

**Evaluation Report on the Universal Instructional Design Project at the
University of Guelph**

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Executive Summary

The Universal Instructional Design (UID) Project commenced at the University of Guelph in Spring 2002. Funded by the Learning Opportunities Task Force, the UID project was a one-time grant initiative that funded 9 courses in total at the University. UID emphasizes the central concept of inclusiveness and equity so that all students, regardless of learning disability or learning style, can fulfill their course requirements without special accommodations. The 9 courses selected for funding were either redesigned (large-scale curriculum reform projects) or enhanced (specific instructional remedies) according to UID.

A program evaluation was conducted for the UID project that included student questionnaires, classroom observations, and student and faculty interviews. The central goals of the evaluation were to assess the extent of UID implementation, and to assess whether student academic self-efficacy and affective states improved as a result of UID implementation.

Students enrolled in UID courses were administered questionnaires at three different time intervals: April 2002, November 2002, and March 2003. The questionnaires specifically measured level of UID implementation, academic self-efficacy and affective states. The questionnaires were available in both hard copy and on-line formats.

The results of the evaluation indicated that level of UID implementation increased significantly over the course of the project. Outside classroom observations of UID courses were made and showed significant correlations with student reported assessments of UID. The evaluation also revealed that student academic self-efficacy and positive affect increased as UID implementation increased. That is, students reported greater academic self-efficacy and more positive emotions in their courses as UID implementation increased. Students also reported that negative affect decreased as UID implementation increased. That is, students experienced fewer negative emotions in their courses as UID increased.

Student interviews were conducted at two different time intervals (March and May 2003) using an on-line focus group format. These interviews revealed specific course aspects in need of improvement before the UID project began, and increasingly positive student feedback as the project progressed.

An important component of the UID project was to disseminate UID findings to the educational community. Instructors teaching UID funded courses were assessed at two different time intervals (August 2002 and March 2003). Instructors indicated increasing knowledge of and commitment to UID principles. In addition, a total of 21 presentations and workshops were completed over the course of the project. These presentations and workshops were held primarily at conferences and Universities, and took place all over North America.

What is Universal Instructional Design?

The term “Universal Design” originated in the field of architecture and design. The premise is that physical spaces and objects that consider the needs of people with disabilities are, in fact, more accessible and useful for all people. In recent years some educators (e.g., Bowe, 2000) have suggested that courses designed and delivered with the needs of disabled students in mind are likewise more accessible and effective for all people – regardless of possible disability, learning style preference, or personal background.

At the core of Universal Instructional Design (UID) is the concept of inclusiveness and equity. UID suggests that ideally all students should be able to fulfill course requirements without special accommodations (i.e., it avoids segregating or stigmatizing a student). This creates a classroom environment that respects and values diversity.

UID appears in many different incarnations. At the University of Guelph, UID was articulated as a set of 7 principles, with each principle representing an important element of UID (Palmer, 2002). Wherever possible (i.e., when designing a new course), UID principles should be incorporated proactively, so that the learning environment is as accommodating as possible from the outset. This reduces or eliminates the need to change by accommodating course elements after the course has already been designed. When a course already exists, implementation of UID principles usually involves removing or reducing existing barriers to accommodation. Listed below are the 7 UID principles, along with an explanation of what each principle represents.

1. Be accessible and fair to all parties.

This principle involves anticipating varying student needs and circumstances. Instruction is designed to be useful to and accessible by students with diverse abilities and circumstances so that all essential elements of the course can be readily accessed. The learning environment should be fair and safe, and provide the same means of use for all students. Means of use should be identical whenever possible, and equivalent when this is not possible.

2. Be straightforward and consistent.

Instruction is designed in a straightforward and predictable manner, regardless of the student's experience, knowledge, language skills, or current concentration level. This principle seeks to eliminate unnecessary complexity, overcome confusion, coordinate all parts of the curriculum, and clarify communications.

3. Provide flexibility in use, participation and presentation.

Instruction is designed to accommodate a wide range of individual abilities. This principle seeks to provide choice in methods of use in order to enable physical use of course elements, allow fuller participation, and permit suitable demonstration of mastery of course requirements. The instructional environment is designed to promote interaction and communication among students and between students and faculty.

4. Be explicitly presented and readily perceived.

Instruction is designed so that necessary information is communicated effectively to the student, regardless of ambient conditions or the student's sensory abilities. All communication media is maximized, without the presumption that students are physically or cognitively enabled for all media.

5. Provide a supportive learning environment.

Instruction anticipates variation in individual student learning pace and prerequisite skills. Instruction is designed to be welcoming and inclusive. Questions and comments are encouraged, and individual needs are respected. High expectations are espoused for all students.

6. Minimize unnecessary physical effort or requirements.

Instruction is designed to minimize or eliminate nonessential physical effort in order to allow maximum attention to learning.

7. Ensure a learning space that accommodates both students and instructional methods.

Instruction is designed with consideration for appropriate size and space for approach, reach, manipulations, and use regardless of a student's body size, posture, mobility, or communication needs.

The Universal Instructional Design (UID) Project

Introduction

In Spring 2002, the University of Guelph, through Teaching Support Services (TSS), received funding from the Province of Ontario's Learning Opportunities Task Force (LOTF) to undertake a study of UID principles. The UID project was a one-time grant initiative in which faculty at the University applied for course funding. There were two types of funding available: course redesign or course enhancement. The course redesign grants involved large-scale curriculum reform projects. There were 5 courses selected for redesign grants:

1. NUTR 4040: Clinical Nutrition II
2. CHEM 1040 and 1050: General Chemistry I and II
3. DAGR 1600: Applied Mathematics
(Note: This course is actually taught at 4 separate campuses operated by the University: University of Guelph, Kemptville College, Ridgeway College, and College D'Alfred. Kemptville College was the main site for the UID project. To date, the instructors at the other 3 locations have not adopted the resources developed by the UID project; therefore the evaluation only included the Kemptville campus.)
4. HAFA 3090: Foodservice Operations Management
5. Online French tutorials (available to all French students and instructors)

The course enhancement grants were smaller scale projects, involving the remedy of specific instructional challenges. Remedies typically focused on the development of a new component or addition to the course. There were 5 courses selected for enhancement grants:

1. NUTR 3040: Clinical Nutrition I
2. BIOM 3120: Laboratory Exercises in Mammalian Physiology
3. DAGR 1350: Agricultural Mechanization
(Note: Similar to DAGR 1600, this course is taught at 4 separate campuses operated by the University. Kemptville College was the main site for the UID project. To date, the instructors at the other 3 locations have not adopted the resources developed by the UID project; therefore the evaluation only included the Kemptville campus.)
4. SART 2800: Extended Media
5. NUTR 2010: Human Nutrition
(Note: This course received funding left over from NUTR 3040. However, this was done late in the UID project, so this course could not be included in the evaluation.)

Grant decisions were made by the TSS Council (a committee comprised of TSS managers along with faculty representatives from all six of the University's colleges), and were based on a variety of factors. Criteria included not only the educational worthiness of the proposed course changes, but also evidence of departmental or college support.

TSS coordinated all course redesign and enhancement projects, providing faculty consultation, production support and in-kind contributions (i.e., technical assistance). More course-specific advice and assistance on how to effectively implement UID principles was provided by the Program Manager/Instructional Designer (PM/ID). The PM/ID worked directly with the faculty, managing each redesign or enhancement grant, and initiating ongoing professional development for all faculty. The PM/ID ensured that resource allocation was appropriate and sufficient, and ensured that each grant project was proceeding according to schedule and budget. The PM/ID also developed a number of UID guides, manuals and worksheets on how to effectively implement UID principles.

Finally, the PM/ID assumed a leadership role in the dissemination of project information and results.

Specific Course Activities

Each redesign or enhancement project implemented specific activities that reflected one or more of the seven UID principles. The breadth of this implementation varied, depending on whether the course was to be redesigned or enhanced. Listed below is a synopsis of the major activities that occurred in each course.

1. NUTR 4040: Clinical Nutrition II (redesign)

- A website was built that included distinctive graphics, a full-featured WebCT site with extensive syllabus, course notes, tables database, quizzing, conferencing, and up-to-date announcements
- Hundreds of new questions for on-line quizzing were written
- The syllabus was completely re-written with special care taken to connect all activities and course requirements to course objectives and learning outcomes
- Course notes were carefully edited according to a custom-designed style guide, and then made available to students in both hard copy and on-line format
- PowerPoint slides and transparencies were developed to complement course lectures
- A searchable nutrition database was purchased and installed on-line
- New case studies and video exercises were developed

2. CHEM 1040 and 1050: General Chemistry I and II (redesign)

- The syllabus was reviewed and recommendations were made with an emphasis on connecting class activities to course objectives and learning outcomes
- Inclusion of video and simulations on course website
- Video taping of additional “e-lectures”
- Production of text-based transcripts of selected lectures
- A review of the course website to optimize navigation, clarify labeling and incorporate new elements

- Creation of an on-line self evaluation activity with feedback that suggested ways to improve
3. DAGR 1600: Applied Mathematics (redesign)
- A detailed review of the entire curriculum, including topics to include/exclude and the sequencing of topics
 - A website was built that included distinctive graphics, new written materials, practice quizzes with feedback, examples, sample problems with feedback, electronic conferencing, and careful definition of terms
4. HAFA 3090: Foodservice Operations Management (redesign)
- A complete revision of written materials with special attention to the roles students adopt through the duration of the course (these roles parallel those in the typical restaurant they might manage)
 - New WebCT course site and syllabus being created
 - Course notes carefully constructed per style guide to ensure navigation, bookmarks in pdf format, and ease-of-use with software such as JAWS
 - Continuation of professor's established practice of offering students options for weighing of activities and exams for final grading through a learning contract
 - Consideration of learning styles when forming teams for the practica within the course
5. Online French tutorials (redesign)
- Students participate in on-line "quests" in pursuit of "treasures" that are awarded upon the successful completion of a quest
 - Quests are offered with varying levels of difficulty and content so that students at different levels of French study can use the quests (i.e. the targeted range is from first year undergraduate to graduate student)
 - Students can self-identify as needing a bypass option that enables professors to include questions requiring visual or auditory identification of media objects without penalizing students unable to do so because of disability
 - The quests are carefully labeled and organized

- Professors can review, use or adapt each others' questions and media elements
 - In almost every question, feedback includes a hyperlink for further study
6. NUTR 3040: Clinical Nutrition I (enhancement)
- Accomplishments were similar to those of NUTR 4040
 - This project was considered an enhancement rather than a redesign to support the semantic distinction made between courses receiving substantial financial and in-kind support, and those leveraging existing UID work.
7. NUTR 2010: Human Nutrition (enhancement)
- Accomplishments similar to those of NUTR 3040
8. BIOM 3120: Laboratory Exercises in Mammalian Physiology (enhancement)
- A lab manual was created that was compatible with existing technical software
 - The lab manual was offered in HTML and pdf formats and was carefully structured for headings, bookmarks, and other navigation aids
 - A software package was made more relevant through the tailoring of activities and the creation of simulations
 - A website for self-directed learning was developed as a complement to the lectures and labs, and included the lab manual, the syllabus, and other course materials
9. DAGR 1350: Agricultural Mechanization (enhancement)
- Accomplishments were similar to those of DAGR 1600
 - This course was classified as an enhancement because of the professor's willingness and capability to do much of the work, thus requiring fewer resources from the UID project
 - In addition to the activities outlined for DAGR 1600, practical labs and manuals for instructors and students were completely reworked
10. SART 2800: Extended Media (enhancement)
- A course website was created with accessible readings, video stills, audio clips, syllabus, bookmarks, and other navigation aids

- Equipment for hands-on exercises was purchased, meaning that students no longer had to wait for equipment to shoot and edit film

Overview of Evaluation Research Methodology

Program Logic Model and Validity Assumptions

The evaluation plan for the UID project began with the creation of the program logic model (see Appendix A). Contained in the logic model were all the major activities, service delivery outcomes, intermediate results, and ultimate results. These components were linked primarily through two validity assumptions. First, that courses developed and taught according to UID principles would enhance student learning experiences. And second, that UID principles are consistent with universally recognized principles of good practice in higher education. These validity assumptions were further delineated according to the 7 principles of UID.

