student requires extra time as an accommodation.
- Review your syllabus and look for opportunities to include details that will help everyone (see box page 12 for suggestions). For example consider an "Access*Ability* Statement" that makes all students feel welcome (see box page 10).

[32] Adapted from Teaching Support Services, University of Guelph-Humber, "Universal Instructional Design (UID): A Faculty Workbook" (University of Guelph, 2002, photocopy). Contact Adrienne De Schutter, Instructional Designer and Project Manager, Guelph-Humber, for more information on their project: adeschut@uoguelph.ca.

[33] "Universal Instructional Design (UID): A Faculty Workbook," 5.

[34] "Universal Instructional Design (UID): A Faculty Workbook," 12.

Consider Including the Following Specific Items in Your Syllabus

- A description of the course
- The course goals and learning objectives
- The prerequisites or skill requirements for the course
- The instructor's name, class location, office hours and location, email, and phone number
- A list of required texts or other resources
- A statement encouraging students who require accommodations to speak to you privately (see box page 10)
- A description of the assignments and their weight
- Policies on missed classes, late assignments, and academic misconduct
- Resources for support, such as the Writing Centre, the Math and Statistics Help Centre, Presentation Skills, Research Instruction, and Learning Skills Support (See Appendix B)
- A schedule of dates indicating topics, readings, field trips, and assignments, which would allow students to make special arrangements in advance (i.e., transportation, sign language interpreters, daycare, etc.)

3.2 Delivering your course

The accessible delivery of material can make a significant difference in a student's level of success in your course, which, in turn, has the potential to get students excited about learning for its own sake. Overall, the suggestions given in this section provide significant benefits to students with disabilities; however, here again, all students benefit from the clarity and straightforwardness of these modes of teaching.

Getting started

- Give students a hard copy of the syllabus and go through it with them during the first class. Essential information should be conveyed orally and in writing.
- Discuss the organisation of the course and why you have chosen that particular structure.
- Students learn best when they can build on what they already know and when they can see how they will benefit from new knowledge. Connect

what they know to the learning objectives of the course and to what they will need to know in upper-level courses or in their careers.[35]

- Explain how the activities and assessment methods used in the course will help students to achieve the desired learning objectives.

Teaching methods

- Plan on incorporating different modes of presentation to deliver course content. Possibilities include: lectures, discussion, small-group work, hands-on activities, and problem solving.
- Allocate time for different topics based on their importance and level of difficulty.

Engaging and motivating students

- Make the best use of class time by helping students to prepare. For example, when you assign texts provide questions to guide the students' reading. Questions should build from lower to higher order thinking, thereby modelling the academic process.
- If you assign readings, be sure to integrate them into the class.[36]
- Convey your enthusiasm for the subject matter to your students.[37]
- Use active learning techniques, such as discussions, problem solving, and group work, to engage students.[38]
- Keep students excited about learning by identifying what they have learned as the course progresses. This helps students to become self-reflective about their own learning.[39]

Clarifying key points and difficult concepts

- Provide definitions of all important terms and concepts. When possible, provide concrete examples and explain their significance.[40]
- Ask students to submit written questions at the end of a lecture or email questions following a lecture, and try to address common problems in the class.
- Find out if there are any on-line learning resources that demonstrate difficult concepts in your discipline. For example, an on-line multi-media resource by Dan Russell, Professor of Applied Physics at Kettering University, offers animations that visualize the behavior of sound and sound waves in numerous situations.[41] MERLOT, a Multimedia Educational Resource for Learning and On-line Teaching, provides access to a wide range of materials for the humanities, the social sciences, business, and the sciences.[42]

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[35] John Biggs, *Teaching for Quality Learning at University* (Buckingham, England; Philadelphia: Society for Research into Higher Education and Open University Press, 1999), 74.

[36] Teresa Dawson's template for class outlines is useful for coordinating learning goals with preparatory activities. For the template, see Teaching and Learning Services, UTSC, (Nov. 2004). Available: <http://tls.utsc.utoronto.ca/faculty/template_outlines.htm>.

[37] "Universal Instructional Design (UID): A Faculty Workbook," 7.