1. Be accessible and fair to all parties.

Creating an educational environment that is accessible to all students facilitates learning. This makes learning goals achievable by students with a wide range of abilities. Learning experiences are created that suit the learner, thereby maximizing the student's ability to progress. Ultimately, by preparing to meet diverse needs, the learning environment will better serve students without special needs.

2. Be straightforward and consistent.

Careful articulation of the goals of the curriculum is essential for successful implementation of UID principles. In so doing, instructional materials and activities are designed so that learning goals can be achieved by students with a wide difference in ability.

3. Provide flexibility in use, participation, and presentation

Learning goals are achieved by means of flexible curricular materials that provide alternatives for students with differing abilities. It is more efficient and effective to build alternatives into the curriculum before the fact, than trying to implement them later.

4. Be explicitly presented and readily perceived.

Student learning goals are achievable when course material and content is made as clear and explicit as possible. This recognizes the unique nature of each student and the need to accommodate differences, which creates learning experiences that suit the learner. Creating explicit access to course materials and information also creates

explicit access to learning itself, allowing students to experience improvements in knowledge and skills.

5. Provide a supportive learning environment

A supportive learning environment is conducive to student learning. Recognizing the strengths and weaknesses of each student creates a learning context supportive enough to accommodate all students. No student is stigmatized or segregated, regardless of ability, background, or learning style

6. Minimize unnecessary physical effort or requirements.

Minimizing the student's physical effort allows maximum attention to learning. Without being distracted by unnecessary physical efforts, the student is free to focus on learning the content of the course.

7. Ensure a learning space that accommodates both students and instructional methods.

Providing the greatest possible access to the curriculum (both educational and physical) improves the educational results of all students. Students are given equal access to the curriculum and classroom, regardless of learning or and/or physical disabilities.

You may note that there is a fair degree of overlap between the 7 principles. The principles are not designed to be mutually exclusive, and indeed it would be difficult to imagine implementing only some of the principles. The principles are inextricably linked so that each one depends upon some degree of implementation of the others for UID to be truly realized.

Hypothesized Intermediate and Ultimate Results

It was hypothesized that the UID project would lead to the following results:

1. The extent to which principles of inclusiveness and equity are used in the classroom would increase (IR1)
2. The extent to which diversity is valued and respected in the classroom environment would increase (IR2)
3. The segregation or stigmatization of any student would decrease (IR3)
4. Understanding and implementation of UID would increase (IR4)
5. Learning opportunities for graduate students and faculty would be developed and facilitated (IR5)

6. Faculty commitment to UID would increase (IR6)
7. For all students, including those with learning disabilities, the following results were hypothesized:
 - a. learning would improve (UR1)
 - b. academic functioning and academic success would improve (UR2 and UR3)
 - c. workplace success would improve (UR4)
 - d. psychological well-being would improve (UR5)
 - e. self-esteem and self-efficacy would improve (UR6)
8. The number of students with learning disabilities who attend University would increase (UR7)
9. A UID community would be created (UR8)

While the anticipated outcomes and results of the UID project were numerous, only a subset of these was investigated empirically. Time and project resources precluded a full study of all the potential impacts of UID. Thus, only those that were deemed most crucial to the current study were included. Specifically, the evaluation measured or included the following:

1. The extent to which UID was implemented into the courses selected for funding as originally proposed.
2. The extent to which UID increased student academic self-efficacy.
3. The extent to which UID increased student positive affect, and decreased student negative affect.
4. The extent of dissemination activities associated with the UID project.

Methodology

The UID project was evaluated using several different methods of data collection. Specifically, we used a combination of focus groups, questionnaires, student interviews, faculty interviews, in-class observations, and descriptive reporting.

Focus Groups

A series of three focus groups were held during the Summer and early Fall of 2002 with students who had been enrolled in either NUTR 3040 or NUTR 4040. The primary goal of these focus groups was to gather information on student satisfaction with these courses *before* the courses were redesigned or enhanced. Thus, they actually functioned as a needs assessment rather than an evaluation of the UID project per se. Students were asked a series of specific questions regarding course content and format, teaching style, and available on-line supports and resources. The information gathered was used to inform the redesign or enhancement of both these courses.

Questionnaire

Students enrolled in courses selected for UID funding were administered a questionnaire at one of three time intervals: April 2002, November 2002, and March 2003. Each time interval involved a new cohort of students, as students would not have enrolled in a particular UID course more than once. Typically, students were informed of the questionnaire through an in-class announcement given by the first author (see Appendix B). Students were given information about the UID project, and the purpose of the questionnaire. They were informed that they could fill out the questionnaire in either hard copy or on-line formats (<http://www.tss.uoguelph.ca/uid/survey/index.cfm>) and that participation was purely voluntary. Consent forms were attached to both the hard copy and on-line versions (see Appendix C). Stacks of the questionnaires were left at the front of the class for students to pick up as they exited the room. Occasionally, instructors would allot a certain amount of class time for students to fill out the questionnaire. In these cases, each student in attendance was given a questionnaire and was given the opportunity to fill it out in class.

The students enrolled in those courses taught at the Kemptville campus (DAGR 1350 and DAGR 1600) did not receive an in-class announcement. The geographical distance of the Kemptville campus made this approach impractical. Instead, questionnaires and a copy of the in-class presentation were couriered to the instructors teaching these courses. They informed their students of the UID project and the purpose of the questionnaire. A video-recording of the first author giving the in-class presentation was also made and posted on-line (<http://www.tss.uoguelph.ca/uid/survey/index.cfm>) for those students who wanted more information

The following measures were included in the questionnaire:

1. April 2002

Students were administered the UID Scale (see Appendix D) in order to measure the extent to which UID was incorporated into the courses selected for funding. The UID Scale was developed specifically for this project. It is a 29-item scale that measures specific UID principles and activities both inside and outside the classroom, rated on a 5-point scale (1 = “strongly disagree, 5 = “strongly agree”).

Students were also given the Purdue Rating Scale for Instruction (Remmers & Elliott, 1950; see Appendix E). The Purdue Rating Scale for Instruction is a 26-item scale that is used to rate the characteristics of the instructor and teaching situation. The first 10 items are rated on a 10-point scale (different end-points for each item), and the last 16 items are rated on a 5-point scale (1 = “extremely poor”, 5 = “excellent”). Three of the 26 items were not included (2 from the first 10 items, and 1 from the last 16 items) because they were deemed not relevant to the UID project.

2. November 2002 and March 2003

The UID Scale was also administered to the students in the courses taught during these semesters. However, at this point the scale had undergone some minor revisions (see Appendix F). Three additional items were added and two were removed, creating a 30-item scale. In addition, the 5-point scale was changed to a 7-point scale (1 = “completely disagree, 7 = “completely agree”).

Additionally, the Purdue Rating Scale for Instruction was replaced. It was decided that the Purdue was too outdated, and that many of the items were either redundant with the UID Scale, or not directly relevant to the kinds of results being measured. As a result, the Academic Self –Efficacy Questionnaire (ASEQ; Wood & Locke, 1987) and the Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988) were included instead.

The ASEQ (see Appendix G) was administered to measure the extent to which UID increased student academic self-efficacy. The ASEQ is comprised of eight subscales that specifically measure academic self-efficacy in the following eight domains: Class Concentration, Memorization, Exam Concentration, Understanding, Explaining Concepts, Discriminating Between Concepts, Note-taking and Grades. The ASEQ is a 33-item scale that measures the student’s level of confidence in performing each of these eight tasks, using an 11-point scale (0 = “totally unconfident, 11 = “totally confident”). The ASEQ has been shown to have good reliability, with Cronbach’s alpha ranging from .73 to .87 (Mone, 1994).

The PANAS (see Appendix H) was administered to measure the extent to which UID implementation was related to positive and negative affect. The PANAS asks students to rate the degree of both positive and negative emotions felt while in the classroom. The PANAS is a 20-item scale containing 10 positive emotions and 10 negative emotions (or alternatively, the PANAS is comprised of two subscales, a positive subscale and a negative subscale). The items are rated on a 5-point scale (1 = “very slightly or not at all”, 5 = “extremely”). The PANAS has been shown to have high reliability, with Cronbach’s alpha ranging from .86 to .90 for the positive subscale, and .84 to .87 for the negative subscale (Watson et al., 1988).

On-line French Tutorial

The French tutorial did not service a specific class, but was instead designed for use by students from a variety of French courses at the University. In addition, UID principles were solely used to guide construction of the tutorial, and were not implemented into any French courses. As a result, it was decided that administration of the UID Scale, the ASEQ and the PANAS would not be appropriate in evaluating this redesign project. Instead, a client satisfaction questionnaire was designed that asked students to rate ten items on a 7-point scale (1 = “completely disagree”, 7 = completely agree”). The items were designed to specifically assess the degree to which various UID principles had been incorporated into the tutorial (see Appendix I). The questionnaire was

posted on the French tutorial website. Every time a student logged on, he or she was prompted through a pop-up dialog box to complete the survey. This box would display each time the student logged on, until the survey was completed. Students were not required to fill out the survey, and could freely use all parts of the website whether they completed the survey or not.

Student Interviews

On the consent form, students were asked if they would be willing to participate in a follow-up interview. Those students who agreed were contacted and asked to fill out the interview consent form (see Appendix J). Interviews were held using an on-line focus group format. Specifically, an on-line conference was set up using WebCT, a software program that facilitates the creation of web-based educational environments. Initially, seven interview questions were posted on the conference page. Each question was designed to capture the essential meaning and primary goal of each of the 7 UID principles (see Appendix K). Students were then invited to respond to each of these seven questions. The conference page was managed by a focus group moderator, who asked students to clarify or expand their responses, and encouraged students to offer suggestions for course improvement. Students had the option of posting their messages anonymously, and could post their messages at any time. The typical on-line focus group ran for approximately two weeks. All student responses were transcribed by downloading them into word processing software. The data were categorized as either pre or post UID and then compared.

Faculty Interviews

Those faculty teaching UID-funded courses were interviewed over the course of the project. The first round of faculty interviews was held in August 2002. Faculty were asked a series of questions, including their reasons for becoming an instructor, why they decided to become involved with the UID project, and what their expectations were for the project (see Appendix L). Interviews were conducted face-to-face, and lasted approximately one hour each.

A second and final round of interviews was held in March 2003. All instructors were emailed a survey that asked them to comment on their experiences with the UID project to date (see Appendix M). All interviews were transcribed and analyzed for major themes and categories.

In-class Observations

Two rounds of classroom observations were conducted. Using a questionnaire (see Appendix N), two outside observers sat in on various classes and independently rated on a 5-point scale (1 = “not at all”, 5 = “very much”) the degree to which they felt that UID principles and activities were being incorporated into the classroom. All classroom observations were scheduled in advance with the course instructor. Scheduling conflicts prevented us from observing all the courses selected for funding. All of the

redesign courses (with the exception of Kemptville) were observed, and two of the enhancement courses were observed. Observation of the enhancement courses was deemed less crucial, because in many cases the enhancement involved activities that did not necessarily impact on the extent to which UID could be observed in the classroom

Descriptive Reporting

In order to assess the extent of dissemination activities associated with the UID project, a list of all dissemination activities was generated. These activities included conference presentations and workshops.

Program Results

Data Collection and Sample Sizes

The UID Scale, the ASEQ and the PANAS were administered to the students who were currently enrolled in UID courses at three points in time: April 2002, November 2002, and March 2003 (the Purdue was only administered in April 2002). The questionnaires were made available in all those courses that were being taught in any given semester. In addition, courses were defined as pre-, interim-, or post-UID. This was done in consultation with the project manager, who made this classification based on where each course was in its level of implementation (see Table 1):

Table 1- Questionnaire Administration Timetable

| | April 2002 | November 2002 | March 2003 |
|------------------|------------|---------------|------------|
| BIOM 3120 | Pre | | |
| CHEM 1040 | Pre | Interim | |
| CHEM 1050 | Pre | | Interim |
| Hafa 3090 | Pre | Interim | Interim |
| DAGR 1350 | Pre | Interim | |
| DAGR 1600 | Pre | | |
| NUTR 3040 | Pre | | Interim |
| NUTR 4040 | | Post | |
| SART 2800 | Pre | | Post |

Data, however, were not actually collected from all of the above courses at each time period. Students were under no obligation to complete the questionnaire. Moreover, under the UID Project there was no real impetus for students to fill out these questionnaires. Students did not enroll in the UID project in the traditional sense. That is, students enrolled in a course, not the UID project. As such, they would not necessarily have had a vested interest in the outcomes of the project. The amount of data that was actually collected from the UID courses is shown below (see Table 2):

Table 2- Response rates for questionnaire per course and time

| | April 2002 | November 2002 | March 2003 |
|------------------|------------|---------------|------------|
| BIOM 3120 | N = 25 | | |
| CHEM 1040 | N = 14 | N = 4 | |
| CHEM 1050 | N = 31 | | N = 21 |
| Hafa 3090 | N = 18 | N = 0 | N = 49 |
| DAGR 1350 | N = 57 | N = 64 | |
| DAGR 1600 | N = 43 | | |
| NUTR 3040 | N = 19 | | N = 7 |
| NUTR 4040 | | N = 41 | |
| SART 2800 | N = 19 | | N = 0 |

Low response rates were an ongoing concern for the UID project. Typically, response rates were highest in those courses in which the instructor set aside class time for students to fill out the survey, or otherwise emphasized to the students the value of the evaluation. Lottery draws were also implemented as a means of increasing response rates.

Student on-line focus groups were held at two times: March 2003, and May 2003. A total of three focus groups were held; again response rates were very low (see Table 3).

Table 3- Response rates for focus groups per course and time

| | March 2003 | May 2003 |
|-----------------------|-------------------|-----------------|
| NUTR 4040 | N = 2 | |
| HAF A 3090 | | N = 4 |
| CHEM 1040/1050 | | N = 5 |

Instructors were interviewed at two times: August 2002 ($N = 9$), and March 2003 ($N = 6$). To maintain confidentiality and anonymity, the names of the instructors and courses are withheld.

Classroom observations were done at two times: November 2002 and March 2003. In November 2002, data were collected from NUTR 4040 (3 separate observations: 2 labs and 1 lecture), and CHEM 1040 (2 separate observations: 1 lab and 1 lecture). In March 2003, data were collected from NUTR 3040, HAF A 3090, BIOM 3120, and CHEM 1050.

Inter-rater Reliability of the Classroom Observations

The inter-rater reliability of the classroom observation data was examined using Cohen's kappa. This statistic examines the agreement between two observers rating the same activity. The kappa values for the two observers were calculated for each course that was observed. The kappa values were quite low, ranging from 0.14 to 0.8. In general, kappa values of .7 or higher are considered to be an indication of good agreement between the observations. Only one course, BIOM 3120, had a kappa level above .7. Please see Table 4 for the kappa value for each course. The mean values for each observer are provided.

Table 4: Agreement between the two observers for each course (using Cohen's kappa), and the mean ratings for each observer

| COURSE | Semester | Cohen's kappa | Observer 1 Mean | Observer 2 Mean |
|---------------------------------------|------------|---------------|-----------------|-----------------|
| Nutrition 4040 Lab - Instructor 1 | Fall '02 | 0.20 | 3.57 | 3.00 |
| Nutrition 4040 Lab - Instructor 2 | Fall '02 | 0.10 | 3.00 | 4.15 |
| Chemistry 1040 Lecture | Fall '02 | 0.11 | 4.34 | 3.79 |
| Nutrition 4040 Lecture | Fall '02 | 0.27 | 2.97 | 3.74 |
| Hotel and Food Administration Lecture | Winter '03 | -0.19 | 4.32 | 4.41 |
| Nutrition 3040 Lecture | Winter '03 | 0.28 | 2.87 | 3.83 |
| Biology 3120 Lab | Winter '03 | 0.80 | 3.80 | 4.11 |
| Chemistry 1050 | Winter '03 | 0.18 | 2.42 | 3.22 |

The low kappa values indicate that the classroom observation scale would likely require some refining before use in other projects. Since the kappa values indicated very low agreement between the raters, it was determined that the ratings of only one observer should be employed to classify the courses. One of the observers was the Project Manager and had been involved in the UID project since its inception. The other observer was the program evaluator, and was less invested in the UID principles and the success of the Guelph project. Since the program evaluator had less of a vested interest in the results of the project, these ratings were used to classify the courses.

Subsequently, the student UID ratings were correlated to the classroom observation ratings. This correlation was high but not significant, $r(5) = .78, p > .05$. The correlation likely did not reach a significant level due to the small number of courses included in the analysis. See Table 5 for the classroom observation ratings and the student UID ratings included in the analysis.

Table 5: Classroom observation and student UID ratings

| COURSE | Student UID Rating | Classroom Observation Rating |
|-------------------------------|--------------------|------------------------------|
| Chemistry 1040 | 4.33 | 6.18 |
| Nutrition 4040 | 2.97 | 4.98 |
| Hotel and Food Administration | 4.32 | 5.68 |
| Nutrition 3040 | 2.87 | 5.40 |
| Chemistry 1050 | 2.42 | 5.34 |

Preliminary Diagnostics

The distribution of scores was examined for each student outcome (ASE, PA, and NA) to determine their appropriateness for analysis. The negative affect variable was

slightly positively skewed and three of the ASE subscales were slightly negatively skewed (exam concentration, understanding, and grades). Nonetheless, these variables were deemed appropriate for the analysis. No outliers were identified.

Extent of UID Implementation

In order to assess the extent to which UID principles were implemented into the courses, the data collected from the UID Scale was analyzed in several different ways. First, an ANOVA was conducted to determine whether levels of UID (based on student rating z-scores) were different for pre-implementation courses, interim courses, and post-implementation courses. There was a significant difference in UID ratings, based on implementation, $F(2,497) = 71.78, p < .001$. Specifically, pre-implementation courses ($M = -0.32, SD = 0.43$) were rated by students as lower in UID compared to interim courses ($M = 0.34, SD = 0.69$) and post-implementation courses ($M = 0.32, SD = 0.59$). There was no significant difference between UID ratings for interim and post-implementation courses.

Next, an analysis of variance was conducted to determine whether there was a difference in the levels of UID in the enhancement courses (BIOL 1040, BIOL 3120, DAGR 1350, SATR 2800) compared to the redesign courses (CHEM 1040, CHEM 1050, DAGR 1600, HAFA 3090, NUTR3040, NUTR 4040). If the redesigns were successfully implemented, these courses should have higher student UID scores, compared to those courses that received only minor enhancements. To conduct this analysis, the student UID Scale scores were transformed into z-scores. Based on the results of the analyses of variance, there was a higher level of UID principles implemented in the redesign courses ($M = 0.13, SD = 0.70$) compared to the enhancement courses ($M = -0.25, SD = 0.48$), $F(1,408) = 37.31, p < .001$.

Thirdly, *t*-tests were conducted to determine whether the level of UID differed depending on time (April 2002, November 2002 and March 2003). The assumption was that as the project progressed, levels of UID should increase. All three *t*-tests were significant. The level of UID (based on student UID z-scores) was higher in November 2002 compared to April 2002, $t(333) = -7.01, p < .001$. The level of UID was higher in March 2003 compared to April 2002, $t(299) = -16.79, p < .001$. The level of UID was higher in March 2003 compared to November 2002, $t(186) = -6.46, p < .001$. Please see Table 6 for the UID means and standard deviation for each semester.

Table 6: Means and standard deviations of student ratings of UID (z-scores) for each semester.

| | April 2002 | November 2002 | March 2003 |
|--------------------|------------|---------------|------------|
| Mean | -0.32 | 0.10 | 0.68 |
| Standard deviation | 0.43 | 0.67 | 0.51 |

There were four courses in which data were collected through the UID Scale in two separate semesters. This allowed for a direct comparison of UID levels in the same

courses. *T*-tests were conducted for each of the four courses to determine whether there was a difference in UID levels between early and later evaluation periods. For three of the four courses, there was a significant increase in UID levels between early and later semesters. In DAGR 1350, UID was higher in November 2002 ($M = -0.12$, $SD = 0.63$) compared to April 2002 ($M = -0.44$, $SD = 0.35$), $t(119) = -3.41$, $p < .001$. In NUTR 3040, UID levels were higher in March 2003 ($M = 0.55$, $SD = 0.45$) compared to April 2002 ($M = -0.74$, $SD = 0.43$), $t(24) = -6.75$, $p < .001$. In CHEM 1050, UID was higher in March 2003 ($M = 0.52$, $SD = 0.57$) compared to April 2002 ($M = -0.34$, $SD = 0.25$), $t(50) = -7.45$, $p < .001$. There was no difference in UID levels in HAFA 3090 between April 2002 and March 2003, $t(61) = 0.44$, $p > .05$.

Impact of UID Implementation on Student Outcomes

Purdue Rating Scale for Instruction

In the first semester of the UID Project (April 2002), students were asked to complete the Purdue questionnaire, along with the UID Scale. It was anticipated that higher UID implementation would be associated with higher Purdue scores. This hypothesis was supported as there was a significant, positive correlation between students' UID ratings and Purdue scores, $r(210) = 0.77$, $p < .01$.

Classifying Level of UID Implementation

To assess the impact of UID implementation on student academic self-efficacy and affective states, all courses were classified into three groups based on student UID ratings and classroom observations. Based on each assessment of UID implementation, courses were classified as high implementation, moderate implementation, or low implementation. For both the student ratings and classroom observations, higher scores indicated higher implementation of UID principles. This empirical classification scheme was created and used instead of the stage of UID implementation (i.e., pre, interim, post) because this provided a more accurate categorization of UID implementation. For example, a pre-implementation course could be classified as either low, moderate or high in UID depending on how UID-compliant the course was to begin with. This would be true for both interim- and post-UID courses as well. As a result, the impact of UID principles on student outcomes is more accurately assessed because the stage of implementation is not necessarily reflective of how much UID there was in a particular course. Employing this categorization, students' overall academic self-efficacy (based on the ASEQ), academic self-efficacy on each of the eight sub-scales of the ASEQ, and scores on the PANAS were compared based on level of UID implementation.

For the classification of UID implementation based on student ratings (using the 7-point scale), courses with a mean UID rating of 5.50 and above were rated as high implementation, courses with a mean UID rating between 5.00 and 5.49 were classified as moderate implementation, and courses with a mean UID rating below 4.99 were classified as low implementation. This classification resulted in two courses being in the high implementation group, two courses being in the moderate implementation group,

and two courses being in the low implementation group. For the classifications based on classroom observations (based on a 5 point scale), courses with a mean observation score between 0 and 2.99 were classified as low, courses with a mean course between 3 and 3.99 were classified as moderate, and courses with a mean scores between 4 and 5 were classified as high UID. This classification lead to two courses in the high implementation group and three courses in the low implementation group. No courses were classified as moderate implementation based on the classroom observation data. Please see Table 7 for the course classifications, as well as the mean student UID ratings and the mean classroom observation scores.