[38] For ideas on incorporating discussion, see Gross Davis, "Leading a Discussion," in *Tools for Teaching*, 63-81.

[39] Teresa Dawson, personal comment, January 2004.

[40] "Universal Instructional Design (UID): A Faculty Workbook," 8.

[41] Dan Russell, Kettering University, "Acoustics and Vibration Animations," May 2003, (June 2004). Available: <http://www.gmi.edu/~drussell/Demos.html>.

[42] See Multimedia Educational Resource for Learning and Online Teaching (MERLOT) (June 2004). Available: <http://www.merlot.org/>. Also see Cooperative Learning Object Exchange, a collaboration of Ontario Universities dedicated to developing "multimedia rich learning resources" (June 2004). Available: <http://cloe.on.ca>. Thanks to UTSC Learning Strategist, Dr. Susan Weaver, for the information on learning objects.

Organising and prioritising information

- Begin class with an overview of the material that you will cover and indicate how it connects with the topic discussed in the previous class.
- Draw attention to the most important points during a lecture and help students understand the conceptual framework for the material.
- At the end of a class, ask students to identify three main points of the lecture. Summaries can be posted online, discussed with a classmate, selectively shared with the class, or handed in to you.

Facilitating note-taking

- Provide an outline for each class (easily done via the UTSC intranet) that identifies the main points and shows how the class relates to the goals of the syllabus. By reviewing an outline before a class, many students find it easier to grasp the conceptual framework for the lecture material. Providing diagrams and tables beforehand can also be useful.[43]
- Another approach is to take short breaks periodically throughout a lecture in order to give students a chance to compare and discuss their notes with a partner. This helps to ensure that students have not missed key points, and it often enables them to clarify the conceptual framework for the material.[44]
- Face the class, rather than, for example, the chalkboard, whenever you are speaking. It is especially difficult for students who are Deaf or hard-of-hearing to follow when you are facing away from the class.[45]
- Speak clearly and at a reasonable pace. Use variations in tone to indicate important points and to keep students engaged.

Addressing different levels of knowledge, learning styles, and rates of learning

- Use accessible, jargon-free language whenever possible. Explain technical or theoretical terms carefully, and consider providing terms on handouts to ensure that students have exact phrasing.
- Use redundancy, especially for key ideas.[46]
- Try to present information verbally, visually, and through modelling or exercises. This is helpful to students with different learning styles (visual, verbal and kinesthetic), as well as to students whose disability impacts hearing, vision or concentration.

[43] Teresa Dawson, personal comment, January 2004. See also note 36.

[44] Biggs, 107-108.

[45] Gross Davis, "Academic Accommodations for Students with Disabilities," in *Tools for Teaching*, 33-34.

[46] Frank Bowe emphasizes the importance of redundancy for teaching students with disabilities. See Bowe, 76-77.

- Review course material with the class before tests or exams, and consider providing a study guide with sample questions from your class outlines or a list of topics.[47]

3.3 Facilitating interaction

Interaction between the course instructor and students, as well as communication between students, helps to create a good environment for teaching and learning. Students are more likely to seek assistance from each other and from the instructor if they understand the protocols of the course and they have been encouraged to feel comfortable asking and answering questions. If you anticipate that a student with a disability will have difficulty with an aspect of your course such as a field trip or an assignment, speak to the student privately as soon as possible to find a suitable form of accommodation or an acceptable alternative should one be required.

Creating a good environment

- During the first class, introduce yourself. Talk to students about your research, share a personal experience that relates to the class, or tell them about your background and interests.[48]
- Ask students to do the same. In smaller classes this can be done verbally, but in larger classes you might ask them to write down answers to a few questions. For instance, ask them, "What do you expect to gain from this class? What are your academic interests, and what do you hope to do after university?"
- Try to be learner rather than teacher centred. As one instructor put it, "Be interested in your learners instead of trying to be an interesting teacher." [49]
- Explain your expectations for the class environment. Ask students to respect each other and to have tolerance for diversity. [50]
- Respect a student's privacy regarding their disability. This is also an important way of creating a good environment in the class as a whole.
- If a student with a disability approaches you, consider suggesting a meeting with them privately in order to discuss if or how their disability will impact their class work. Ask students if there are particular activities that are challenging for them. Students may be able to suggest variations of these activities that they can participate in more comfortably. [51]