Table 7: Course classification based on student ratings and classroom observations of UID implementation

| Classification | Student Ratings | | Classroom Observation | |
|----------------|-----------------|-----------------|-----------------------|-----------------|
| | Course | Mean UID Rating | Course | Mean UID Rating |
| HIGH | CHEM 1040 | 6.18 | CHEM 1040 | 4.33 |
| | HAFA 3090 | 5.68 | HAFA 3090 | 4.32 |
| MODERATE | NUTR 3040 | 5.40 | | |
| | CHEM 1050 | 5.34 | | |
| LOW | NUTR 4040 | 4.98 | NUTR 4040 | 2.97 |
| | DAGR 1350 | 4.27 | NUTR 3040 | 2.87 |
| | | | CHEM 1050 | 2.42 |

Academic Self-Efficacy Questionnaire (ASEQ)

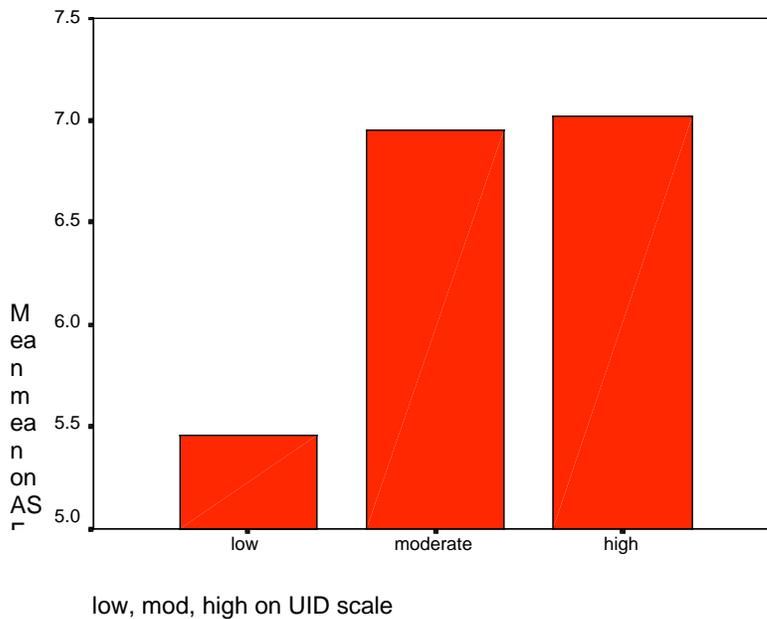
The mean of all items on the ASEQ was calculated to determine each student's ASEQ score. In addition, the means for each of the eight ASEQ sub-scales were calculated to determine student confidence in specific activities (class concentration, memorization, exam concentration, understanding, explaining concepts, discriminating between concepts, note-taking, grades). Higher mean scores indicate higher confidence, or higher academic self-efficacy. Subsequently, the ASEQ scores and ASEQ sub-scale scores for high implementation courses, moderate implementation courses and low implementation courses were compared using analysis of variance.

When student ratings were employed to classify the courses, the analysis revealed a significant impact of UID implementation, $F(2,194) = 18, p < .001$. Specifically, courses with high and moderate UID implementation lead to higher academic self-efficacy or perceived ability to perform the necessary academic tasks, compared to low UID implementation. Please see Table 8 for the significance level of each comparison and Figure 1 for the mean academic self-efficacy for each level of UID implementation.

Table 8: Means and standard deviations for all student outcomes for each level of UID implementation, based on student ratings.

| Student Outcome | Mean (Standard Deviation) | | |
|------------------------|---------------------------|-----------------------------|------------------------|
| | High UID Implementation | Moderate UID Implementation | Low UID Implementation |
| Academic Self-Efficacy | 7.07 (2.00) | 6.95 (1.96) | 5.46 (1.87) |
| Positive Affect | 3.49 (0.85) | 2.63 (0.77) | 2.63 (0.96) |
| Negative Affect | 1.85 (0.79) | 1.66 (0.70) | 2.11 (0.90) |

Figure 1: Mean Academic Self-Efficacy by Level of UID Implementation (based on student ratings).



Subsequently, an analysis of variance was conducted for each of the eight sub-scales to determine whether UID implementation had an impact on each type of academic self-efficacy. The analysis was significant for 5 of the 8 sub-scales: class concentration, $F(2,169) = 12.30, p < .001$; memorization, $F(2,169) = 25.73, p < .001$; exam concentration, $F(2,169) = 8.53, p < .001$; understanding, $F(2,169) = 23.74, p < .001$; and explaining concepts, $F(2,169) = 13.40, p < .001$. The analyses for discriminating between concepts, $F(2,169) = 1.63, p > .05$; note-taking, $F(2,169) = 0.91, p > .05$; and grades, $F(2,169) = 0.94, p > .05$, were not significant. For each analysis, however, there was one significant post hoc comparison, between low implementation and high implementation courses (all at $p < .001$). In each case, the high UID implementation courses lead to higher levels of academic self-efficacy compared to low UID implementation courses. Please see Table 9 for the means and standard deviations for each sub-scale at each level of UID implementation.

Table 9: Means and standard deviations for each ASE sub-scale for each level of UID implementation (based on student ratings)

| ASE Sub-scales | Mean (Standard Deviation) | | |
|---------------------------------|---------------------------|-----------------------------|------------------------|
| | High UID Implementation | Moderate UID Implementation | Low UID Implementation |
| Class Concentration | 6.94 (1.81) | 6.45 (2.50) | 5.32 (2.19) |
| Memorization | 6.73 (1.75) | 5.04 (2.50) | 4.48 (2.05) |
| Exam Concentration | 7.57 (1.86) | 6.75 (2.53) | 6.11 (2.40) |
| Understanding | 7.83 (1.83) | 5.90 (2.54) | 5.57 (2.17) |
| Explaining Concepts | 6.85 (2.02) | 5.45 (2.27) | 5.10 (2.17) |
| Discriminating between Concepts | 6.07 (3.36) | 5.85 (2.50) | 5.29 (2.27) |
| Note-Taking | 6.62 (3.69) | 6.35 (2.50) | 5.98 (2.45) |
| Grades | 6.71 (3.65) | 6.15 (3.18) | 6.04 (2.64) |

When classroom observation ratings were employed to classify the courses, the analysis revealed a similar significant impact of UID implementation, $F(1,117) = 17.17$, $p < .001$. Courses with high UID implementation lead to higher academic self-efficacy, compared to low implementation courses (see Table 10).

Table 10: Means and standard deviations for all student outcomes for each level of UID implementation, based on classroom observations.

| Student Outcome | Mean (Standard Deviation) | |
|------------------------|---------------------------|------------------------|
| | High UID Implementation | Low UID Implementation |
| Academic Self-Efficacy | 7.64 (1.37) | 6.43 (1.71) |
| Positive Affect | 3.48 (0.79) | 2.81 (0.85) |
| Negative Affect | 1.91 (0.85) | 1.94 (0.87) |

Next, analyses of variance were conducted for each sub-scale. The analyses for seven of the eight sub-scales were significant at $p < .05$ or better, and the other subscale (exam concentration) was borderline significant. For each sub-scale, the academic self-efficacy ratings were higher in high UID implementation courses, compared to low UID implementation courses. See Table 11 for the results of the analyses as well as the means and standard deviations for each sub-scale.

Table 11: ANOVA results for each ASE sub-scale, and the ASE means and standard deviations for high and low implementation courses (based on classroom observations)

| ASE Sub-Scale | ANOVA Results | Mean (Standard Deviation) | |
|---------------------------------|-----------------------------|---------------------------|------------------------|
| | | High UID Implementation | Low UID Implementation |
| Class Concentration | $F(1,92) = 5.24, p < .05$ | 6.72 (1.80) | 5.82 (2.01) |
| Memorization | $F(1,92) = 25.44, p < .001$ | 6.56 (1.81) | 4.67 (1.84) |
| Exam Concentration | $F(1,92) = 3.87, p = 0.52$ | 7.57 (1.79) | 6.73 (2.32) |
| Understanding | $F(1,92) = 14.54, p < .01$ | 7.62 (1.84) | 6.21 (1.74) |
| Explaining Concepts | $F(1,92) = 22.81, p < .001$ | 7.43 (1.81) | 5.63 (1.85) |
| Discriminating between Concepts | $F(1,92) = 18.60, p < .001$ | 7.52 (1.76) | 5.71 (2.24) |
| Note-Taking | $F(1,92) = 8.91, p < .01$ | 8.18 (2.00) | 6.97 (1.93) |
| Grades | $F(1,92) = 9.83, p < .01$ | 8.31 (1.78) | 7.03 (2.15) |

As an additional means of assessing the impact of UID implementation on academic self-efficacy, an analysis of variance was conducted using enhancement/redesign as an independent variable. Earlier, we were able to show that redesign courses had higher levels of UID implementation compared to the enhancement courses. Therefore, this higher level of UID implementation should lead to better student outcomes. The analyses revealed a significant effect of enhancement/redesign, $F(1,195) = 35.53, p < .001$. Students in the redesign courses had higher levels of academic self-efficacy ($M = 6.74, SD = 1.75$) compared to students in the enhancement courses ($M = 5.07, SD = 2.03$).

Positive and Negative Affect Schedule (PANAS)

In order to examine the impact of the implementation of UID principles on students' affect, two individual scores were calculated. The mean rating for all positive affect items was calculated to create a positive affect score. The mean rating for all negative affect items was calculated to create a negative affect score.

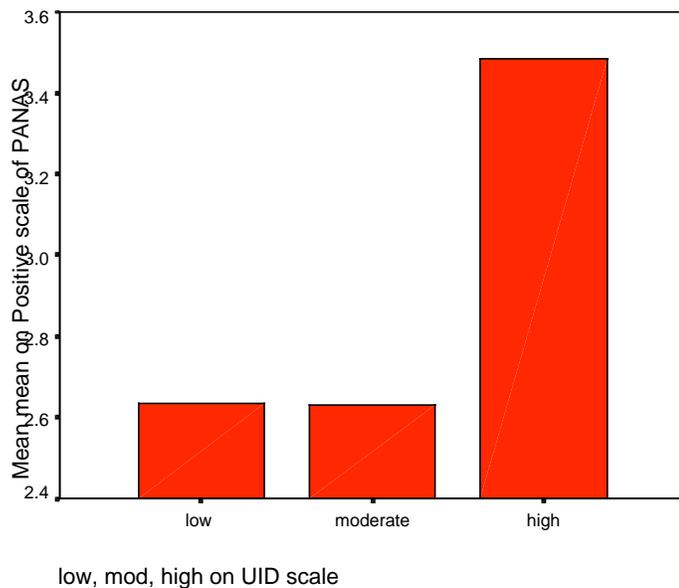
Positive Affect

When student ratings were employed to classify the courses, there was a significant difference in positive affect based on UID implementation, $F(2,194) = 19.56, p < .001$. Specifically, high levels of UID implementation led students to feel more energetic, enthusiastic, active and alert, compared to moderate or low levels of UID implementation. Please see Table 12 for the significance level for each comparison, and Figure 2 for the mean positive affect by UID implementation.

It should be noted that although these results were significant, there is less than one point difference in positive affect between high implementation courses and moderate

implementation courses. Therefore, these results must be interpreted and applied accordingly.

Figure 2: Mean Positive Affect by Level of UID Implementation (based on student ratings)



When classroom observation ratings were employed to classify the courses, there was a significant impact of UID implementation on positive affect. Students in high implementation courses had higher positive affect compared to students in low implementation courses, $F(1,117) = 18.96, p < .001$.

The enhancement/redesign variable was also employed to assess the impact of UID implementation on positive affect. The analysis revealed a significant difference in positive affect, $F(1,195) = 24.17, p < .001$, where students in redesign courses ($M = 3.14, SD = 0.91$) had higher positive affect compared to students in enhancement courses ($M = 2.45, SD = 0.96$).

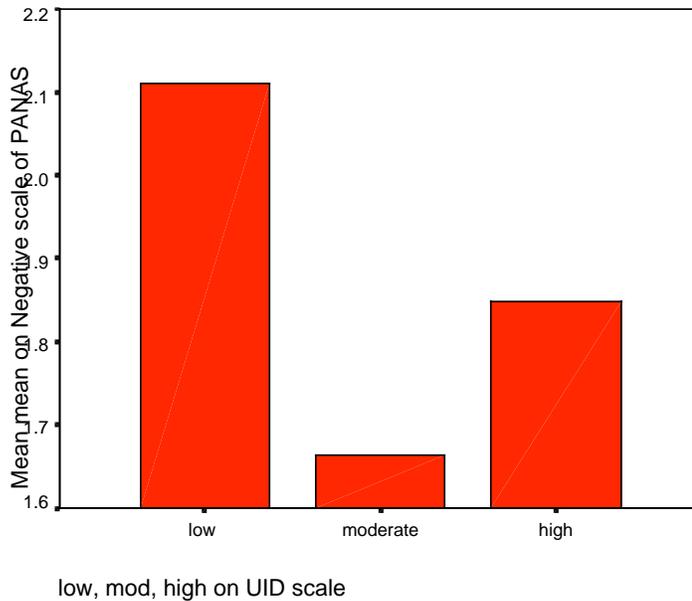
Negative Affect

When student ratings were employed to classify courses, there was a significant difference in negative affect, based on the level of UID implementation, $F(2,194) = 3.99, p < .05$. Specifically, students in moderate implementation courses reported lower feelings of distress and displeasure compared to those in low implementation courses. This may include, for example, experiencing less anger, contempt, guilt, fear, or nervousness.

Below, please see Table 12 for the significance level for each comparison and Figure 3 for the mean negative affect by type of course. It should be noted that even though there

was a significant difference in negative affect based on UID implementation, there was less than one point difference in negative affect between the moderate and low implementation courses. Therefore, these results must be interpreted accordingly.

Figure 3: Mean Negative Affect by Level of UID Implementation (based on student ratings)



When classroom observations were employed to classify the courses, there was no significant impact of UID implementation on negative affect, $F(1,117) = 0.04, p > .05$.

Finally, when the enhancement/redesign variable was employed to examine the impact of UID implementation on negative affect, the analysis was not significant, $F(1,195) = 2.48, p > .05$.

Table 12: Significance level for each comparison for Academic Self-Efficacy (ASE), Positive Affect (PA), and Negative Affect (NA), based on student ratings.

| Comparison | Significance | | |
|-----------------------|-----------------|-----------------|-----------------|
| | ASE | PA | NA |
| High vs. Moderate UID | Not significant | $p < .001$ | Not significant |
| High vs. Low UID | $p < .001$ | $p < .001$ | Not significant |
| Moderate vs. Low UID | $p < .01$ | Not significant | $p < .05$ |

French Tutorial Questionnaire

At the time of this report, there were a total of 5 students who had logged on to the French tutorial website. These 5 students were asked to log on as part of the user-testing process (one student was visually impaired). Their collective feedback was used in the design of the tutorial. The projected number of students in general who were to use the tutorial had been much higher. The primary reason for this lack of use was that the instructor who originally applied for funding no longer taught the course that was the original launch pad for the tutorial. The instructors who took over the course were new to the University of Guelph, and did not have sufficient time or resources to devote to the UID project.

Student Interviews

Data collected from the on-line focus groups were looked at for various themes and categories. Quotes that typify these are presented below.

Before the UID Project

“One of the major issues I had with the way the course was set up was that there was no course pack. Sure, it was available on-line but not everyone has convenient Internet access or printer at home.”

“Perhaps if there was some area on the course website for posting unfamiliar terms and their meanings, it might benefit other students. I'm aware that there is a glossary on-line, but a medical dictionary of sorts might also help.”

“For the most part the course was presented only through power point lectures, with the professor expanding on some points. I feel that it would have been useful to have more practical examples, such as practice questions, throughout the course.”

“We were required to learn specific calculations that we would be tested on in midterm & final examination. However, we only had one or two example questions to practice with, making it difficult to truly test our abilities.”

“I think that this course should schedule time for group meetings, as part of each students' time table. Group meetings were a MAJOR part of this course and unnecessary frustration occurred for some groups who could not find a regular time to meet.”

“My perception of the course at the beginning was one of discouragement. I feel that a more thorough overview of the course (other than the hardcopy of the outline) would have helped to set the stage and calm any initial fears.”

Author's note: All of these comments were used to guide the development of UID courses.

After the UID Project

“The way the course was laid out, pretty much everything we needed was right in the course-pack, and the websites that were highlighted each week were also great resources.”

“In terms of essential activities, it felt like you couldn't miss any steps because there were constant reminders about what was due, and how to do it correctly.”

“We were encouraged to do research and find answers to your questions in the real world I think this contributed to the quality of education I received in this course, because I had the freedom to explore the opportunities of information resources.”

“The instructor was always honest and fair when approached by someone in tears or about group problems. The instructor was always objective and helped you to figure out the solution on your own. That was pretty cool!”

“I love the fact that there were so much flexibilities within the course. It gave the group a chance to really demonstrate creativity and also how to think quick on our feet.”

“I felt I was welcome to express anything I have in mind to the class. It was great fun to try new things in this course.”

“The only physical challenge that I feel was present was being able to write everything down in the lectures. It was VERY helpful having the notes online. This way we could actually focus on what was being said and jot quick points onto our sheets.”

Faculty Interviews

Faculty were primarily interviewed about their experiences with the UID project. Below are some key quotes that typify faculty responses.

“I would say that in the past we never gave too much thought to different methods of presentation or alternate methods...it (UID) opened up our eyes and we started looking more towards the students' perspective ...definitely I'll be talking to the other instructors and trying to promote some of this.”

“Those principles are general enough that you can use them throughout curriculum development at any level. It gives you direction, it gives you focus.”

“I would really urge you, the UID program, to continue. That extra little bit of money and extra access to expertise...there is a real aura of legitimacy there.”

“One thing that I found really intriguing about UID is that it can be used as a model, not just for accessibility, but used as a model. It makes it simple for somebody to understand...there are some great principles there.”

“UID demonstrates on one hand the need for faculty to be more attuned to the diverse needs for the student body and specialized requirements of individual learners. On the other hand, UID suggests principles of solid teaching and design. Both reasons combine to create a stronger package or tool-kit for instructors that can result in increased student satisfaction.”

“I am consulting with a professional organization developing an on-line continuing ed course – involvement in the UID project has influenced my advice there.”

“I’ve become much more aware of trying to teach in a way that will suit various people’s learning styles.”

“I have been able to incorporate lessons learned from the UID project into another senior level course.”

“Being aware of UID principles and having been involved with the UID project over the past year has made a dramatic difference in my approach to teaching and has greatly increased my confidence in dealing with students.”

Dissemination Activities

Listed below is a summary of all the dissemination activities (presentations and workshops) that resulted from the UID project.

May 2002

- Destination Success Conference, Georgian College, Barrie, ON

June 2002

- Renewal 2002, Annual Conference for Practitioners of the 4MAT® Curriculum Design Model, Chicago, IL
- UID: Promoting Inclusiveness in Student Learning, STLHE 2002, McMaster University, Hamilton, ON

September 2002

- Issues of Accessibility and UID, University of Ottawa, Ottawa, ON

October 2002

- Adaptive Technology Fair, University of Waterloo, Waterloo, ON

November 2002

- UID 101, A Crash Course, University of Waterloo, Waterloo, ON

December 2002

- Promoting Inclusiveness in Student Learning, University of Waterloo, Waterloo, ON

February 2003

- Inter-University Disabilities Issues Association, Ryerson University, Toronto, ON

May 2003

- Destination Success Conference, Georgian College, Orillia, ON (2 presentations)
- Learning Styles and UID, NEXUS, University of Toronto, Toronto, ON
- Your Turn to Learn (staff PD day), Durham College, OIT, Oshawa, ON
- Meeting for faculty and senior administrators, York University, Toronto, ON
- What can teachers do in the classroom to help students with learning disabilities succeed, John Abbot College, Montreal, QC

June 2003

- Incremental Changes with High Impact, STLHE 2003, Vancouver, BC
- Workshop for staff at Nova Scotia Board of Education and full day session with government and university/college administrators, Acadia University, Wolfville, NS

August 2003

- Inclusive Teaching Strategies in the Classroom, CHRIE 2003, Palm Springs, CA

October 2003

- Faculty PD event, University of Toronto, Toronto, ON
- AT Fair and presentation to faculty and staff, University of Waterloo, Waterloo, ON

November 2003

- Faculty PD event, McMaster University, Hamilton, ON

March 2004

- Workshop presentation, Learning Disabilities Association of Quebec, Montreal, QC

Conclusions, Limitations and Future Directions

Overall, the results of the UID project were very encouraging. Level of UID implementation increased over the course of the project, and student academic self-efficacy and positive affect were significantly higher the greater the level of UID implementation. Similarly, negative affect was significantly lower the greater the level of UID implementation, as reported by students.

These promising results however, should be tempered with the knowledge that there were some limitations to the evaluation of the UID project. First, as already mentioned, response rates were very low. Students had no vested interest in participating in the evaluation because they were not program participants in the traditional sense. They did not know when they registered for a particular course that this course was a part of the UID project. Future studies of this nature would be well served well by specified and substantial fiscal incentives as a means of increasing student participation. It is also important to note that those courses that did have higher response rates often had enthusiastic instructors who were willing to invest their time by encouraging students to participate in the evaluation and/or by setting aside class time for students to complete the questionnaires. In order to secure sufficient response rates, an evaluation of this type requires faculty buy-in and cooperation. Similar grant projects in the future should consider explicitly outlining evaluation activities in the faculty contract and making involvement in the evaluation a stipulation of the grant money.

A related issue is that those students who did participate in the evaluation did so voluntarily and may have differed in an important ways from the general population of students. It is possible that those students most pleased with their course decided to fill out a survey or take part in an on-line focus group, thereby biasing the results. The evaluation design had no method for detecting this possibility.

A second issue concerns the actual courses that were included in the analyses. In some cases, certain data sets did not include more than one or two courses, either because certain courses were not being offered at the time of data collection, or because there were certain courses in which no students responded to the questionnaires. While the data sets are assumed to be representative of the UID project as a whole, one cannot discount the possibility that unique features of these courses contributed to the results.

Third, each round of data collection involved a new cohort of students (a student would not enroll in a particular course more than once). As a result, these groups may also have differed in important ways, although demographic indicators revealed no differences. Other important contextual factors, such as the accompanying organizational climate, the instructor teaching the course (which changed for some courses during the project), and particular student expectations and experiences could not be covaried out of the data analysis. We simply did not know enough about the students and had no means, given the scope and resources of the project, to assess this information.

Fourth, the UID project was a self-nominated grant project. Instructors initiated their involvement in the project and invested a significant amount of their own time and resources. The instructors were actively involved in improving their courses before commencement of the UID project and so were already teaching course of a higher than average quality to begin with. As a result, these courses had less room to improve, which may have caused ceiling effects. Thus, it is encouraging that, despite this possibility, improvements were seen across all three categories of student outcomes.

This evaluation represents one of the first large-scale assessments of UID principles and indicates that UID significantly improved student outcomes, including academic self-efficacy and affective state. Given this, UID represents an innovative and promising new method for course design and delivery. At the same time, this evaluation has also led us to recognize several potential recommendations that can be incorporated into future evaluations of UID.

The agreement between individuals assessing the implementation of UID principles through classroom observation was low. There are two possible explanations for these results. It is possible that the one observer was too invested in the project and was not able to assess the courses objectively. Therefore, in future projects, it would be beneficial to employ two independent observers who were not directly involved with the implementation stages of the project to assess UID implementation. The second possible explanation for the low levels of agreement between observers is methodological weaknesses in the scale. It may be necessary to more thoroughly review and revise the scale before it is employed in future evaluation projects.

Wherever possible, efforts should be made to follow the same cohort of students throughout the evaluation. This ensures that the sample will not differ on variables that may confound the results of the study. This option was not possible in the current project, given the manner in which UID was delivered. Of course, it is likely that future UID projects will be implemented in a similar fashion. In this case, efforts should be made to gather a matched sample of students enrolled in non-UID courses as a means of including adequate control groups. The resources and time constraints of the current project did not allow for this important addition. Having a matched non-UID sample would also address the potential ceiling effects that might occur when instructors self-nominate for funding.

The current project implemented UID principles in a wide variety of courses, with self-selected instructors. Future projects may consider implementing UID principles in an entire program or course of study. This broad implementation would have several advantages. First, a larger number of students could potentially benefit from the implementation of UID principles. Second, the cumulative effects of UID principles could be assessed. It would be interesting to examine the impact of an entire course of study on student outcomes. Furthermore, if these students were followed long-term, the potential impact of UID principles on career success could be assessed. Third, researchers would be able to assess the ease or difficulty of implementing the UID principles by instructors who were not self-selected for the project. Due to their dedication to the project, these instructors may have found the implementation of the principles relatively

easy. This may not be the case for instructors who would not be willing to self-select for such a project. For broad implementation of UID principles, it may be necessary for researchers to examine means to facilitate the implementation of the principles as well as ways to encourage instructors to adopt the principles. In other words, UID researchers should examine ways to increase faculty commitment to UID.

Since UID principles were geared towards creating an environment that respects and encourages equity and diversity, it would be valuable to assess the impact of UID on a wide variety of students. In the current project, very few students self-identified as having a disability, therefore the impact of UID on this particular group of students could not be assessed. To fully appreciate the impact of UID principles, future evaluation work should assess the impact of UID principles on students with both learning disabilities and physical disabilities. Furthermore, it may be possible to create a joint project between Teaching Support Services and the Center for Students with Disabilities to encourage the implementation of UID principles, as well as assess their impact on students with disabilities. In addition, UID practitioners and programs implementing UID principles should broadcast their efforts to potential students. This may encourage students with learning disabilities to enroll in university courses, as they will be aware that their concerns will be taken into consideration in course development.