Encouraging participation

- Tell students when and how you would prefer to answer questions. For example, allow students to pose questions during a lecture, or ask them to write down questions for a discussion at the end. For students who require more time to absorb the material, sending questions by email can be an effective alternative.
- Rephrase student questions for the whole class before you answer them. This can help you to clarify the question, and all students have a better chance of hearing what was said. Write down key points during class discussions so that students who are Deaf or hard-of-hearing can follow.

[47] Teresa Dawson's template for a class outline is available from Teaching and Learning Services, UTSC, (Nov. 2004). Available: <http://tls.utsc.utoronto.ca/faculty/template_outlines.htm>.

[48] Universal Instructional Design (UID): A Faculty Workbook," 10.

[49] Jack Jones, "Creating a Positive Interactive Learning Environment" (Nipissing University, North Bay, Ontario, 2001, photocopy), 8.

[50] "Universal Instructional Design (UID): A Faculty Workbook," 10.

[51] Center for Teaching and Learning, University of North Carolina at Chapel Hill, "Teaching for Inclusion," 30 January 2001, (June 2004). Available: <http://ctl.unc.edu/tfi13.html>.

- Ask students what they know about a topic before you start lecturing, and ask them questions to check if they understand the new material as it is delivered.
- Set up activities in which students interact with each other during class time. This kind of activity is useful for students to develop tolerance for different views, and students can gain insight into their own points of view through comparison with others.[52]
- Group activities can present challenges for some students, but by including students with disabilities in groups, all students may gain new understanding of one another and an increased tolerance for difference. By creating an environment where students with disabilities can participate in all class activities, you convey to the class that students with disabilities are equally important and capable members of the class.[53]
- While all students should be encouraged to participate in class discussions, students with certain kinds of disabilities may feel uncomfortable speaking in front of the class (i.e., a student with a communication or mental health disability). Where appropriate, these students can be given an alternative task, particularly when they are being graded on participation. For example, having students email their thoughts and questions to you after the class demonstrates their knowledge of the material taught in the lecture.

Availability outside of class

- Hold regular office hours, announce your availability during class, and ensure that you are on hand during those times.
- Set clear guidelines for responding to email and stick to them. Email can be particularly useful for communicating with students with disabilities that affect their speech, hearing, health, mobility and/or mental health.

Facilitating student interaction outside of class

- Set up electronic discussions, a list-serv, or a live on-line chat forum for your class. These can be moderated or not, depending on how much time you want to dedicate to them.
- Encourage students to form study and informal peer groups outside of class.

Soliciting and using feedback from students

- Solicit feedback from students on a regular basis with quick questionnaires to find out what is working effectively and what is not.[54] Ensure that the questionnaires are available in alternate format (i.e., enlarged print, electronic, online web survey). Adapt and modify your teaching methods according to the results.
- Ask students to complete a more detailed evaluation halfway through or towards the end of the course. Incorporate the feedback from students into the course, and use it to further modify the course for the future.[55]

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[52] Biggs, 79.

[53] Center for Teaching and Learning, University of North Carolina at Chapel Hill, "Teaching for Inclusion." For ideas on how to accommodate specific kinds of disabilities also see Disabilities, Opportunities, Internetworking, and Technology (DO-IT), "The Faculty Room," University of Washington, 2001, (June 2004). Available: <http://www.washington.edu/doit/Faculty/Strategies/Academic/Groupwork/>.

[54] "Universal Instructional Design (UID): A Faculty Workbook," 15.

[55] See Teresa Dawson's template for student feedback, Teaching and Learning Services, UTSC, (Nov. 2004). Available: <http://tls.utsc.utoronto.ca/faculty/template_feedback.htm>.