It is also recommended that future evaluations investigate the impact of each of the seven principles specifically. Although there is a good deal of overlap and mutual dependence among the 7 principles, it is possible that some are more effective than others in improving student outcomes. Alternatively, it may be that additional principles need to be added in order for UID to be truly realized. Conceptually defining UID as a set of 7 principles in the current project does not preclude the possibility that future projects may redefine UID in a more parsimonious or theoretically sound manner. By addressing this issue, future projects can remove ineffective activities and add potentially missing activities in order to improve the effectiveness and efficiency of UID.

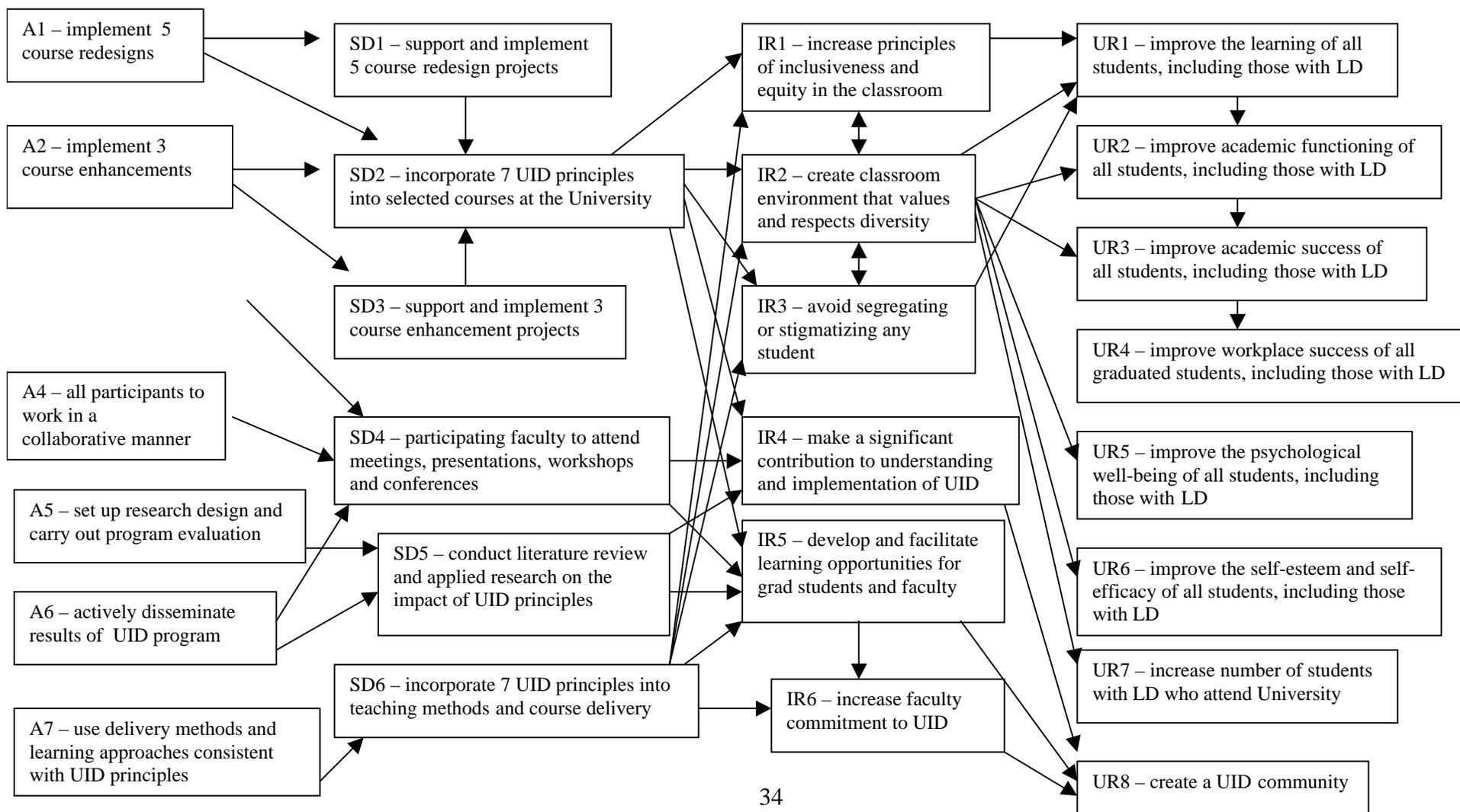
Finally, future evaluation should include an investigation of as many components of the program logic model as possible. Only a small subset of the hypothesized results were evaluated in the current project. However, the logic model contained several hypothesized results worthy of consideration. Of particular importance is the impact of UID on LD students, and academic and workplace success.

The results of the current project are promising, indicating that the implementation of UID principles has a positive impact on students. Therefore, UID practitioners should develop the UID community and encourage other educational institutions to adopt UID principles, as well as evaluate their efforts. There were a total of 68 organizations and educational institutions that requested information about the UID project. Ongoing efforts should be made through the University of Guelph and other institutions to disseminate information about UID and to encourage new projects as a means of assessing the potential impact of this powerful method of course delivery.

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Appendix A: Program Logic Model



Appendix B: Oral Presentation

Good Morning/Afternoon everyone.

My name is Linda Yuval and I am a graduate student at the Department of Psychology here at the University of Guelph. I have been hired as a research assistant for the Universal Instructional Design (UID) Project being implemented at the University of Guelph.

Several courses at the University have been selected for this two year project, which seeks to implement into these courses principles of UID. This course is one of 11 courses that have been approved for funding. All the courses that have been approved for funding are in various stages of development. This means one of three things: no changes have been implemented into your course; some changes have been implemented into your course; or all the changes have been implemented into your course.

In order to evaluate the effectiveness of the project, we are asking students enrolled in these courses to help us collect data by taking part in a survey. The survey will ask you various questions concerning your course impressions and experiences.

You can complete the survey through a paper-based format or on-line, whichever you prefer.

I will leave hard copies of the surveys up here at the front of the class for those of you who prefer this format. For those of you who prefer filling out the survey on-line, an information sheet with the web address will also be left at the front of the classroom for you to pick up.

If you are filling out a hard copy, please fold the survey in half and tape or staple it together when you are finished. The outside of the last page will have the name and address of the person to whom the survey should be returned. Just make sure this information is facing outward, and then place the survey in the inter-campus mailbox located in the University Centre.

I want to emphasize that participation in this survey is purely voluntary, and you are under no obligation to participate. Moreover, you may refuse to answer any questions, and to cease your participation at any time. We do however, strongly value your opinions, and your participation in this evaluation would be greatly appreciated.

Thank you for your time.

Appendix C: Student Consent Form

Dr. Karen Korabik (519) 824-4120 ext 3188
DECLARATION OF INFORMED CONSENT

I, _____ (please print name) give my informed consent to participate in the evaluation component of the University of Guelph's Universal Instructional Design Project, conducted by Dr. Karen Korabik and Linda Yuval (of the University of Guelph).

- (a) I understand that the general purpose of the research is to demonstrate the effectiveness of the Universal Instructional Design Project.
- (b) ALL data collected from my participation in the survey will be kept strictly confidential.
- (c) I understand that my academic records are required for research purposes. I authorize the researchers to access these files, with the understanding that they will be used for group (aggregate) purposes only and not in individual form.
- (d) I understand that if I choose, I may participate in a follow-up interview of approximately 30-45 minutes in length. The interview will occur approximately 2-4 weeks after completion of the survey and will ask me to expand on the answers I provide in this survey.
- (e) I understand that should I choose to participate in an interview, my name will not be released or disclosed to anyone other than those individuals directly involved in the study.
- (f) I understand that I may refuse to answer any question that I do not wish to answer.
- (g) I consent to the future use and publication of the research results with the understanding that the information will be reported in group form only. This means that no individual identification will be made.
- (h) I understand that the group data from this study may be subsequently used for other research purposes.
- (i) I understand that the group data from this study may be used for teaching purposes.
- (j) I understand that my participation is voluntary, and I am free to withdraw from the study at any time without penalty of any kind.
- (k) I agree that I have been given adequate information about the study and understand the procedures to be followed.

Are you be willing to participate in a follow-up interview based on this survey?
_____ YES _____ NO

If you would like to participate in a follow-up interview, please indicate your contact information.

Email _____

Phone number _____

If you have any questions or concerns about this study, feel free to contact Linda Yuval (519) 824-4120 x8754, lyuval@uoguelph.ca or Jaellayna Palmer (519) 824-4120 x3858, palmerj@uoguelph.ca

Name (please print clearly)

date

Signature

e-mail address

Note: Your e-mail address here is required for feedback purposes only. After your participation in the study is complete, you will receive an email outlining the anticipated results and implications of the research.

We will start by collecting some information on your personal characteristics.

Age: _____

Sex: _____

Semester of study: _____ **Full time** _____ **Part time** _____

Please check off the college that you belong to:

College of Physical and Engineering Science

College of Biological Science

College of Social and Applied Human Sciences

College of Arts

Ontario Veterinary College

Ontario Agricultural College

Other

Not applicable

Please indicate your course code and number: _____

One of the goals of this study is to design courses that assist students with physical and/or learning disabilities. Does this apply to you? _____YES _____NO

If you answered yes to the above question, could you indicate the nature of your disability?

Conditions or circumstances that are not specifically diagnosed as physical and/or learning disabilities can still interfere with your ability to attend class and concentrate while in class. Do you face any other medical illness, condition or circumstance that you believe interferes with your learning and academic success? _____YES _____NO

If you answered yes to the above question, could you indicate the nature of your illness or condition? _____

Are you currently enrolled in the Learning Opportunities Program at the University of Guelph? _____YES _____NO

Is English your first language? _____YES _____NO

Please continue with the rest of the survey.

Appendix D: UID Scale (April 2002)

UNIVERSAL INSTRUCTIONAL DESIGN PROJECT PRE-PROJECT SURVEY

Several courses at the University of Guelph have been selected for a two-year project called “Universal Instructional Design”. As this project begins we are asking students now enrolled in these courses to help us collect data through a three-part survey. Please use campus mail to return the survey to Jaellayna Palmer, Teaching Support Services, Day Hall. (There is a campus mail drop-box in the University Centre). All information will be used for aggregate purposes only. No individual student will be identified, and all results will remain confidential and anonymous. Thank you very much for taking part in this survey!