Working with teaching assistants (TAs)

- When you meet with your TAs, talk to them about general issues regarding teaching students with disabilities, and encourage them to be sensitive to issues of diversity that relate to the course.
- Explain to your teaching assistants that they should follow the same policies as you do, particularly in terms of accommodating students with disabilities, and mentor them on how this is done.

3.4 Providing resources

Providing course material such as the syllabus, handouts, study guides, and assignment sheets in multiple formats reduces barriers. Give out hard copies during class, but also offer them in an electronic format (online using the UTSC intranet or on CD). Students using specialized software, for instance, benefit from this provision.

Assistive technology further reduces barriers for students with disabilities. By cooperating with students and by facilitating the use of assistive technology in the classroom, instructors can make a significant difference in a student's ability to succeed in a course. For instance, by wearing an FM system transmitter that amplifies sound, an instructor can make it possible for a student who is hard-of-hearing to follow and participate more fully in the class.

Making course materials accessible

- When creating electronic resources, ensure you use a format that functions with screen readers, such as pdf files (with the accessibility feature enabled) and html. [56] Web pages created in html should use <alt> tags for graphics. Test the accessibility of your web site using free tools such as Bobby. [57]
- Try to select videos for the class that are close-captioned. If a video is close-captioned, it will be listed as such in the library catalogue. When suitable material is not available in this form, Access*Ability* Services will be able to inform faculty as to how transcripts of the videos can be created.
- If you place readings on reserve in the library for students, provide students with disabilities with their own copies. This will reduce unnecessary difficulties in accessing course material.

Assistive technology and services

- Assistive technology includes all forms of technology that help to diminish barriers for students with disabilities.
- Although, as a faculty member, you may not be directly involved with assistive technology, you may find that by familiarizing yourself with the options available, you are better prepared to assist students in the accommodation process. See Appendix A for a description of the forms of assistive technology and their benefits.
- Different kinds of equipment and software are suitable for different disabilities. For students with low vision, for example, a closed circuit television (CCTV) enlarges print so that they can read it. For students who are blind, on the other hand, a screen reader produces a synthesized voice output from computerized text.
- The University's Adaptive Technology Resource Centre (ATRC), located in Robarts Library on the St. George Campus, supports the use of assistive technology for students with disabilities.

[56] For assistance with accessibility features and electronic resources, contact UTSC Computing and Network Services at: helpdesk@utsc.utoronto.ca or see <http://cns.utsc.utoronto.ca/>.

[57] There are several free services for testing web pages. See Bobby at: <http:// bobby.cast.org/> or Watchfire at: <http://www.watchfire.com/solutions/accessibility.asp>.

3.5 Student assessment

Because assessment is such an important component of any course, all students must be treated fairly, including students with disabilities. At the same time it is important to recognize that "fair" does not mean "the same."[58] Providing alternative modes of assessment for students with disabilities is a way of accommodating a functional difference caused by a disability and a way of giving these students an equal opportunity to succeed.

Alternate assessment methods

- At the beginning of the course, explain how you will assess students, and make sure this is documented in the syllabus; throughout the course, prepare students for upcoming assignments and tests.
- Use a variety of modes of assessment to address different learning styles, and select forms of assessment that reinforce your learning goals for the course.
- When appropriate, consider offering students a choice of assignment formats. For example, give them the choice of either writing individual essays or doing a group project.[59] This choice will especially benefit students with chronic health conditions, such as cancer, who may find group projects difficult to arrange around medical appointments.
- Describe the format of a test or an exam, and give examples or practice questions.
- Design questions that test higher-level skills, such as problem-solving, in addition to questions that merely require the recall of information.[60]
- Give students sufficient time to complete assignments. Students with disabilities frequently benefit from extra time to write tests or exams. Assistive technology can increase the time required to complete a task, and some students may require more time to process information. Notify students when you are unable to accommodate them without the support of Access*Ability* Services (i.e., with assistive technology or extra time to complete tests and exams) and refer them to the service for assistance.[61]
- Because of time constraints and distractions, in-class quizzes and assignments can be problematic for some students with disabilities. Where appropriate, consider allowing extra time, or give take-home quizzes instead.
- Try to use several different kinds of assessment, and avoid very heavily weighted components, such as an exam worth 50% of the final grade.

Ongoing feedback

- Provide constructive and encouraging feedback on assignments.
- Try to return assignments promptly.
- Whenever possible, give students concrete examples of good work.

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[58] Ontario Human Rights Commission, *Policy and Guidelines on Disability and the Duty to Accommodate*, March 2001, (June 2004). Available: <http://www.ohrc.on.ca/english/publications/disability-policy.shtml>, 14.

[59] For a thorough source on providing alternate forms of assessment, see Australian National University, Disability Services Unit, "Alternative Assessment for Students with Disabilities," 2001, (June 2004). Available: <http://www.anu.edu.au/disabilities/altass.html>.

[60] Gross Davis, "Quizzes, Tests, and Exams," in *Tools for Teaching*, 241-242.

[61] See http://www.utsc.utoronto.ca/~ability for more information on the test and exam accommodations offered through Access*Ability* Services.

- Frequent feedback and smaller, cumulative assignments that break down complex activities such as a research paper into smaller, manageable tasks are helpful to all students and particularly students with learning disabilities, acquired brain injuries, mental health and chronic health conditions.[62]

3.6 Physical access

When you design your course, you have an opportunity to create an instructional experience that is accessible to all students. Most frequently, instructors have some control over physical, informational, communicational, attitudinal, and technological aspects of a course. Try to avoid creating potential barriers for your students.

Awareness and accommodation

- Try to arrange for a classroom that is suitable for your needs and those of your students. Students should have sufficient space to work, and students with mobility aids such as scooters and wheel chairs should be able to navigate the room without having to disturb other students.
- Encourage students who are blind or have low vision to familiarize themselves with a classroom, science lab, or computer lab when the class is not in session.
- Provide handouts of technical terms so that students who have difficulty taking notes can follow the class. Again, drawing on the principles of universal instructional design, this will be beneficial to all students.
- Give students regular breaks during the class. This is important both for the physical comfort of students and for enhancing the retention of material for all students. Studies show that students concentrate for about the first 10 – 15 minutes in a lecture, but a short rest or even a change in activity results in renewed concentration.[63]
- In large classes, use a microphone so that students can hear you clearly. Students who are Deaf, deafened, or hard-of-hearing may experience difficulty following lectures and contributing to discussions. To make it easier for these students to understand what is going on, repeat student responses and write important points on the board.[64]

Options for out-of-class activities and program design

- If you are involved in shaping policies, consider ways of incorporating some flexibility into your department's programs. By starting with clear goals, it may be easier to assess which requirements are essential for the program and which create unnecessary barriers for students.
- Find out in advance if a site for an out-of-class activity is accessible, and, when possible, only select accessible sites.[65] Fieldwork components can present challenges for students with certain kinds of disabilities. If students are unable to participate in fieldwork, where appropriate try to accommodate them in your course by providing alternate ways for them to learn and

[62] For more on designing good assignments, see John Bean, Engaging Ideas: *The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom* (San Francisco: Jossey-Bass Pub., 1996).

[63] Biggs, 99-100.

[64] Disabilities, Opportunities, Internetworking, and Technology (DO-IT), "The Faculty Room." See page 25 for website.

[65] See Gross Davis's section on physical access, "Academic Accommodations for Students with Disabilities," in *Tools for Teaching*, 33.

demonstrate their understanding of the material.[66]

- Notify students well in advance of any fieldwork or class trips so that necessary accommodations, such as transportation and daycare, can be arranged.
- In classes with laboratory components, work with students with disabilities to find suitable lab partners and to ensure that the working relationship is effective for both students.
- Good safety practices are essential for all students working in laboratory settings, but safety should not be used to exclude students with disabilities from courses with lab components. When necessary, seek the advice of the University of Toronto's Office of Environmental Health and Safety.[67]

Conclusion

UID as an on-going process

UID is not a panacea. It will not completely remove the need for individual accommodations, nor will it eliminate many of the challenges faced by students with disabilities. However, it does represent two steps in the right direction: it moves us towards changing attitudes that contribute to the difficulties students with disabilities face; and it is a step towards making higher learning more accessible to all.