Please circle your response to the following questions:

| SD – Strongly Disagree | D – Disagree | N-Neither Agree Nor Disagree | A – Agree |
SA – Strongly Agree | NA – Not Applicable |

| | | |
|--|---------------------------------|--------|
| 1. The course materials are provided in alternative formats (for example, on disk, on a web site, etc.) | [SD] [D] [N] [A] [SA] | [NA] |
| 2. This professor provides useful on-line supports and resources, including external websites. | [SD] [D] [N] [A] [SA] | [NA] |
| 3. This learning environment (e.g., classroom, lab, etc.) accommodates me physically. | [SD] [D] [N] [A] [SA] | [NA] |
| 4. This class offers a safe, non-threatening learning environment. | [SD] [D] [N] [A] [SA] | [NA] |
| 5. New material is presented at a comfortable pace for me. | [SD] [D] [N] [A] [SA] | [NA] |
| 6. New material is presented in more than one way. | [SD] [D] [N] [A] [SA] | [NA] |
| 7. The course syllabus clearly describes the content and expectations of this course. | [SD] [D] [N] [A] [SA] | [NA] |
| 8. I feel free to pose questions or give opinions during this class. | [SD] [D] [N] [A] [SA] | [NA] |
| 9. This professor emphasizes the most important topics during the lecture so students know what to focus on in the textbook and other assigned readings. | [SD] [D] [N] [A] [SA] | [NA] |
| 10. Videos shown in class are captioned (i.e., the dialogue appears as text on the screen). | [SD] [D] [N] [A] [SA] | [NA] |
| 11. Essential reading material is also available in digital format or on-line. | [SD] [D] [N] [A] [SA] | [NA] |
| 12. The equipment used in this class (e.g., lab equipment, computers, etc.) is straightforward to use and handle. | [SD] [D] [N] [A] [SA] | [NA] |
| 13. This professor is approachable and accessible. | [SD] [D] [N] [A] [SA] | [NA] |
| 14. This professor encourages a classroom environment that shows tolerance for others. | [SD] [D] [N] [A] [SA] | [NA] |
| 15. This professor accurately describes what material will be covered on tests and exams. | [SD] [D] [N] [A] [SA] | [NA] |
| 16. Technical terms and other difficult words are written on the blackboard, presented on overheads, emphasized through written materials and/or the course website. | [SD] [D] [N] [A] [SA] | [NA] |

| | | |
|---|----------------------------|-------|
| 17. Difficult ideas and concepts are presented with enough elaboration and examples for me. | [SD] [D] [N] [A] [SA] | [NA] |
| 18. This professor verbalizes everything that is written on the blackboard or presented on an overhead. | [SD] [D] [N] [A] [SA] | [NA] |
| 19. Overheads are presented in fonts and colours that can be easily read. | [SD] [D] [N] [A] [SA] | [NA] |
| 20. This professor's expectations are consistent with the course syllabus. | [SD] [D] [N] [A] [SA] | [NA] |
| 21. This professor does not speak while facing the blackboard or looking down at an overhead. | [SD] [D] [N] [A] [SA] | [NA] |
| 22. This professor encourages and/or organizes study groups, discussion groups and listservs. | [SD] [D] [N] [A] [SA] | [NA] |
| 23. All students have access to all parts of the curriculum (i.e., textbooks, web sites, lab equipment, other materials and assigned readings, etc.). | [SD] [D] [N] [A] [SA] | [NA] |
| 24. This professor uses various means of evaluation (i.e., write an essay instead of a test, projects, portfolios, etc.). | [SD] [D] [N] [A] [SA] | [NA] |
| 25. This professor allows me to choose how I am evaluated (i.e., allows students to write an essay instead of a test, etc.) | [SD] [D] [N] [A] [SA] | [NA] |
| 26. This professor respects the diversity of students in the class. | [SD] [D] [N] [A] [SA] | [NA] |
| 27. Essential information is presented both verbally and visually. | [SD] [D] [N] [A] [SA] | [NA] |
| 28. This professor is open to other viewpoints. | [SD] [D] [N] [A] [SA] | [NA] |
| 29. I would recommend this course to other students. | [SD] [D] [N] [A] [SA] | [NA] |

Appendix E: Purdue Rating Scale for Instruction

For the following 8 questions, please circle the number you feel best represents your instructor in this course.

| | |
|--|---|
| <p>1. Interest in Subject</p> | <p align="center"> 1 2 3 4 5 6 7 8 9 10 </p> <p align="center"> Subject seems dull to him/her. Seems mildly interested. Always appears enthused about his/her subject. </p> |
| <p>2. Sympathetic Attitude toward Students</p> | <p align="center"> 1 2 3 4 5 6 7 8 9 10 </p> <p align="center"> Entirely unsympathetic and inconsiderate. Tries to be considerate but finds it difficult at times Always courteous and considerate. </p> |
| <p>3. Fairness in Grading</p> | <p align="center"> 1 2 3 4 5 6 7 8 9 10 </p> <p align="center"> Constantly shows partiality. </p> |

| | |
|-----------------------------------|--|
| | Shows occasional favouritism. Absolutely fair and impartial to all. |
| 4. Open-mindedness | <p>1 2 3 4 5 6 7 8 9 10</p> <p>Entirely intolerant, allows no contradiction. Biased on some things but usually tolerant Welcomes differences in viewpoint.</p> |
| 5. Presentation of Subject Matter | <p>1 2 3 4 5 6 7 8 9 10</p> <p>Indefinite, involved, and monotonous. Sometimes mechanical and monotonous Clear, definite and forceful.</p> |
| 6. Sense of Proportion and Humour | <p>1 2 3 4 5 6 7 8 9 10</p> |

| | |
|---------------------------------------|---|
| | <p>Over-serious; no sense of relative values. Fairly well balanced. Always keeps proper balance; not over-critical or over-sensitive.</p> |
| 7. Self-reliance and Confidence | <p>1 2 3 4 5 6 7 8 9 10</p> <p>Hesitant, timid, uncertain. Fairly self-confident; occasionally disconcerted. Always sure of him/herself; meets difficulties with poise.</p> |
| 8. Stimulating Intellectual Curiosity | <p>1 2 3 4 5 6 7 8 9 10</p> <p>Destroys interest in subject; makes work repulsive. Occasionally inspiring; creates mild interest Inspires students to independent effort; creates desire for investigation.</p> |

For the following questions, select the number that best represents your class in general
| 1 - Extremely Poor | 2 – Poor | 3 – Average | 4 – Above Average | 5 - Excellent |
NA – Not Applicable |

| | | |
|--|-------------------------------|--------|
| 9. Suitability of the method or methods by which subject matter of the course is presented (recitation, lecture, laboratory, etc.) | [1] [2] [3] [4] [5] | [NA] |
| 10. Suitability of the size of the class (consider the subject matter and type of class - lecture, lab., etc.) | [1] [2] [3] [4] [5] | [NA] |
| 11. The degree to which the objectives of the course were clarified and discussed | [1] [2] [3] [4] [5] | [NA] |

| | | |
|---|-------------------------------|--------|
| 12. The agreement between the announced objectives of the course and what was actually taught | [1] [2] [3] [4] [5] | [NA] |
| 13. Suitability of the reference materials available for the course | [1] [2] [3] [4] [5] | [NA] |
| 14. Suitability of the laboratory facilities available for the course | [1] [2] [3] [4] [5] | [NA] |
| 15. Suitability of the assigned textbook | [1] [2] [3] [4] [5] | [NA] |
| 17. The use made of tests as aids to learning | [1] [2] [3] [4] [5] | [NA] |
| 18. Amount of freedom allowed students in the selection of the materials to be studied (considering the subject matter) | [1] [2] [3] [4] [5] | [NA] |
| 19. How the course is fulfilling your needs (consider your ultimate as well as your immediate goals) | [1] [2] [3] [4] [5] | [NA] |
| 20. Diversity in the class | [1] [2] [3] [4] [5] | [NA] |
| 21. Suitability of the amount and type of assigned outside work | [1] [2] [3] [4] [5] | [NA] |
| 22. The weight given to tests in determining the final grade for the course | [1] [2] [3] [4] [5] | [NA] |
| 23. Coordination of the tests with the major objectives of the course | [1] [2] [3] [4] [5] | [NA] |
| 24. Frequency of tests | [1] [2] [3] [4] [5] | [NA] |

Appendix F: UID Scale

UNIVERSAL INSTRUCTIONAL DESIGN PROJECT SURVEY

IMPORTANT INSTRUCTIONS

1. This survey is double-sided. Please make sure to answer the questions on both sides of each page.
2. Please use the attached pre-coded OPTICAL SCORING SHEET to answer all questions. Please DO NOT write on the survey booklet.
3. Use only an HB PENCIL to fill in the optical scoring sheets.
4. DO NOT fill in your name or ID number on the optical scoring sheet.
5. Please use the optical scoring sheets to fill in your sex and birthdate.
6. Please use campus mail to return the survey to Jaellayna Palmer, Teaching Support Services, Day Hall. (There is a campus mail drop-box in the University Centre).

All information will be used for aggregate purposes only. No individual student will be identified, and all results will remain confidential and anonymous

Please circle your responses on the optical scoring sheet using the following scale:

| | | | | | | | |
|----------------------------|----------|----------|-----------------------------------|----------|----------|-------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| Completely Disagree | | | Neither Agree Nor Disagree | | | Completely Agree | Not Applicable |

1. The course materials are provided in many alternative formats (for example, on disk, on a web site, etc.)

2. This professor provides useful on-line supports and resources, including external websites.

3. This learning environment (e.g., classroom, lab, etc.) accommodates me physically.

4. This class offers a safe, non-threatening learning environment.

5. New material is always presented at a comfortable pace for me.

6. All new material is presented in more than one way.

7. The course syllabus clearly describes the content and expectations of this course.

8. I feel free to pose questions or give opinions during this class.

9. This professor emphasizes the most important topics during the lecture so students know what to focus on in the textbook and other assigned readings.

10. All videos shown in class are captioned (i.e., the dialogue appears as text on the screen).

11. Essential reading material is also available in digital format or on-line.

12. The equipment used in this class (e.g., lab equipment, computers, etc.) is very straightforward to use and handle.

13. This professor is highly approachable and accessible.

14. This professor encourages a classroom environment that shows tolerance for others.

-
15. This professor accurately describes what material will be covered on tests and exams.
-
16. Technical terms and other difficult words are presented in more than one way (i.e., blackboard, presented on overheads, emphasized through written materials and/or the course website).
-
17. Difficult ideas and concepts are presented with enough elaboration and examples for me.
-
18. This professor verbalizes everything that is written on the blackboard or presented on an overhead.
-
19. Overheads are presented in fonts and colours that can be easily read.
-
20. This professor's expectations are always consistent with the course syllabus.
-
21. This professor often speaks while facing the blackboard or looking down at an overhead.
-
22. This professor encourages and/or organizes study groups, discussion groups and/or electronic conferencing.
-
23. All students have access to all parts of the curriculum (i.e., textbooks, web sites, lab equipment, other materials, assigned readings, etc.).
-
24. This professor uses various means of evaluation (i.e., write an essay instead of a test, projects, portfolios, etc.).
-
25. This professor respects the diversity of students in the class.
-
26. Feedback on tests and exams in this course provide an opportunity for further learning.
-
27. Essential information is presented both verbally and visually.
-
28. This professor is open to viewpoints other than his/her own.
-
29. The course materials reflect a diversity of viewpoints and opinions toward the course topic.
-
30. Tests and exams given in this course are consistent with what is emphasized in class.
-

Thank you for taking the time to fill out this survey. If you have agreed to participate in an interview, you will be contacted within 2-4 weeks to set up an appointment time.

Appendix G: Academic Self-Efficacy Questionnaire

Remember the course in which this questionnaire is being administered is the one you should think of when answering the following questions.

The questions in this section of the survey ask about your perceptions of your ability to perform various academic tasks, such as reading, note taking and memorization. For each of the tasks you are asked to rate how confident you are about your ability to perform at that particular level, using the following scale:

| | | | | | | | | | | |
|------------------------|---|---|---|---|-------------------------|---|---|---|---|----------------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Totally Unconfident | | | | | Moderately Confident | | | | | Totally Confident |

Please provide a rating of between 1 and 10 for each level of difficulty, using the optic scoring sheet.

CLASS CONCENTRATION

The proportion of class periods for which you feel you are able to concentrate and stay fully focused on the materials being presented.

31. Concentrate for at least 50% of a class period.
32. Concentrate for at least 70% of a class period.
33. Concentrate for at least 90% of a class period.
34. Concentrate for at least 100% of a class period.

MEMORIZATION

The proportion of facts and concepts covered in the course that you feel you are able to memorize and recall on demand (e.g. exam time, in response to questions).

35. Memorize 60% of the facts and concepts.
36. Memorize 70% of the facts and concepts.
37. Memorize 80% of the facts and concepts.
38. Memorize 90% of the facts and concepts.
39. Memorize 100% of the facts and concepts.

EXAM CONCENTRATION

The proportion of time during exams for which you feel you are able to focus exclusively on understanding and answering questions and avoid breaks in your concentration.

40. Stay focused on the exam for 50% of the time.
41. Stay focused on the exam for 70% of the time.
42. Stay focused on the exam for 90% of the time.
43. Stay focused on the exam for 100% of the time.

UNDERSTANDING

The proportion of facts, concepts and arguments covered in the course that you feel you understand as they are presented in lectures, tutorials or course materials (e.g. textbooks, assigned articles).

44. Understand 50% of concepts as presented.
45. Understand 70% of concepts as presented.
46. Understand 90% of concepts as presented.
47. Understand 100% of concepts as presented.

EXPLAINING CONCEPTS

The proportion of facts, concepts and arguments covered in the course (e.g., in lectures, tutorials or course materials) that you feel you are able to fully explain clearly to others in your own words.

48. Explain 40% of the concepts etc. in my own words.
49. Explain 60% of the concepts etc. in my own words.
50. Explain 80% of the concepts etc. in my own words.
51. Explain 100% of the concepts etc. in my own words.