As you review and revise your own teaching practices in light of UID, observing that you are already following many of the principles, Access*Ability* Services and Teaching and Learning Services invite you to participate in an ongoing conversation about inclusive teaching practices at UTSC. Discuss UID with colleagues, with teaching assistants, and perhaps even with students. Consult the resources presented in this booklet, try some new ideas and make use of on-campus services. Finally, let us know what you are doing and how it is working, and do not hesitate to suggest ways in which our offices can further assist you to achieve your teaching goals for all students in your courses.

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[66] See Teresa Dawson's "Common Teaching Goals and Typical Ways of Achieving Them" in *Teaching and Learning for Diversity at UTSC (UTSC, Teaching and Learning Services, 2003), 17.*

[67] University of Toronto, "Office of Environmental Health and Safety," 18 November 2003, (June 2004). Available: <http://www.utoronto.ca/safety/>.

APPENDIX A

ASSISTIVE TECHNOLOGY [68]

Forms of Assistive Technology	Description of the Technology and Benefits
Accessible on-line learning tools	Web-based teaching programs, such as the UTSC intranet and Blackboard, which can be used for distance learning.
Alternative keyboards	Keyboards with different layouts and sizes for people who have difficulty working on conventional keyboards.
Alternative mouse systems	Alternative pointing systems that replace a mouse for people who have trouble maneuvering one.
Braille embosser and text-to-Braille conversion	Hardware that prints a copy of a text document in Braille.
Closed circuit television (CCTV)	A video magnification system that allows a person with low vision to enlarge text and images.
Electronic aids to daily living system	Either a device or a system that allows a person to operate appliances and electrical equipment such as a computer, a phone, and electrical switches using voice activation or remote control.
FM system transmitter	A device that amplifies sound for a person who is hard-of-hearing.
Grammatical support tools	Either grammar correction and support tools, such as the grammar check on a word processing program, or grammar learning tools, which aim to actively improve the grammar of the user.
Haptic devices	A mouse or other device used with computer software, which allows a person to use a computer by receiving tactile feedback. The user feels rather than sees the Graphical User Interface. Haptic devices are useful for individuals with a visual impairment and for kinesthetic learners.

[68] This chart is based on the Adaptive Technology Resource Centre, "Technical Glossary," University of Toronto, (June 2004) Available: <http://www.utoronto.ca/atrc/reference/tech/techgloss.html>. The website describes each form of technology in detail and provides resources for further information. To find out about the Centre, see the website of ATRC at: < http://www.utoronto.ca/atrc/contact.html >.

Forms of Assistive Technology	Description of the Technology and Benefits
Linux accessibility	Linux is a free computer operating system, which offers accessibility features similar to those of commercial operating systems (Microsoft and Macintosh). Screen readers, Braille support, and screen magnification are examples of the accessibility resources.
Neural interface devices	People with severe physical disabilities can use these devices, which operate on the small electrical signals generated by eye movements or brain waves, to control a computer or an electrical device attached to a computer.
Non-display based personal digital assistants	Personal digital assistants are handheld computers that are used as organizers, note takers, and communication devices. Non-display PDAs use aural output, Braille displays, and Braille keyboards rather than text-based and visual displays.
On-screen keyboards	Instead of a conventional physical keyboard, this is one that is permanently visible on-screen. It can be used with any type of pointer device, and is therefore helpful for people with many kinds of physical disabilities.
Optical character recognition (OCR)	A process that converts an image of text, such as a scanned paper document or electronic fax file, into text that can be edited on a computer. Kurzweil is a common OCR reading tool, used with a scanner, for people with low vision or reading difficulties.
Personal digital assistants (PDA)	Handheld computers that are used as organizers, note takers, and communication devices. People with learning or cognitive disabilities often find them helpful.
Refreshable Braille display	A device that can read text from a computer and convert it to Braille, one line of text at a time.
Screen magnifiers	Software that enlarges the information on-screen for people with visual disabilities. They are designed to run seamlessly with the operating system and commonly used programs.

ASSISTIVE TECHNOLOGY CONTINUED

Forms of Assistive Technology	Description of the Technology and Benefits
Screen readers and talking browsers	Screen readers produce a synthesized voice output from text displayed on the computer screen and from keystrokes entered on the keyboard. Talking browsers are similar except that they are specifically designed for internet use.
Speech synthesizers	A device used for speech output. Typically, they are used with screen readers or OCR/scanning programs for people who are blind or have visual impairments.
Switches (operational)	People with mobility disabilities often use these to operate computers or other electronic devices. Switches can be buttons, a sensory plate, or touch-free devices that are easier to activate than standard keyboards or other controls.
Text-to-speech systems	Converts text from a computer document, such as a word-processed document or a web page, into audible speech heard through the computer speaker. Like screen readers, text-to-speech systems can be used with optical character recognition; however, text-to-speech software is different from screen reading technology because it does not read any system information.
Voice output communication aids	Electronic devices that generate printed and/or spoken text. These are useful for people who cannot communicate adequately through natural speech.
Voice recognition systems	Voice recognition systems use voice as an input device. People with a range of mobility-related disabilities can use them to dictate text into a computer or to give commands to a computer.
Word prediction	Software that predicts words based on word frequency and context. Some kinds include features such as checking spelling as you type, speech synthesis, and hotkeys for frequently used words. Word prediction helps slow typists and people with minor visual impairments or dyslexia with text entry.

APPENDIX B

Services for faculty, staff and students

UTSC offers a wide range of support services to faculty, staff and students. For faculty, these services are designed to assist in course preparation and delivery. The Writing Centre, for instance, offers consultations on designing assignments and Access*Ability* Services offers support for the provision of accommodations for students with disabilities. Students, on the other hand, use the same services for assistance with their course work. By including a brief description of relevant services in your syllabus, you can help students access the support they need to succeed.

Academic Advising & Career Centre supports students' advising, career, employment and learning skills needs through print resources, one-on-one appointments, and a variety of workshops including test and exam preparation, time management and study strategies. See http://www.utsc.utoronto.ca/counselling.

Access*Ability* Services provides information and consultation services to students, prospective students, university departments, faculty and staff on the assessment and provision of accommodation and services for students with disabilities. See http://www.utsc.utoronto.ca/ability.

Adaptive Technology Resource Centre (**ATRC**) is located in Robarts Library on the St. George Campus. See http://www.utoronto.ca/artrc/.

Computing and Networking Services supports the use of information technology in UTSC courses. It offers supervised computing clusters with access to printing, software, the internet and the UTSC intranet. Its facilities include a student support centre. See http://cns.utsc.utoronto.ca/.

Faculty Consultation on Teaching includes assistance with syllabus and assignment design, as well as providing a sample "accessibility statement" to include on a syllabus. See http://tls.utsc.utoronto.ca/faculty/default.htm.

Library Services provides research assistance in person, online, and by phone. See http://library.utsc.utoronto.ca/.

Math and Statistics Help Centre provides math and statistics support for all students including help with data analysis and interpretation. Services include individual appointments with a tutor, as well as workshops and seminars. See http://tls.utsc.utoronto.ca/data_interpretation/default.htm.

Presentation Skills Help offers workshops and individual consultations for students giving presentations as part of their course requirements. See http://tls.utsc.utoronto.ca/instruction/presentation/default.htm.

Research Skills Help provides a variety of online research skills resources at http://tls.utsc.utoronto.ca/instruction/default.htm. Reference Librarians also offer research tutorials and in-class workshops to assist students in learning effective research strategies. See http://library.utsc.utoronto.ca/reference/tutorials.htm.

The Writing Centre offers one-on-one consultations, writing seminars, and handouts on academic writing. English language support for non-native English speakers is also offered. See http://tls.utsc.utoronto.ca/TWC/index.htm.

Bibliography

The principles of UID can help you to identify areas of your teaching that can be adjusted for greater accessibility. To facilitate your teaching and learning process, the following section lists resources available to assist you in your research in the areas of disability and UID.

Disability and Accommodation

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