DISCRIMINATING BETWEEN CONCEPTS

The degree to which you feel you are able to discriminate between the more important and less important facts, concepts and arguments covered in the course (i.e., in lectures, tutorials and course materials).

52. Able to identify the most important concepts, points, etc. 50% of the time.
53. Able to identify the most important concepts, points, etc. 70% of the time.
54. Able to identify the most important concepts, points, etc. 90% of the time.
55. Able to identify the most important concepts, points, etc. 100% of the time.

NOTE-TAKING

The proportion of the time that you feel you are able to make understandable course notes which emphasize, clarify and relate key facts, concepts and arguments as they are presented in lectures, tutorials or course materials.

56. Make understandable notes for 50% of the material.
57. Make understandable notes for 70% of the material.
58. Make understandable notes for 90% of the material.
59. Make understandable notes for 100% of the material.

GRADES

The degree to which you feel you have the necessary skills to get various grades in this course, assuming that you try.

60. Get an A in this course.
61. Get at least a high B in this course.
62. Get at least a low B in this course.
63. Get at least a C in this course.

Appendix H: Positive and Negative Affect Schedule

Please continue using the computer optic scoring sheet to answer the following questions.

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer **using the optic scoring sheet**. Indicate to what extent **you feel this way when you are in this class**. Use the following scale to rate your answers.

| 1 | 2 | 3 | 4 | 5 |
|--------------------------------|----------|------------|-------------|-----------|
| very slightly or not at all | a little | moderately | quite a bit | extremely |

- 64. interested
- 65. distressed
- 66. alert
- 67. irritable
- 68. excited
- 69. ashamed
- 70. upset
- 71. inspired
- 72. strong
- 73. nervous
- 74. guilty
- 75. determined
- 76. scared
- 77. attentive
- 78. hostile
- 79. jittery
- 80. enthusiastic
- 81. active
- 82. proud
- 83. afraid

Thank you for your participation in this survey. Please fold the package in half, tape or staple it together, and drop it in the intercampus mailbox located in the University Centre.

Appendix I: French tutorial questionnaire

Proposed client satisfaction survey questions

Using the scale below, please indicate your agreement to the following questions.

| | | | | | | |
|------------------------|---|---|-------------------------------|---|---|---------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Completely Disagree | | | Neither Agree nor Disagree | | | Completely Agree |

1. The demonstration “quest” helped me use the website.
2. The website is easy to use and navigate.
3. The website is presented in colours and fonts that are easy to see.
4. The content of the website (e.g. quests) is presented in a straightforward and explicit manner.
5. The format of the questions (e.g., multiple choice, true/false, fill in the blanks, etc.) is clear and appropriate for the type of question being asked.
6. Within this website I was able to find material relevant to the course I am taking.
7. The website makes learning more fun.
8. The website helped me improve my readiness for the material presented in my course.
9. I believe my academic achievement will improve as a result of using this website.
10. Overall, I am satisfied with this website.
11. Please indicate how often you plan on using the website.

- Once a day
- 2-4 times a week
- Once a week
- Twice a month
- Once a month
- Less than once a month

12. Please feel to make any other comments or suggestions.

Appendix J: Student Interview Consent Form

Dr. Karen Korabik (519) 824-4120 ext 3188

DECLARATION OF INFORMED CONSENT

I, _____ (please print name) give my informed consent to participate in the evaluation component of the University of Guelph’s Universal Instructional Design Project, conducted by Dr. Karen Korabik and Linda Yuval (of the University of Guelph).

- (a) I have received the letter of information in which I was informed that the general purpose of the research is to demonstrate the effectiveness of the Universal Instructional Design Project.
- (b) ALL data collected from my participation in the interview will be kept strictly confidential.
- (c) I understand that my name will not be released or disclosed to anyone other than those individuals directly involved in the study.
- (d) I understand that statements I provide during the interview process may be used verbatim for quotation purposes.
- (e) I understand that I may refuse to answer any question that I do not wish to answer.
- (f) I consent to the future use and publication of the research results with the understanding that the information will be reported in group form only. This means that no individual identification will be made.
- (g) I understand that the data I provide may be subsequently used for other research purposes.
- (h) I understand that the data I provide may be used for teaching purposes.
- (i) I understand that my participation is voluntary, and I am free to withdraw from the study at any time without penalty of any kind.
- (j) I understand that the interview will be audio recorded, and that I will be identified on this audio recording by number only. Audio recordings will be kept in storage for a period of 1 year.
- (k) I agree that I have been given adequate information about the study and understand the procedures to be followed.

If you have any questions or concerns about this study, feel free to contact Linda Yuval (519) 824-4120 x8754, lyuval@uoguelph.ca or Jaellayna Palmer (519) 824-4120 x3858, palmerj@uoguelph.ca

Name (please print clearly)

date

Signature

Appendix K: Student Interview Questions

Did you have difficulties accessing course materials or participating in any essential activities related to this class?

.....

Were there major areas of confusion or inconsistency among course objectives, your own expectations and/or how the course was presented?

.....

Did you find that the course offered you enough choices in how it was presented so that you could, to a certain extent, approach the course in a way that suited your needs and abilities?

.....

Were there obstacles to your receiving or understanding the information and resources you needed in this course?

.....

Did you feel respected as a person, welcome to express your thoughts and able to explore new ideas in this course?

.....

While participating in this course, were there physical challenges or obstacles that you feel could have been avoided?

.....

Did you find any of the materials or activities in this course to be inappropriate or unsuitable?

Appendix L: Faculty Interview Questions (August 2002)

1. How long have you been an instructor?
2. Think back to when you first entered this profession. Was the primary appeal teaching or research?
3. How do you NOW view/balance your work between teaching and research? Which do you prefer and why?
4. If you were to consider your career as a journey, where along the path would you say you are currently?
5. What have been some of the major influences on your personal career development?
6. Had you heard about UID principles before your involvement in the UID project?
7. What was your primary reason for applying for (or accepting) UID funding?
8. What are your expectations for this project?
9. At this point in time do you think that working with UID is likely to have a lasting impact on your work? If so, how? If not, why not?
10. Do you think you will collaborate and share information on UID with other faculty members and colleagues? If so, how? If not, why not?
11. Describe the kinds of UID strategies and activities, if any, that were in your course prior to receiving UID funding.
12. What was the teaching climate at Guelph like before the UID project?
13. Please check off any of the following in which you would like to participate:

- seminars and workshops
- conferences and other professional meetings
- UID listserv
- website
- newsletters
- other (please specify)

Appendix M: Faculty Interview Questions (March 2003)

14. Now that you have had a few months experience with the UID Project, have there been any changes in how you think about your role as an instructor or researcher?

15. Are you finding that your involvement with the UID project is helping you become more knowledgeable about UID principles? If so, in what ways?

16. If you teach more than one course, has the UID project to date influenced any changes in your other courses? If so, please explain these changes.

17. So far, would you say that your reasons for applying for (or accepting) UID funding are being fulfilled? If so, in what ways? If not, why not?

18. What are your expectations for the remainder of this project?

19. At this point in time do you think that working with UID is likely to have a lasting impact on your teaching and related work? If so, how? If not, why not?

20. Have you been sharing -- or do you intend to share -- information on UID with other faculty members and colleagues? If so, how? If not, why not?

21. Do you think that the UID project has the potential to change the teaching climate at Guelph? If so, in what ways?

22. Please indicate the extent to which you implemented the following activities into your course **BEFORE** the UID project and **SINCE** your involvement in the UID Project, using the following scale:

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

a) Course materials (e.g., lecture notes) are provided in several alternative formats (for example, on disk, on a web site, etc.).

BEFORE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

SINCE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

b) Useful on-line supports and resources are made available to students, including external websites.

BEFORE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

SINCE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

c) The course syllabus clearly describes the content and expectations of this course.

BEFORE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

SINCE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

d) Essential reading material is also available in digital format or on-line.

BEFORE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

SINCE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

e) Technical terms and other difficult words or concepts are presented to students in more than one way (i.e., on the blackboard, presented on overheads, emphasized through written materials and/or the course website).

BEFORE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

SINCE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

f) Essential information given during lectures is presented both verbally and visually.

BEFORE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

SINCE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

g) All students have equal access to all parts of the curriculum (i.e., textbooks, web sites, lab equipment, other materials, assigned readings, etc.).

BEFORE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

SINCE THE UID PROJECT

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

h) Graphs and/or diagrams are used during lectures.

| BEFORE THE UID PROJECT | | | | | |
|------------------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

| SINCE THE UID PROJECT | | | | | |
|-----------------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

i) Question-asking and opinions occur regularly during class.

| BEFORE THE UID PROJECT | | | | | |
|------------------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

| SINCE THE UID PROJECT | | | | | |
|-----------------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

j) On average, how many hours per week do you spend meeting with the students in this class (outside of regular class time, during office hours, via email, etc.)

0-2 hours 2-4 hours 4-6 hours More than 6 hours

k) On average, how long does it take for you to respond to student emails?

less than 1 day 1 to 2 days 2 to 3 days more than 3 days

Appendix N: Classroom Observation Checklist

Verbal Domain

- a) Speaks at a reasonable pace
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- b) Speaks clearly
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- c) Asks questions, pausing long enough for students to respond
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- d) Verbalizes everything that is presented visually
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- e) Stresses most important points by pausing, speaking slowly, raising voice, etc.
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- f) Explains subject matter in familiar, colloquial language
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- g) Speaks in a dramatic or expressive way
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- h) Tells jokes or humorous anecdotes
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- i) To consider: How would a student with a **learning disability** react to the lecture?

Auditory Domain

- a) Sound level of AV materials suitable to room
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- b) Speaks at sound level suitable to the room
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- c) Does not speak while facing blackboard or looking down at overhead
- | | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |
- d) Ensures that all students can hear each other's questions and comments (repeating them if necessary)

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

e) To consider: How would a student with a **hearing disability** react to the lecture?

Visual Domain

a) AV materials readily seen

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

b) Videos are captioned

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

c) Overheads presented in colours and fonts that can be easily read

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

d) Technical terms and other difficult words/concepts are presented visually

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

e) Uses gestures to show emphasis

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

f) Smiles and/or looks relaxed

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

g) Uses graphs or diagrams to facilitate explanation

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

h) Puts outline of lecture on blackboard or overhead screen

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

i) To consider: How would a student with a **visual disability** react to the lecture?

Cognitive Domain

a) Uses advance organizers

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

j) Uses questions to encourage learning

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

b) Encourages question-asking and opinions during class

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

c) Implements group activities

| | 1 | 2 | 3 | 4 | 5 | 0 |
|--|------------|----------|------------|------|-----------|-----|
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| d) Uses concrete everyday examples to explain concepts and principles | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| e) Defines new or unfamiliar terms | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| f) Uses visual aids (blackboard or overheads) to explain new or unfamiliar terms | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| g) Repeats difficult ideas several times | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| h) Answers students' questions thoroughly | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| i) Incorporates students' ideas into lecture | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| j) Indicates out-of-class resources relevant to lecture or activities (WebCT, websites, books, etc.) | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| k) Clearly indicates transition from one topic to the next | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| l) Reviews topics covered in previous lecture at beginning of each class | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| m) Summarizes topics covered in current lecture at the end of each class | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| n) Asks if students understand before proceeding to next topic | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |
| o) Shows respect for all students | 1 | 2 | 3 | 4 | 5 | 0 |
| | Not at all | Somewhat | Moderately | Much | Very much | N/A |

p) The selection processes used to organize students into various activities (i.e., group work, presentations, etc.) are done in a fair and consistent manner.

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

q) Pays attention to students in all locations, not just those who take an active role in the lecture and/or activities.

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

r) Asks for input from a variety of students, seeking a diversity of ideas and opinions.

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

s) To consider: How would a student with an **attention disorder** react to the lecture?

Physical Domain

a) Basic comforts present in the room

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

b) Enough chairs and desks for all the students in the class

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

c) Lab and computer equipment is easy to handle

| | | | | | |
|------------|----------|------------|------|-----------|-----|
| 1 | 2 | 3 | 4 | 5 | 0 |
| Not at all | Somewhat | Moderately | Much | Very much | N/A |

d) To consider: How would a student with a **physical disability** react to the lecture?